Non-zero-sum collaboration, reciprocity, and the preference for similarity: Developing an adaptive model of close relational functioning

TIM COLE AND JC. BRUNO TEOBUL
DePaul University

Abstract
An evolutionary framework was used to develop a model of relational functioning among friends. The proposed model focuses on the collaborative nature of close friendships and attempts to highlight two adaptive mechanisms important in creating non-zero-sum outcomes among highly interdependent parties. The model emphasizes the importance of reciprocity in creating mutually beneficial outcomes through social exchange, and it articulates how the preference for similarity is useful when creating non-zero-sum rewards through synergistic coordination. In particular, the focus is on the unique role that shared interests and mutual knowledge play when individuals attempt to pursue common goals through joint activity. The implications of the model are discussed with respect to a host of issues ranging from deceptive communication to relational satisfaction and commitment.

Collaborative behavior is a fundamental aspect of close relationships. The collaborative nature of our relationships is important to investigate because it provides insight into what it means to be human and it furthers our understanding of how we relate to each other. By adopting an evolutionary perspective, we articulate how two fundamental adaptive processes underlie collaboration among close, nonkin relations. Specifically, we examine how reciprocity and the preference for similarity may have been designed by natural selection to produce non-zero-sum outcomes through the exchange of resources and the coordination of joint activities.

We start with a review of evolutionary psychology (EP) and then we highlight the unique problem that close, nonkin relationships, namely friendships, have posed for evolutionary scholars. Briefly, extreme acts of altruism, common among friends, are difficult to account for completely in terms of kin selection and/or reciprocal altruism (the latter is referred to as the “Banker’s Paradox”; Tooby & Cosmides, 1996). In light of this dilemma, we develop a model of close relationships based on two adaptive mechanisms that tend to promote non-zero-sum outcomes among friends. We posit that these two adaptive processes underlie collaborative behaviors in close relationships and may help explain friendship-based (nonkin) altruistic tendencies. Finally, we present our model and discuss the implications it has for our understanding of contemporary personal relationships. It is hoped that grounding a model of dyadic relationships in terms of adaptations for exchange and coordination will provide scholars with a metatheoretical framework for exploring the formation and maintenance of close relationships.

Evolutionary Psychology
Evolutionary psychology is the study of the human mind as designed by evolutionary
processes (Barkow, Cosmides, & Tooby, 1992). According to this perspective, our psychological functioning has been shaped by longstanding problems encountered by our ancestors, just as biological functioning has been shaped by environmental constraints (Tooby & Cosmides, 1992). In short, the human mind is not a blank slate, rather it comes equipped to solve familiar (and ancestral) problems through the use of psychological adaptations (i.e., predispositions toward preferences, judgments, and behavioral tendencies that were, on average, beneficial to our ancestors in specific contexts; Pinker, 2002; Tooby & Cosmides, 1992). According to many evolutionary scholars, most aspects of cognitive functioning are not domain general, but are domain specific; that is, particular forms of reasoning, inferences, and decision-making rules have been uniquely configured to provide historically advantageous solutions to well-defined problems (Tooby & Cosmides, 1992).

An EP perspective openly challenges the traditional claim that complex behavior can be understood with respect to general models of socialization or basic principles of conditioning and reinforcement (see, for elaborate explanation, Pinker, 2002; Tooby & Cosmides, 1992). Of particular interest here is the finding that animals (human and non-human) differentially respond to reinforcement and modeling depending on the (adaptive) nature of the stimulus involved—some responses and behaviors are quickly reinforced and learned whereas others are not (for review, see Garcia y Robertson & Garcia, 1985; Mineka, 1992). Along the same line, Cosmides and Tooby (1992) have repeatedly demonstrated how difficult it is for individuals to reason about conditional rules in the abstract case; however, people have little trouble applying such logic when it is framed in terms of social exchange. This effect has been cross-culturally observed (Sugiyama, Tooby, & Cosmides, 2002) and it appears to have a specific neurological basis (Stone, Cosmides, Tooby, Kroll, & Knight, 2002)—consistent with an evolutionary account of human behavior. At the risk of boring readers familiar with EP, several claims and concepts underlying this approach are worth highlighting, as they are essential to our proposed model.

Logic underlying adaptations is covert. First, psychological mechanisms do not operate at the level of conscious awareness. Neuroscientists have come to the conclusion that the brain is a complex, multifaceted, information-processing device that does almost all of its work covertly—outside of mindful experience (Damasio, 1999; Gazzaniga, 1998). The mind reacts to sensory cues, processes information, and renders judgments without an individual’s moment-to-moment understanding of the sensory input involved or the logic underlying the decisions rendered (Damasio, 1999; Gazzaniga, 1998).

To evolutionary psychologists, this view of the mind makes perfect sense. Evolution works at the level of the gene (inclusive fitness), not at the level of the species or individual (Hamilton, 1964). As such, genes have been recording complex solutions to multifaceted and intricate problems for millions of years and they have been doing so without any understanding of the trials or tribulations encountered or comprehension of the solutions found. In fact, Tooby and Cosmides (1992) have argued that many of the solutions to problems that people typically encounter are beyond the ability of any individual to deduce or learn because the solutions “depend on statistical relationships that are unobservable” to those involved (p. 111). Natural selection, however, has worked out such complex problems through the process of trial and error and the solutions have been recorded in our genes in the form of domain-specific psychological adaptations (Tooby & Cosmides, 1992). For example, males have historically experienced relatively high levels of paternity uncertainty (i.e., is that really my child?) because human gestation and birth are female traits. In response to this chronic problem, males, but not females, have developed a preference
for investing in infants that at least minimally resemble themselves even though the presence of negligible facial similarities is not detectable at a conscious level of awareness (see Platek et al., 2003). Despite the reality that the “mind is the last to know things” (Gazzaniga, 1998, p. 1), people cling to the idea that they are keenly aware of their motivations, inferential processes, and decision-making rules (Daly & Wilson, 1999).

**Adaptive responses rely on emotions.**

A second principle worth highlighting involves the role of emotion in the execution of psychological adaptations (Wright, 1994). Emotions are not an oddity of our evolutionary past (Damasio, 1999). Emotions precede thought, often working unannounced (outside of awareness), and they are absolutely necessary for making decisions, inferences, and judgments (Damasio, 1999; Gazzaniga, 1998). Emotions prepare the groundwork for the unfolding of events—they ready our bodies for action and they direct our minds toward solutions that have been historically advantageous (Fredrickson, 1998). According to evolutionary psychology, emotions serve as the “superordinate program” directing the activities of perception; attention; inference; learning; memory; goal choice; motivational priorities; categorization and conceptual frameworks” to name just a few (Cosmides & Tooby, 2000, p. 93). In other words, all human behavior and reasoning are built on an emotional foundation, and it is impossible to act without emotions sitting in the driver’s seat (Damasio, 1999). For instance, Damasio (1999 pp. 62–67) discussed how damage to the amygdala can result in the loss of a specific emotional response. Although the individuals affected typically retain complete cognitive functioning, they are unable to render simple judgments or make decisions that correspond to the emotional impairment at hand. As Damasio noted, these unfortunate situations “testify to the paramount importance of emotion in the governance of not just simple creatures but of humans as well” (p. 67).

**Self-interest corresponds with historical fitness.**

The third idea requiring clarification involves the notion that individuals are motivated by their self-interest. The concept of self-interest does not mean that individuals are necessarily selfish and pursue pleasure, or that people engage in activities because they perceive them to be advantageous; rather, an evolutionary perspective forces us to redefine self-interest in terms of genetic fitness (Hamilton, 1964; Tooby & Cosmides, 1992). As noted, genes rely on solutions and strategies that have historically enhanced their survival. And over the course of evolution, our genes have repeatedly faced numerous and specific obstacles to the superordinate task of keeping us alive long enough to successfully reproduce and raise offspring. Solutions that contributed to the survival and spreading of our genes constitute our self-interest today. For instance, our craving for sweets (Cosmides & Tooby, 1997), our jealous response to an unfaithful mate (Buss, Larsen, Westen, & Semmelroth, 1992), and the differential care we give to our offspring (Mann, 1992) are all responses that have been useful from a gene’s point of view. Defining self-interest as such does not mean that these responses need to increase fitness in our current environment (i.e., desire for sweets), be pleasant for us to experience (i.e., jealousy), or be part of our conscious decision-making (i.e., withdrawing resources from sick children); but this characterization of self-interest does make us keenly aware of the motivational force underlying human nature (Alexander, 1987). In short, self-interest needs to be viewed in terms of historical factors that have increased a gene’s likelihood of surviving and reproducing, rather than by exploring self-interest as an individual’s explicitly stated goals, intentions, and desires.

