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Reasons for Reconciling

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Reconciliation has become a fashionable topic in the study of primate social behavior, with its own e-mail network, workshops at scientific meetings, and even writings aimed at representation to popular audiences. Following an early report by de Waal and van Roosmalen,¹ researchers have now documented in about 20 primate species that opponents in aggressive conflicts are attracted to one another after aggression has ended and then engage in friendly reunions. "Reconciliation" designates a particular constellation of social interactions, but is also loaded with connotations that relate to the function of these interactions.

According to de Waal,² reconciliation acts to "repair the social network" as antagonists "mend their disturbed relationship" (p. 342). In fact, much more effort has gone into documenting the occurrence and patterning of postconflict friendly reunions than has gone into documenting their function in reconciling opponents. In this context, Silk's³ recent

questioning of the purported function of postconflict friendly reunions, or, as she calls them, peaceful postconflict contacts, is timely and welcome. Silk proposes that such reunions may not function to repair social relationships and preserve social bonds, but instead may be signals of benign intent that simply allow opponents to resume social interaction immediately after conflict.

We argue first that, based on generally accepted views of what social relationships are and how they change, Silk's "alternative" explanation is not really an alternative to the notion of social relationship repair. From an individual primate's perspective, that explanation may represent a more accurate view of the motivational underpinnings of this behavioral constellation, but this perspective is complementary, not antithetical, to a view of its ultimate function in relationship maintenance. Second, we suggest that Silk's search for an alternative explanation is due to her belief that if reconciliation functions to

maintain social relationships, postconflict reunions should have long-term effects on relationships. Long-term effects of reconciliation have not yet been demonstrated, but this lack of evidence is not compelling for several reasons. Also, we disagree with the premise that long-term effects are necessary indicators of the repair function of postconflict reunions. Nevertheless, Silk's analysis should challenge researchers to conduct more conclusive searches for such long-term effects, and generally to invest more effort in documenting the reconciliatory function of these postconflict friendly reunions. We close by discussing some new results, which suggest that monkeys are concerned about their social relationships, not just their immediate behavioral options, after aggressive conflicts.

The notion of repairing disturbed relationships is rather vague. We need to specify what is meant by "relationship," "disturbance," and "repair." Ethologists have defined social relationships in terms of the behavior (i.e.,

social interactions) exhibited by social partners. Kummer,⁴ emphasizing the functional consequences of engaging in relationships, described them as investments that facilitate beneficial social interactions between the individuals involved. Benefit is ultimately measured in terms of lifetime reproductive success. Interactions not only reflect the adaptive functioning of a relationship (e.g., grooming cleans the skin), but shape the relationship to maximize the value of the social partner (e.g., if A grooms B now, B may subsequently be more likely to tolerate A at a limited resource). Hinde⁵ used "relationship" to refer more descriptively to the content, patterning, and quality of interactions between two individuals. These parameters are important characterizations of the dyadic relationship because they describe the specific ways in which each individual responds, and has previously responded to the other. An important component of both definitions is that earlier interactions influence later ones. By definition, then, relationships last through time.

Relationships also change through time, as the individuals involved change the ways they respond to one another. These changes can occur over variable time scales. Primatologists often measure changes occurring over months or years. Examples include changes in newly formed groups, in mother-infant relationships, or in shifting alliances among male chimpanzees. Relationships may change over much shorter periods as well, however. Particularly relevant to the present discussion are changes that occur over minutes or perhaps hours, as a result of particular interactions between social partners. A single fight, for example, may change the relationship between the opponents from what it was before the fight occurred.

To document changes in relationships, researchers need to characterize them at two times. These characterizations typically involve a summary of data on the content, patterning, and quality of interactions over some period. Using Hinde's schema, an instantaneous characterization of a relationship is impossible. This does not mean that the

relationship does not exist at any one instant, but only that instantaneous resolution of its status, through an analysis of its constituent interactions, is not possible. To characterize a relationship at any particular moment, we need another strategy. One possibility, suggested by Kummer's more functional view, is to test or challenge the relationship's adaptive functioning: By providing two animals with an opportunity to interact adaptively, we can see whether or not they use this opportunity.

