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Promoting Cooperation and Trust in "Noisy" Situations: The Power of Generosity

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The authors present an interdependence theoretical framework and advance the argument that generosity serves the important purpose of communicating trust, which is assumed to be of utmost importance to coping with incidents of negative noise (i.e., when the other every now and then behaves less cooperatively than intended). Using a new social dilemma task (the parcel delivery paradigm), it was hypothesized that incidents of negative noise would exert detrimental effects on trust and trust-related judgments and experiences, as well as cooperation, and that relative to tit for tat and self-regarding strategies (stingy or unconditionally cooperative strategies), other-regarding strategies (i.e., unconditional cooperation and generosity) would be more effective at reducing such as detrimental effects. Results from 2 studies provided strong support for these hypotheses, suggesting that the power of generosity is underestimated in the extant literature, especially in its ability to maintain or build trust, which is essential for coping with noise.

Keywords: cooperation, noise, generosity, reciprocity, trust

One of the greatest challenges to interpersonal relations is rooted in social dilemmas or conflicts between self-interest and collective interest. After all, it is tempting to benefit from other's cooperation and not always reciprocate the other's cooperation. Yet people often seem to be able to maintain lasting cooperation not only with their close partners but also with casual friends, colleagues, and sometimes even relative strangers on the street (e.g., Van Lange, De Cremer, Van Dijk, & Van Vugt, 2007). One key question is, how can people maintain lasting cooperation in social dilemmas? Should one respond in kind, giving exactly as much as one has received? Should one give more than one has received or less? What thoughts and feelings are elicited by a partner's generosity, responding in kind, and stinginess? Common wisdom is often contradictory, in that sometimes wisdom is associated with being other regarding and doing good for others (e.g., what goes around, comes around) and sometimes wisdom is associated rather with being self-regarding and doing good for oneself (e.g., nice guys finish last).[1]

Decades of social dilemma research, consisting of thousands of studies, appear to converge on the following conclusion: Do unto others what they do unto you. Indeed, numerous studies have demonstrated that, in repeated social dilemmas, a reciprocating strategy, called tit for tat, is more effective at eliciting cooperation than most other strategies, including an unconditionally cooperative strategy (see Axelrod, 1984; Oskamp, 1971; see also McClintock & Liebrand, 1988; Patchen, 1987). Clearly, past research has made an immeasurable contribution to understanding the behavioral responses elicited by various interpersonal strategies, thereby often using a classic version of the prisoner's dilemma game. However, it is also true that this immense literature has devoted almost no attention to the thoughts and feelings (e.g., judgments of other's personality, interaction goals, overall affective evaluations) elicited by these strategies (like tit for tat). Also, past research has given very little attention to the influence of some key structural features that may help us understand why tit for tat is so effective or whether there might be alternative strategies that are even more effective in eliciting cooperation.

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[1] The terms *other regarding* and *self-regarding* are derived from the recent literature on the evolutionary approaches to cooperation (e.g., Gintis, 2007; Henrich et al., 2006; Silk et al., 2005). Also, we should note that in the remainder of the article, we use the concept of reciprocity in a specific sense, referring to the tendency of people to reciprocate cooperation with cooperation and noncooperation with noncooperation. Also, strict reciprocity is defined in terms of interaction qualities of tit for tat (except for the first choice), that is, when people very precisely reciprocate the degree of cooperation that they received from the other in the past interaction (see Kollock, 1993; Nowak & Sigmund, 1992; Van Lange et al., 2002). We acknowledge, however, that the concept of reciprocity has a broader meaning in the tradition of social exchange theory (e.g., Homans, 1961) or in alternative models of social interaction (e.g., reciprocity in self-disclosure) that are rooted in various conceptual frameworks.

