

## **Biases in perceiving one's own social position and social ties as evolved psychological mechanisms**

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### **Abstract**

Negotiating dominance hierarchies and developing cooperative relationships are major adaptive problems in many lines of animal evolution, and especially primates. Therefore, people should have evolved psychological mechanisms that address particular challenges involved with the complex social interactions in human society. Evolutionary psychologists have previously identified the potential adaptive value of self-enhancement biases in perceiving one's own behaviors, cognitions, and characteristics. In this paper, I extend the evolutionary analysis of biases in social cognition to the perception of social structure and one's position in it. In a review of research conducted in natural social settings, I find evidence of three such biases: over-estimation of own dominance rank, over-reporting own social interaction with higher status others, and over-estimation of own centrality in social networks. For each bias, several studies suggest a moderate strength illusion. I offer evolutionary accounts of the adaptive functions of these biases. Most interpretations concern the potential that these illusions stimulate individuals to behave in ways that lead to higher status and cultivation of beneficial social ties. More extensive cross-cultural research is needed to assess the universality of these biases and hypotheses they imply.

### **Introduction**

Negotiating dominance hierarchies and developing cooperative relationships are major adaptive problems in many lines of animal evolution, and especially primates (Buss, 1999). As a consequence, people should have a host of evolved psychological mechanisms that address particular challenges involved

with the complex social interactions in human society. One set of these mechanisms might be expected to focus on perceiving individuals' characteristics and social structure.

Systematic biases in cognition often indicate the presence of such mechanisms (Krebs and Denton, 1997). Krebs and Denton (1997) reviewed a broad range of biases in social perception that focused on the individual characteristics (e.g., motivations, attitudes, and dispositions) of oneself and others, and discussed their adaptive functions. One of their main conclusions from reviewing the literature is that, in many circumstances and for many characteristics, people tend to perceive themselves more favorably than they do others. Krebs and Denton (1997) argued that such biases in social perception can increase fitness by creating self-fulfilling prophecies in which an individual's inflated view of himself stimulates adaptive behavior that approaches the perception. Usually people are not aware of their biased self-perceptions. Such "self-deception renders the deception being practiced unconscious to the practitioner, thereby hiding from other individuals the subtle signs of self-knowledge that may give away the deception being practiced" (Trivers, 1985, p. 395). Thus, illusions about oneself can also help convince others that one's biased self-perceptions are accurate (Krebs and Denton, 1997).

In addition to the biases Krebs and Denton (1997) reviewed, there is also substantial evidence that North Americans evaluate themselves more favorably on multiple dimensions of personality than do their peers in naturally interacting groups, such as members of a sorority or school class (Cogan et al., 1915; Iannucci, 1991; Malloy and Albright, 1990; Webster et al., 2000).

In addition, Harris and Schaubroeck's (1988) meta-analysis showed that self-assessments of work performance tend to be more positive than supervisor and peer assessments. Similar self-enhancement biases have been observed in China (Falbo et al., 1997) and replicated for some dimensions in Taiwan (Farh et al., 1991) and Hong Kong (Yik et al., 1998). Furthermore, self-esteem and self-enhancement bias are positively correlated in personality assessments (Brown, 1986; Yik et al., 1998) and job performance ratings (Baird, 1977), which is consistent with the adaptive function of such biases (Krebs and Denton, 1997). Self-enhancement bias may also be specific to assessing particular individual characteristics. For instance, in one study, undergraduates tended to estimate their knowledge of specific semantic domains (e.g., birds or diseases) as slightly less than the typical undergraduate's knowledge in that domain (Brewer, 1995).

In this paper, I extend the evolutionary analysis of cognitive biases to the perception of social structure and one's position in it. Although people have relatively accurate perceptions of overall affiliation patterns (Delfosse and Smith, 1979; Freeman et al., 1988, 1989; Marshall, 1957; Marshall and McCandless, 1957; Smith and Delfosse, 1980; Webster, 1994, 1995) and dominance orders (Sluckin and Smith, 1977; Strayer et al., 1980), they display biases in perceiving their own positions and relational ties in such structures. I review the evidence for three of these biases based on studies conducted in natural social settings. Multiple studies indicate the existence of each bias. I also offer an evolutionary account for the adaptive functions of these biases and propose hypotheses for further evaluation of these biases as evolved psychological mechanisms.

### **Bias in perceiving own dominance rank**

Several studies have examined individuals' bias in perceiving their own rank in a dominance order. In these studies, researchers defined bias as assessing oneself as more dominant than others perceive one to be.

#### Perceptions of social class position

Warner et al. (1960) described a method for collecting perceptions on the class positions of families that they and their colleagues used in studies of towns and cities in the United States in the 1930s and 1940s. Their procedure involves asking respondents to identify the social classes in their community and then indicate the classes to which families they knew, including their own, belonged. Warner et al. (1960) noted informally that most of their respondents placed themselves in higher class positions than others perceived them to occupy.

Loomis and Powell (1949) studied perceptions of class positions in two Costa Rican agricultural villages. They interviewed ten members of each community. Each respondent was given a set of cards, with each card bearing the name of a different head of a family and his wife in the village. Respondents then sorted the families into groups according to their social classes. In one community, 8 respondents assigned themselves to the same class that the majority of the other respondents did, while 2 respondents placed themselves in higher classes than the other respondents perceived them to occupy. In the other community, 9 respondents rated their own class position just as the majority of other respondents had rated them, but one respondent perceived himself to be of higher class standing than most of the respondents judged him to be.

