'You scratch my back and I scratch yours' versus 'love thy neighbour'
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CHAPTER 5

Reciprocal altruistic behavior and emotions
Scorekeeping versus bonding

1 Reciprocal altruism and emotions

Emotions play an important role in the concept of psychological mechanisms. According to evolutionary psychology, humans are equipped with mental modules, or psychological mechanisms. These psychological mechanisms have evolved to cope with recurrent situations in the ancestral environment (Cosmides and Tooby 2000; Crawford 1998). Whenever an individual is confronted with a cue signaling such a situation, the mechanism is triggered and the appropriate responses become salient (Symons 1992; Tooby and Cosmides 1990b). Emotions function to link the ancestrally appropriate behavioral response to a specific adaptive problem (see also Frijda 1986; Nesse, 1990; Plutchik 1980). For example, the cue “large fanged animal” activates the emotion of fear, which prepares the organism for the appropriate response: to flee. In addition to the basic emotions of fear, joy, anger and sadness, also the secondary, or social emotions, are attributed with specific functions. For example, guilt is triggered by the subject’s wrong doing of another person, and functions to urge reparation of the relationship (Fessler and Haley 2003; Parker 1998). Jealousy functions to warn people that their reproductive partner offers too much attention to a potential rival (either sexually or in terms of

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1 This chapter has been submitted for publication (c-authored with Frans N. Stokman).
resources) (Buss 2000). And according to Leary (1999), low self-esteem warns the subject that he is not accepted by his group and needs to mend this.

This paper focuses on the emotions accompanying reciprocal altruism. Although many authors have suggested the relevance of specific emotions for reciprocal altruistic behavior, empirical work is scarce. Using two mechanisms of reciprocal altruism as a starting point, the first being triggered by an imbalanced relationship and the second by the need of the other person, we will formulate hypotheses about the role of emotions in reciprocal altruistic behavior. Hypotheses will be tested by presenting subjects with dilemmas involving cues from both mechanisms, which are expected to trigger different emotional and behavioral responses.

1.1 The scorekeeping mechanism

In his seminal paper, Trivers (1971, p. 35) defines altruistic behavior as behavior that benefits another organism’s inclusive fitness while being detrimental to the organism performing the behavior. The presence of such behavior between non-related individuals, especially among humans, seems to contradict the principles of evolution. Trivers argues that such behavior is adaptive to the extent that the performer of the behavior keeps track of whether the recipient repaid him or not, and if not, curtails all future benefits to this individual. If all individuals are exposed to the same risk of needing help, in the end, reciprocal altruists are better off than non-altruists. For the human case, Trivers draws an outline of a psychological system underlying reciprocal altruism, in which an important role is played by specific emotions. Positive emotions like friendship and liking are presented as emotions motivating altruistic behavior. On the other hand, moralistic aggression and indignation are triggered by the absence of a reciprocal benefit, and function to stop one from providing the recipient with any future benefits, as well as punish, or threaten to punish, the recipient. Gratitude functions as to regulate one’s response to altruistic acts, and guilt leads someone who has cheated to make up for his misdeed and to behave reciprocally in the future. Other emotions suggested by Trivers are sympathy (which motivates altruistic behavior as a function of the plight of the recipient), and trust and suspicion (which helps one to detect possible cheaters).

Although the psychological system provided by Trivers includes a considerable number of emotions expressing a willingness to help and an interest in the other person’s needs, later scholars have focused on the avoidance of being cheated. Thus, in general, the psychological mechanism of reciprocal altruism is
described as a mechanism for scorekeeping (e.g., Cosmides and Tooby 1992; McElreath et al. 2003). This mechanism is very similar to the basic assumptions of the social psychological tradition of equity theory (Walster et al., 1978), according to which individuals try to avoid situations in which the ratio of outputs and inputs associated with a relationship is either larger of smaller than the other person’s ratio.

Figure 5.1: Scorekeeping mechanisms (avoiding underbenefiting and avoiding overbenefiting)

The central cue of the scorekeeping mechanism is the difference between benefits received and benefits provided. The resulting behavior is aimed at recovering or maintaining this balance, in the case of both underbenefiting and overbenefiting. Thus, if someone else has received more than he has given back, retaliatory emotions like indignation and anger are triggered, leading to behavior aimed at recovering the balance between benefits provided and received (Nesse 1990; Parker 1998; Trivers 1971). On the other hand, the opposite situation is harmful too. To prevent others from considering me a cheater, I have to avoid that I receive more from them than I return. Therefore, overbenefiting from a person triggers urge-to-reciprocate emotions like obligation, gratitude, guilt, and fear of retaliation, resulting in behavior aimed at recovering balance (Nesse 1991, p. 277; Parker 1998, p.127; Trivers 1971). See Figure 5.1.
1.2 The bonding mechanism

A number of scholars have criticized the one-sided emphasis on scorekeeping. For example, Kiyonary et al. (2000) argue that cooperation not only requires a cheater detection mechanism, but also a social exchange heuristic, or a willingness to cooperate. According to Tooby and Cosmides (1996), scorekeeping behavior is restricted to the exchange domain, which is characterized by explicit contingent exchange and turn-taking reciprocation. In contrast, the altruistic adaptations in the friendship domain do not map unto the structure of tit for tat or any other standard model of reciprocal altruism, they argue. Instead, friendships are characterized by a spontaneous pleasure to help the other, without looking for a contingent return (p. 131, 139; see also Silk 2003). Moreover, using simulation data, De Vos and coworkers (2001; this dissertation, Chapter 3) show that a strict scorekeeping strategy is vulnerable in an unpredictable environment, where actors do not get in distress neatly in turn. They distinguish between two reciprocal altruistic strategies, one guided by the rule to minimize the difference between benefits received and benefits provided (called Keeping Books Balanced); the other characterized by the tendency to return to those actors with whom one has interacted most frequently (called Commitment). Their simulations show that if the risk of getting in need of help is high, actors using a Commitment strategy are more successful in invading a population of non-cooperative actors than are actors using a Keeping Books Balanced strategy.

