

Original Article

## Cheaters Are Looked At Longer and Remembered Better Than Cooperators in Social Exchange Situations

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**Abstract:** What information is most salient during social exchange? Our studies assess the relative importance of cheaters and cooperators and whether their importance is affected by amount of resources involved in the exchange. In Experiment 1, participants categorized individuals as cheaters, cooperators, or neither, and rated how important they are to remember using a 7-point scale. In Experiment 2, participants categorized individuals, and then looked at their photos. This was followed by tests of face recognition, and memory for social contract status. Experiment 1 found cheaters were rated more important to remember than cooperators and more so when a greater amount of resources was involved. Experiment 2 found cheaters were looked at longer and people had better memory for their faces and were more likely to remember their social contract status. This suggests the mind evolved to remember information most pertinent in social contract situations.

**Keywords:** Social exchange; social contract theory; memory bias; cheating; cooperation.

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### Introduction

Cooperation between individuals for mutual benefit, known as “reciprocal altruism,” is a pervasive feature of social living and has been of crucial importance in hominid evolution (Cosmides, 1989; Cosmides and Tooby, 1989; 1992; Sugiyama, Tooby, and Cosmides, 2002; Tooby and DeVore, 1987; Trivers, 1971). Social exchange, however, can only evolve under certain conditions: Individuals must not be

indifferent to cheaters (Axelrod, 1984; Cosmides and Tooby, 1989; Dawkins, 1976; Hamilton, 1964). Research using the Wason selection task has found that people are adept at identifying people who are in a position to cheat (e.g., Cosmides, 1989; Cosmides and Tooby, 1992; Gigerenzer and Hug, 1992). Recent neuropsychological research has found a locus for cheater detection abilities: Patients with bilateral limbic system damage affecting temporal pole and amygdala are uniquely impaired in reasoning about social contract versions of the selection task (Stone, Cosmides, Tooby, Kroll, and Knight, 2002).

In addition to being adept at identifying individuals in a position to cheat, however, one must also be good at *remembering* individuals and information regarding their behavior in previous social exchange situations (Cosmides and Tooby, 1989). But, what information is most important to remember? We test the following hypotheses:

(1) *Cheaters are remembered better than cooperators.* This is suggested by two pieces of evidence: First, it is cheaters who threaten the viability of social exchange because of the advantages of accepting benefits without paying costs (e.g., Axelrod, 1984; Cosmides and Tooby, 1989, 1992; Dawkins, 1976; Hamilton, 1964). Second, discovering someone cheated may be more diagnostic of their character than finding out they cooperated. Successful cheaters have to appear to be trustworthy, so they likely have to cooperate much of the time.

(2) *Cooperators are remembered better than cheaters.* People who have cooperated may be deemed trustworthy, and we may remember them particularly well so that they can be approached first in future instances of exchange. Indeed, as Brown and Moore (2000) have argued, due to the problem of subtle cheating, it is important for people to be good at detecting and remembering individuals with pro-social motives (see also Brown, Palmetta and Moore, 2003).

(3) *Cheaters and cooperators are remembered equally well.* Both categories may be important and worth remembering, though for different reasons. We want to remember the cheaters because we want to avoid them in the future. We want to remember the cooperators because they are people that we want to approach first in future instances of social exchange. Indeed, in Brown and Moore's (2000) study, performance on altruist-detection and cheater-detection versions of the Wason selection task were comparable, suggesting people may place equal importance on detecting and remembering cheaters and cooperators.

Two studies present evidence relevant to these issues (Mealey, Daoood, and Krage, 1996; Oda, 1997). Specifically, both of these studies found that the faces of cheaters were remembered better one week after being exposed to them than were the faces of those deemed trustworthy. These studies, however, leave some important questions unanswered. First, they did not examine whether people were more likely to remember the social contract information of the cheaters. Demonstrating that the faces of cheaters are more likely to be recognized does not show that people also have biased access to relevant information about their character. Indeed, according to Bruce and Young's (1986) model of face perception, recognizing an individual face is