However one measures a relationship, whether over some period, perhaps a short one, or at an instant in time, we can view disturbance as an interruption in the usual pattern of behavior. The idea that aggressive conflict disturbs relationships is supported by both sorts of measurements. Aggressive conflicts frequently result in the immediate spatial separation of opponents or an increased rate of hostile interactions,⁶⁻¹⁰ so that beneficial interactions between them cease. In an experimental study of macaques, when dyads were challenged to show tolerance around a limited resource, prior aggression clearly reduced tolerance relative to baseline levels.¹⁰

Evidence that postconflict reunions may repair such disturbed relationships also comes from studies that characterize relationships in different ways. After conflicts, a victim is less likely to receive further aggression if it has had a friendly reunion with its opponent than if it has not had one.⁷⁻¹⁰ When two animals that recently have engaged in aggressive conflict are challenged to reveal their levels of mutual tolerance around a limited resource, tolerance levels are indistinguishable from baseline levels only when the aggression has been followed by friendly reunion.¹⁰

It is this latter notion of repair that Silk disputes, and to which she proposes an alternative explanation. She interprets the effect of postconflict friendly reunions on subsequent tolerance or rates of aggression not as relationship repair, but rather as "only" facilitating friendly interaction between the two opponents in the very near future. But what is relationship repair if it is not facilitating friendly

interaction and reducing the likelihood of further aggression? If postconflict friendly reunions enable former opponents to interact peacefully, they are changing the pattern of social interaction between the individuals from less to more tolerant, and this, by definition, signifies a change in their relationship.

At the level of motivation, it is certainly plausible that signaling benign intent in order to resume or allow peaceful social interaction comes closer to describing an individual's behavior than does signaling a desire to repair a social relationship. Whether and how nonhuman primates cognitively represent their social relationships is not yet understood, but these questions differ from the ultimate one concerning the function of postconflict reunions. They are certainly important questions, and Silk's analysis of what we would view as more proximate determinants of postconflict reunion raises a cautionary note about interpreting strategic reconciliation as evidence of Machiavellian intelligence.¹¹ For example, saying that primates have a greater desire to interact positively with more attractive social partners is a cognitively simpler explanation of their strategically directed reconciliation than saying that they directly assess the value (*sensu* Kummer⁴) of different partners and modify their behavior accordingly. But whether a simple rule of thumb or a more complex assessment is used in deciding whether to reconcile, the result, in terms of changing patterns of interaction and thus changing the relationship, would be the same.

As Silk points out, nearly all studies that have examined the effects of postconflict reunion on subsequent social interaction have looked at behavior that occurs within minutes after the reunion. These must be considered short-term effects. The conflicts typically investigated are also usually mild relative to the extreme forms of aggression of which primates are capable. In the course of a relationship that may last for years and even decades, these short-term ups and downs may seem like minor events. Silk's essay, as well as a recent research paper by Silk, Cheney, and Seyfarth,⁹ suggest that it is particularly the absence of demon-

strable long-term effects of postconflict friendly reunions that leads her to emphasize only their immediate consequences and to question their influence on long-lasting relationships.

We agree with Silk that there presently are no convincing data demonstrating any effects of friendly reunions on social relationships beyond a few minutes after conflict. However, there also are no convincing data refuting such long-term effects. The only explicit attempt to identify longer-term effects was made by Silk, Cheney, and Seyfarth,⁹ in a study of wild female baboons. These investigators considered whether postconflict reunion (actually grunts by the aggressor) influenced rates of friendly and agnostic interactions between former opponents over the ten days following conflict. They found no effect, except that aggression actually increased. This negative result is inconclusive, however, for at least three reasons.

First, Silk and her colleagues considered influences on only the rates of social interaction between former opponents. Rates are easy to score, but are only one possible measure of social behavior. It might be more revealing to consider other measures, like duration, quality, and context of social interactions or to examine critical postreunion events such as opportunities for cooperation between the former opponents.

Second, in this observational study, the independent variable (occurrence of reunion) was not manipulated, so that conflicts followed by reunion might have differed in some way from those not followed by reunion. For example, the conflicts followed by reunion might have been more severe, at least from the participants' perspective, than those not followed by reunion. Perhaps these more severe conflicts would have led to depressed levels of interaction in the following ten days had no reunion occurred. Reunion might have prevented this reduction in interaction and restored the rate of subsequent social interaction to a level comparable to that following less severe conflicts, namely those not followed by reunion. Alternative explanations like this bedevil any nonexperimental study of cause and effect.¹²

Third, the particular postconflict reunions that these investigators examined, namely grunts by dominant female aggressors, may not have been conciliatory reunions. Female baboons direct their grunts almost exclusively to mothers of infants, to whom they are highly attracted; these grunts generally facilitate access to infants, even outside postconflict contexts.¹³ While grunts by a dominant female may signal her benign intent toward another female's infant, they may not signal affiliative intent toward the mother herself: Grunts did increase infant handling by dominant partners after conflicts, but not affiliation between females.⁹ An inhibition of hostile interactions between females by the dominant's postconflict grunts may result automatically if an absence of hostility is required for simultaneous attention to the infant. It may seem that we are now agreeing with the major point of Silk's essay, namely that postconflict reunions do serve only immediate ends, and do not act to repair relationships. Instead, however, our point is that Silk and her co-workers may have been focusing on the wrong kind of reunions, namely those that must automatically result when a female tries to handle a dependent infant that isn't hers. In this particular situation, the relationship between the two adults may be beside the point.