Similar distinctions have been made by sociologists and social psychologists. Clark and Mills (1979; Clark and Grote 2003) distinguish between exchange relationships and communal relationships. Communal relationships are characterized by mutual concern about each other's welfare and a positive attitude towards benefiting the other when a need exists. Exchange relationships, on the other hand, are characterized by the obligation to reciprocate a received benefit with a comparable return benefit. Clark and Mills hypothesize that individuals have communal relationships with family members, romantic partners and friends, whereas relationships with acquaintances, strangers and business partners pertain to the domain of exchange relationships. The results of their experiments demonstrate that towards (potential) friends or romantic partners, subjects are less likely to keep track of benefits provided and benefits received, and show more liking if the other does not keep tracks of benefits provided and benefits received, compared to strangers or persons who are not available for friendships or romantic partnerships (Clark 1984; Clark and Mills 1979). Fiske (1992) proposes four universal forms of sociality, of which communal sharing is identical to Clark and...
Mills’ communal relationship, whereas both equality matching, in which people keep track of the imbalances among them, and market pricing, where all relevant features and components are reduced to quantitative utilities, can be considered part of Clark and Mills’ exchange relationship (the fourth form of sociality Fiske distinguishes, authority ranking, is not relevant here). Moreover, Deutsch (1975) distinguishes between different norms of distributive justice. The equity norm, according to which a person’s received benefits should be proportional to the costs he has made, is similar to the operation of an exchange relationship. In contrast, the need norm, according to which a person should be rewarded according to his needs, applies to the workings of a communal relationship. In a study by O’Connell (1984), the presence of different norms governing exchange behavior was tested among people who built their own houses. The results show that benefits exchanged between kin and friends, in contrast to benefits exchanged on the market-place, are governed by non-instrumental concern and the need norm.

In sum, there are many indications for the presence of an additional mechanism of reciprocal altruism. In contrast to the scorekeeping mechanism, this mechanism is triggered by the other person’s need, rather than by an unbalance in scores. The relevant emotions are those expressing an interpersonal bond, and a desire to help others in need. Because of the focus on the bond between individuals, we use the term bonding mechanism (see Figure 5.2).

**Figure 5.2: Bonding mechanism**

![Diagram of bonding mechanism]

**1.3 Research questions and expectations**

Two questions will be addressed. First, what is the relation between bonding emotions and behavioral responses, and scorekeeping emotions and behavioral responses, respectively? And second, do emotions play a mediating role between cues and behavior? These questions are addressed by presenting subjects with situations containing cues for both the bonding and the scorekeeping mechanism, thereby posing a dilemma between bonding and scorekeeping behavior. All situations involve both a needy person requesting for help, and an unbalance in...
benefits received and benefits provided – either an unbalance in which the subject is underbenefiting, or one in which the subject is overbenefiting. Based on the descriptions of the two mechanisms, we expect high levels of bonding emotions towards the needy person, like commitment and warmth, to increase the tendency to help. In contrast, in the dilemma between helping a needy one and avoiding underbenefiting, high levels of retaliatory emotions, like anger and indignation, are expected to correlate with a refusal to help. On the other hand, in the dilemma between helping a needy one and avoiding overbenefiting, high levels of obligation, guilt, gratitude and fear of retaliation towards the person to whom one is indebted, are expected to correlate with reciprocating behavior. (Note that in the last situation, there is only a dilemma if the needy one is a different person than the person from whom one is overbenefiting).

Second, if emotions play a mediating role between cues and emotions, the effect of situational characteristics on an individual’s behavioral response should be explained by the emotions experienced by this individual. Two situational characteristics will be investigated: the Object of help and the Relationship with the interaction partner. Both situational characteristics are varied between a typical exchange characteristic and a typical communal characteristic. Thus, the object of help is varied between providing assistance in the case of illness and the lending of money, and the relationship with the interaction partner is varied between a good friend and an acquaintance. If emotions play a mediating role, the effects of both the object of help and the relationship with Alter on behavioral response should be fully accounted for by the emotions triggered by these situational characteristics.

Finally, since the social psychological literature on helping behavior has given a great deal of attention to the effect of personality, also a number of personality characteristics are taken into account. Experiments have demonstrated positive effects of prosociality, responsibility, internal control, and empathy on willingness to help (Eisenberg et al. 1994; McClintock and Allison 1989), as well as on cooperative behavior in prisoner’s dilemma games (Van Lange 1999) and reward allocation decisions (Perugini and Galluci 2001). In addition, individuals who have actually engaged in helping behavior (rescuing Jews; providing first aid after an accident) scored higher on internal control and social responsibility (Bierhoff et al. 1991; Oliner and Oliner 1988). However, none of these studies have investigated the role of emotions in the relation between personality characteristics and helping behavior. As in the case of situational characteristics, we expect the effect of personality characteristics on reciprocal altruistic behavior to be mediated by emotions. Figure 5.3 shows the complete model.
2 Methods

Subjects
Subjects were 402 first-year psychology students, who had to spend three half days filling out questionnaires as part of their curriculum. The relevant questionnaire was scheduled halfway through the first day and took about fifteen minutes to complete. Completed questionnaires were obtained from 391 subjects. Data from two other questionnaires, scheduled at other times during the three half days, were also included, namely a Social Value Orientation scale (N=386), and a Justice Sensitivity scale (N=385). Mean age was 20 years (sd=4); 73% of the subjects were of the female sex.

Experimental design
Subjects were presented with three scenarios about a situation in which they were being asked for help by one or two persons they knew. All scenarios contained on the one hand cues for the bonding mechanism (someone in need for help), and on the other hand cues for the scorekeeping mechanism (an imbalance in benefits received and provided). Thus, they formed dilemmas between helping a needy person and avoiding an unbalanced relationship. Behavioral response was measured on a four-point scale, ranging from a definite scorekeeping response to a definite bonding response. This dilemma structure made it possible to investigate which and to what degree personality, situational and emotional variables predict a subject’s decision for a bonding response as opposed to a scorekeeping response.
To control for order-effects, the order of the dilemmas was randomly varied. Immediately following the scenario, subjects had to report how they would feel towards the requester(s) in the story. Next, they were asked what they would do. Finally, subjects were asked to estimate how the requester in the story would feel if they would not help him (in the case of two requesters they were asked to estimate how the requester whom they had chosen to help would feel if they would not have helped him).

Two situational characteristics were manipulated, namely Object of help and Relationship with Alter. First, Object of help was varied by presenting half of the subjects with scenarios concerning the lending of money, the typical object of exchange relations. In these scenarios the request for help involved a request to borrow 100 Euros because the requester’s purse had been stolen. The other half received scenarios involving a more timeless object of help, namely the providing of help in the case of illness. In these scenarios, requesters asked the subject to come over the next day to take care of them. Second, subjects’ Relationship with the requester(s) was varied between a typical communal relationship type and a typical exchange relationship type, namely friend and acquaintance. This was done by presenting half of the subjects with scenarios involving only “good friends”, and half of the subjects with scenarios involving only “acquaintances”. The question of whether these characteristics are related to helping behavior and scorekeeping behavior is dealt with elsewhere (Smaniotto et al., submitted). Here, their primary function is to generate variation in the dependent variables.