**Evolutionary accounts can be applied at multiple levels of analyses.**

Finally, it is important to note that an evolutionary account of human behavior...
can be applied at multiple levels of analyses. Although this interpretive flexibility is advantageous, it can also lead to confusion when scholars fail to specify the level of analysis at which they are working, switch back and forth between different levels of analysis without explicitly marking such jumps, or use the same terminology across multiple levels of abstraction. In particular, the terms reciprocity and social exchange have been used to explain altruistic behavior at varying levels of abstraction. At a superordinate level of abstraction, it is possible to interpret such behavior with respect to a general, broad-based notion of reciprocity/exchange; that is, help others when it pays to do so, or, as more eloquently put by Ghiselin (1974), "Scratch an 'altruist,' and watch a 'hypocrite' bleed" (p. 247). At a more basic level of abstraction, the terms reciprocity and social exchange have also been used to describe one, of many specific adaptive responses that govern the exchange of resources (i.e., a narrow, tit for tat model of reciprocity; Axelrod & Hamilton, 1981, p. 1393; Cosmides & Tooby, 1992). This concrete form of reciprocity/exchange refers to the specific psychological processes (design features) that regulate the swapping of resources among trading partners (these design features are described in greater detail later in the manuscript). Taken together, the superordinate view of social exchange represents a general principle of human behavior (give when you are likely to get in return), and a basic level of analysis describes how a specific adaptive response (e.g., kin selection, direct reciprocity, indirect reciprocity, etc.) works in a given context to produce outcomes that, on average, satisfy the more general idea that behavior is constrained by self-interest. Most evolutionary scholars believe that the real work of producing fitness benefits takes place at the basic level of abstraction and, as such, a host of modular, adaptive responses have been uniquely tailored to solve specific, longstanding problems encountered by our hominid ancestors (Tooby & Cosmides, 1992). In fact, Tooby and Cosmides (1996) claimed that the variety and complexity alone of some of the adaptations needed to regulate altruism will most likely rival the adaptive features underlying the design of the human eye. The goal of this article is to identify how two basic level adaptations were, in all likelihood, designed to produce fitness benefits in the context of friendships, and, unless otherwise explicitly noted, our analysis focuses on adaptive processes at a basic level of analysis.

Summary

An evolutionary framework serves as the backdrop for our model of close relationships. As such, it is assumed that relational behaviors today are guided, in large part, by, a host of basic level, logically covert, emotionally driven, and historically designed adaptive responses. The advantage of using an evolutionary account is that it "carves" the world "at its joints" (Daly & Wilson, 1999, p. 510). It organizes our thinking and knowledge about human behavior around the issues that are central to who we are (e.g., status-seeking, attachment-forming, coalition-building animals, etc.). Additionally, an evolutionary-based approach serves as a powerful heuristic for studying human behavior across traditional academic boundaries (Tooby & Cosmides, 1992).

The Problem of Developing an EP Account of Friendship

Although many specific relational issues (e.g., attraction, jealousy, mate preferences, etc.) and several broad theoretical models of romantic relationships have been put forward using an EP paradigm (e.g., Fletcher & Simpson; 2000; Zeifman & Hazan, 1997), few attempts, by comparison, have been made to explain friendships from an evolutionary perspective. The key obstacle to developing such a theory is the fact that people, often at great expense to themselves, lend considerable assistance to friends when they are in dire straits (Tooby & Cosmides, 1996). Although such acts of altruism are readily explainable (i.e., consistent with
general reciprocity) in other relational settings, it is more difficult to explain such costly behavior in the context of a friendship. For instance, in familial settings, providing extensive support to children is hardly selfless when one considers that genes are just transferring resources to the closest living copy of themselves (inclusive fitness; Hamilton, 1964). And romantic relationships have been influenced by the extensive care required to raise human offspring, and, accordingly, attachment processes wisely compel an individual to render assistance to a romantic partner who has a shared interest in the rearing of one’s children (Zeifman & Hazan, 1997). In the case of close friendships, however, people are still expected to provide extensive help in times of need (Clark & Mills, 1993) but the benefits underlying the giving of this assistance are not as apparent. And such costly and widespread behavior must have a corresponding advantage; otherwise such tendencies would have been selected against over the course of time (Tooby & Cosmides, 1996). In other words, there must be a “pathway” or connection between one’s self-interest and extensively helping friends when they are down on their luck (Tooby & Cosmides, 1996). Making such connections is important because it enriches our understanding of social life and often leads to novel predictions about human behavior (Tooby & Cosmides, 1992). Currently, several explanations have been offered to account for extreme acts of altruism among friends.

**Kin-selection as a possible explanation for altruism among friends**

The first explanation relies on kin selection (inclusive fitness; Hamilton, 1964) as the primary mechanism governing altruistic behavior in friendships. According to this explanation, the difficulty involved in distinguishing kin from nonkin results in kinship benefits being misapplied to proximate others (e.g., Korchmaros & Kenny, 2001). There are, however, some problems with this rub-off hypothesis. One drawback is that this account does not adequately explain why people go out of their way to help some people but not others in their immediate environment (i.e., the rub-off effect is not indiscriminate). In fairness, though, reasonable explanations for the discriminatory offering of help to close nonkin have been put forward: People are most likely to render assistance to individuals who closely resemble kin in a variety of ways (i.e., physically, behaviorally, proximately; Korchmaros & Kenny, 2001). Essentially scholars argue that kin selection works through feelings of emotional closeness and therefore we grant special treatment to nonkin based on our intimate feelings for them (Korchmaros & Kenny, 2001).

Nevertheless, even if kin selection does have a hand in the beneficial treatment that friends receive, there is reason to believe that other adaptive mechanisms must be at play. First, both group living (involving kin and nonkin members) and referents for “kinship” are a universal feature of human behavior (Brown, 1991). From these observations one can deduce that humans have a long history of making distinctions between kin and close nonkin. Perhaps one of the adaptive features of language was its ability to label kin and nonkin as such, thereby allowing inclusive fitness to thrive as social groupings became more complex. Regardless, the fact that people use language to make distinctions between kin and nonkin seems to suggest that factors other than kin selection may be responsible for altruistic behavior among friends (why make such universal and fundamental distinctions, if they ultimately do not matter?). Second, there are consistent differences in the amount of assistance people offer these two groups (see Brown, 1991; Clark & Mills, 1993). This differential offering of assistance between kin and nonkin is difficult to explain if altruism among friends is simply based on the misapplication of adaptive processes designed for kin. In fact, kin selection could not have evolved except in an environment where kin and nonkin were noted as such and treated
differently (though such a system need not have been optimal, it still had to be capable of making discriminations). Finally, empirical evidence suggests that emotional closeness does not moderate the effects of kin selection as proposed. Rather research indicates that when comparing friends to kin, despite liking and feeling closer to their friends, people offer more assistance to their kin (Kruger, 2003). In short, liking kin is not a perquisite for helping kin (as many people know), and, as such, it is unlikely that kin selection via liking is responsible for the preferential treatment friends receive. Overall, the evidence suggests that kin selection does not adequately account for the rendering of assistance to close nonkin. This conclusion is consistent with the claim that most adaptations for altruism are uniquely configured to different social and relational contexts (see Dugatkin, 1997). Along the same line, Tooby and Cosmides (1996) have argued that life did not design a simple, general-purpose adaptation for altruism; but, instead, unique adaptive problems require unique adaptive solutions and the providing of assistance to friends in need is most likely driven by its own set of circumstances. Put another way, the pathway between kin selection and extreme acts of altruism in friendships is unclear.

Social exchange as a possible explanation for altruism among friends (the Banker’s Paradox)

Reciprocal altruism (concrete reciprocity) has also been called on to explain altruistic tendencies among close friends. Reciprocal altruism states that if you come to my assistance, I’ll come to yours—in essence a tit for tat transaction (Axelrod & Hamilton, 1981, p. 1393). Although such rules of exchange are an inherent and important feature of all social and personal relationships (Cosmides & Tooby, 1992; Trivers, 1971), this explanation by itself cannot account for extreme acts of altruism among close friends. This theoretical explanation simply does not match the relational record. Extreme acts of altruism in close relationships occur without obligation (Clark & Mills, 1993) and studies have found that people are offended when friends immediately offer to pay back such acts of kindness (Shackelford & Buss, 1996). It is fairly easy, nevertheless, to reconcile these apparent contradictions within a social exchange model. For example, several scholars have argued that by considerably expanding the time frame in which such trades occur, the dilemma is resolved. Social exchange can account for such altruistic tendencies if one allows paybacks to be implicitly deferred (Batson, 1993; Shackelford & Buss, 1996). This extended asynchronous model of social exchange appears to fit the empirical record, but closer examination reveals a larger problem. Tooby and Cosmides (1996) pointed out, in particular, that altruistic behavior among friends was unlikely driven by adaptive processes related to reciprocal exchange because it was too risky to lend credit in such situations. Given the hardships encountered in our ancestral environment (see Sugiyama & Chacon, 2000), as situations became more desperate the cost of helping as well as the default rate would have increased. From a social exchange perspective, helping friends in dire need would have been a potentially costly investment strategy because the prospect of collecting a roughly equivalent return would have decreased as a friend’s need for help increased. As Tooby and Cosmides (1996) have noted, reciprocal altruism “would seem to favour decision rules that caused others to desert you exactly when your need for help was greatest” (p. 132). Accordingly, this scenario is referred to as “the Banker’s Paradox” wherein the more desperate a person is for help, the less likely is his or her ability to pay it back, and hence the less assistance he/she is likely to receive (Tooby & Cosmides, 1996). Simply put, the logic of reciprocal altruism, although important in close relationships, is unlikely to produce extreme sacrifices when friends are down on their luck; the pathway from concrete reciprocity to general reciprocity is not clear in such contexts.
Developing an Alternative Model to Account for Altruism among Friends