a separate and dissociable component from accessing person identity and character information. Second, the studies do not examine whether the amount of resources involved in the exchange has an effect on the biased memory for cheaters. It is possible that differences between cooperators and cheaters emerge only when there is a substantial amount involved in the exchange and that relatively small amounts do not lead to any differences in memory for cheaters or cooperators. Third, the studies did not examine the processes leading to better memory for the faces of cheaters. For instance, do people spend more time looking at the faces of cheaters than the cooperators? Fourth, the studies did not examine how soon the bias is evident in people's memory. They looked at memory one week after exposure, allowing for the possibility that in relatively short durations, no bias may be evident. Fifth, the studies did not examine whether people are conscious of the need to remember some individuals more than others. Is it a product of implicit processing, or is there also explicit awareness of the relative importance of social contract information? The present experiments were designed to address each of these questions.

## **Experiment 1**

This study assessed people's explicit judgments of the relative importance of cheaters and cooperators, and how these judgments are affected by the amount that is involved in the exchange. Specifically, participants used rating scales to indicate how important it is to remember individuals they had categorized as cheaters, cooperators, or neither.

## **Method**

*Participants.* Forty-nine individuals participated (41 female, 8 male; mean age = 19.74 years, ranging from 18 to 27). In this and the next experiment, all participants were volunteers from introductory psychology classes at California State University, Long Beach, and they received extra credit added to their final grade. All were tested individually.

*Stimuli and apparatus.* This experiment used eight social contract rules, each embedded in a scenario providing a context for each rule (see Figure 1 for sample item). The rules were of the form "if P then Q", such as "If you borrow money from John, you must make your payments on time." Along with each rule, participants received information about different fictional individuals. The information specified whether the individuals had a) accepted a benefit and failed to pay the cost (cheaters), b) accepted the benefit and paid the cost (cooperators), or c) the information was irrelevant to the rule (neither). For the above rule, an example of irrelevant information would be "This person went to high school with John." For each rule, information on six individuals was provided: two cheaters, two cooperators, and two neither, leading to a total of 48 individuals across the eight rules and scenarios.

**Figure 1      Sample item**

John is a very successful businessman. Through his hard work, he has managed to build a very good life for himself and his family. Though he is well off, he is also quite generous. He is willing to help out his long-time friends by offering them loans with interest rates lower than those of local banks. His friends have agreed to borrow money from John in order to buy cars, homes, and to pay for college tuition for their children. John's requirement for loaning his friends money is as follows:

If you borrow money from John, you must make your payments on time.

Unfortunately, while some of his friends cooperate with the rule, others have not. Some decided to borrow money from him without paying it back, while others promptly make their payments. Your task is to determine, on the basis of the information given, which of the following individuals are cheaters, which are cooperators, and which are neither.

Ch1: This person borrowed \$2,000 from John and didn't pay him back.

Ch2: This person borrowed \$50,000 from John and didn't pay him back.

Co1: This person borrowed \$2,000 from John and paid him back.

Co2: This person borrowed \$50,000 from John and paid him back.

N: This person went to high school with John.

N: This person was in John's fraternity.

N.B. The full list of items can be obtained from the first author at [dchiappe@csulb.edu](mailto:dchiappe@csulb.edu).

For the cheaters and cooperators, we manipulated the amount or resources involved in the exchange (See Figure 1). The amounts used were the same for the cheater and cooperator conditions. In addition, participants were also shown photos of the individuals. These were color photos of adult males, taken with permission from the University of Stirling face database, and from the Purdue University face database (Martinez and Benavente, 1998). To not confound faces with conditions, six different versions of the experimental program were created, with each photo appearing in each of the six conditions. Furthermore, two orders were generated for each of these six versions, so that participants did not always see the faces in the same order. For each participant, the program also generated a random order of presentation for each of the eight rules.

The experiment was conducted on a Dell™ desktop computer, running Super Lab™. Participants used the “1” key (labeled “CH”) to classify cheaters, the “2” key (labeled “CO”) to classify cooperators, and the “3” key (labeled “N”) to classify someone as neither a cheater nor a cooperator on the basis of the information provided. They used the number keys (from 1 to 7) at the top of the keyboard to indicate how important it is to remember a given individual.