The present research seeks to bridge this gap in several important respects. First, we present a novel framework, rooted in interdependence theory (Kelley et al., 2003), which conceptualizes social interaction in terms of features of the situation and both persons (i.e., the so-called SABI model, described below). Second, we examine not only behavioral responses (as in most past research) but also trust, judgments of other's personality, judgments of other's interaction goals (i.e., perceived transformations), and affective evaluations. Third, as a key structural feature, we suggest that the effectiveness of strategies may be strongly shaped by *noise,* defined as discrepancies between intended and actual outcomes for an interaction partner due to unintended errors (cf. Axelrod & Dion, 1988; Bendor, Kramer, & Stout, 1991; Kollock, 1993; Van Lange, Ouwerkerk, & Tazelaar, 2002). We argue that human cooperation is particularly challenged by *negative noise,*[2] that is, errors that cause actual outcomes to be worse than intended, such as accidentally saying the wrong thing or not responding to an e-mail because of a network breakdown, and that may lead to misunderstanding. However, surprisingly few studies have sought to capture negative noise (henceforth, noise), even though it underlies many situations in everyday life and often gives rise to uncertainty and misunderstanding, thereby activating important psychological processes such as trust, judgments of another's interaction goals, and affective evaluations. Thus, it becomes important to examine whether noise may exert detrimental effects on cooperation and to evaluate the effectiveness of tit for tat and other strategies in their ability to cope with noise.

The major purpose of the present research is to increase our understanding of the psychological consequences of various interpersonal strategies in social dilemmas with noise and without noise. Specifically, Study 1 compared three classic strategies (unconditional noncooperation, tit for tat, and unconditional cooperation), whereas Study 2 compared three strategies that are entirely reciprocal (tit for tat) or largely reciprocal, namely, generous (i.e., giving somewhat more than received) or stingy (i.e., giving somewhat less than received). We used concepts and principles derived from interdependence theory (Kelley & Thibaut, 1978; Kelley et al., 2003) for characterizing these strategies in terms of outcome transformations (i.e., in terms of motives, such as maximizing joint outcomes and minimizing absolute differences in outcomes for self and other: MaxJoint and MinDiff, respectively. This transformational analysis was then used to advance a framework for understanding how incidents of noise may undermine cooperation, trust, perceived transformations and evaluations of strength and morality (cf. Liebrand, Jansen, Rijken, & Suhre, 1986; Van Lange & Kuhlman, 1994), and affective evaluations. One key hypothesis is that cooperation, as well as perceptions of the partner's transformations, is undermined by noise but more so for tit for tat than for strategies that are driven by other-regarding transformations and communicate generosity (i.e., giving more than one has received).

An Interdependence Analysis of Interpersonal Strategies in Noisy Social Dilemmas

How can we understand the psychological consequences of interpersonal strategies? Also, how can we understand structural consequences of social situations (e.g., noise)? Classic and recent formulations of interdependence theory expand Lewin's (1936) well-known formula, $B = f(P, E)$, by stating that an interaction (I) between two individuals (or Persons A and B) can be conceptualized in terms of needs, thoughts, and motives in relation to one another in the context of the specific social situation (S) in which their interaction transpires (Kelley & Thibaut, 1978; Kelley et al., 2003; Rusbult & Van Lange, 2003). This model can be expressed in the equation, $I = f(S, A, B)$ and is often captured by its acronym: SABI (Holmes, 2002; Kelley et al., 2003; see also Rusbult & Van Lange, 2003; Van Lange, Otten, De Bruin, & Joireman, 1997; Van Lange et al., 2007). In the following, we outline how the SABI model can increase our understanding of how people respond to other's behavior in noisy social dilemmas.

The Situation

In classic formulations of interdependence theory, the situation (S) is defined by classic features such as degree of dependence, mutuality of dependence, and degree of corresponding versus conflicting interest (Kelley & Thibaut, 1978). As noted earlier, in the present research, we examined social dilemmas, situations characterized by a conflict between self-interest and collective interest. Such situations can be interpreted as being diagnostic (Holmes & Rempel, 1989; sometimes these situations are called *strain tests*; cf. Kelley, 1983), that is, they provide a test in which interaction partners' true goals, values, and motives are revealed (cf. Kelley, 1983; Kelley et al., 2003).

In more recent versions of interdependence theory, an important dimension is added to the structural analysis of situations: information availability or the degree to which information about one another's preferences and intentions is available (Kelley et al., 2003; Rusbult & Van Lange, 2003). The availability of such information about others—or the lack thereof—is of utmost importance for understanding social interaction and is especially pronounced in situations where action is likely to be misimplemented. As noted earlier, such situations may often be affected by noise. Noise may have important implications for the functionality of interpersonal strategies. For example, arriving late for an important meeting because of an unexpected traffic jam may give rise to uncertainty and misunderstanding (e.g., "Why doesn't he show up?"), erroneous attributions ("He must have left home late"), and wrongful impressions (e.g., "He probably is not dedicated to our joint project"), and these, in a reciprocal environment, may cause patterns of *negative reciprocity* (e.g., "Next time, I will make him wait as well!").