#### Children's judgments of dominance position

Omark et al. (1975) described children's bias in estimating their own dominance ranks. They interviewed schoolchildren in kindergarten through third grade in a private middle-class school in the United States ( $n = 450$ ) and a public suburban school outside of Zurich, Switzerland ( $n = 250$ ). The researchers asked the kindergartners to indicate which of their classmates (from pictures) were "tougher" than themselves. The children in grades 1-3 reported their perceptions by ranking each of their classmates in terms of toughness. For both the U.S. and Swiss samples, Omark et al. (1975) found that the level of agreement within dyads of children (i.e., child A reports he is tougher than child B, and child B also reports child A is tougher) increases from approximately 40% in kindergarten to approximately 60-75% in grade 3. In those dyads marked by disagreement, the vast majority (65-100% across samples and same-sex/cross-sex categories of dyads) involved each child reporting she or he was tougher than the other. This overestimation bias was highest in boy-boy dyads in both samples, and the bias remained high across the grades for boys. For girls, however, the bias was more variable across samples and age groups. From this sex difference in overestimation bias and their systematic observations of the children, Omark et al. (1975, p. 312) concluded that "boys were more involved in aggressive encounters and an apparently necessary corollary of this was that the boys overrated their own status position."

#### Interpretation

I interpret the slight to moderate overestimation of social rank in these studies as indicating an evolved psychological mechanism to facilitate status striving. Overestimating one's own dominance position may lead one to behave in ways that are likely to increase status.

At the same time, these same behaviors may also tend to make others believe one is higher status than one really is, which further enhances the likelihood of climbing up in the hierarchy.

#### Status mobility and bias

If overestimating one's dominance rank provides an impetus to engage in behaviors that are likely to increase status, such a bias should occur only in those settings where mobility within the hierarchy is possible. Davis et al. (1941, p. 72) noted the link between mobility and such biases:

... individuals ... tend to minimize the social differentiations between themselves and those above. This difference in perspective is partly explained by the fact that class lines in the society are not permanent and rigid and that upward mobility is fairly frequent. It is, further, due to the natural tendency in such a status system to identify with "superiors."

When mobility is restricted, however, people should display no bias or underestimate their dominance rank. Hartung's (1988, p. 170) insights underlie this hypothesis:

The hypothesis here is that people use self-deception to lower their self-esteem when it is to their advantage to be satisfied with a position which they would otherwise perceive as unfair. Consider a man whose job is lower ranking than he knows he deserves. If he has no hope of advancement he may eventually, through self-deception, convince himself that he is commensurate with his job's status. Instead of seeing himself as too good for his job, this form of self-deception will enable him to reconcile the disparity between his self-image and his reality. That will allow him to see his bureaucratic superiors as actual superiors and enhance his ability to behave subordinately toward them. In turn, everyone will become more comfortable with his presence, and he will increase his likelihood of remaining employed. Accordingly, downward adjustment of self-esteem can facilitate psychological, social, and economic security that would otherwise be in jeopardy.

Baumeister (1989, p. 186) also described similar ideas.

Price (1993) collected a valuable dataset that is well-suited for testing the hypothesis that overestimation of status should occur only in settings with reasonable potential for status mobility. Price studied gravity-fed irrigation networks in the Fayoum Oasis in Egypt. A network includes all those farmers who draw their irrigation water from a particular secondary feeder

canal, which is itself an offshoot from a main canal maintained by the Egyptian government.

Each secondary feeder canal is operated by farmers who draw their water from it. In some networks, farmers use portable internal combustion pumps to lift water from the secondary canal to their fields. The pumps allow farmers to irrigate almost without restriction provided they have access to a pump. In other networks, farmers use other methods for delivering water from the canal to their fields (direct gravity flow from secondary canal to fields, undershot waterwheels, and animal-driven waterwheels). Farmers in these networks jointly allocate to each other time shares for watering. Because the secondary feeder canals are not lined with an impermeable surface, water is lost as it flows from the top to the bottom of the canal. In non-pump reliant networks, Fayoumi irrigators have institutionalized a practice of giving downstream farmers extra time allotments for watering to compensate them for this water loss. In addition, the secondary canals must be maintained regularly by clearing the sediments and vegetation that accumulate (at downstream canal locations before upstream locations). In the Fayoum, canal maintenance is a collective activity involving all farmers in the network working together along the whole length of the secondary canal. These efforts require all farmers to postpone work in their fields while the maintenance activities are performed.

Price conducted oral interviews in Arabic with each farmer in 10 different irrigation networks. He asked them to rate on a 5-point scale the ability of each of the individual irrigators within their network (including themselves) to get other irrigators to engage in canal maintenance work. The labels for the 5-point scale are "no power," "a little power," "some power," "moderate power," and "much power." The list of names of farmers was randomized for each network.

Price and Brewer (1996) analyzed these data to investigate the relationship between farmers' power to induce others to engage in canal maintenance and their positions in the irrigation networks. Across the 10 networks, the aggregated ratings of individual farmers' power are inversely related to their rank position in the network (i.e., serial position in the network from the top to the bottom of the canal). That is, farmers at the top of a secondary feeder canal were perceived to have more power than farmers at the bottom. However, the relationship is strong (mean  $r = -.73$ ) in the 7 networks in which farmers used non-pump methods for delivering water to their fields, but weak (mean  $r = -.29$ ) in those networks in which farmers relied on pumps. Price and

Brewer (1996, p. 14) concluded that "pumps seem to dislodge irrigation rank position as the basis for the distribution of power by counteracting the negative effects of conveyance loss [water lost flowing down the canal] and canal maintenance neglect on downstream farmers."