*Procedure.* Participants began by reading the instructions for the task, which required them to categorize individuals as cheaters, cooperators, or neither, on the basis of the information provided, and then to indicate how important it is to remember those individuals, using a scale ranging from “1” (not at all important) to “7” (extremely important). Participants were told that the information we get about people can suggest that we should remember them. This is because we may have to interact with them in the future.

Each set of trials began with the scenario presented on the computer screen, written in black against a white background. The rule appeared in the middle of the scenario, on a separate line. The scenario remained on screen until participants pressed the spacebar. Then they received information about six individuals. For each of the six individuals, trials proceeded as follows: A box (2¾” wide and 3¼” long) appeared in the center of the screen, with a question mark embedded inside. Beneath it, the information for an individual was shown. The question “Is this person a cheater, cooperator, or neither?” appeared underneath. Once participants categorized the individual, a photo of him appeared. It was presented where the box-plus-question had been. Underneath, the question “How important is it to remember this person?” appeared, with the seven-point rating scale below. It remained until participants entered a number. Information for the next individual then followed.

## **Results**

Prior to analyzing the rating scale data, we examined participants’ performance in categorizing the individuals as cheaters, cooperators, or neither. Only participants with at least 90% accuracy were included in the analyses. Two were excluded, leaving 47. Table 1 includes the mean rating on the seven-point scale across the different levels of social contract status.

**Table 1**

Results for Experiments 1 and 2

**Note:** Numbers in parentheses are standard deviations. CH = cheater, CO = cooperator and N = Neither. 1 = less at stake, 2 = more at stake. Means for # of faces and status recalled are out of a maximum of 8 for CH 1, CH 2. CO 1 and CO 2. They are out of 16 for the totals.

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		Mean rating on 7-point scale	Mean viewing time in msec	Mean # faces recognized	Mean # status recalled
Cheaters	CH 1	5.67 (1.29)	6132 (5271)	5.85 (1.58)	3.33 (1.68)
	CH 2	6.29 (1.07)	6327 (5401)	5.85 (1.73)	3.42 (1.87)
	Total	5.98 (1.14)	6306 (5297)	11.69 (2.91)	6.75 (3.20)
Cooperators	CO 1	3.98 (1.86)	5659 (5673)	5.49 (1.84)	2.76 (1.63)
	CO 2	4.33 (1.81)	5714 (5733)	5.48 (1.61)	2.94 (1.59)
	Total	4.15 (1.81)	5694 (5684)	10.98 (2.97)	5.69 (2.55)
Neither	Total	1.67 (0.86)	3735 (3403)	9.49 (3.31)	3.38 (2.34)

A one-way, repeated-measures ANOVA with social contract status as the repeated measures factor, revealed a significant difference,  $F(4, 184) = 144.33, p < .001$ . Post hoc, pairwise comparisons with a Bonferroni adjustment revealed that all means were significantly different from each other. Thus, CH 1, CH 2, CO 1 and CO 2 all received higher ratings than N,  $p < .001$ . Furthermore, CH 2 received higher importance ratings than CH 1,  $p < .001$ ; CO 2 received higher ratings than CO 1,  $p < .001$ ; both CH 1 and CH 2 received higher ratings than both CO 1 and CO 2,  $p < .001$ .

This was further confirmed with a 2X2 repeated measures ANOVA with status (cheater vs. cooperator) and amount (lower vs. higher) as the two repeated-measures factors. There was a main-effect of status,  $F(1, 46) = 59.83, p < .001$ . There was also a main effect of amount,  $F(1, 46) = 52.52, p < .001$  and a significant interaction

between status and amount,  $F(1, 46) = 5.96, p < .05$ . That is, there was a greater increase in importance rating for the cheaters (difference = .62 between CH 1 and CH 2) than for the cooperators (difference = .35 between CO 1 and CO 2). Cheaters were rated more important to remember than cooperators and more so when a greater amount of resources was involved.