Persons A and B

In addition to the situation, Persons A and B (or the self and the other) are logical building blocks for understanding social

[2] Errors that cause outcomes to be better than intended are referred to as positive noise. Although both types of noise may lead to misunderstanding, we suggest that negative noise rather than positive noise, is particularly likely to give rise to misunderstanding along with reduced levels of cooperation. Also, it can be argued that negative noise is more prevalent in everyday life than positive noise. Moreover, we have found that incidents of negative noise exert stronger (negative) effects than incidents of positive noise, which tend to exert weak effects (described in Van Lange et al., 2002). Therefore, as in previous work on noise, we examine negative noise in the present article.

interaction. As for the self, we suggest that many people, perhaps even a majority, tend to adhere to a very simple rule—to behave roughly as cooperatively as the other did in the previous interaction. Indeed, people exhibit a strong tendency to reciprocate other's cooperation and noncooperation in the context of experimental social dilemmas (e.g., Van Lange, 1999; see also Parks & Rumble, 2001). This explains to some degree that we often see enduring forms of either cooperative interactions (when both cooperate) or noncooperative interactions (when neither cooperates) rather than enduring forms of interaction in which one cooperates while the other benefits by not reciprocating. According to the SABI model, the key issue is that the beliefs and goals that each person (A and B) brings to bear on the situation, as well as how they shape one another's beliefs and goals through their interactions, are important to understanding relatively enduring patterns of cooperative interaction. In doing so, people translate the behavior of others into judgments regarding trust, specific interaction goals (i.e., perceived transformations), personality impressions, and affective evaluations. These processes are discussed next.

Meaning Analysis: From Strategies to Perceived Transformations

The heart of the SABI model involves how persons A and B interact in the context of a specific situation (S). We suggest that how self interprets other's behavior in noisy social dilemmas and how this translates to trust should be a powerful determinant of cooperative behavior. Such interpretation of other's behavior has been termed *meaning analysis*—a process by which people seek to understand the reasons for an event that is occurring (cf. Berscheid, 1983; Frijda, 1988; Weiner, 1986). Meaning analysis represents judgments of specific interaction goals and also trust, personality impressions, and affective summaries of interactions.

According to interdependence theory, meaning analysis is strongly linked to the conceptual distinction between the *given situation* and the *effective situation* (Kelley & Thibaut, 1978). The given situation represents the consequences of own and other's actions in terms of gut-level, self-interested preferences. The effective situation also represents the broader interpersonal consequences of own and other's actions—what do the outcomes mean for the other or for future interactions with the other? A person may adopt one of several *outcome transformations* (Kelley & Thibaut, 1978; Kelley et al., 2003; Van Lange et al., 2007), including altruism, maximizing the partner's outcomes (MaxOther); cooperation, maximizing the joint outcomes for self and partner (MaxJoint); equality, minimizing differences between own and partner's outcomes (MinDiff); competition, maximizing the relative advantage between own and partner's outcomes (MaxRel); and individualism, maximizing one's own outcomes irrespective of the partner's outcomes (MaxOwn; Kelley & Thibaut 1978; Messick & McClintock, 1968).

In the present research, we advance a framework (see Table 1) in which we conceptualize the various interpersonal strategies in terms of outcome transformations, that is, in terms of the primary goals with which one may approach an interaction situation. We also suggest that people are likely to translate observations of another's interactions (i.e., the other's strategy) in terms of outcome transformations that are central to interdependence theory. In this framework, we conceptualize tit for tat in terms of equality (MinDiff), in that, during interaction, tit for tat involves giving the partner as much as one has received from the partner in a previous interaction. As such, tit for tat takes an intermediate position on a dimension of self-regarding transformations to other-regarding transformations (even though the first choice is a cooperative choice and as such is other regarding). As displayed in Table 1, the generous and stingy strategies are conceptualized as other-regarding and self-regarding variants of tit for tat, as they combine the equality motive (MinDiff) with maximizing joint and other outcomes (MaxJoint/MaxOther) and maximizing own and relative outcomes (MaxOwn/MaxRel), respectively (see Bendor et al., 1991; Kollock, 1993; Van Lange et al., 2002). According to interdependence theory, the perceived transformations are central to understanding interpersonal trust, judgments of the other's personality (e.g., impressions of other's morality and strength), and overall affective evaluation (e.g., how good or bad one feels about the interaction).