Despite scholars’ inability to adequately explain costly acts of altruism among friends, friends continue to render considerable aid in times of need (Clark & Mills, 1993). In an attempt to account for such tendencies, Tooby and Cosmides (1996) outlined a “niche model” of relationships based on the notion that friendships were designed, in part, as a risk-reduction strategy to the problem of securing assistance unlikely to be offered through concrete models of reciprocal exchange. Accordingly, Tooby and Cosmides (1996) speculated that friendships may have evolved through individuals providing unique and valuable rewards to others who then had a vested interest in securing that person’s well being. Specifically, Tooby and Cosmides (1996) argued that friendships are formed with respect to criteria (e.g., positive externalities, mind reading, similar preferences, etc.) that permit two individuals to develop a strong dyadic partnership reflecting a deep level of engagement. By doing so, friends make themselves indispensable so that partners have a self-serving motive for providing assistance (I need you, therefore I’ll help you). The aim of this article is to build a more elaborate model of close partnerships by examining how adaptations for social exchange and coordination may account for collaborative tendencies among friends. Ultimately, we will argue that adaptations associated with coordination, rather than reciprocal exchange, present a more plausible pathway linking friendship-based altruism with self gain (general reciprocity).

Overview

We posit that two basic adaptive processes are fundamental to close relational functioning. These adaptive mechanisms, reciprocity and a preference for similarity, were useful to our ancestors because they helped solve two fundamentally different, but important, problems related to survival. The problem of resource variability was solved through adaptations for social exchange; the problem of complex task achievement was solved through synergistic coordination. We argue that these adaptive responses often resulted in non-zero-sum gains: the creation of more, from less, for everyone involved (Wright, 2000). These two adaptations continue to underlie collaborative behavior among close relational partners today, and aspects of synergistic coordination, in particular, may help explain why people in close, nonkin relationships engage in costly acts of altruism. We start with a discussion of the beneficial outcomes that non-zero-sum collaboration may have provided our evolutionary ancestors in the context of a close, dyadic partnership. Next, we investigate the possible design features underlying reciprocity and similarity with respect to dyadic exchange and coordination. Finally, we present a model of friendships grounded in these two adaptive responses and we discuss our proposed framework with respect to the implications it has for our understanding of contemporary relationships.

Collaboration as a non-zero-sum solution

Among evolutionary scholars, it is widely assumed that collaboration among humans evolved in response to the chronic problems associated with resource and task management (e.g., Alvard & Nolin, 2002; Sedikides & Skowronski, 2000). In fact, most living systems rely on collaborative processes because such measures often result in non-zero-sum outcomes—the achievement of gains that are greater than their corresponding costs for all parties involved (Axelrod & Hamilton, 1981; Wright, 2000). Although collaboration among independent parties is a beneficial and ubiquitous feature of human life, the adaptive mechanisms regulating such tendencies differ from context to context (Tooby & Cosmides, 1992, 1996). For example, in familial contexts, altruistic behavior can be accounted for by kin selection (Hamilton, 1964). On the other hand, direct models of reciprocity (i.e., help me and I’ll help you) govern cooperative
norms in social and personal relationships (i.e., repeated interaction among non-genetically related individuals; Axelrod & Hamilton, 1981; Trivers, 1971). In situations where future interaction among individuals is less likely, indirect models of reciprocity appear to operate via status and reputation effects (i.e., though you are unlikely to pay me back, I’ll help you as long as others take my contributions into account; Alexander, 1987; Nowak & Sigmund, 1998). Finally, in social settings where a larger collective effort can result in mutual benefits, cooperative behavior is induced by the threat of freeloader punishment (i.e., if you don’t do your part, you might be able to enjoy the benefits, but you’ll also bear the brunt of our anger; Fehr & Gachter, 2002). Different mechanisms are used to produce collaborative gains in different contexts, but it is important to keep in mind that emotional responses govern these adaptive outcomes (e.g., love, gratitude, sympathy, anxiety, guilt, shame, resentment, anger, etc).

Non-zero-sum collaboration in the special case of friendships

Although collaboration is an ubiquitous feature of social life, such non-zero-sum cooperation plays a fundamentally important role in close relationships, especially in the context of friendships (Tooby & Cosmides, 1996). In fact, many relational theories implicitly or explicitly conceptualize close relationships, including friendships, as collaborative partnerships through which individuals seek rewards (e.g., Blau, 1964; Foa, Converse, Tornblom, & Foa, 1993; Kelley & Thibaut, 1978). The tendency for humans to form such non-kin-based collaborative alliances has been part of our evolutionary heritage. Such relationships are a universal feature of human life and they play an important role in the lives of modern day hunter-gatherers (Jarvenpa & Brumbach, 1988). We offer a model of close relationships based on the idea that dyadic partnerships are governed by at least two adaptations designed to resolve fundamental problems related to survival. Both of these collaborative adaptations can be discussed using game theory terminology. Specifically, we argue that dyadic collaborations can be viewed as games involving the exchange of resources and games involving the coordination of joint activities.

The Problem of Resource Variability

During the course of human development, essential resources were highly variable across both time and space (Sedikides & Skowronski, 2000, p. 95). Accordingly, individuals were consistently confronted by situations in which they needed resources they did not possess, while also finding themselves in situations where they had access to resources they could not immediately use. Given such a state of affairs, adaptations designed to regulate the reliable swapping of important resources would have provided fitness benefits to the parties involved (Cosmides & Tooby, 1992). In short, through collaborative exchange, individuals could offset their losses by trading against their gains (Trivers, 1971).

Social Exchange as a Solution to the Problem of Resource Variability

The idea that collaborative exchange is fundamental to close relationships is hardly novel. The notion that mutually beneficial exchange underlies all social and personal relationships has been articulated under several different guises including reciprocal altruism (Axelrod & Hamilton, 1981; Trivers, 1971), the norm of reciprocity (Gouldner, 1960), resource theory (Foa et al., 1993), and social exchange (Blau, 1964; Cosmides & Tooby, 1992). For purposes here, a game theory analysis of this process, as outlined by Cosmides and Tooby (1992), will be drawn on to explicate how mutually cooperative behavior meets evolutionary constraints (i.e., is in one’s self-interest). Building on the work of biologists (e.g.; Axelrod & Hamilton, 1981; Trivers 1971), Cosmides and Tooby (1992) identified the conditions in which collaboration between two interdependent
parties can result in mutual self-gain (non-zero-sumness).

**Benefits of social exchange.** Collaborative exchange is advantageous when both parties experience “gains in trade” (Cosmides & Tooby, 1992, p. 169). In other words, there is an asymmetrical cost/benefit structure underlying the exchange of resources (Trivers, 1971). My act of helping you is more beneficial to you than the cost incurred to you by helping me (you come out ahead). Likewise, your act of helping me is more beneficial to me than the costs I accrued by helping you (I come out ahead). In short, direct reciprocity can result in gains for all—a symbiotic activity (Trivers, 1971). If two hunter-gatherers obtain different resources on any given day, both parties may benefit by swapping a portion of their gains with each other. If a friend invites you over for dinner and you return the favor later in the week; it is possible that the benefits received (a free meal) are greater for everyone involved than the costs accrued (the expense of cooking an extra portion). When two scholars work on a set of manuscripts and one does the bulk of the writing for one manuscript and his colleague undertakes this task on the other; both colleagues may come out ahead in the end by trading authorship rights.

**Problem underlying social exchange.** Ideally, it would be in one’s self interest to enjoy such altruistic overtures without incurring any costs at all—it pays to cheat. It is not, by comparison, in a friend or coauthor’s interest to act so generously without realizing a return. Therefore, in certain situations non-altruistic behavior appears to be the wisest course of action. When anticipation of future exchange between two parties is unlikely and indirect reciprocity is not at play, as in a single-game audience-free environment, altruism should be avoided (i.e., the classic prisoner’s dilemma; Axelrod & Hamilton, 1981). On the other hand, when repeated interaction is likely, the possibility of mutually beneficial exchange becomes more probable as long as individuals, at large, are designed to collaborate when such behavior is likely to result in self-gain. Likewise, a mechanism is needed that inhibits cooperation when such tendencies allow individuals to be repeatedly taken advantage of by others. Surprisingly, the simple strategy of reciprocity appears to achieve both of these objectives (Axelrod & Hamilton, 1981; Wright, 2000).