## **Experiment 2**

Experiment 2 examined the amount of time people spend looking at the faces of cheaters, cooperators and those classified as neither. It also examined whether there are biases in memory for both the faces of individuals and for information regarding their character (i.e., whether they were cheaters, cooperators, or neither) and whether the amount involved in the exchange has an effect on encoding information about individuals.

## **Method**

*Participants.* One hundred and twenty eight individuals participated (102 female, 26 male, mean age = 20.4 years, ranging from 18 to 79). All were tested individually, and were given one hour to complete the task.

*Stimuli and apparatus.* The eight scenarios, the photos, and information on the social contract status of individuals from Experiment 1 were used for part one of this study. The second part of the experiment used 96 photos, 48 from part one, and a second set of 48 photos, taken from the same face databases. The order in which the faces were presented was randomized, with one random order per participant.

Both parts of the experiment were conducted on a Dell™ desktop computer, running Super Lab™ software. Responses were recorded using a 6-button response box with millisecond accuracy. From left to right, the first button was red and had no label. The next two buttons were yellow and labeled “yes” and “no.” The remaining three buttons were green and were labeled “CH,” “CO,” and “N,” representing cheaters, cooperators, and neither.

*Procedure.* As in Experiment 1, each of eight sets of trials began with a scenario presented on the screen, with a rule appearing roughly in the middle of the scenario. The scenarios remained on screen until participants pressed the red button on the response box. This was followed by information on six individuals that had to be categorized according to their social contract status (cheater, cooperator, or neither). For each of the six individuals, the trials proceeded as follows: A box appeared in the center of the screen, with a question mark embedded inside. Under the box, the information for that individual was presented. Beneath the information, the question “Is this person a cheater, cooperator, or neither?” appeared. Once participants categorized the individual, a photo of the individual was shown. It was presented where the box plus question mark had been. The picture remained on the screen until the participant pressed the red button. Participants were told to look at each photo for

as long as they wished. They were also instructed to leave their left index finger on the red button throughout the first part of the experiment. Once a photo was removed from the screen, a row of seven asterisk marks appeared on the center of the screen for 2500 msec, followed by the information for the next individual. Prior to doing the experimental trials, subjects were given a practice scenario to make sure they knew what to do in this part of the experiment.

After part one, participants were immediately given a surprise recognition memory test. They saw photos of adult males, half new and half from part one. The photos appeared on the center of the screen. For each one, participants had to answer two questions: (1) Do you recognize this person from part one? And, (2) Was this person a cheater, cooperator, or neither? These questions appeared, one at a time, beneath each photo, centered horizontally on the screen. For the first question, they had to respond by using the yellow buttons labeled “yes” and “no,” depending on whether they recognize the person from the first part. For the second, they had to respond using the green keys, labeled “CH,” “CO,” and “N,” depending on whether they remember them as cheaters, cooperators, or neither. If participants did not recognize the person from part one, they were told to respond “no” to the second question as well.

## **Results**

As in Experiment 1, only those participants that correctly categorized at least 90% of the individuals were included in the following analyses. This led to the exclusion of five participants, leaving a total of 123.

### *Viewing times for faces*

Table 1 lists the mean viewing times for all the faces that were correctly classified as cheaters, cooperators, or neither. Because the sphericity assumption was violated, the Greenhouse-Geiser adjustment was used on the viewing times ( $\chi^2(2) = 32.47, p < .001$ ). A one-way ANOVA revealed significant differences between these three groups,  $F(1.62, 197.51) = 61.89, p < .001$ . Pairwise comparisons using Tukey’s HSD test (critical value = .0588) found that cheaters were looked at longer than cooperators ( $p < .05$ ), cheaters were looked at longer than those categorized as neither ( $p < .05$ ), and the cooperators were also looked at longer than those categorized as neither ( $p < .05$ ).

To examine whether the amount involved in the exchange affected viewing time, we carried out a repeated measures ANOVA, with social contract status (cheater vs. cooperator) and amount (less vs. more) as repeated measures factors. There was a significant effect of social contract status, with viewing times greater for cheaters,  $F(1, 122) = 15.57, p < .001$ . Although the descriptive statistics revealed longer viewing times when a higher amount was involved in the exchange, this was not significant,  $F(1, 122) = .72, p = .397$ . There was also no interaction,  $F(1, 122) = .18, p = .669$ .