Scenarios

Two scenarios posed a dilemma between helping a needy one and avoiding underbenefiting. Both scenarios involved one actor who is in need and requests for help. In the Debtor in need dilemma, the requester (D) was someone who already received help from the subject recently. Helping him again would imply an increase in the imbalance of benefits received and benefits provided, and put the subject at risk of being cheated. By refusing to help, this risk would be avoided. Thus, granting the request was the typical bonding response, whereas refusing to help was the typical scorekeeping response (see Figure 5.4A).
The Refuser in need dilemma was included as a more literal translation of the tit for tat strategy. It was similar to the Debtor in need dilemma, except that the requestor (R) was someone who had recently refused to grant a request for help on the subject’s part. Again, helping this person would put a subject at risk of being cheated. By refusing to help one would retaliate his previous behavior.

To emphasize the seriousness of the requesters’ need for help, in both the Debtor in need and the Refuser in need dilemma, subjects were informed that the requesters did not know many people whom they could appeal to. Behavioral response was measured on a four-point scale, with answering categories “definitely not helping”, “probably not helping”, “probably helping”, and “definitely helping” (see Figure 5.4B).

The third scenario posed a dilemma between helping a needy one and avoiding overbenefiting (Reciprocate vs help dilemma). In contrast to the previous dilemmas, it was
impossible to devise a dilemma between avoiding overbenefiting and helping a needy one if only one requester is involved. If a person to whom I am indebted is in need, both the bonding and the scorekeeping mechanism would respond with providing help. Therefore, a scenario involving two requesters was devised, where the dilemma consisted of which requester to provide benefits to. In this scenario both actors requested for help at the same time. The first requester (the creditor, C) recently granted a similar request for help by the subject. However, in contrast to the second requester (the needy one, N), he was only mildly in need. Thus, in the money context C asked for repayment of 100 Euros because he wanted to buy new clothes, whereas N asked to borrow 100 Euros because his purse had been stolen. Similarly, in the illness context C asked for assistance because he had caught a touch of flu, whereas N’s illness was described as more serious, preventing him from leaving the house. Therefore, if the subject chose to reciprocate C, this would indicate that he attached a higher priority to avoiding overbenefiting. If he chose to help N, this would indicate a preference for helping someone who is in need. Again, a four-point scale was used, with answering categories “definitely reciprocating C”, “probably reciprocating C”, “probably helping N”, and “definitely helping N”. Subjects were informed that they did not have enough resources to provide benefits to both requesters, that they had known both requesters for about an equally long period, that C and N earned about the same income, and that they did not know much people whom they could appeal to (see Figure 5.4C).

Measurement of emotions

Emotions were measured using self-reports. Although reliability of self-reports of emotions has been questioned – critics have put forward problems of memory, self-deception, social desirability and individual differences in lexical meanings (Lazarus 1991, p. 450; Plutchik 2003, p. 17), they are generally considered a valuable option (Lazarus 1991; Ortony et al. 1988, p. 9; Wallbot and Scherer 1989), especially since the possibilities of taking objective measurements of emotions are still in their infancy. As yet, no clear-cut relations between complex emotion states and physiological responses have been established (Plutchik 2003, p. 141-143).

For every requester, subjects were instructed to fill out a list of emotions. All emotion lists contained the same fourteen emotions that were selected to represent Bonding emotions (Commitment, Warmth, Worriedness), Retaliatory emotions (Contempt, Anger, Disappointment, Indignation, Irritation), and Urge-to-Reciprocate emotions (Gratitude, Obligation, Guilt). Three additional emotions
functioned as filler-items (Sadness, Uncomfortableness, Understanding). Subjects were instructed to indicate the degree to which they would experience the concerning emotion on a four-point scale (answering categories “not at all”, “a little”, “quite”, “strong”). Furthermore, after the behavioral response measure they were presented with a final emotion list containing the same emotions on which they had to rate the emotions they would expect the target person to experience if they had not helped (in case of the Reciprocate vs help dilemma, the target person was the one they had chosen to help). Of these lists the Expected Retaliatory emotions were used as a measure of fear of retaliation.

Principal Factor analyses were conducted to confirm the hypothesized categories (see Appendix 3). Emotion responses to the Debtor in need and the Refuser in need dilemmas were combined (see Section 3.1). The Retaliatory emotions and the Expected Retaliatory emotions formed clear factors in all emotion lists. Reliability analyses yielded alphas ranging from 0.78 to 0.90. Warmth, Commitment and Worriedness were part of the same factor in most of the emotion lists, but Worriedness showed consistently lower factor loadings. In contrast to expectations, Gratitude was also placed in this factor. As in the case of Worriedness, factor loadings were generally low. Moreover, communality-values of Gratitude were occasionally extremely low, indicating that the variance in Gratitude responses was not well explained by the common factors. Therefore, a two-variable Bonding variable was constructed, consisting of Warmth and Commitment. Alphas ranged between 0.67 and 0.75. There appeared to be no cluster of Urge-to-Reciprocate emotions. Obligation, Gratitude and Guilt never appeared as a single cluster. They were sometimes categorized in the Bonding emotions factor and sometimes in different factors. Like Worriedness, they are treated as separate emotions in the further analyses.

**Personality traits**

Personality scales were administered at other times during the three half days subjects spent filling out questionnaires. The personality measures include a scale that is often associated with prosocial or altruistic behavior, namely an adjusted version of the Social Value Orientation Scale, as well as a questionnaire consisting of two scales that explicitly focus on the avoidance of underbenefiting and overbenefiting.

**Prosociality.** Subjects were presented with five questions from the Social Value Orientation Scale developed by Van Lange et al. (1997), which originally consisted of nine items. All five questions concerned a choice for one out of three
different distributions of a fixed amount of money, to be divided between the subject and another actor. Options always included a prosocial distribution, with both Ego and Alter getting the same amount; an individualistic option, which was, compared to the prosocial option, more beneficial to Ego and less beneficial to Alter; and a competitive option, in which, compared to the individualistic option, Ego’s reward was smaller but the difference between Ego’s reward and Alter’s reward was larger. Instead of categorizing subjects as either prosocial, individualistic or competitive, an interval variable was created by adding up the number of prosocial answers. Since the number of competitive answers was extremely low (only five out of 386 subjects chose for the competitive option one or more times), it made no sense to use competitiveness as a separate variable.