Silk, Cheney, and Seyfarth⁹ cite Cords and Thurnheer's¹⁴ experimental study as providing additional evidence that postconflict reunions serve to indicate an animal's immediate intent. These researchers did not manipulate reunions after individual conflicts, but did manipulate an overall tendency for the macaques they studied to engage in postconflict reunions. During the period in which reconciliation was more frequent, social partners did not have friendly interactions at higher rates than when reconciliation was less frequent. Again, however, rates are the only data presented that might reflect relationship quality. This is because the study was not designed to investigate long-term consequences of postconflict reunion. Also, rates of interaction were measured concurrently with rates of reconciliation, so the sampling schedule could not have re-

vealed whether high rates of reconciliation would be followed by, and hence could possibly have caused, high rates of sociopositive interaction.

The shortcomings of these two studies in demonstrating long-term effects of postconflict friendly reunion highlight the need for more carefully designed investigations. However, even if future research supports the conclusion that a single reunion has a negligible influence on a relationship viewed in the long term, it is conceivable that the cumulative experience of many conflicts, most followed by friendly reunion, does influence relationships in the long run. In a simple additive way, the proportion of friendly interactions would have to be higher for dyads that reconciled repeatedly than for dyads that did not. The habit of reconciling conflicts might make social partners get along better over the long run by increasing a dominant's tolerance of the subordinate, and by decreasing chronic stress in the subordinate. Repeated occasions in which partners communicate their mutual interest in each other by reconciling after conflict may increase the predictability of their interaction patterns, and hence their ability to interact in adaptive ways.¹⁵ These are just hypotheses at present, as there are, again, no relevant data. Testing these ideas would be difficult: One would have to manipulate the occurrence of postconflict friendly reunion over a long period. But the main point here is that there is, in principle, a way that postconflict friendly reunion could serve a long-term function in maintaining and improving relationships, even if any single reunion, viewed in isolation, had only an immediate effect on social interaction. Thus, while the existence of long-term effects of particular social interactions remains an interesting empirical question, it is not necessarily the critical question in resolving the ultimate function of those interactions. Postconflict reunions that repair social relationships need not lead to their long-term improvement. Such reunions might change only immediate interactions between former opponents, but if the nature of the interaction is thereby returned to what it was before conflict, the reunions do repair relationships.

Having acknowledged that postconflict reunions may have both short- and long-term effects on behavior, and that both kinds of behavioral effects could influence relationships in the long-term, we would like finally to consider some new data that may shed light on which timescale matters to the monkeys themselves. Some studies of reconciliation have been concerned with the anxiety levels of the opponents (especially the victim), which are measured in terms of displacement activities like self-scratching.¹⁶ These studies suggest that anxiety and its relief may be proximate determinants of reconciliation behavior. Following conflict among long-tailed macaques, victims' anxiety levels are well above baseline, and postconflict reunion hastens their return to baseline. The postconflict increase in displacement activities and their return to baseline levels following reunion coincide with the pattern of recurrence of aggression against the victim, a possible cause of stress and anxiety.⁸

What happens if we consider the victim's anxiety level as a function of the social relationship it has with its opponent? In a recent analysis, Aureli¹⁷ found that macaque victims scratch more after unreconciled conflicts with "friends" than with "non-friends," where friendship was operationalized in terms of affiliation frequency. For at least ten minutes after conflict, the probability of receiving aggression from the original aggressor or others (or both) was not

different when these conflicts were with "friends" versus "non-friends." Differential risk of immediately resuming hostilities therefore cannot explain the difference in anxiety levels after conflicts with "friends" versus "non-friends." If, however, victims were concerned about disturbance of their longer-term relationships, Aureli's result would be expected. It is consistent with this interpretation that "friends" reconciled more of their conflicts than did "non-friends." While this result does not specify how long the longer term may be, it nevertheless suggests that something beyond the immediate future is relevant.

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