### *Face recognition*

Table 1 lists the mean number of faces recognized for cheaters, cooperators, and those classified as neither. A one-way repeated measures ANOVA was carried out to examine overall differences in face recognition. Because the sphericity assumption was violated, the Greenhouse-Geiser adjustment was used ( $\chi^2(2) = 13.46, p = .001$ ). The ANOVA revealed significant differences between these three groups,  $F(1.81, 220.76) = 34.43, p < .001$ . Pairwise comparisons using Tukey's HSD test (critical value = .676) found that the faces of cheaters were remembered better than the cooperators ( $p < .05$ ), the faces of cheaters were remembered better than those categorized as neither ( $p < .05$ ), and the faces of cooperators were also remembered better than those categorized as neither ( $p < .05$ ).

To examine whether the amount involved had an effect on the likelihood of faces being recognized, we carried out a repeated measures ANOVA, with social contract status (cheater vs. cooperator) and amount (less vs. more) as the two repeated measures factors. The results revealed a significant effect of social contract status, with cheaters being more likely to be remembered,  $F(1, 122) = 10.63, p < .001$ . Although the descriptive statistics revealed greater recognition when more was at stake in the exchange compared to when less was involved, this failed to be statistically significant,  $F(1, 122) = 0.005, p = .943$ . There was also no interaction between social contract status and amount involved in the exchange,  $F(1, 122) = .00, p = 1.00$ .

### *Memory for social contract status*

Table 2 lists the mean number of individuals for whom participants could correctly recall the social contract status (i.e., cheater, cooperator or neither). A one-way repeated measures ANOVA was carried out to examine overall differences in memory for the social contract status. The sphericity assumption was satisfied ( $\chi^2(2) = 3.54, p = .171$ ). The results revealed significant differences between the three groups,  $F(2, 244) = 78.43, p < .001$ . Pairwise comparisons using Tukey's HSD test (critical value = .653) found that the social contract status was more likely to be remembered for cheaters than cooperators ( $p < .05$ ), more likely to be remembered for cheaters than those categorized as neither ( $p < .05$ ), and more likely to be remembered for cooperators than for those categorized as neither ( $p < .05$ ).

To determine whether the amount involved had an effect on the likelihood of the social contract status being remembered, a repeated-measures ANOVA was done, with social contract status (cheater vs. cooperator) and amount (less vs. more) as the two repeated measures factors. The results revealed a significant effect of status, with cheaters more likely to have their social contract status remembered,  $F(1, 122) = 15.15, p < .001$ . Though the descriptive statistics revealed greater likelihood of remembering social contract status when more resources were involved, this was not

significant,  $F(1, 122) = .1.29, p = .259$ . There was also no interaction between status and amount of resources involved,  $F(1, 122) = 0.13, p = .719$ .

## **General Discussion**

These studies examined the salience of information in social contract situations. We tested three claims about the relative importance of cheaters and cooperators: (1) Cheaters are more important to remember than cooperators, (2) Cooperators are more important to remember than cheaters, and (3) Cheaters and cooperators are equally important to remember. Our results are most consistent with the first. Experiment 1 found people rated cheaters more important to remember than cooperators, though both were rated higher than those categorized as neither. Experiment 2 found cheaters were looked at longer than cooperators, though both were looked at longer than those classified as neither. People also had better memory for faces of cheaters than cooperators, and were more likely to remember social contract information for cheaters.

Why should cheaters be particularly salient? One reason is because cheaters threaten the very viability of social exchange (e.g., Cosmides, 1989; Cosmides and Tooby, 1992; Gigerenzer and Hug, 1992). Unless steps are taken to identify and remember individuals that accept benefits and fail to pay costs, cheaters would out-reproduce cooperators. Furthermore, instances of cheating may carry greater information value. If evolution works to improve the efficiency of cognitive mechanisms, we would expect that it would produce a cognitive system that is particularly sensitive to information that has the greatest diagnostics value. In this case, it should be most sensitive to information providing cues about a person's character. Everything else being equal, knowing that a person cooperated may not tell us much about their character. Knowing that they cheated would be more relevant. This is because cheaters have to give the appearance of being trustworthy and thus they may have to cooperate much of the time.