Justice Sensitivity Victim (JS Victim). We used a six-item scale to measure subjects’ sensitivity of being a victim of injustice, as developed by Schmitt et al. (1997; see also Fetchenhauer and Huang 2004). Examples of items are “I am irritated when others get the praise that should be given to me” and “I don’t forget when I need to repair another person’s omissions.” Subjects were asked to indicate the degree to which each item applied to them on a seven-point scale. (Reliability: alpha=0.76.)

Justice Sensitivity Perpetrator (JS Perpetrator). Subjects’ sensitivity of being a perpetrator of injustice was measured by the mirrored version of the JS Victim Scale, also developed by Schmitt et al. (1997). Items include “My conscience objects when I get the praise that should be given to someone else” and “I don’t forget when someone else has to repair my omissions”. (Reliability: alpha=0.75.)

3 Results

Although the dependent variable was measured on a quasi interval scale, linear regression analyses would yield unreliable results due to highly skewed distributions of both emotion and behavior responses (see Appendix 4). Instead, behavioral response variables were dichotomized and used as dependent variables in a series of logistic regression analyses. In the Debtor in need and Refuser in need dilemmas answering categories were recoded into helping versus not helping, and in the Reciprocate vs help dilemma answering categories were recoded into helping N versus reciprocating C. Rather than using subjects’ scores on the independent variables to predict the scores on behavioral response, logistic regression analysis predicts the probability of helping (as opposed to not helping/ reciprocating). Separate analyses
were performed for the scenarios posing a dilemma between helping a needy one and avoiding underbenefiting (Debtor in need and Refuser in need dilemmas) and for the scenario posing a dilemma between helping a needy one and avoiding overbenefiting (Reciprocate vs help dilemma).

3.1 Avoiding underbenefiting versus helping

The two scenarios posing a dilemma between helping a needy one and avoiding underbenefiting were analyzed together. To avoid being forced to use a repeated measures statistical design, from each subject only the responses on the dilemma emerging first in the questionnaire was included in the analyses. Next, a dummy variable was created to indicate whether the requester was a debtor or a refuser. Guilt and Gratitude were excluded from the analyses because of the small number of subjects reporting Guilt or Gratitude in either the Debtor in need or the Refuser in need dilemma (more than 90% of subjects were in the two lower categories; see Appendix 4).

Table 5.1 shows the results. To facilitate interpretation, odds values [Exp(b)] rather than logodds values are shown. Odds values denote the probability of helping as a fraction of the probability of not helping. For example, an odds of 1 indicates that the probability of helping equals the probability of not helping, that is, no effect of the concerning predictor whatsoever. A value larger than 1 means that with each additional unit of the predictor, the odds of helping versus not helping increases. A value smaller than 1 indicates that with each additional unit of the predictor, the odds of helping versus not helping decreases. To facilitate comparison of negative and positive effects, values smaller than 1 are denoted as \(1/\exp(b)\). For example, in the case of Bonding emotions (Model 1), each additional unit of emotion leads to a multiplication of the odds of helping by 2.34. The effect of Retaliatory emotions is larger in size and opposite in direction: with each additional unit the odds of helping is multiplicaled by 4.02, or 0.25.
Table 5.1: Results of logistic regression analyses on the Debtor in need and Refuser in need dilemmas. Values denote the odds of helping versus not helping \( \exp(b) \).

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
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<td>1.20</td>
<td>500.00</td>
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<td>1.31</td>
<td>1.43</td>
<td>1.43</td>
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<tr>
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<td>1.84</td>
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<td>4.61</td>
<td>1.77</td>
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<tr>
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<td></td>
<td>1.67</td>
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</table>

N: 379 370 361 361
-2 Log likelihood: 319.11 336.60 261.11 243.37
Hosmer Lemeshow Test (Chi²): df=8 (ns) df=8 (ns) df=8 (ns) df=8 (ns)

Note: Emotions were measured on a 4-point scale with 1=not at all and 4=strong.
** Wald statistic significant at p<0.01; * Wald statistic significant at p<0.05

To answer the first research question, regarding the effects of Bonding emotions and Scorekeeping emotions on behavioral responses, a model was estimated with the emotions as independent variables and behavioral response as dependent variable (Table 5.1, Model 1). We expected that Bonding emotions and Worriedness trigger helping behavior, whereas Retaliatory emotions lead to

Scorekeeping and bonding emotions in a dilemma between helping and avoiding underbenefiting

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behavior aimed at avoiding an unbalance (i.e., refusing to help). In other words, a high degree of Bonding emotions and Worriedness should increase the odds of helping, and a high degree of Retaliatory emotions should decrease the odds of helping.

The results show that, in accordance with expectations, Bonding emotions have a positive effect on the odds of helping and Retaliatory emotions have a negative effect. The effect of Worriedness is slightly positive but not significant. Obligation, which was expected to be only effective in the dilemma between helping a needy one and avoiding overbenefiting, increases the odds of helping. Also Expected Retaliatory emotions increase the odds of helping, although the effect is not significant. This suggests that the designated Urge-to-Reciprocate emotions are not exclusively related to avoiding overbenefiting. A possible interpretation is that individuals feel that they have a strong moral obligation to help a person in need, which is both expressed by the emotion of obligation and, to a lesser degree, by the expectation that the other person will be resentful if they do not help.

The role of emotions in a dilemma between helping and avoiding underbenefiting

Models 2 to 4 center on the question whether emotions play a mediating role between personality and situational variables on the one hand, and behavioral responses on the other hand. To answer this question we need to compare logistic regression models when excluding and including the emotion variables. If emotions play a purely mediating role, the following conditions should be fulfilled (e.g., Baron and Kenny 1986):

1) The model including the emotion variables has a better fit than the model excluding the emotion variables.
2) The logistic regression coefficients of the situational and personality variables decrease when including the emotion variables.
3) The logistic regression coefficients of the emotion variables do not decrease when controlling for the personality and situational variables.
4) There are no interaction effects of emotion variables and personality or situational variables. If that were the case, this would point to a moderating rather than a mediating role of emotions.
5) When conducting additional regression analyses with the significant emotions as dependent variables, the personality and situational variables that were significant in the logistic regression analyses show significant effects.
Model 2 contains the effects of the situational and personality variables. The Dilemma variable, Object of help, Relationship with Alter and Sex were inserted as dummy variables, whereas JS Victim, JS Perpetrator and Prosociality were treated as interval variables. In addition, all possible 2-way interaction terms were subjected to a stepwise selection procedure. As shown in Model 2, there are significant main effects of Object of help and JS Victim. The odds of helping is 2.27 times as large in the illness context as it is in the money context. The negative effect of JS Victim indicates that subjects who are more sensitive to being a victim of injustice are less likely to help. As appears from the absence of further significant effects, the odds of helping does not differ for friends versus acquaintances and females versus males, nor does it change with increasing scores on JS Perpetrator or Prosociality. In addition, there are two significant interaction effects, one concerning Dilemma and Prosociality and the other of Dilemma and Object of help.