We suggest that incidents of noise exert detrimental effects on cooperation, as well as on perceived transformations, trust, perceived morality and strength, and affective evaluations. As noted earlier, an incident of noise differs from the interaction patterns that have been normal up to that point and typically brings about outcomes that are more negative than one had expected on the basis of previous interactions. As such, it becomes understandable that after repeated incidents of noise, there will be a decline in cooperation, other-regarding transformations, trust, impressions of morality and strength, and overall affective evaluation.

Perhaps even more importantly, we suggest that strategies that are somewhat more other regarding than the tit-for-tat strategy are better able at coping with noise than the tit-for-tat strategy. How so? First, if most people exhibit an inclination toward reciprocity, then a few incidents of noise may pull them into the direction of reduced cooperation. The reason is that both the self, whom we assume to be largely reciprocal, and the other (i.e., tit-for-tat strategy) are likely to reciprocate the observed (or inferred) behavior rather than the intended behavior. Put differently, if both adhere to tit for tat, then neither the self nor the partner can effectively pull each other into the direction of enhanced cooperation because neither tends to behave more cooperatively than the partner did in the previous interaction. There is some indirect evidence from computer simulations suggesting that the detrimental effects of noise can be reduced if at least one of the two persons adds generosity to his or her strategy (Nowak & Sigmund, 1992). As such, this explanation is a logical explanation that rests on the assumption that most people adhere to tit for tat, at least in response to tit-for-tat partners.

A second, complementary line of reasoning assumes that the building of trust may serve as an important mechanism for coping with noise. Specifically, the self is less likely to perceive an incident of noise as intentional if the self has strong (rather than weak) trust in the other. We assume that generosity is one of the key mechanisms for building trust, in that it entails giving more than the other has given. As such, the benign intent underlying generosity is relatively unambiguous because the other outperforms one's own level of cooperation. Such communication and building of trust are likely to help give the other the benefit of the doubt when dealing with a new incident of noise. Hence, we assume that for generous partners, people are less likely to adhere to strict reciprocity and therefore are less likely to fall prey to negative reciprocity (or the echo effect), which may even enhance possibilities for enhancing cooperation over time. This mechanism highlights the psychology underlying

Table 1
An Interdependence Framework for Understanding Participants' Reactions to Behavioral Strategies of Others

Partner's strategy	Unconditional cooperation	Generous	Tit for tat	Stingy	Unconditional noncooperation
Orientation of partner	Other regarding	Other regarding	Equality	Self-regarding	Self-regarding
Transformations by partner	MaxOther/MaxJoint	(MaxOther, MaxJoint)/MinDiff	MinDiff	MinDiff/(MaxOwn, MaxRel)	MaxOwn/MaxRel
Noise-free situations					
General					
Level of cooperation	High	Very high	Very high	Low	Very low
Trust	Very high	Very high	High	Low	Very low
Cognitive interpretations					
Personality judgments	Weak/moral	Moderately strong/moral	Strong/moral	Moderately strong/immoral	Moderately strong/immoral
Perceived transformations	MaxOther/MaxJoint	MinDiff/MaxJoint	MinDiff/MaxJoint	MaxOwn/MaxRel	MaxOwn/MaxRel
Affective evaluations					
Positive affect	Very high	Very high	High	Low	Very low
Negative affect	Very low	Very low	Low	High	Very high
Noisy situations					
General					
Level of cooperation	High	Very high	Low	Low	Very low
Trust	High	High	Low	Low	Very low
Cognitive interpretations					
Personality judgments	Moderately strong/moral	Moderately strong/moral	Moderately strong/immoral	Moderately strong/immoral	Moderately strong/immoral
Perceived transformations	MaxOther/MaxJoint	MinDiff/MaxJoint	MaxOwn/MaxRel	MaxOwn/MaxRel	MaxOwn/MaxRel
Affective evaluations					
Positive affect	High	High	Low	Low	Very low
Negative affect	Low	Low	High	High	Very high

Note. MaxJoint = maximizing the joint outcomes for self and partner; MaxOther = maximizing the partner's outcome; MaxOwn = maximizing one's own outcomes irrespective of the partner's outcomes; MaxRel = maximizing the relative advantage between own and partner outcomes; MinDiff = minimizing differences between own and partner's outcomes.

differences between cooperative, generous partners; tit-for-tat partners; and stingy, noncooperative partners.