The non-pump networks thus represent a setting in which status mobility is almost completely restricted, as farmers' power appears to be determined by their geographic positions. In such circumstances, individuals have few alternatives for changing their statuses. According to my hypothesis, then, there should be no bias in farmers' perceptions of their own power in non-pump networks. On the other hand, the pump-reliant networks represent a setting in which individual and social factors, not geography, presumably influence the distribution of power. This situation is precisely one in which individuals should be expected to overestimate their status.

To test these hypotheses, I first standardized each farmer's ratings to a mean of 0 and standard deviation of 1 to eliminate individual differences in use of the rating scale as a possible confound. I then compared each farmer's rating of himself to the mean rating he received from all farmers in the network. Tables 1a and 1b present the results. The proportion overestimating is the proportion of farmers who rated their own power higher than farmers' average ratings for them. The mean difference measure indicates the signed difference between self and aggregate ratings, which in this case can be interpreted in standard units. The  $t$  value is the test statistic from a matched pair  $t$ -test, and the Pearson correlation coefficient indicates the magnitude of the

difference (see Rosenthal, 1991). Positive values on the  $t$  statistic and mean difference and correlation measures indicate overestimation of power. The mean correlations (Rosenthal, 1991), weighted by number of farmers in a network, summarize these relationships across networks of a given type.

The results are consistent with the hypotheses. In the non-pump networks, farmers actually underestimated their power mildly. In the pump-reliant networks, farmers overestimated their power modestly. The point biserial correlation between irrigation network type (non-pump vs. pump) and the bias correlation coefficient is .73 ( $n = 10$ ,  $p < .05$ ), indicating a strong difference in the direction and extent of bias between the two types of networks.

#### Hypotheses for future research

Barkow (1975) asserted that "to evaluate the self as higher than others is to maintain self-esteem." This notion, along with the research showing an association between self-esteem and self-enhancement bias in assessing personality traits mentioned earlier, suggests that self-esteem should be positively correlated with overestimation of own status in settings that allow some status mobility. Also, by extrapolating from Omark et al.'s (1975) findings with children, I would expect that men tend to show a slightly greater overestimation bias than women in perceiving their own dominance positions. Although women are likely to be just as aware of dominance orders as men, throughout human evolution women have generally not been direct participants in dominance contests. Rather, women have changed status primarily through the status of their mates and male kin. Furthermore, to demonstrate that

Table 1. Biases in estimating own power to instigate others to engage in canal maintenance, Fayoum Oasis, Egypt (data from Price, 1993)

#### a) Non-pump irrigation networks

Irrigation network	$N$ of farmers	% overestimating	mean difference	matched pair $t$	Pearson $r$
Keman Faris 1	19	47	-0.04	-0.25	-.06
Keman Faris 2	17	53	-0.10	-0.51	-.13
Naqalifa 1	17	50	-0.33	-1.50	-.35
Naqalifa 2	26	58	0.15	1.03	.20
Sanhour 1	13	38	-0.53	-1.96	-.49
Sanhour 2	13	46	-0.30	-1.22	-.33
Shakshouk	13	08	-0.91	-4.05	-.76

weighted mean  $r = -.22$ , cumulative  $Z = -2.66$

## b) Pump irrigation networks

Irrigation network	N of farmers	% overestimating	mean difference	matched pair t	Pearson r
Qasr Al-Basl 1	20	75	0.42	2.02	.42
Qasr Al-Basl 2	14	50	0.19	0.77	.21
Qasr Al-Basl 3	14	71	0.23	1.11	.29

weighted mean  $r = .33$ , cumulative  $Z = 2.07$

overestimating own dominance rank is adaptive, in current environments at least, it would be necessary to examine what observable behaviors correlate with this bias (provided sufficient variation exists in individuals' degree of bias). Along these lines, I would expect that those who overestimate their rank are more likely to climb in the hierarchy over time than those who do not overestimate their rank.

#### Upward status bias in ego's reported interaction

Interaction is by definition a symmetric relation: if person A is interacting with person B, then person B is also interacting with person A. Reported interaction is biased to the extent that the reports by each of a pair of individuals or categories of individuals depart from such symmetry or disagree.

#### Reported interaction

Blau (1954, 1955) documented an upward status bias in reported interaction in his classic study of 16 agents in a department of a federal law enforcement agency in the United States. The agents' primary responsibility was to investigate businesses to determine whether they had violated the laws the agency administered. Blau measured agents' status levels with supervisor ratings and peer rankings of individual agents' competence and performance. He validated his measure of status by showing that high status agents dominated discussions in departmental meetings and other formal and informal interactions among agents that he observed. To measure reported informal social interaction, Blau asked the agents to identify those agents from a list with whom they had ever eaten lunch. He found that high status agents were much less likely to reciprocate reports of eating lunch together than low status agents. Blau (1954, p. 343) noted that "the attractiveness of the esteemed expert [high status agent], which found expression in his colleagues' remembering occasional contacts with him that he had forgotten, or perhaps reporting associations that had never occurred,

induced the other to [report] disproportionately many contacts with him."