Figures 5.5 and 5.6 depict the probability of helping as a function of Prosociality and Object of help, respectively. Odds values were converted into probabilities using the formula:

\[
\text{Probability of helping} = \frac{\exp(a + b_1^*x_1 + b_2^*x_2 + \ldots + b_n^*x_n)}{\exp(a + b_1^*x_1 + b_2^*x_2 + \ldots + b_n^*x_n) + 1}
\]

The concerning x's were substituted with different values of Prosociality and Dilemma (Figure 5.5) and Object of help and Dilemma (Figure 6). To control for the remaining variables, all other x's were substituted with their mean values. As is shown in Figure 5.5, the negative interaction effect of Dilemma and Prosociality indicates that Prosociality only affects responses in the Refuser in need dilemma. In the Debtor in need dilemma, the probability of helping is very high, regardless of the degree of Prosociality. Moreover, the positive interaction effect of Dilemma and Object of help indicates that whereas subjects are equally likely to grant a request for money by a Debtor or a Refuser, they are less likely to grant a request for assistance in the case of illness if it concerns a Refuser than if it concerns a Debtor (see Figure 5.6). This suggests that being ill is considered such an urgent need that a previous refusal is less acceptable, and more likely to evoke punishment in the form of withholding help, compared to indebtedness.
Figure 5.5: Probability of helping as a function of Prosociality.
Key:
- - Debtor in need
- - - Refuser in need

Figure 5.6: Probability of helping as a function of Object of help.
Key:
- - Debtor in need
- - - Refuser in need
Model 3 includes situational and personality variables as well as the emotion variables from Model 1. The first three requirements for the mediating role of emotions prove to be fulfilled. First, the sharp decline of the -2 log likelihood ratio indicates a strong increase in model fit (Chi²=75.49; df=5; p<0.001). Second, there is a general decrease in the effects of the situational and personality variables. The main effect of JS Victim and the interaction effect of Dilemma and Prosociality lose significance. The main effect of Object of help remains at the same level, but its interaction effect with Dilemma decreases substantially. And third, all emotions that were significant in Model 1 maintain significance.

The fourth requirement for the mediating role of emotions is tested in Model 4. If emotions have a mediating role between situational and personality characteristics, they should have identical effects within each category of the situational and personality variables. In other words, there should be no significant interaction effects. The presence of significant interaction effects would imply that the emotions operate differently within the different categories of the personality and situational characteristics, rather than explain the effect of the personality and situational characteristics. Model 4 contains all variables of Model 3, as well as those two-way interaction terms of emotions and situational or personality variables that proved to be significant in a stepwise selection procedure. In contrast to expectations, there are two significant interaction effects: a negative interaction effect of Sex and Retaliatory emotions and a negative interaction effect of Prosociality and Worriedness. Both of these will be interpreted in the next section.

The fifth requirement for the mediating role of emotions is that the indirect effects of situational and personality characteristics are confirmed by linear regression analyses with the emotions as dependent variables. Table 5.2 shows the results of three regression analyses, with the emotions that were significant in Model 1 as dependent variables, and the situational and personality characteristics, including the two interaction effects, as independent variables.

The results confirm the presence of some of the suggested indirect effects. Thus, the indirect effect of JS Victim on the odds of helping appears to be due to a negative effect on Bonding emotions (b=-0.02; p<0.01) and a positive effect on Retaliatory emotions (b=0.03; p<0.01). The effect of the interaction term Dilemma by Object is spread over all three emotion variables: compared to Refusers in need of money, Debtors in need of nursing elicit more Bonding emotions (b=0.53; p<0.01), less Retaliatory emotions (b= -0.47; p<0.01) and more Obligation (b=0.62; p<0.01). Unexpectedly, the interaction effect of Dilemma and Prosociality on behavioral response is not reflected in these additional regression analyses: although prosocial
subjects report significantly less Retaliatory emotions as compared to less prosocial subjects, none of the emotion variables is affected by the interaction of Dilemma and Prosociality.

**Table 5.2: Results of three linear regression analyses with emotions as dependent variables and situational and personality characteristics as independent variables. Underbenefiting dilemmas.**

<table>
<thead>
<tr>
<th></th>
<th>Bonding emotions</th>
<th>Retaliatory emotions</th>
<th>Obligation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>2.06**</td>
<td>1.76**</td>
<td>1.04**</td>
</tr>
<tr>
<td>Dilemma (Debtor)</td>
<td>0.12</td>
<td>-0.54**</td>
<td>0.36*</td>
</tr>
<tr>
<td>Object (illness)</td>
<td>0.12</td>
<td>-0.05</td>
<td>0.07</td>
</tr>
<tr>
<td>Relationship (friend)</td>
<td>0.18**</td>
<td>-0.04</td>
<td>0.09</td>
</tr>
<tr>
<td>Sex (female)</td>
<td>-0.09</td>
<td>-0.09</td>
<td>0.17</td>
</tr>
<tr>
<td>JS Victim</td>
<td>-0.02**</td>
<td>0.03**</td>
<td>0.00</td>
</tr>
<tr>
<td>JS Perpetrator</td>
<td>0.00</td>
<td>-0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Prosociality</td>
<td>-0.00</td>
<td>-0.05*</td>
<td>0.03</td>
</tr>
<tr>
<td>Dilemma by Prosociality</td>
<td>0.02</td>
<td>0.05</td>
<td>-0.05</td>
</tr>
<tr>
<td>Dilemma by Object</td>
<td>0.53**</td>
<td>-0.47**</td>
<td>0.62**</td>
</tr>
<tr>
<td>R²</td>
<td>0.25</td>
<td>0.37</td>
<td>0.19</td>
</tr>
<tr>
<td>N</td>
<td>368</td>
<td>367</td>
<td>371</td>
</tr>
</tbody>
</table>

Note: Emotions were measured on a 4-point scale with 1=not at all and 4=strong. * = significant at p<0.05; ** = significant at p<0.01

**Interaction effects of emotions in a dilemma between helping and avoiding underbenefiting**

In contrast to expectations, there were two significant interaction effects of and emotion and an independent variable. The negative interaction effect of Sex and Retaliatory emotions indicates that the presence of Retaliatory emotions decreases the odds of helping to a higher degree among women than among men (see Figure 5.7), suggesting that women act more on their Retaliatory emotions than men do.