Clearly, these mechanisms do not at all exclude each other. Rather, we suggest that they are mutually supportive, in that generosity may serve as mechanism for pulling people in the direction of cooperation (rather than pulling them in the direction of negative reciprocity) and for the building of trust. Moreover, it is possible, if not likely, that relative to tit-for-tat partners, other-regarding partners communicate an atmosphere in which people are more likely to adopt a relaxed accounting system (Kollock, 1993), in which people adhere less strongly to social bookkeeping and strict forms of social exchange (Clark & Mills, 1979, 1993) than to gestures of good will and perhaps relational trust (rather than calculus-based trust; cf. Kramer, 1999; Lewicki, Tomlinson, & Gillespie, 2006; Rousseau, Sitkin, Burt, & Camerer, 1998).

Thus, we predicted the detrimental effects of noise to be more pronounced for tit for tat than for other-regarding strategies. That is, we expected that relative to other-regarding strategies, tit for tat suffers more from noise, in that it causes a stronger decline in cooperation, as well as in trust, other-regarding transformations, impressions of morality,[3] and affective evaluations.

Summary of Hypotheses

To summarize, we advanced two general hypotheses. Our first general hypothesis was that incidents of noise would exert detrimental effects not only on observable behavior but also on underlying cognitions and feelings about the other that form the basis of trust. More specifically, we expected noise to exert detrimental effects on levels of cooperation (Hypothesis 1a) and general expressions of trust (Hypothesis 1b). Also, we predicted that noise would exert effects on cognitive interpretations that people make about behavior of others. First, we predicted that noise would exert detrimental effects on the perception of other-regarding transformations to others and that it would enhance the perception of self-regarding transformations to others (Hypothesis 1c). Second, we expected noise to exert detrimental effects on judgments that people make about the morality (versus immorality) of others (Hypothesis 1d; see footnote 3; for largely exploratory purposes, we included judgments of strength, anticipating no

[3] Research has revealed that individuals who are perceived as moral elicit more cooperation than individuals who are perceived as immoral and that individuals who are perceived as strong (e.g., those adopting a tit-for-tat strategy; McClintock & Liebrand, 1988) elicit more cooperation from others than individuals who are perceived as weak (Liebrand et al., 1986; Van Lange & Kuhlman, 1994). Also, people tend to give much weight to morality information and little, if any, weight to information about strength (morality-importance effect; for a review, see Wojciszke, 2005; also see De Bruin & Van Lange, 1999a, 1999b, 2000). Reasoning from this research, we suggest that communication of other-regarding transformations (i.e., MaxJoint and MaxOther) will be perceived as more moral and therefore will elicit more cooperation. Moreover, these impressions of morality (i.e., doing the right thing) may serve as a buffer to possible incidents of noise.

pronounced effects for noise). Third, we expected that noise would exert effects on overall affective evaluations. We expected that noise would exert detrimental effects on positive affect that people experience regarding the behavior of others and that it would have reverse effects on negative affect that people experience about behavior of others (Hypothesis 1e).

Our second general hypothesis was that the effects of noise, as predicted in Hypothesis 1, would be more pronounced for a tit-for-tat partner than for either other-regarding (i.e., unconditionally cooperative and generous) or self-regarding partners (i.e., unconditionally noncooperative and stingy).[4] More specifically, we expected a pattern in which other-regarding partners—regardless of the occurrence of noise—would elicit relatively high levels of cooperation, trust, attribution of other-regarding transformations, perceived morality, and positive affective evaluations, whereas self-regarding partners would elicit relatively low levels of these variables (Hypothesis 2a–2e).