Moreover, based on his observations of social interaction in the department office, Blau discovered that high status agents received many more interactions (i.e., interactions initiated by others) than low status agents. Also, low status agents were much more likely to initiate social interactions with other agents. Taken together, these results are consistent with Riecken and Homan's (1954, p. 795) hypothesis that "... the higher a member's rank the more interactions he will receive from other members. Interaction tends to flow from low-rank people to high-rank people." Blau (1954, pp. 339-340) noted that agents approached their high status peers "... not only to ask their advice, but also to seek their companionship, since associating with a respected person tends to be especially desirable ... [low status] agents tended to exercise more initiative than the [high status agents] partly because they were more likely to request advice, but also partly because they were more concerned with improving their position in the group."

Barnlund and Harland (1963) examined the influence of status in reported interaction among members of all 18 sororities at a midwestern U.S. university ( $n = 254$ ). The researchers asked all sorority women at the university to indicate the female undergraduate she had most recently communicated with for more than 5 minutes and who was not a member of her own sorority. Sorority women then also reported where these communication partners lived. Barnlund and Harland (1963) measured the status of all sorority women by assigning them the status of their sororities (obtained from the results of other studies). Sorority members tended to report having interacted with women who resided in sororities that were of higher status than their own. However, these results do not automatically imply an upward status bias in reported interaction. Barnlund and Harland's (1963) findings might be expected if women in high status

sororities had higher frequencies of interaction with women who did not belong to their own sororities (particularly women in other high status sororities) than women in low status sororities. Nonetheless, the possibility of bias in their reports remains strong.

Webster (1995) conducted a comprehensive study of bias in reported interaction among personnel of a regional accounting firm in the United States. There were four levels of formal status in the firm (in descending order): partner, manager, associate, and support staff. She observed informal social interactions among the personnel at lunch (in the firm's breakroom and nearby restaurants), weekly softball games (excluding interactions on the playing field), and voluntary firm social events. Webster (1995) interviewed 23 of the 28 personnel in the firm. She gave them an individually randomized list of those who worked at the firm and asked them to indicate those with whom they interacted on a social basis.

Webster (1995) cross-classified dyads by whether the interaction ties were reciprocated, unreciprocated, or not reported and whether the dyads were observed interacting. Fifty-seven percent of all dyads were not reported to interact socially by either individual in the pair, although 31% of these dyads were observed interacting. Of the dyads involving reported ties, 45% were reciprocated. Nearly all (94%) of the dyads with reciprocated ties were observed interacting and the reciprocated ties were concentrated among dyads at the same status level. However, 42% of the unreciprocated ties were not observed interacting. Table 2 shows the cross-tabulation of senders and receivers of reported interaction ties by formal status level. Most of the unreciprocated and unobserved ties are directed to persons at the highest status level, the partners. The 5 ties directed to the support staff--seemingly discrepant from an upward status bias--may also be consistent with this general pattern. Webster (1995, p. 298) noted that the recipient of these ties was "... the executive secretary who has been with the firm since its inception ... [and] perhaps because of her position and long history with the firm, she possesses some kind of implicit power that is recognized." Interestingly, Webster found that the unreciprocated but observed ties were not related to the status similarities or differences between individuals in the dyads. Rather, she demonstrated that these ties could be explained by the number of ties a person was observed to have, such that persons with many ties tended to report ties that were not reciprocated.

Leung (1996; cited in Cairns et al., 1998) studied 138 fourth grade and 167 seventh grade students in

Hong Kong. The children were asked to identify the social groups within their grades, including their own groups. Leung (1996) measured status in this context with peer and teacher ratings of scholastic competence. He found that in contrast to the aggregate reports of group membership, the children's reports of members in their own groups were biased toward including high status students and excluding low status students.

#### Reported friendship and sociometric choice

The four studies just summarized point to a tendency for people to overreport interaction with higher status others and/or underreport interaction with lower status others. Similarly, individuals' reported friendship ties and other types of affiliative sociometric choices (e.g., liking, would like to spend time with, etc.) are also biased toward persons of higher status than themselves in every relevant study that I could find in the literature. Each of these studies included all or nearly all members of the community studied, or a representative sample of a community. These studies were conducted in a diverse range of settings (all studies were done in the United States unless otherwise noted): high schools (Hollingshead, cited in King, 1961; Riley et al., 1954), an elite women's junior college (Smucker, 1947), college fraternities and sororities (Vreeland, 1942), military companies and squads (Masling et al., 1955), departments of companies in Japan and the United States (Nakao, 1987), rural "open-country" communities (King, 1961), a rural church congregation (Schweitzer cited in King, 1961), a village (Lundberg and Lawsing, 1937), and representative samples of adults in Detroit [multiple points in time] (Curtis, 1963; Jackson, 1977; Verbrugge, 1977), Cambridge and Belmont, Massachusetts (Laumann, 1966), and a German town (Verbrugge, 1977). In addition, researchers have often interpreted some patterns of unreciprocated sociometric choices as resulting from status stratification and upward status bias (e.g., Davis and Leinhardt, 1972; Sherif, 1956). Although Riley et al.'s (1954) respondents expected slightly less reciprocation of liking choices from higher rather than lower status persons, the expected rate of reciprocity was still fairly high for each status of alter (61-78%) (Riley et al., 1954). This means that individuals making friendship and other sociometric choices to higher status others typically believe the sentiment is mutual.