The negative interaction effect of Prosociality and Worriedness should be interpreted against the background of positive main effects of both Prosociality and Worriedness. Figure 5.8 shows the probability of helping as a function of Worriedness. By substituting the minimum, average and maximum value on Prosociality in the logistic regression formula, different curves were acquired for
subjects low, average and high on Prosociality. As shown in Figure 5.8, the positive effect of Worriedness is restricted to subjects low on prosociality. Among subjects scoring average or high on prosociality the degree of Worriedness does not make a difference; they tend to help the needy one anyway.

Figure 5.7: Probability of helping as a function of Retaliatory emotions.

Key: —— male —— female

Conclusion

In sum, the results of the dilemma between helping and avoiding underbenefiting provide support to the hypothesis that Bonding emotions increase helping behavior. Worriedness also increases helping behavior, but only among subjects scoring low on prosociality. Also in line with the hypotheses is the negative effect of Retaliatory emotions, although this effect is larger for women than for men. The unexpected effect of Obligation suggests that this emotion is not an exclusive Urge-to-Reciprocate emotion. The mediating role of emotions is supported, although the representation of a strict model in which the effects of situational and personality characteristics on behavioral response are completely accounted for by emotions is not confirmed. After including the emotion variables, model fit increases drastically and the effects of personality and situational characteristics generally decrease, but they do not disappear completely. Furthermore, the presence of two interaction effects of emotions and personality characteristics
suggestion that the mediating role of emotions mainly concerns situational characteristics.

Figure 5.8: Probability of helping as a function of Worriedness.

3.2 Avoiding overbenefiting versus helping

The same procedure of model construction was followed for the dilemma between helping a needy one and avoiding overbenefiting. Since there was only one scenario presenting this dilemma, all responses were included in the analyses. Furthermore, as the concerning scenario involved two requesters, and posed a dilemma between whom to help, the number of emotion variables was doubled and the presented odds values denote the probability of helping the needy one (N) as a fraction of the probability of reciprocating the creditor (C). Retaliatory emotions towards C and N, as well as Gratitude towards N were not included in the logistic regression analyses because of the small amounts of subjects reporting these emotions (more than 90% of subjects are in the two lower categories; see Appendix 4). Expected Retaliatory emotions were also excluded since the target person of these emotions varied according to which requester the subject had chosen to help. However, a comparison of the mean value on Expected Retaliatory emotions by those subjects who decided to help N with those subjects who decided to reciprocate C showed no difference (both mean values were 2.25).
Table 5.3: Results of logistic regression analyses on the Reciprocate vs help dilemma. Values denote the odds of helping N versus reciprocating C \( [\text{Exp}(b)] \).

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.61^{-1}</td>
<td>1.65</td>
<td>1.49</td>
<td>125.00^{-1}</td>
</tr>
<tr>
<td>Object (illness)</td>
<td>9.28^{**}</td>
<td>7.23^{**}</td>
<td>2.78^{-1}</td>
<td></td>
</tr>
<tr>
<td>Relationship (friend)</td>
<td>1.02^{-1}</td>
<td>1.29^{-1}</td>
<td>1.10</td>
<td></td>
</tr>
<tr>
<td>Sex (female)</td>
<td>1.08</td>
<td>1.33</td>
<td>1.75</td>
<td></td>
</tr>
<tr>
<td>JS Victim</td>
<td>1.04^{-1}</td>
<td>1.06^{*}</td>
<td>1.11</td>
<td></td>
</tr>
<tr>
<td>JS Perpetrator</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Prosociality</td>
<td>1.03</td>
<td>1.04</td>
<td>2.00^{*}</td>
<td></td>
</tr>
<tr>
<td>Bonding emotions towards N</td>
<td>2.57^{**}</td>
<td>3.41^{**}</td>
<td>4.55^{**}</td>
<td></td>
</tr>
<tr>
<td>Bonding emotions towards C</td>
<td>1.34^{-1}</td>
<td>1.73^{-1}</td>
<td>2.22^{**}</td>
<td></td>
</tr>
<tr>
<td>Worriedness towards N</td>
<td>1.47</td>
<td>1.28</td>
<td>2.52^{*}</td>
<td></td>
</tr>
<tr>
<td>Worriedness towards C</td>
<td>1.72^{*}</td>
<td>1.13^{-1}</td>
<td>1.35^{-1}</td>
<td></td>
</tr>
<tr>
<td>Obligation towards N</td>
<td>3.82^{**}</td>
<td>3.18^{**}</td>
<td>3.43^{**}</td>
<td></td>
</tr>
<tr>
<td>Obligation towards C</td>
<td>4.59^{1***}</td>
<td>3.83^{1***}</td>
<td>4.27^{1***}</td>
<td></td>
</tr>
<tr>
<td>Guilt towards N</td>
<td>2.69^{1***}</td>
<td>2.48^{1***}</td>
<td>5.71^{1***}</td>
<td></td>
</tr>
<tr>
<td>Guilt towards C</td>
<td>1.44</td>
<td>1.79^{**}</td>
<td>15.47^{**}</td>
<td></td>
</tr>
<tr>
<td>Gratitude towards C</td>
<td>1.07</td>
<td>1.06</td>
<td>1.11</td>
<td></td>
</tr>
<tr>
<td>Object * Obligation towards C</td>
<td></td>
<td>3.09^{*}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationship * Obligation towards C</td>
<td></td>
<td>2.50^{*}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationship * Guilt towards N</td>
<td></td>
<td>4.56^{**}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JS Victim * Guilt towards C</td>
<td></td>
<td>1.08^{*}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prosociality * Worriedness towards N</td>
<td></td>
<td>1.24^{-1}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>366</td>
<td>355</td>
<td>349</td>
<td>349</td>
</tr>
<tr>
<td>-2 Log Likelihood</td>
<td>318.95</td>
<td>381.74</td>
<td>277.64</td>
<td>249.55</td>
</tr>
<tr>
<td>Hosmer Lemeshow Test</td>
<td>13.309;</td>
<td>5.99;</td>
<td>8.53;</td>
<td>8.53;</td>
</tr>
<tr>
<td>(Chi^2) df=8 (ns)</td>
<td>df=8 (ns)</td>
<td>df=8 (ns)</td>
<td>df=8 (ns)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Emotions were measured on a 4-point scale with 1=not at all and 4=strong.