Study 1

Our first experiment was designed to compare a tit-for-tat strategy, pursuing equality (i.e., MinDiff), with unconditional cooperation, primarily motivated to benefit the other (i.e., MaxJoint and MaxOther), and unconditional noncooperation, primarily motivated to benefit the self (i.e., MaxOwn and MaxRel). We studied these particular strategies for two reasons: (a) They are classic strategies in social dilemma research that have been studied very often in noise-free settings (e.g., see Kuhlman & Marshello, 1975; Van Lange & Visser, 1999; Wrightsman, O'Connor, & Baker, 1972), and (b) in doing so, we were able to compare the tit-for-tat strategy, which is often regarded as a baseline, with both extreme ends (other regardingness vs. self-regardingness) of our framework (see Table 1).

Method

Participants and experimental design. Two hundred and four participants (80 men, 124 women) with an average age of 21 years took part in the present research. They were recruited at the campus of the VU University (Amsterdam, the Netherlands) by printed flyers. Each participant was paid €5 in exchange for participation (at the time the study was conducted, €5 equaled $5 in American currency). The experimental design was a 3 (partner's strategy: unconditional cooperation, tit for tat, or unconditional noncooperation) × 3 (noise: absent, low noise, or high noise) × 4 (blocks of trials) analysis of variance (ANOVA), with the latter variable being a within-participant variable (this variable is discussed shortly). The primary dependent variable was level of cooperation.

Procedure. Eight to 15 participants attended each research session. On arrival, each participant was greeted and escorted to one of 15 cubicles, which prevented participants from communicating with each other. The entire experiment was conducted on Apple Macintosh computers, using a program written in Macromedia Authorware.

The social dilemma task. The experiment started by explaining to the participants that the computers in the different cubicles were connected and that they would be paired to interact via computer in a decision task for an unknown number of trials. Next, participants read the instructions of the social dilemma task. We used a paradigm in which participants delivered valuable parcels for each other throughout a virtual city. By using this paradigm, we are able to improve mundane realism in three ways. First, the task involves unintended errors due to noise incidents (i.e., roadblocks that obstruct the way to the place of delivery). Second, in this approach, participants have to make an effort to enact cooperative behavior (i.e., navigating through an unknown city). Third, because of the nature of the task (i.e., delivery of parcels), the behavior of the participants should reveal some inherent variability.

The social dilemma task consisted of eight trials, each of which were divided into two parts (Part A and Part B). In Part A, the participant was the sender of the parcel, and the preprogrammed partner was the deliverer, and in Part B, the participant was the deliverer, whereas the partner was the sender of the parcel. In this way, the task involved a so-called sequential social dilemma, in which the preprogrammed partner always acted first. We deliberately chose to do this for two reasons. First, strategies differ in terms of the trade-off between the degree of other regardingness and the degree of exploitability (the degree to which a strategy is vulnerable to being exploited by an interaction partner; cf. Axelrod & Dion, 1988). By choosing a sequential setup, we wanted to emphasize this trade-off: On the one hand, the preprogrammed partner actually communicates a leap of faith by placing the outcome of every trial in the hands of the participant. On the other hand, participants are motivated to maximize their own gains by exploiting the partner, at least to some extent, in every trial. A second reason for choosing a sequential task is that many or most everyday social interactions tend to be sequential in nature—in fact, one may go as far as to claim that it is exceptionally rare for people to be forced to make simultaneous decisions. Furthermore, some previous work (e.g., Insko et al., 1998) revealed no differences for cooperation levels among dyads between sequential and simultaneous social dilemma tasks.

When being the sender of the parcel (Part A), the participant was shown a screen with the elapsed time, the income of the other, and own costs (see Figure 1). Also, the following text was displayed on the screen: "The other is delivering your parcel. It depends on the other how much time this will take. A moment please!" When being the deliverer of the parcel (Part B), the participant was shown a map of a city with streets, woods, and houses (see Figure 2). As can be seen in Figure 2, the participant was represented on the map with a blue ball, and the location where the parcel should be delivered was indicated with a yellow flag. The distance between the ball and the flag was the same for all rounds. Before the task started, the participants received 3 s to find out the exact location of the ball and the flag on the map. This was to avoid individual differences in visual focusing that might influence the results. Participants could move through the city by clicking the mouse pointer on one of four red arrows around the blue ball; the ball would move to the next intersection in the intended direction. In this way, participants could wander freely through the city. The parcel was delivered when the participants moved the blue ball over the yellow flag.