In contrast to his finding an appreciable upward status bias in reported friendships, Laumann (1966) discovered that respondents in his study actually displayed a mild downward status bias in reporting the occupations of both of their next-door neighbors. That is, respondents tended to report that their neighbors had

Table 2. Informal social interaction in an accounting firm: Unreciprocated and unobserved dyads by formal status rank, adapted from Webster (1995)

Reports sent	Partners	Managers	Associates	Support
Partners	5	1	0	1
Managers	2	0	0	3
Associates	5	0	0	1
Support staff	7	0	0	0

lower occupational statuses than they did. These results cannot be explained by individuals reporting their friends' characteristics in a biased fashion. Laumann (1972) observed quite high reliability between respondent and friend reports of the friend's educational and occupational status in a probability sample of white men in Detroit. This implies that individuals are biased in which persons they choose as friends, not the reported characteristics of their friends. However, it seems that Laumann's (1966) respondents' reports of their neighbors' characteristics were biased, because presumably one's next-door neighbors are fixed and cannot be subjectively and selectively "chosen" in an interview.

#### Interpretation

An upward status bias in reported friendship and sociometric choices does not necessarily represent a bias in perception, because, unlike interaction, these relations are not necessarily symmetric. The upward status bias in friendship and sociometric choice, though, does indicate the direction of interpersonal attraction, which seems to color individuals' reports of their interactions. Some have speculated that sociometric choices to higher status others may often represent intentions to initiate friendships (Riley et al., 1954; Schutte and Light, 1978), and this may be the case for reported interaction with higher status others as well. In any event, the upward status bias seems to be a reflection of the asymmetry of attention. The tendency of lower ranking individuals to attend to higher ranking individuals has been viewed as a major component or consequence of primate dominance orders (Chance and Jolly, 1970; for related ideas, see Gilbert, 1990).

But why should high status individuals be the focus of attention? Fiske (1993, p. 621) answered this plainly: "The powerless attend to the powerful who control their outcomes." It would seem adaptive for individuals to

develop positive ties to those who can influence their fates. Biases in perceived interaction and attraction may impel people to initiate such relationships or persist in attempts to initiate and maintain them.

The upward status bias in interpersonal attraction can also be understood as a strategy to minimize the "credit risk" in friendship choice, as described by Tooby and Cosmides (1996, p. 132):

Assisting one individual may take time, resources, or be dangerous to oneself--it therefore precludes other worthwhile activities, including assisting others. From this perspective, exchange relationships are analogous to economic investments. Individuals need to decide who they will invest in, and how much they will invest. Just as some economic investments are more attractive than others, some people should be more attractive as objects of investment than others.

Thus, higher status persons may be especially desired as associates because they may also be better able to reciprocate crucial assistance than persons of the same or lower status than oneself.

Indeed, some research hints at the value of affiliative connections to higher status persons. Cross-sectional studies suggest that having social ties to higher status persons increases the likelihood for attaining higher status occupational positions (Lin, 1999). In addition, in an entrepreneurial firm specializing in information systems, personnel perceived to be friends of high status employees were judged by others to be moderately better performers in their jobs than those not perceived to be friends of high status employees (Kilduff and Krackhardt, 1994). The boost in reputation associated with the friendship tie was independent of the performance ratings the target employee received from his or her supervisor or the target employee's formal status in the organization. Given the likely influence of

reputation on diverse outcomes, this finding suggests that friendships with high status persons can pay significant dividends that friendships with others cannot.

The downward status bias in reporting next-door neighbors' occupations observed by Laumann (1966) suggests a slight denigration of status for one's similar status peers, given the economic stratification of neighborhoods and the strict geographic, rather than social, definition of the next-door neighbor relation. Just as slightly overestimating one's own dominance rank may lead one to compete more effectively for status, so might perceiving one's equals as holding slightly lower status. For example, such a downward bias might lead one to approach status contests involving equals with confidence, which in turn might tend to produce more successful outcomes. Also, this kind of downward bias may stimulate one to seek affiliative ties to persons perceived as similar status but who are actually of higher status.

#### Hypotheses for future research

If the upward status bias in perceived interaction and friendship motivates action, then lower status persons who report unreciprocated ties to higher status persons should ultimately make more observable attempts to initiate and maintain interaction with them than lower status individuals who do not report unreciprocated ties to those higher status persons. The unreciprocated ties from a lower status person to a higher status person should also be more likely to develop into reciprocated or actual ties over time than for mixed-status dyads in which neither person reports a tie to the other. That is, higher ranking persons should be more likely to report ties to those lower ranking persons who have previously reported ties to them than those who have not. In addition, I also predict that higher status persons should display more favorable observed behavior toward lower ranking persons who report unreciprocated ties to them than toward lower ranking persons who do not report ties to them. Moreover, I expect that the tendency to report unreciprocated ties to higher status others correlates positively with self-esteem.

#### **Overestimating own centrality in socially bounded communities**

Kumbasar (1994; Kumbasar et al., 1994) conducted two studies on biases in the perception of social ties. Each study focused on a separate socially bounded community (engineers in the department of a computer company [ $n = 25$ ] and residence advisors at a university housing complex [ $n = 19$ ] in the United States). Members of each of these groups had known each other for several years, interacted regularly with each other,

and had many opportunities to observe each other's social interactions in the group. In both studies, Kumbasar collected members' perceptions of the group's social structure with self-administered questionnaires. For each member of the community including self, a respondent indicated the other members who were the target person's friends on an individually randomized list of all group members (the order of the target members in the questionnaire was also randomized). So, each respondent reported his or her own friends as well as the friends of every other member of the group.