**Concrete reciprocity as an adaptive solution to the problem of social exchange**

Reciprocity is a psychological adaptation by which individuals monitor their contributions in light of their partners’ contributions and make adjustments accordingly—a tit for tat transaction (Axelrod & Hamilton, 1981, p. 1393; Cosmides & Tooby, 1992). Reciprocity ensures that individuals trade resources with others who return such favors (you help me, I’ll help you) and it leads to punishment or avoidance of those whose actions are detrimental to one’s self (if you hurt or hinder me, I’ll hurt or hinder you). Because of this simple strategy, individuals, over repeated interactions, seek cooperative rather than competitive exchanges because cooperation can provide mutual and added benefits, whereas reciprocal competition results in mutual harm (Axelrod & Hamilton, 1981; Wright, 2000).

**Design features underlying reciprocity in close relationships**

For reciprocal processes to result in non-zero-sum collaboration, adaptations underlying reciprocity must have design features that make it possible for individuals to exchange resources when it is beneficial to do so.

**Resource monitoring.** First, mechanisms for reciprocity require that individuals *tacitly monitor* their own and others’ resource contributions. In order to fine-tune one’s resources contributions vis-à-vis a partner’s contributions, it is essential to have an ongoing (emotionally based) assessment of the quality and quantity of the efforts being put forth (Cosmides &
The notion that individuals affectively respond to resource gains/losses lies at the heart of many relational theories (Kelley & Thibaut, 1978; Walster, Walster, & Berscheid, 1978) and such emotive responses appear to have a basis in reality (see Sprecher, 2001a; Roloff, 1987).

Cheater detection. Second, not only do individuals need to monitor resource transactions, but mechanisms are needed to quickly detect when individuals fail to play by the rules (when they take and fail to give in return). Such information-processing skills are critical to social exchange, and, not surprisingly, numerous studies lend support to the claim that the human mind was uniquely designed for just such a task (e.g., Stone et al., 2002; Sugiyama et al., 2002).

Resource adjustments. Third, being able to monitor expenditures and detect cheaters is of little use unless adaptive processes underlying social exchange also motivate individuals to adjust their own exchange behavior or regulate their partners’ behavior, or both. In short, there need to be emotionally based inducements designed to get people to return favors (e.g., feelings of gratitude, obligation, guilt, etc.) and there also need to be emotionally driven tendencies to punish or avoid individuals who repeatedly fail to play by the rules (e.g., anger, resentment, etc.; see Trivers, 1971; Wright 1994). Again, there is strong empirical evidence underlying the idea that individuals regulate their contributions in light of their partners’ contributions and that affectively laden responses play a critical role in this process (Wieselquist, Rusbult, Agnew, & Foster, 1999).

Sensitivity to interdependence. Finally, although reciprocity is useful in a variety of social contexts, its influence should be more prominent in certain contexts than others. Specifically, the degree to which individuals expect continued interaction determines the degree to which reciprocity operates (Axelrod & Hamilton, 1981; Trivers, 1971). In highly interdependent contexts, where non–genetically related parties are repeatedly interacting, reciprocity is a more salient feature of resource exchange. And as noted above, all-out competition is neither an attractive option nor a wise investment of resources in such situations. Consequently, in dependent contexts, collaboration becomes imperative and therefore implicit monitoring, behavioral regulation, and the sensitivity to fairness all increase. On the other hand, when the likelihood of future interaction is relatively weak, non-zero-sum gains may still be important, but they are likely achieved through other means (e.g., indirect reciprocity). Direct reciprocity is not as great a concern when two individuals are not mutually dependent on each other. Accordingly, the sensitivity to fairness, implicit monitoring, and behavioral regulation also begin to play less crucial roles in such contexts (it is easier to dismiss distant others’ behavior). Simply put, systems designed to regulate social exchange among nonkin should be more salient when interdependence is high, thereby increasing the likelihood that non-zero-sum solutions will emerge when they matter the most. It is important to keep in mind, however, that even though reciprocal exchange is an important feature of close relationships, this specific adaptation is unlikely to generate costly acts of altruism when the likelihood of receiving an equivalent payback becomes more uncertain (the Banker’s Paradox).

The Problem of Complex Task Achievement

In addition to the problem of resource variability, our hominid ancestors were also confronted with many tasks critical to survival that were difficult to accomplish independently. For instance, numerous activities such as hunting, gathering, creating shelter, and fending off attacks from predators and enemies played an important role in our evolutionary history (Alvard & Nolin; 2002; Hill, 2002). In fact, many of these activities, like hunting large game, would have been virtually impossible to accomplish through solitary efforts (Hill,
2002). Individuals could pursue many important tasks on their own, but they could increase the likelihood of success and diffuse the risk through the formation of collaborative alliances (see Taylor, 2002). As such, it is widely assumed among evolutionary scholars that collaborative coordination evolved as a means of successfully negotiating these complex, yet essential, activities related to survival (e.g., Alvard & Nolin, 2002; Maynard Smith & Szathmary, 1995).

Collaborative coordination as a solution to complex task achievement

Benefits of collaborative coordination. In its most simple case, synergistic mutualism entails two parties working together to achieve a joint outcome whereby the rewards obtained are greater than each participant’s corresponding cost (Maynard Smith & Szathmary, 1995). A classic example of synergistic coordination is two individuals rowing a canoe—both rowers can receive benefits (increased speed) greater than what could be obtained through solitary efforts (Maynard Smith & Szathmary, 1995). Other examples help illustrate the benefits underlying collaborative coordination in dyadic contexts. Schelling (1960) presents the problem of two lovers trying to find each other after becoming separated at a department store; by coordinating their actions both parties can realize a mutual benefit (i.e., efficiently locate each other). Or consider a heated exchange between two coauthors that leads to the articulation of a novel idea. Or imagine the case of two hunter-gatherers attempting to track and kill a large animal. Again, in all of these instances, non-zero-sumness is possible if the ultimate gain exceeds the cost of working together.

Problem underlying collaborative coordination. Synergistic coordination among parties is useful because it can lead to non-zero-sum gains, but such outcomes are not necessarily easy to achieve (Alvard & Nolin, 2002; Bornstein, Gneezy, & Nagel, 2002). Perhaps the best way to highlight the challenges underlying collaborative coordination is to compare such problems with the difficulties encountered during social exchange. Simply stated, the obstacles to achieving coordination are not the same as the problems underlying social exchange because the reward structure between these two games is fundamentally different (Alvard & Nolin, 2002; Maynard Smith & Szathmary, 1995). During social exchange, benefits are obtained through “gains in trade” (Cosmides & Tooby, 1992, p. 169), whereas the benefits of coordinated action materialize not through the swapping of resources but through the synchronizing of efforts to create a joint outcome (Schelling, 1960). Social exchange occurs in an asynchronous manner (i.e., there is often a lag time between the occurrence of an act and the response to it; Trivers, 1971); dyadic coordination typically involves synchronous efforts as two parties work together simultaneously (or at least this was the case in our ancestral environment). Friends cooking dinner together constitutes a coordination game, whereas alternating cooking responsibilities among interdependent parties transforms the undertaking into a game of exchange. It is important to note that at a higher level of abstraction it is possible to view both exchange and synergistic coordination as being consistent with a generalized form of reciprocity/exchange: Give when you get something in return. At a basic level of abstraction, however, the psychological adaptations involved in these two games differ. The mechanisms regulating the swapping of resources are not the same as the mechanisms governing the creation of a joint outcome (i.e., trading meals back and forth does not involve the same psychological processes as those involved in cooking a meal together).

These distinctions are important to highlight because they suggest that the potential for cheating is a less salient feature of dyadic coordination, if cheating is even possible (see Maynard Smith & Szathmary, 1995). In dyadic coordination, individuals typically
share a common fate—they jointly succeed or fail (Maynard Smith & Szathmary, 1995; Schelling, 1960)—whereas in games of exchange, cheating is always possible (i.e., taking without returning; Axelrod & Hamilton, 1981; Trivers, 1971). If one party rowing a canoe doesn’t pull his weight, neither party will achieve forward motion (Maynard Smith & Szathmary, 1995). This example helps to illustrate the critical point that in dyadic coordination if one party attempts to pull back, although he may increase his likelihood of obtaining a relative gain (i.e., expending less effort than the other party), by doing so the cheater simultaneously increases the likelihood of creating a joint failure—a complete loss. In short, the advantage of trying to cheat another at games of dyadic coordination is offset by the impact that such behavior has on securing a favorable outcome (the cheater ends up cheating himself as well). It is interesting to note, however, that in the context of coordinated group action, as group size increases cheating becomes a more attractive option. In a group setting, one can still reap relative gains by having others do more work, but the real advantage to cheating in this context comes about because the increased group size can minimize the potential negative impact of one’s behavior on the final outcome. Given the attractive nature of cheating in larger group contexts, it should come as no surprise that adaptations have been designed to deal with the problem of freeloaders in such situations (Fehr & Gachter, 2002).