** Wald statistic significant at p<0.01; * Wald statistic significant at p<0.05
Scorekeeping and bonding emotions in a dilemma between helping and avoiding overbenefiting

We expected the odds of helping N to be positively affected by Bonding emotions and Worriedness towards N and not to be affected by Bonding emotions and Worriedness towards C. As shown in Table 5.3 (Model 1), Bonding emotions towards N increase the odds of helping N, whereas Bonding emotions towards C lead to a non-significant decrease in the odds of helping N. In contrast to expectations, both Worriedness towards N and C raise the odds of helping N, but only the second is significant. Urge-to-Reciprocate emotions towards C were expected to lower the odds of helping N, whereas Urge-to-Reciprocate emotions towards N should have no significant effects. Model 1 shows that, as expected, Obligation towards C lowers the odds of helping N. However, as in the dilemma between helping a needy one and avoiding underbenefiting, there is also a positive effect of Obligation towards the needy one. Guilt shows the opposite picture: Guilt towards C is associated with a non-significant increase in the odds of helping N, whereas Guilt towards N is associated with a decrease. A possible explanation is that subjects did not report Guilt as a consequence of the cues presented in the dilemma, but as an expression of awkwardness in anticipation of going to refuse the target person. Finally, neither do the results provide support to the urge-to-reciprocate function of Gratitude: the effect of Gratitude towards C is positive, although it is not significant.

The role of emotions in a dilemma between helping and avoiding overbenefiting

Model 2 contains the situational and personality characteristics. A stepwise addition of all possible 2-way interaction terms did not yield any increase in fit. The only significant effect comes from Object of help. Compared to the money context, the illness context multiplicates the odds of helping N with 9.28.

The next model includes the emotion variables (Model 3). As appears from the decrease of the -2 Log likelihood ratio, the fit of Model 3 is significantly better than that of Model 2 (Chi²=104.10; df=9; p<0.001), fulfilling the first requirement of the mediating role of emotions. However, compared to the analyses of the dilemma between helping and avoiding underbenefiting, there is much less support for emotions as mediators between personality and situational

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Pearson’s correlations with the filler emotion Uncomfortableness support this interpretation. Of all emotions towards C and N, Guilt towards C correlates most strongly with Uncomfortableness towards C (r=0.55; p<0.01; two-tailed) and Guilt towards N correlates most strongly with Uncomfortableness towards N (r=0.54; p<0.01; two-tailed).
characteristics on the one hand, and behavioral responses on the other hand. First, the coefficients of the situational and personality characteristics do not decline after including the emotion variables. The effect of Object of help, which was the only significant effect in Model 2, remains at the same level. Moreover, the effect of JS Victim increases, thereby reaching significance. Second, although four emotion variables that were significant in Model 1 maintain their effects, two emotion variables change considerably in their effects when controlling for the personality and situational variables. The effect of Guilt towards C increases and reaches significance. Moreover, the puzzling effect of Worriedness towards C reverts in direction and loses significance.

Model 4 shows that the fourth requirement for the mediating role of emotions is also not fulfilled. There is a considerable number of interaction effects, mainly concerning situational characteristics.

With both the second, third and fourth requirement unfulfilled, conducting additional regression analyses is meaningless. Since there is no support for a mediating role of emotions, it makes no sense to investigate the “direct” effects of situational and personality characteristics on the emotion variables.

*Interaction effects of emotions in a dilemma between helping and avoiding overbenefiting*

The results of the Reciprocate vs help dilemma showed five significant interaction effects of emotions and situational or personality variables. The effect of Obligation towards C appears to be dependent on both Object of help and Relationship with Alter. Figures 5.9 and 5.10 depict both interaction effects when controlling for all other variables. The negative effect of Obligation towards C on the probability of helping N appears to be much stronger in the money context, as compared to the illness context (see Figure 5.9), and mildly stronger towards friends, as compared to acquaintances (see Figure 5.10). The first interaction effect is in line with the ambiguous role of Obligation. Apparently its Urge-to-Reciprocate function is restricted to the money context. The second effect suggests that if people experience Obligation towards a creditor, they are more likely to act upon it if they deal with friends than if they deal with acquaintances.
Figure 5.9: Probability of helping N (as opposed to reciprocating C) as a function of Obligation towards C.
Key: solid line - money, dashed line - illness.

Figure 5.10: Probability of helping N (as opposed to reciprocating C) as a function of Obligation towards C.
Key: dashed line - friend, solid line - acquaintance.
Furthermore, there are two interaction effects concerning Guilt. The positive interaction effect of Guilt towards N and Relationship with Alter cancels out the negative main effect of Guilt. As Figure 5.11 shows, the negative effect of Guilt towards N is confined to interactions with acquaintances, whereas there is no or hardly any effect on interactions with friends. In line with the previous interpretation of Guilt as an expression of awkwardness in the anticipation of going to refuse the target person, a plausible explanation is that if subjects decide to reciprocate C (and consequently, refuse to help N), they are more concerned if they deal with an acquaintance than if they deal with a friend, and thus, report more Guilt towards acquainted N’s than towards befriended N’s. Next, when plotting the negative interaction effect of Guilt towards C and JS Victim (Figure 5.12) it turns out that for subjects scoring high on JS Victim, the positive main effect of Guilt towards C on helping N turns into a negative one. It seems therefore, that among subjects who are highly sensitive to being a victim of injustice, Guilt towards C does operate in the expected way; that is, as an Urge-to-Reciprocate emotion.