In both studies, Kumbasar et al. found strikingly consistent biases in respondents' perceptions of their own centrality in the community's social network. She demonstrated the tendency to inflate one's own centrality in the network with three separate analytic approaches. The first method involved scaling respondents' reports with correspondence analysis to obtain a multidimensional representation that allows comparisons between individual and aggregate perceptions. Figure 1 shows a two-dimensional correspondence analysis plot for the engineering group. In the picture, the labeled ends of the lines represent an individual's position in the social structure as perceived by all respondents in the aggregate. The pointed ends of the lines represent an individual's position as perceived by that individual. The proximity between any two individuals in the figure indicates the degree of similarity of their friendship ties.

Overall, respondents perceived their own positions in the network similarly to how others perceived them. However, nearly every respondent viewed himself or herself as more central--closer to the origin--than others viewed him or her to be. (For the ranked distances from the origin in a 6-dimensional solution, only two respondents perceived themselves to be less central than the others did). The results from the residence advisors study show exactly the same pattern. These findings are not an artifact of variation in the simple number of friends that a respondent perceives self or others to have because correspondence analysis removes the effect of such differing "marginal" tendencies.

The second method Kumbasar and colleagues used to assess bias in perceptions was examining a respondent's own centrality in the whole social network as perceived by that respondent, based on graph theoretic measures of centrality. For both studies, respondents perceived themselves to be disproportionately and highly central in the network (in contrast to the expectation that respondents should perceive themselves to have centralities that vary across



the full range of a distribution). The final method Kumbasar et al. used was to compare the number of friends a respondent reported having with those the respondent's friends (as determined by the respondent) reported the respondent to have (based on the median of friends' perceptions). Figure 2 shows the scatterplot between these two perceptions for the engineering group. For nearly every respondent, the respondent reported having more, and in most cases, many more friends than the respondent's friends reported the respondent to have.

Johnson and Orbach (2002) also examined biases in perceiving one's own centrality in a social network. They interviewed 44 North Carolina state legislators, agency managers, legislative and agency staff, and representatives of special interests about who discussed a major piece of legislation with whom. The legislation developed over three years. For each person in the network, including self, a respondent indicated the three others with whom that person discussed the legislation most. Johnson and Orbach compared self-reported and peer-reported measures of indegree centrality. The self-reported measure reflects the number of persons an respondent perceived as discussing the legislation with him or her. The peer-reported measure, which served as the criterion, reflects the number of persons who reported discussing the legislation with a particular respondent. Both measures were normalized such that the number of perceived and reported outgoing ties were effectively held constant across persons. For 64% of respondents, self-reported indegree centrality was higher than peer-reported indegree centrality. Peer-reported centrality was higher than self-reported centrality for 18% of respondents, and the remainder had similar self- and peer-reported centralities.

#### Interpretation

Members in each community were well-acquainted with each other and had numerous opportunities to observe and learn about each other's social interactions. Therefore, it is unlikely that an respondent's lack of awareness of others' interactions and friendships could account for these results. In Kumbasar's studies, respondents perceived greater reciprocity and transitivity of friendship ties among those they considered friends than among those not considered friends. This could potentially account for some of the apparent bias only for results based on correspondence analysis and some of the graph theoretic centrality measures, but not for the other results. I interpret the bias in overestimating one's own centrality in a socially bounded community as an evolved psychological mechanism that prompts an individual to cultivate

reciprocity. In fact, Kumbasar et al. (1994, p. 500) speculated that "actors with inflated centrality may feel that they have a more powerful and controlling position within the network and may count on more others when they need help or support." An individual is likely to behave friendly and cooperatively toward those whom she or he considers friends. Such behaviors are more likely to elicit friendly and cooperative acts from the perceived friends.

The bias in overestimating one's own centrality as reflected in Kumbasar's results from the correspondence analysis and some of the graph theoretic centrality measures may also be due in part to upward status bias in an individual's friendship choices. If higher status individuals tend to be more central in the network and respondents disproportionately choose higher status persons as friends for themselves but not others, a similar effect might be observed. This may account for the apparent lack of bias in estimating one's own centrality in a network of "significant" family ties defined by individuals within two steps or links of a focal person (Widmer and La Farga, 2000). Widmer and La Farga collected their data on the relation of "emotional support" in the same way as Kumbasar and performed the same kind of correspondence analysis. Yet in their plots, respondents do not seem to be any more central on average than they are perceived to be by others in the network. This kind of network is arbitrarily bounded and would be defined quite differently depending on the focal person. Therefore, individuals in such networks do not necessarily share the same frame of reference or compete for status with all others in the network.

Overestimating one's own centrality in a network might also confer benefits to the extent that one acts friendly to others and presents an image that many others are one's friends and colleagues. These displays may tend to convince others that an individual is a valued associate and encourage them to initiate cooperative relationships with that person (cf. Krebs and Denton, 1997).