Taken together, the fundamental problem of coordinating dyadic behavior is not that parties may cheat, but that more than one solution can typically be employed to solve a coordination problem. From a game theory perspective, dyadic coordination problems are difficult to resolve because multiple equilibrium (solutions) typically exist (Bornstein et al., 2002; Schelling, 1960). Thus, when two lovers get separated in a department store, multiple solutions exist with respect to a meeting place. The catch is that both parties must select a solution that corresponds with their partner’s strategy. Or consider again two individuals attempting to row a canoe. There are many different ways individuals can achieve a coordinated outcome (i.e., variations in timing, speed, force, blade row, etc.), but unless both individuals implement the same rowing technique, the task will result in failure (Maynard Smith & Szathmary, 1995). In sum, when it comes to coordinating dyadic behavior, individuals not only need to participate in collaborative activities, they must participate in such a way that their actions correspond with their partner’s actions to produce beneficial results.

With an EP approach to the problem of collaborative coordination, the goal becomes one of identifying the possible adaptive mechanisms that helped our ancestors efficiently engage in coordinated behavior. Several potential solutions to the problem of collective coordination have been proposed. For instance, it has been argued that “public rituals” are used to solve coordination problems in larger social contexts through the creation of common knowledge (Chwe, 2001). Along the same line, scholars claim that the desire to “conform to the norm” facilitates coordinated action in group settings (Alvard & Nolin, 2002). It has also been argued that humans evolved an elaborate “self-identity,” in part to solve the coordination problems needed to live efficiently in complex social groups (Sedikides & Skowronski, 2000). Although potential solutions to the problem of larger collective coordination have been put forward, few attempts have been made to identify the mechanisms that underlie coordinated outcomes in the context of dyadic partnerships. With this in mind, we propose that the preference for similarity may help explain how coordination costs are reduced in dyadic settings.

**Preference for similarity as an adaptive solution to dyadic coordination**

The preference for similarity in close relational partners is profound (e.g., Byrne,
1971; Newcomb, 1961), yet most of the accounts underlying this universal desire rely on general concepts such as cognitive consistency or theories of reinforcement, or both (for a review, see Berscheid, 1985). The concern with these explanations is that they are little more than tautological in nature: we like similarity because similarity is rewarding. By adopting an EP perspective, we are prompted to ask why this is true. Why is it so easy to find similarity in a partner rewarding? Or, alternatively, why aren’t we conditioned or socialized to find dissimilarity, rather than similarity, appealing?

According to the perspective offered here, individuals are predisposed to value similarity in close relational partners because to our evolutionary ancestors such preferences conveyed an important adaptive advantage. It is not hard to imagine how in our ancestral environment a preference for similarity would have been advantageous with respect to synergistic coordination among dyads. Though resource procurement and threat management were universal concerns (Hill, 2002; Sedikides & Skowronski, 2000), individuals most likely pursued these tasks in light of their differential interests, skills, and experiences. Consistent with this claim is the observation that hunter-gatherers often formed stable task groups composed of two or three individuals in a work unit around important goal-related activities (Jarvenpa, 1993; Jarvenpa & Brumbach, 1988). And with respect to men in particular, anthropologists have noted that the task of hunting starts with a large band of individuals, but pairs often branch off from the main group over time (Hill, 2002). Likewise, Taylor (2002) has discussed the historically important role of friendships in the lives of women with respect to accomplishing fundamental tasks such as gathering and child rearing. From a coordination perspective, it would have been beneficial for both men and women to form such dyadic partnerships with individuals who were similar to themselves in terms of their goals, expectations, and belief structures.

Similarity makes dyadic coordination easier to achieve. The preference for similarity would have been useful because it solves both ends of the coordination problem. Similarity makes it more likely that two individuals are oriented toward a mutual goal. For instance, two hunter-gatherers interested in traveling long distances to pursue large game are more likely to benefit from coordinating their actions than a pair of hunters whose interests fail to coincide. More important, similarity also reduces the costs of coordination because it presumes the existence of common knowledge between two individuals. Individuals who are similar to each other are more likely to share common focal points, referents, experiences, assumptions, and so forth. And the importance of such common knowledge in facilitating coordinated outcomes has been investigated across a variety of disciplines (see Mehta, Starmer, & Sugden, 1994; Planalp & Garvin-Doxas, 1994; Schelling, 1960). For instance, common ground or shared knowledge is essential when using language to coordinate behavior efficiently (Clark & Marshall, 1981; Fussell & Krauss, 1989). Two scholars who share similar knowledge, for example about evolutionary psychology, can quickly discuss their research agendas by exploiting their common knowledge—they both know what the other knows and they both make use of this shared resource (see Clark & Marshall, 1981; Planalp & Garvin-Doxas, 1994). Like-minded researchers also avoid the frustrations and setbacks that typically occur when collaborators do not share goals, interests, background assumptions, and so forth. Moreover, scholars studying game playing situations have made similar claims; common knowledge makes coordination among interdependent parties easier to achieve (Mehta et al., 1994; Schelling, 1960). Finally, and as already noted, in larger collective contexts humans draw on public rituals to create common knowledge, thereby resolving complex coordination problems (Chwe, 2001).

We suspect that similarity may make coordination easier to achieve through common knowledge via at least two different
routes. To begin with, similarity may make coordination easier to achieve simply because people go with what they know (i.e., they rely on their own focal points, referents, assumptions, expectations, etc.; Krauss, Fussell, & Chen, 1995), and accordingly their behavior is more likely to converge or coincide with others who happen to share similar focal points, referents, assumptions, and expectations. Experimental research involving games of coordination supports this claim—that the sharing of common focal points facilitates coordinated outcomes (Mehta et al., 1994). Research also indicates that playing coordination games with fixed (repeat) partners leads to non-zero-sum gains (Cooper & Wallace, 1998). We believe that such fixed partnerships are beneficial because they allow individuals to exploit mutual knowledge formed during the playing of prior games (see Clark & Marshall, 1981; Krauss & Fussell, 1991). Alternatively, similarity may provide individuals with special insight or perspective into another’s point of view. For these reasons, similarity may allow individuals to make more reasonable guesses about each other’s intentions and behaviors. And having access to such similarity-based insider knowledge could reduce the costs of working together. In either case, from the perspective offered here, the solving of coordination problems through common knowledge does not require explicit awareness of the underlying cognitive processes involved in such a complex undertaking. To the individuals at hand, common knowledge resolves coordination problems just as other complex mental activities occur—from the users’ point of view, it just seems to happen (Damasio, 1999; Gazzaniga, 1998).

In summary, similarity among interdependent parties makes it more likely that individuals share mutual goals. Similarity, by default, also establishes common knowledge, which leads to a reduction in coordination costs. Accordingly, similarity makes the benefits of coordination more likely while simultaneously making it less expensive to do so. Over the years, other relational scholars have expressed related ideas about the importance of similarity. In particular, Kelley and Thibaut (1978, p. 64) talked about the importance of similarity with respect to creating correspondent outcomes among interdependent parties. Along the same line, Berscheid (1985, p. 457) noted that similarity allows for greater prediction, control, and coordination. And scholars studying romantic relationships have argued that similarity is essential between partners because it makes mutual goal attainment more likely (Botwin, Buss, & Shackelford, 1997) and it undoubtedly helps reduce conflict (Acitelli, Kenny, & Weiner, 2001). The unique claim offered here is that the preference for similarity is most likely a psychological adaptation that conveyed important non-zero-sum gains by making collaborative coordination easier to achieve in dyadic partnerships. This idea is also consistent with biologists’ claim that the key to successful coordination often lies in “partner choice” (Dugatkin, 1995). Moreover, such active partner selection with respect to coordination has been widely observed across the animal kingdom (Dugatkin, 1995).

Proposed design features underlying the preference for similarity in close relationships

If the preference for similarity were designed to help to reduce coordination costs among dyads, it should have certain design features associated with it.

Sensitivity with respect to different types of similarity. For a system to compel individuals to form collaborative alliances with respect to similarity, such a system must be designed to reliably distinguish the self from others on the basis of important similarities and differences. Such automatic categorization processes have been well documented and appear to be fundamentally set along at least two dimensions: sex and age (see Kurzban, Tooby, & Cosmides, 2001). It is interesting to note that these two dimensions correspond to the dimensions that are
typically used to form non-kin-based dyadic partnerships among modern day hunter-gatherers (Jarvenpa & Brumbach, 1988) and these dimensions play an important role in the formation of friendships in the developed world (Nahemow & Lawton, 1975). We suspect that these two dimensions played (and continue to play) such a large role because they were readily apparent and they were likely to correspond, on average, with differences in goals, experiences, background knowledge, and so forth. For instance, in our ancestral environment (as well as today) young boys and elderly women were (and are) undoubtedly interested in pursuing different activities and they were (and are) likely to have different experiences and belief structures. If one had to pick a coordination partner quickly, age and sex might have been (and continue to be) a good place to start.