Finally, the negative interaction effect of Prosociality and Worriedness towards N is similar to that in the dilemma between helping and avoiding underbenefiting: only among subjects low on prosociality is there a positive effect of Worriedness towards N. Subjects scoring average or high on prosociality are likely to help N, regardless whether they worry or not (see Figure 5.13).
Figure 5.12: Probability of helping N (as opposed to reciprocating C) as a function of Guilt towards C.
Key: JS Victim — low — average — high

Figure 5.13: Probability of helping N (as opposed to reciprocating C) as a function of Worriedness towards N.
Key: Prosociality — low — average — High
CHAPTER 5

Conclusion

In sum, the results of the dilemma between helping and avoiding overbenefiting provide only partial support to the distinction between bonding and scorekeeping mechanisms. In line with expectations, the odds of helping $N$ is increased by Bonding emotions towards $N$ and not affected by Bonding emotions towards $C$. Furthermore, like in the dilemma between helping a needy one and avoiding underbenefiting, the positive effect of Worriedness towards $N$ is restricted to subjects who are not very prosocial. Behavior is also influenced by Worriedness towards $C$, although this effect disappears when controlling for personality and situational characteristics. In addition, there is little support that Obligation, Guilt, Gratitude and Expected Retaliatory emotions lead to reciprocating. Dependent on the Object of help, Obligation is interpreted as a feeling of indebtedness towards a creditor, leading to reciprocating, or as a moral duty to help a needy one. Furthermore, only among subjects who are highly sensitive to being a victim of injustice does Guilt function as an Urge-to-Reciprocate emotion. Among those lower on JS Victim it expresses some kind of awkwardness in the anticipation of going to refuse the target person. The remaining Urge-to-Reciprocate emotions do not affect behavior.

Next, the mediating role of emotions does not receive much support. Although the inclusion of the emotions leads to a strong increase in fit, it does not lead to a decrease in the effects of situational and personality variables. There is more support for a moderating role of emotions concerning both personality and situational characteristics.

4 Overall conclusion

This study attempted to determine the role of emotions in reciprocal altruistic behavior by using dilemmas between helping a needy person and avoiding an unbalanced relationship. Hypotheses were tested regarding the relation between specific emotions and behavioral responses. Bonding emotions like Commitment and Warmth, as well as Worriedness were expected to increase the tendency to help a person in need rather than refusing him or using one’s resources to reciprocate a creditor. Retaliatory emotions, including Contempt, Anger, Disappointment, Indignation and Irritation, were expected to trigger behavior aimed at avoiding underbenefiting, that is, a refusal to help. Finally, Urge-to-Reciprocate emotions, like Obligation, Guilt and Gratitude, as well as Expected Retaliatory emotions, were expected to trigger behavior aimed at avoiding
overbenefiting, that is reciprocating a creditor. Furthermore, based on the evolutionary psychological view of emotions, we predicted that emotions mediate the relation between personality and situational characteristics on the one hand, and behavioral responses on the other hand.

In general, the results of the dilemma between helping a needy one and avoiding underbenefiting were supportive to the hypotheses. A high degree of Bonding emotions increased the tendency to help a needy person, and a high degree of Retaliatory emotions decreased the tendency to help. Furthermore, all necessary conditions for the emotions to have a mediating role were fulfilled. The results of the dilemma between helping a needy one and avoiding overbenefiting were less supportive. The effects of Urge-to-Reciprocate emotions on reciprocating behavior were absent or conditional on situational or personality variables. Thus, Obligation increased the tendency to reciprocate a creditor only if the Object of help was money, and Guilt was positively correlated with reciprocating only among subjects who were highly sensitive to being a victim of injustice. In contrast, subjects who reported high levels of Gratitude or Expected Retaliatory emotions towards the creditor were not more likely to reciprocate him than subjects who were not grateful or expecting retaliation at all. Furthermore, there was no support for the mediating role of emotions.

To conclude from these results that people do not have a psychological mechanism for avoiding overbenefiting seems too rash. Since the Reciprocate vs help dilemma involves a situation with two requesters, and the behavioral response consists of whether to help N or to reciprocate C, rather than whether to help or not to help, it is more prone to errors, resulting in weaker relations between variables. Another possible reason for the weak results is that the Urge-to-Reciprocate emotions are less basic than the Bonding and Retaliatory emotions. Whereas the Bonding and Retaliatory emotions appear on the most basic list of primary emotions (i.e., including anger, fear, joy/love, sadness) (Plutchik 2003, p. 73), the Urge-to-Reciprocate emotions are examples of secondary or social emotions (e.g., Nesse 1990; Parker 1998). By definition, secondary emotions are less universal than basic emotions and thus will be more liable to differences in interpretation.

Limitations of the study
A possible criticism is that the emotion responses reflect only stereotypes about which emotions belong to which behavioral response (e.g., see Wallbott and Scherer 1989, p. 64). Although the questions concerning behavioral response were
presented after the emotions lists, it is possible that the scenarios, being about actors requesting for help, made subjects automatically reflect on their reaction to the requests, and adjust their emotion responses accordingly. This problem is inextricably linked to the use of self-reports and can only be solved if the possibilities for taking objective measurements of complex emotions increase.

Another possible criticism concerns the use of a scenario rather than an experimental design. A drawback of scenarios is that they measure what subjects say they will do rather than behavior itself. Furthermore, the cues presented in a scenario are less strong than cues administered in a laboratory situation. At first sight, both of these drawbacks seem to be absent in an experimental design. However, in the case of the present research question it is doubtful whether an experimental design would yield more valid results. First, in contrast to many experimental designs focusing on how subjects distribute or allocate resources (e.g., Ultimatum Games and Public Good Games), the present research question requires that subjects are not anonymous. Maintaining anonymity serves to eliminate effects of future interactions on one’s present behavior towards an interaction partner, for example, the prospect of being punished for selfish behavior (Fehr and Gächter 2000). In the present research, the expectation of one’s interaction partner’s Retaliatory emotions is one of the variables under study. Furthermore, it makes no sense to study the effect of Relationship with Alter among anonymous subjects. On the other hand, an experimental design in which non-anonymous subjects have to distribute resource, such as an Ultimatum Game design, would yield responses that are strongly biased by social desirability.

Second, bringing subjects into the laboratory in pairs of real friends or acquaintances, and experimentally creating an unbalance in their relationship means a strong asymmetry in cues for Bonding emotions on the one hand and Retaliatory or Urge-to-Reciprocate emotions on the other hand. How this asymmetry will affect responses is uncertain. By using instead subjects who do not know each other and then manipulate attraction, cues for Bonding and Retaliatory or Urge-to-Reciprocate emotions would both be experimentally induced. Obviously this would evoke much lower degrees of Bonding emotions compared to a situation in which subjects have known each other for years.

In conclusion, both scenarios and experiments have their merits and drawbacks. Our understanding of the relation between Bonding, Retaliatory and Urge-to-Reciprocate emotions on the one hand and reciprocal altruistic behavior on the other hand would benefit most if both scenario and experimental designs were used.