#### Hypotheses for future research

My hypotheses follow the logic from previous sections. First, I predict that, people who report unreciprocated ties to similar status others behave more favorably and cooperatively toward those others than similar status others whom they do not choose nor are chosen by. Second, over time, an individual's new incoming friendship choices from similar status others are more likely to be sent by those whom he or she has chosen previously than those he or she has not previously chosen. I would expect these hypothesized

Figure 1. Correspondence analysis representation of aggregate perceived positions of individuals (labeled ends of lines) and self-perceived positions (pointed ends), from Kumbasar et al. (1994)

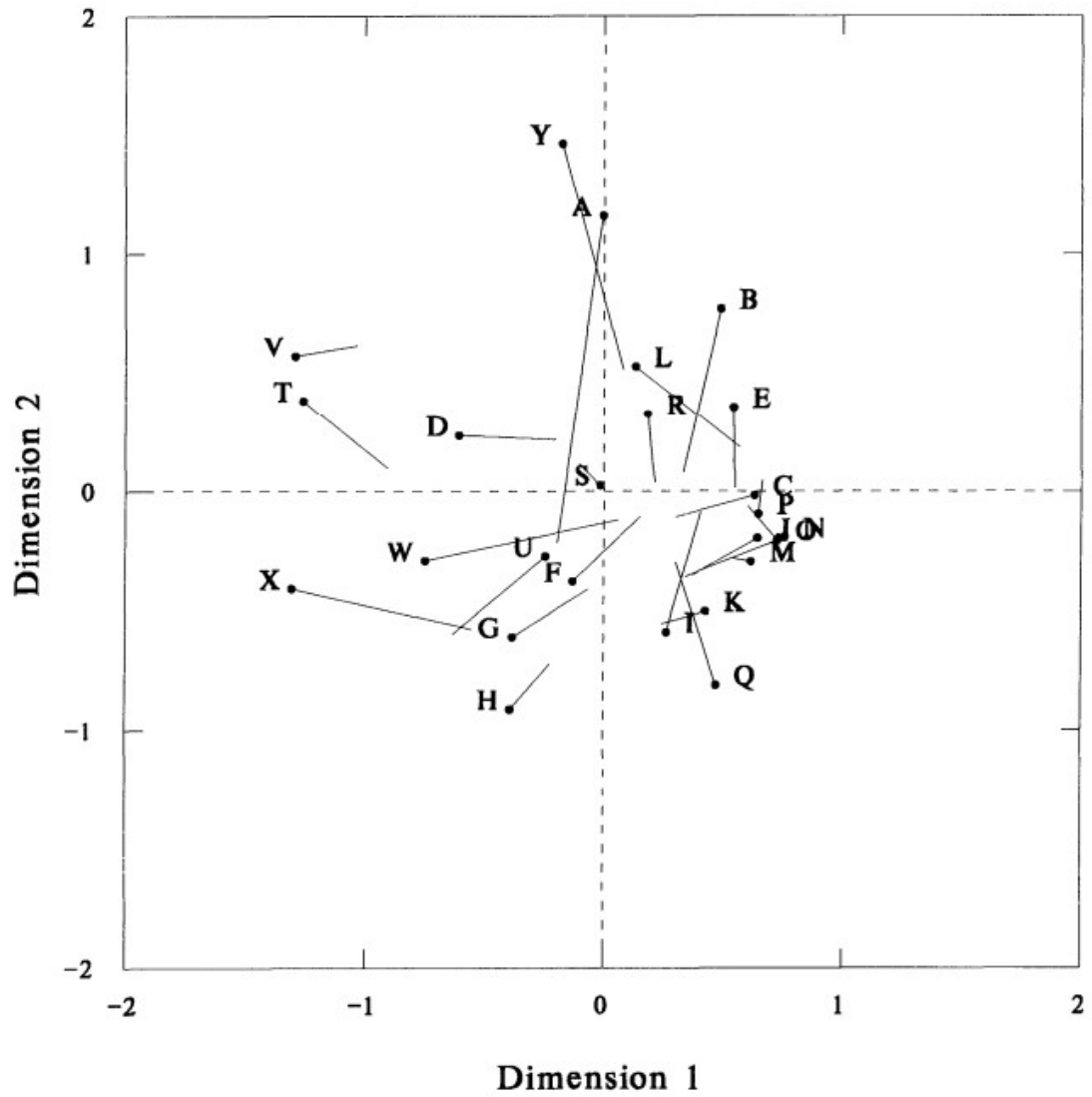
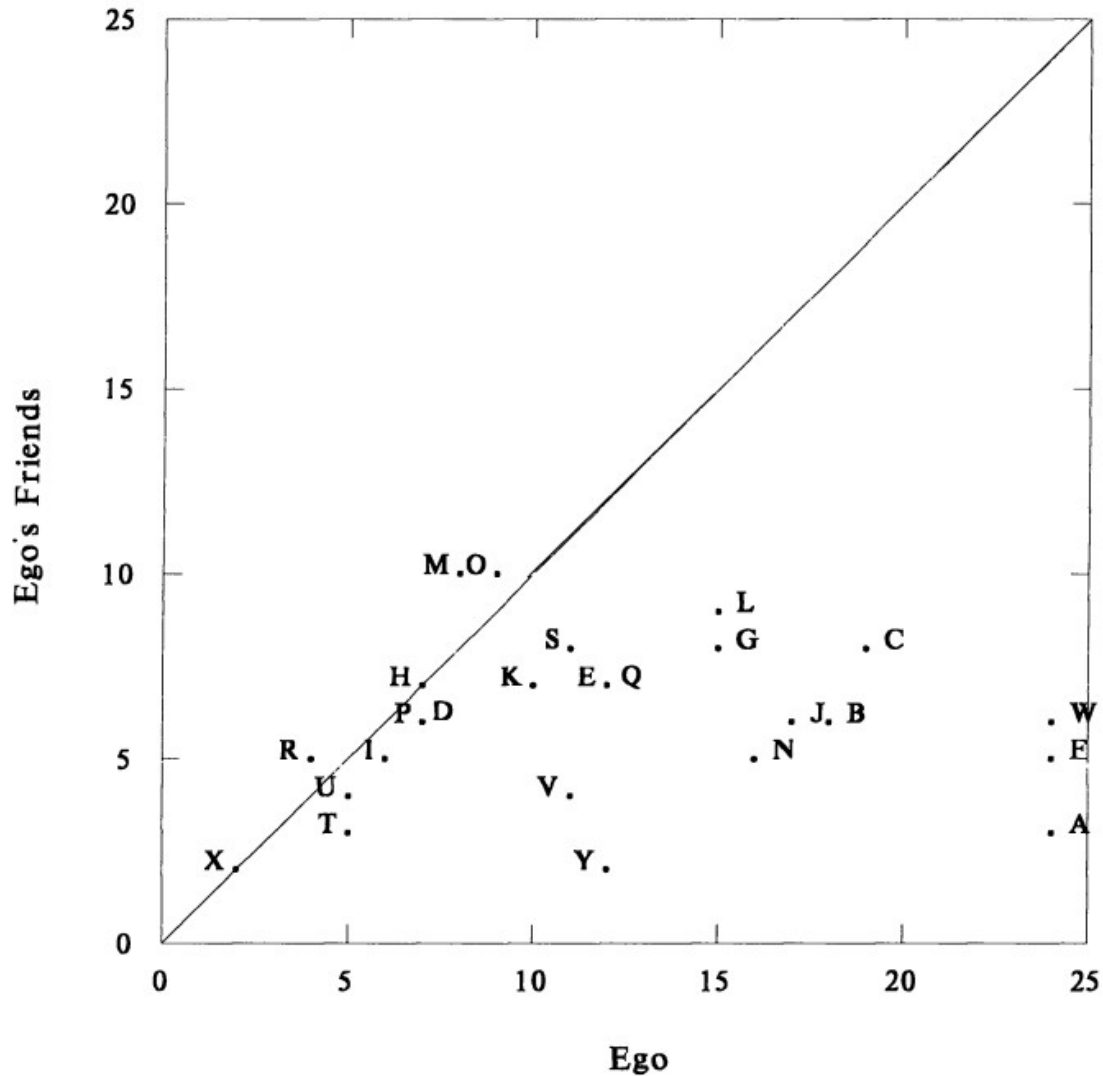