Moreover, from a coordination perspective, it would have been useful to have mechanisms in place that take notice of others who shared similar cognitive knowledge structures (i.e., similar beliefs, values, and expectations), regardless of how those beliefs were made manifest. Just as social exchange systems demonstrate a certain degree of flexibility with respect to the types of resources that can be traded (see Foa et al., 1993), systems designed to detect similarity should exhibit some flexibility in terms of the potential stimulus (e.g., actions, belief statements, appearance, associations, etc.) that can be used to identify other like-minded partners. And, empirically, people have little difficulty responding to attitudinal similarity in others when such relevant information is present (see Byrne, 1971).

Furthermore, a system designed for promoting coordination among dyadic partners should also be sensitive to the type of coordination problem at hand. Similarity that makes coordination easier to achieve should be preferred over similarity along dimensions unrelated to coordinated outcomes. Consistent with this claim, Davis (1981) found that the preference for similarity varies according to its potential impact on future interaction. Although people prefer others who are attitudinally similar (Byrne, 1971), individuals also demonstrate a discriminatory preference for similarity that facilitates coordination (i.e., interaction; Davis, 1981). Additionally, it is important to note that individuals tend not to categorize individuals along any salient dimension unless those dimensions are thought to be an important marker of group alliances (see Kurzban et al., 2001) or are the only intergroup marker available in a given situation (e.g., Lemyre & Smith, 1985). In short, the human mind appears to be designed to detect similarity along dimensions important to achieving coordination with respect to both dyadic partnerships and larger coalitions.

**Inducements to form partnerships.** In addition to detecting similarities, a system designed to regulate dyadic coordination must be capable of compelling individuals to pursue relational involvement when similar others are present. Namely, there need to be emotionally based inducements for interacting with people in situations where coordination might be readily achieved. Consistent with this line of reasoning, the detection of similarity often results in positive emotional responses (Byrne, 1971) that are known to encourage “broaden-and-build” behaviors underlying the formation of social relationships (Fredrickson, 1998, p. 307).

**Responses to the emergence of difference.** Not only should a system designed to promote collaborative coordination compel people to seek interaction with like-minded individuals, but such a system should be responsive when dissimilarities arise in established relationships. From a coordination perspective, the emergence of different beliefs, values, and attitudes in well-established relationships is problematic because it signals that those once-shared beliefs, values, and expectations are no longer mutual, ultimately increasing the likelihood that joint outcomes may become more difficult to achieve. Accordingly, the emergence of
differences with respect to important belief structures should give cause for concern and prompt the use of strategies designed to deal with such problems. Again, research indicates that individuals are troubled when partners express differences, resulting in increased uncertainty and information-seeking behavior (Planalp & Honeycutt, 1985).

Sensitivity to interdependence. Finally, a system designed to regulate collaborative coordination must be sensitive to the relational context in which it operates. The more interdependent two individuals are, the more imperative it becomes that they share important similarities. And the notion that similarity becomes more important in highly interdependent contexts is well-supported (see McPherson, Smith-Lovin, & Cook, 2001).

The role of complementarity

We have focused on the preference for similarity because we believe that similarity in goals, values, and belief structures helps individuals overcome the primary obstacle underlying collaborative coordination—namely, the problem of multiple equilibrium (Bornstein et al., 2002; Schelling, 1960). Nevertheless, it should also be noted that complementarity is important with respect to both games of exchange and coordination. In terms of social exchange, resource differences are essential to the processes. There was not much to be gained by simultaneously trading a handful of tubers for a handful of tubers (see Cosmides & Tooby, 1992). And with respect to coordination, complementarity of skills and abilities would have been advantageous. Two hunters are more likely to create an effective partnership if they possess complementary skills: one being better at tracking prey, the other better at throwing a spear.

Other possible adaptive responses to the problem of dyadic coordination

We have focused on the importance of similarity with respect to collaborative coordination among dyads. It is important to note that other adaptive responses were undoubtedly useful with respect to creating shared knowledge. We suspect that many mundane friendship activities (e.g., self-disclosure, hanging out, gossiping, sharing inside jokes, rituals, play activities, etc.) were designed to increase and reinforce mutual knowledge, making subsequent coordination among relational partners easier to achieve. In fact, many other scholars have noted the importance of “interaction” and “time spent together” as a means of creating common knowledge (Clark & Marshall, 1981; Krauss & Fussell, 1991). Through interaction or simply being “copresent,” individuals implicitly and explicitly gather information about each other, which they can subsequently draw on to solve coordination problems (see Clark & Marshall, 1981; Krauss & Fussell, 1991). Two researchers discussing their agenda can communicate more efficiently by drawing on their joint knowledge created in prior conversations (see Planalp & Garvin-Doxas, 1994). Or two hunter-gatherers are likely to achieve greater efficiency with respect to hunting or gathering the more time they spend in each other’s presence. In fact, the copresence effect (Clark & Marshall, 1981; Krauss & Fussell, 1991) may help explain why proximity plays such an important role in friendship formation. Proximity, through the copresence effect, may reduce coordination costs among acquaintances. Again, we have focused on the importance of similarity with respect to coordination, but we also believe it is important to acknowledge that many other relational tendencies were probably designed to promote and maintain mutual knowledge among dyadic partners.

How collaborative coordination helps resolve the Banker’s Paradox

Ultimately, adaptive processes underlying collaborative coordination may help explain why individuals engage in costly acts of altruism in close, non-kin-based
relationships. As relational partners spend more time together engaged in both resource exchange and activities requiring coordination, relational partners create shared knowledge that is unique and distinctive with respect to their relationship. Through interdependent endeavors, individuals implicitly and explicitly acquire information about each other’s preferences, expectations, desires, fears, motivations, strengths, weaknesses, peculiarities, behavioral tendencies, and so forth. Perhaps this outcome is best articulated by Planalp (1993) when she notes that friends become “real experts on one another. They know about each other’s backgrounds, habits, present lives, future plans, particular experiences, people they know and so on” (p. 349).

Building on this idea, we argue that adaptive processes underlying the creation of idiosyncratic mutual knowledge are also responsible for altruism among friends. When individuals in highly interdependent relationships create extensive mutual knowledge, this knowledge becomes a vital resource that can be exploited for self gain (Planalp & Garvin-Doxas, 1994). As such, friends become indispensable, not because of who they are, but because of what they know and, more important, because of how this knowledge could have been put to use when creating non-zero-sum gains through joint activity. From an evolutionary perspective, it would be in one’s self-interest to lend considerable assistance to a friend in dire need, not based on the narrow premise that a friend might ultimately pay back such a generous favor (i.e., the Banker’s Paradox; Tooby & Cosmides, 1996), but as a means of protecting a precious, hard to replace, resource. This resource just happens to reside in the fitness benefits individuals gain by exploiting mutual knowledge with a collaborative coordination partner.

By adopting a coordination perspective, it is also fairly easy to see how such altruistic tendencies could have evolved. If our hominin ancestors received benefits by helping coordination partners overcome severe setbacks, then individuals who may have been predisposed to act as such, would have had an adaptive advantage over individuals who were more inclined to turn their backs on partners in trouble. As such, these altruistic tendencies would have become stable evolutionary strategies over the course of time. If our reasoning is correct, then, the more people feel they know a friend, the more they should be willing to help that friend out in a time of need. This hypothesis, though not yet tested, is much more difficult to derive from a social exchange model. Our account of altruism also implies that friendships would look very different if close relationships were based on adaptations involving reciprocal exchange alone. Accordingly, adding a collaborative coordination component to our understanding of relational functioning may help us explain a wider range of relational behaviors (e.g., inside jokes, rituals, hanging out). In sum, the pathway connecting extreme acts of altruism to general reciprocity (serving one’s self interest) is made more clear when viewed as a safeguard designed to protect a valuable, perhaps irreplaceable, resource, than as a response designed to lend extensive credit in the face of increasing uncertainty.

Development of a Model of Close Relationships Based on Adaptations for Exchange and Coordination

Incorporating the ideas above, we present a model of relational development based on the premise that close relationships are grounded in logically covert, emotionally driven, and historically designed adaptive responses involving the exchange of resources and the coordination of joint activities.