However, our results also provide some support for the view that it is important to remember cooperators. Cooperators were looked at longer and remembered better than those judged irrelevant to the social contract situation. This suggests that people also regard as important individuals displaying pro-social behavior (Brown and Moore, 2000). This is important because individuals need to know whom to approach in future instances of exchange, not just which individuals to avoid. Of course, it may also be important to rely on information from other people in the form of gossip, to avoid the problem that even cheaters often have to cooperate (Emler, 1990, 1992).

The present studies also found that people can make conscious judgments of the relative importance of remembering cheaters and cooperators. This was revealed in Experiment 1, where explicit judgments of importance were assessed. This suggests people can strategically implement encoding strategies that increase the likelihood of remembering different individuals. For instance, by knowing that they want to remember the cheaters, people can decide to spend more time looking at their faces

relative to individuals with a different social contract status. This is what we found in Experiment 2.

Our studies also examined whether the amount of resources involved in the exchange has an effect on the relative importance of remembering cheaters and cooperators. One would expect that any differences in importance between the two should be particularly evident when there is more to lose or gain in an exchange. When trivial amounts are involved, the relative difference in importance between cheaters and cooperators may be negligible. The amount involved in the exchange could also affect the actions that a person takes in dealing with cheaters. As Cosmides and Tooby (1989) put it, "When you believe that I have cheated you in a major way, there should be a flood of memories about your past history with me: You must decide whether it is worth your while to continue our relationship" (p. 63). Thus, do you give a person another chance, or do you exclude them outright from all future exchange? The extent of the infraction likely plays an important role in this regard.

The first study found that people gave higher important-to-remember ratings when a greater amount was involved. However, the results of the second experiment failed to find an effect of amount. Thus, people's conscious intentions did not turn into longer viewing times, and did not turn into a greater likelihood of remembering the individuals. Though the descriptive statistics were in that direction, the results were not significant. This could be due to the high amounts of variance observed in the viewing times. High variance can have the effect of eliminating any differences observed between experimental conditions. By contrast, the data in the first experiment were obtained using a 7-point rating scale. By its very nature, this constrains much of the variance, making it more likely that an effect will be significant. At any rate, further research will be required to address this issue.

Another interesting discovery of the present study has to do with how quickly the effects on memory are evident. Previous studies have found differences in memory between cheaters and cooperators with a delay of a week between first exposure to the faces and subsequent attempts at recognition (Mealey, Daood, and Krage, 1996; Oda, 1997). These studies, however, did not examine whether those biases are evident after only a short delay. Indeed, one might expect that in the short run, no bias would be evident because the individuals would be relatively fresh in memory. Interestingly, however, a bias in remembering the cheaters was evident shortly after the individuals were first seen. Thus, cheaters stand out right away, more so than do people exhibiting pro-social behavior. Future research will have to determine whether differences between cheaters and cooperators get larger with time or remain constant.

Importantly, the memory bias was evident not just in terms of face recognition, but also with respect to the social contract status. The studies by Mealey, Daood, and Krage (1996) and Oda (1997) found biased face recognition for cheaters, but did not examine whether there are differences in the likelihood of remembering that the cheaters were cheaters compared to remembering that the cooperators were cooperators. As noted above, however, one must not only be able to recognize many different individuals, one must also be able to recall how those individuals behaved in

social contract situations. This is crucial for deciding whether or not to channel future resources to an individual. Our studies suggest that biases in memory also extend to the information regarding the individual's character.

To conclude, though much research has shown people are good at identifying potential violators of social contract rules, the present study shows that people are adept at remembering the information that carries the greatest diagnostic value in social exchange. People are particularly good at remembering the faces of cheaters, and that these individuals violated social contract rules, compared to other social contract information. Moreover, our results suggest that this may be accomplished at least in part by spending a greater amount of time looking at the faces of these individuals.

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