Figure 2. Scatterplot of the number of friends reported by a respondent for self (x-axis) and median number of friends reported for the respondent by the respondent's self-reported friends (y-axis), from Kumbasar et al. (1994)



differences to be relatively small, given the results from Hallinan's (1978/1979) longitudinal study of elementary school students' friendship choices. She found that unreciprocated choices tended to remain unreciprocated from one observation point to the next, were somewhat less likely to become null choices (i.e., withdrawal of the unreciprocated choice), and least likely to become reciprocated choices. However, she also found that the likelihood of unreciprocated choices becoming reciprocated was much higher than the combined

likelihood of null choices becoming unreciprocated or reciprocated. Third, I expect that an individual who receives a choice from a similar status individual but does not reciprocate will nonetheless come to behave more favorably and cooperatively toward that individual than similar status others who did not choose him or her. Fourth, I hypothesize that self-esteem correlates with each of the measures of bias in perceiving own centrality.

## Discussion

The claim that these three biases represent evolved psychological mechanisms must remain tentative for now. Further replication of these biases in other diverse settings and cultures is required before concluding that they are human universals. Research testing the hypotheses presented here also is needed to evaluate fully the adaptiveness of these biases. Nonetheless, the evidence to date does suggest that these biases are evolved psychological mechanisms. As these biases appear to address the same or similar adaptive problems, future research should also examine the relationships among these biases and between these biases and other related biases in social perception. Moreover, I predict that people have biases in perceiving the dominance rank, status of friends, and social network centrality of their kin and friends, as such illusions might enhance inclusive fitness and the value of reciprocity (cf. Cohen and Fowers, 2004; Gagne and Lydon, 2004; Krebs and Denton, 1997; Wenger and Fowers, 2008).

There seems to be an optimal margin of illusion (Baumeister, 1989) in perceiving oneself and others. Krebs and Denton (1997, p. 41) explained that "... biases in social cognition that have evolved in the human species mediate only moderate distortions of reality. It would have been, and continues to be, adaptive to perceive reality accurately for many, if not most, purposes." If one's perceptions are too biased, any behaviors resulting from them could be maladaptive (e.g., attempting to live a much higher status lifestyle than one can afford) or lack credibility in the eyes of others (e.g., claiming a close relationship with a very

high status individual known to others when none exists). The biases I have reviewed here appear to occupy this moderate range of distortion.

Biases in perceiving social structure and social relationships represent a class of phenomena that are especially ripe for analysis from an evolutionary psychological perspective. Some of these biases have already been framed in evolutionary terms, such as outgroup homogeneity bias in perceiving social interaction patterns (Freeman and Webster, 1994; cf. Krebs and Denton, 1997), the tendency to list high status persons before low status persons when recalling individuals who belong to a given socially bounded community (Brewer, 1995), and the apparent overestimation of help given to members of one's social support network (Essock et al., 1988). Undoubtedly other biases of this sort may be more deeply understood in light of evolutionary principles.

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