Exploration. During initial encounters, people engage in games of exchange and coordination. Individuals interact with each other and they implicitly monitor the extent to which reciprocity transpires, the degree to which similarity is present, and how readily coordination is achieved. We believe that successful trade, similarities, and effective coordination during initial
encounters lead to the inducement of a positive emotional state. It is most likely that people are not aware of such emotional responses nor do individuals typically realize the impact that these subtle, emotional reactions have on their behavior (Damasio, 1999). We propose that these emotional responses, induced by positive reciprocity and similarity-based coordination serve at least two important functions. First, these positive responses cognitively and behaviorally “open” individuals up to others. Specifically, positive emotions encourage “broaden-and-build” behaviors underlying the formation of personal relationships (Fredrickson, 1998, p. 307). Such emotions encourage creativity, exploration, and the investment of time, energy, and effort (Fredrickson, 1998). Second, we believe that positive emotions play an important role in signaling to others the potential for further relational involvement. Specifically, we argue that during initial encounters, positive affect induced by reciprocal gains and the ease of coordination result in what Buck (1985) calls “spontaneous expressive tendencies” (p. 405). Such spontaneous displays are thought to play an important role in coordinating behavior among individuals (Buck, 1985). Borrowing this idea, we believe that genuine displays of positive affect induced during initial interaction serve as a subtle signal to others that it is safe to explore the possibility of escalating their relational involvement.

Evidence with respect to exploration. The importance of reciprocity and the sharing of similarities in relational development has been well established (see Berg, Piner, & Frank, 1993; Newcomb, 1961). Support for the idea that successful coordination results in positive outcomes, by comparison, is less direct. Research indicates that responsiveness during interaction (i.e., responding to others in an appropriate and relevant manner) leads to increased attraction (for review of this work, see Berscheid, 1985). Other research indicates that positive interaction can have an impact on feelings of closeness and attraction toward a stranger (Albada, Knapp, & Theune, 2002; Aron, Melinat, Aron, Vallone, & Bator, 1997), though the influence of coordination per se was not directly investigated in these studies. It is interesting and important to note, however, that the human mind can track positive or negative interactions with others even when conscious, logical decision-making cannot possibly account for such judgments. Consider Boswell, a man who is completely unable to remember anyone or any event beyond the immediate present (similar to the lead character in the film, Momento; Tranel & Damasio, 1993). Remarkably, Boswell can discriminate at an emotional level (i.e., electrodermal response) among individuals who have been repeatedly nice (friendly, rewarding, accommodating) or nasty (difficult, demanding, indifferent) to him in the past. Based on the nature of their past interactions, Boswell has developed a preference for individuals which is expressed through an affective response.

Development and maintenance. When repeated interactions result in mutual reciprocity and effective coordination, positive affect, trust, and in-group categorization are likely to become more salient. In turn, individuals are likely to pursue further relational involvement. Individuals will be more likely to seek out each other’s company, trade favors, spend more time together, and participate in joint activities. If this increased interaction leads to further positive reciprocity and efficient coordination, such outcomes are likely to induce emotional responses fueling more intense resource exchange and the playing of more elaborate coordination games. From the perspective offered here, relational development can be viewed as a positive feedback loop. Successful exchange and coordination ultimately beget more extensive exchange and coordination.

As individuals increase the extent to which they successfully play games of exchange and coordination, interdependence between relational partners becomes more pronounced. This increased mutual
dependence goes hand-in-hand with the creation of highly idiosyncratic mutual knowledge. As individuals spend more time together engaged in both resource exchange and activities requiring complex coordination, relational partners create shared knowledge that is unique and distinctive with respect to their relationship. This extensively shared knowledge facilitates subsequent coordinated gains and is accompanied by a host of emotional and perceptual biases that help individuals maintain their relationally based non-zero-sum rewards. Specifically, non-zero-sum gains produced through positive reciprocity and synergistic coordination are tied to the formation of positive illusions and other affective and cognitive biases, which work to promote relational stability (Fletcher & Simpson, 2000; Murray, 1999). The notion that positive illusions underlie relational conviction does not mean that individuals lack knowledge of their intimate partners; rather, it suggests that when people benefit from their relationships they put a positive spin on the information they have knowingly acquired (see Murray, 1999). Furthermore, we speculate that creating highly idiosyncratic mutual knowledge with another individual underlies the feeling of being understood, an important indicator of intimacy and relational satisfaction (Reis & Shaver, 1988). Feeling understood occurs as a result of creating extensive mutual knowledge that can be used to resolve complex coordination problems efficiently. It is important to note, however, that we are not saying that individuals should be able to articulate their mutual beliefs with a high degree of precision for we believe that most mutual knowledge is tacitly acquired and covertly used (for similar argument about communicative processes in general, see Kellermann, 1992). From the perspective taken here, implicit mutual knowledge is critical for solving coordination problems, and the ability to articulate such knowledge is considerably less important.

Evidence with respect to development and maintenance. The claims underlying our model are consistent with research demonstrating that relational development is centered around social exchange and that this process tends to be fast and furious in nature (for review, see Berg & McQuinn, 1986; Hays, 1985). Additionally, the ideas proposed here coincide with research indicating that reciprocity plays an important role in close relationships throughout the lifespan (for review, see Buunk & Prins, 1998); even when a partner is facing serious illness, reciprocal exchange is still expected (Ybema, Kuiper, Hagedoorn, & Buunk, 2002). Our model also attempts to bridge the gap between those who believe close relationships are based on communal rules of providing assistance (Clark & Mills, 1993) and those who believe that resource exchange is primarily driven by concerns for reciprocity (Batson, 1993; Buunk & Prins, 1998; Ybema et al., 2002). We believe that both positions have merit. According to our model, reciprocity predominately governs the exchange of resources in close relationships and these trades occur in an implicit and asynchronous manner. In times of great need, however, friends do lend considerable assistance to each other, which appears to be self-sacrificing (communal). We speculate that although such behavior appears altruistic, it is nevertheless driven by adaptive processes designed to protect a vital resource (i.e., synergistic outcomes created via mutual knowledge). Unfortunately, the relational record with respect to the impact of shared knowledge on close relational functioning is less well developed than research on social exchange. Some evidence, nevertheless, indicates that the exploitation of mutual knowledge is an important and distinguishing feature of conversational behavior among friends that allows them to communicate more efficiently (Planalp, 1993).

Discord. The model presented above highlights the best-case scenario, when individuals successfully achieve high degrees of exchange and coordination. When exchange or coordination becomes problematic—for a host of reasons—individuals experience discord.
In the exploration phase, discord may occur when potential partners lack the resources that are in demand, or when others fail to reciprocate positive contributions, or when dissimilarity makes coordination difficult to achieve. When discord occurs during exploration, it is likely to induce negative affect and this emotional response will serve to inhibit or restrict further exploration and investment. We speculate that negative affect will also serve as a signal to others that they need not expend additional effort toward relational involvement.

In the development and maintenance phase, discord is likely produced when individuals experience repeated losses, rather than gains, in their close relationships. This may occur when partners lose access to resources they once had to trade, or when individuals desire different resources over the course of time and partners are not willing or able to accommodate these novel requests. Additionally, an individual’s activity- or goal-related interests may gradually change and this shift may not coincide with a partner’s plans, ultimately making coordination more difficult to achieve. When discord occurs in developed relationships, the experience is likely to be very emotionally painful and result in increased relational uncertainty (e.g., see Planalp & Honeycutt, 1985). This uncertainty is likely to be followed by an active, conscious attempt to gain more information with respect to the nature and the scope of the problem at hand (Fletcher & Simpson, 2000; Planalp & Honeycutt, 1985). After identifying the problem, individuals may attempt to resolve the problem by changing their own or their partners’ behavior. In some cases, discord may lead to relational termination altogether.

Implications of the proposed framework

Complements traditional accounts of close relationships. Our metatheoretical framework emphasizes relational development in friendships, but we believe that our model corresponds to romantic relationships as well for we suspect that games of exchange and coordination operate in a similar manner in romantic contexts. Reproductive relationships, however, pose special problems that required the development of additional adaptive responses. Specifically, long-term mating relationships required many other adaptations, such as mechanisms for selecting reproductive partners (mate preferences; Buss, 1989), responding to threats to infidelity (jealousy, Buss et al., 1992), and mechanisms designed to promote relational stability (attachment; Zeifman & Hazan, 1997).

Our model may also provide insight into the distinction between communal versus exchange relationships (Clark & Mills, 1993). From the perspective offered here, all dyadic relationships are exchange oriented (see Buunk & Prins, 1998; Ybema et al., 2002); individuals trade resources for mutual gain even though the participants need not be explicitly aware of the details of this process. Nevertheless, individuals in close relationships do more than simply trade favors; relational partners also lend considerable assistance to each other in times of need (communal giving). We agree with Clark and Mills (1993) that such behavior is not driven by (concrete) social exchange, but we offer several explanations as to why seemingly communal behavior may occur in different relational contexts. In the case of friendships, helping a friend in need can be viewed as an adaptive response designed to increase fitness by protecting a valuable resource—idiosyncratic mutual knowledge—necessary for creating important non-zero-sum outcomes through coordinated action. With respect to romantic relationships, helping a partner in need also would be advantageous with respect to protecting uniquely held mutual knowledge; again as such knowledge is used to create coordinated outcomes. Additionally, helping a long-term mate enhances the survivability of a partner who has a vested interest in the raising of one’s offspring (Zeifman & Hazan, 1997). And finally, an evolutionary view of parental love and the extraordinary sacrifices this emotive response entails simply lays bare a gene’s attempt to help itself (Hamilton, 1964).
Overall, an evolutionary framework adds an explanatory layer of depth to Clark and Mills’ (1993) descriptions regarding communal giving.

The model offered here is also consistent with many of the claims and ideas underlying traditional resource-based accounts of close relational functioning (i.e., self-expansion model, resource theory, interdependence theory, equity theory; Aron & Aron, 1996; Foa et al., 1993; Kelley & Thibaut, 1978; Walster et al., 1978). Consistent with these accounts, we argue that close relationships are primarily a vehicle through which individuals realize non-zero-sum gains.

The proposed framework offers an alternative view of close relational functioning. There are key differences between our perspective and traditional explanations. First, we situate our model of relational life in an evolutionary paradigm. One of the advantages of using an evolutionary approach lies in its interdisciplinary nature. This interdisciplinary focus requires that knowledge claims made in one discipline must be consistent with knowledge claims established in other fields (Tooby & Cosmides, 1992). For this reason, those studying close relationships must make sure that their explanations about human life correspond with key developments emerging from anthropology, biology, ethology, psychology, the neurosciences, and related fields. Those using an evolutionary approach cannot operate in isolation from relevant discoveries outside their primary field of interest nor should they offer explanations that are inconsistent with discoveries in other domains. For example, the idea that gender differences among children with respect to toy preferences is due to socialization, modeling, or reinforcement is open to question given that one of our closest genetic relatives, vervet monkeys, demonstrate similar tendencies, yet these animals are not indoctrinated by our culture, values, or biases (Alexander & Hines, 2002). Along the same line, the notion that individuals should be able to accurately articulate how equitable resource expenditures are in their close relationships is open to debate (Gazzaniga, 1998). It is more likely that resource gains/losses are tracked at an emotional level and that mindful awareness of this process is most likely to occur in the negative case. And with that said, emotions are likely to precede the active, conscious search for the root cause of the problem at hand (see Damasio, 1999; Gazzaniga, 1998).

Consistent with this claim, some relational scholars are starting to argue that awareness of inequity may occur after the experience of negative reactions (Grote & Clark, 2001). Longitudinal research also suggests the possibility that variables typically considered as relational outcomes (i.e., affectively laden responses such as satisfaction and commitment) may precede judgments of equity, though such findings have been called a “reverse causal direction” (Sprecher, 2001b, p. 607). From the perspective put forward here, the data are most likely going in the right direction and perhaps some of our theoretical claims about close relationships need to be reconsidered.

Second, our approach is unique in that it places both reciprocity and similarity at the heart of our theoretical accounts of relational life. Unlike most relational approaches, similarity is not something to be set aside or simply accounted for by theories of reinforcement or by the desire to avoid cognitive dissonance. Moreover, our framework provides a straightforward and parsimonious account of the important role that similarity plays in close relationships—the more similar individuals are, with respect to their goals, beliefs, values, and interests, the better, because sharing similarities makes coordination easier to achieve. Unlike a self-expansion model, in which differences (within limits) would theoretically lead to more growth (Aron & Aron, 1996), the preference for similarity, not difference, is what drives relational development. Although individuals in close relationships may be able to view a partner’s performance-related (skill-based) differences in a complementary light (Beach, Whitaker, Jones, & Tesser, 2001), differences in goals, values, and interests are not the foundation
on which close relationships are built (Newcomb, 1961). In short, there is a direct correspondence between the key empirical findings about close relationships and our conceptual understanding of such relationships. Relationships are built on adaptive processes designed to produce non-zero-sum outcomes with respect to games of exchange and coordination.

Third, our model is unique in that it highlights the important role that coordinated action and mutual knowledge play in close relationships. Scholars are beginning to explore the neurological basis underlying social exchange processes (e.g., Stone et al., 2002), and, by comparison, our understanding of how individuals develop and use mutual knowledge when pursuing common goals through joint activity is regrettably underdeveloped. We suspect that a whole host of adaptations underlie coordination games in close relationships, yet little is known about such processes. We hope that more attention will be given to the study of coordination in close relationships.

Finally, the perspective offered here is unique with respect to the causal force presumed to underlie close relational functioning. According to our model, individuals are not logical game players, interdependence problem solvers, or outcome maximizers; rather, individuals are *emotionally driven adaptation executors* (Tooby & Cosmides, 1992; Wright, 1994). They respond to situations in the present based on strategies that were successful, on average, to our ancestors in the past. In other words, people do not approach relational life in a thoughtful, rational manner attempting to achieve a specific outcome; instead outcomes are created through innately configured strategies that sufficed when exchange and coordination games were played a long time ago. It is interesting to note that many of the people living in the market-driven economies of the world today are able to purchase from complete strangers many, if not all, of the benefits historically obtained through close, personal relationships. And from a purely rational standpoint, this may be the most efficient and economical way to obtain such resources; yet few people venture down this path. Instead, individuals prefer to reciprocate resources and participate in coordinated action with intimate others. We believe that this occurs because the human mind was not designed to approach long-standing problems with an eye toward the application of brute logic; rather the human animal was configured by natural selection to respond to situations by relying on innate and emotionally driven strategies that were sufficient when solving similar problems in the past. We argue that our theories of close relationships should reflect this simple yet profound assumption about human nature.

Reexamination of important relational issues. The conceptual shift from problem solver to adaptation executor is important because it forces us to look at relational life in a new light. As such, we hope that the ideas broached here will stimulate new ways of thinking about relationships and how they work. Topics such as trust, satisfaction, commitment, betrayal, and loneliness may have their meaning changed by a reexamination of close relationships in light of the ideas put forward here (Alexander, 1987). For example, trust has been defined as the belief that a partner is responsive to one’s needs (Holmes & Rempel, 1989), but the experience of trust may ultimately be linked to the extent to which dyadic partners can symbiotically trade resources and synergistically pursue mutual goals. Simply stated, trust may be a function of getting what one wants from a partner through repeated games of exchange and coordination. Along the same line, satisfaction and commitment may be viewed as indicators reflecting the degree to which partners can repeatedly trade resources and efficiently coordinate outcomes. With respect to betrayal, researchers have currently noted that this relational experience occurs when partners cheat at games of exchange (see Shackelford, 1997). From the perspective offered here, betrayal may also occur when a partner pulls out of, or refuses to play, coordination games as he or she has
in the past. Finally, it is interesting to note that the experience of loneliness has been linked to problems with reciprocal exchange (Buunk & Prins, 1989) and to a sense of alienation (i.e., feeling different, misunderstood, not needed; Rubenstein & Shaver, 1982). From our point of view, such feelings of alienation may stem from an individual’s inability to play complex coordination games with a partner. From this perspective, loneliness may prompt individuals to search for alternative relational partners who might be better suited to bringing about non-zero-sum outcomes.

The model proposed also may be useful when developing midlevel theoretical explanations about human behavior. We suspect that deceptive behavior among close interdependent parties is more pronounced in games of exchange than in games of coordination (cheating is more theoretically possible in social exchange situations). And with respect to games of coordination, we speculate that truth telling is more pronounced when partners’ interests naturally coincide, whereas deception is more likely to occur as interests begin to diverge (Alexander, 1987). Furthermore, our model may be useful in helping make sense of how individuals render judgments about their partners’ use of deception. When resource exchange and coordination are easy to achieve, individuals will have little interest in entertaining suspicions about their partners’ behavior. In contrast, feelings of suspicion will likely run high as exchange or coordination begins to result in discord.

Summary. We hope that the ideas presented here will stimulate scholars to think about old problems in new ways. The goal of providing an outline of our ideas is to encourage others to help us test the critical claims associated with our model. In particular, we hope that more attention will be given to examining the role of mutual knowledge in close relationships, considering how little is currently known about this important topic (Planalp, 1993). Though some may characterize the use of an adaptationist framework as a penchant for “telling stories” (Gould & Lewontin, 1979, p. 587), Tooby and Cosmides (1992) have argued that post hoc reasoning in other fields of inquiry—that is, reasoning from “form-to-function” (i.e., asking why Asia has the Himalayas)—often leads to important and novel discoveries, and therefore such accounts are often part and parcel of the scientific process, even when it comes to making sense of human nature (p. 77).

References


Clark, M. S., & Mills, J. (1993). The difference
Cosmides, L., & Tooby, J. (1992). Cognitive adap-
Byrne, D. (1971).
Botwin, M. D., Buss, D. M., & Shackelford, T. K.
Buss, D. M., Larsen, R., Westen, D., & Semmelroth, J.

What it is and is not.

between communal and exchange relationships:

Cambridge University Press.


Rational ritual: Culture, coor-

Personality and Social

Ghiselin, M. T. (1974). The economy of nature and the


Grote, N. K., & Clark, M. S. (2001). Perceiving unfair-
ness in the family: Cause or consequence of marital distress? Journal of Personality and Social Psychology, 80, 281–293.

Hamilton, W. D. (1964). The genetical evolution of