[4] For the self-regarding partners, we did not expect detrimental effects of (negative) noise because we anticipated a natural floor effect, that is, the level of cooperation may already be low when negative noise incidents are absent and, as a consequence, cannot get much lower.

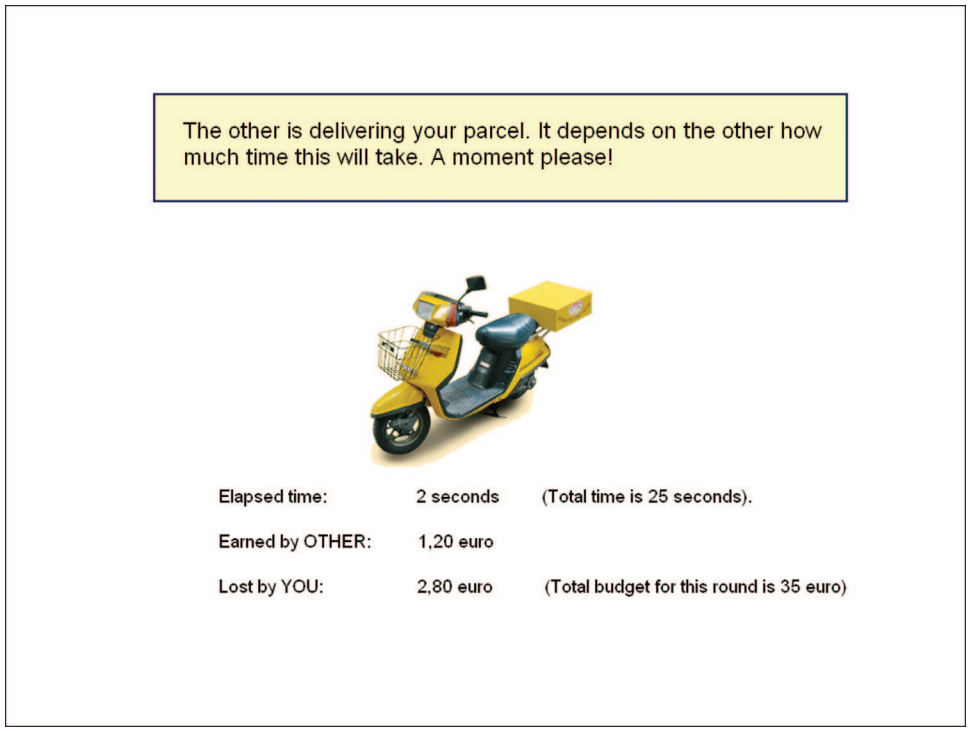

Figure 1. The screen that is displayed to the participants when the partner is the deliverer. Note that in the original experiment, the text was in Dutch.

Both parts of a trial lasted no longer than 25 s. The level of cooperation was measured by the amount of time the participants took to deliver the parcel. Deliverers were paid per time unit: Every second they were busy delivering, they earned €0.60. So, it was in their direct self-interest to stay on the road as long as possible (like a taxi driver). For the senders of the parcel, the delivery was costly, they lost €1.40 per second. It was in the interest of the sender that the delivery come as fast as possible. As can be seen in Table 2, maximum cooperation would be to deliver the parcel in 5 s. The participant would then earn €3.00 (5 × €0.60), and the sender would lose €7.00 (5 × €1.40) of his or her €35 budget. Minimum cooperation would be to not deliver the parcel or to deliver it in exactly 25 s. This would result in an outcome of €15.00 (25 × €0.60) for the deliverer and an outcome of €0.00 (€35.00 minus 25 × €1.40) for the sender. At the end of every trial, the earnings of Parts A and B were summed to obtain the total outcomes. Table 2 provides an overview of the outcome structure of the social dilemma.

The social dilemma task included four equivalent blocks of trials. Participants were not informed about the total number of eight trials. After explaining the social dilemma task, we administered four questions to check comprehension of the task. Before being able to proceed, the participants had to answer three out of four questions correctly. When two or more questions were answered incorrectly, the instructions were displayed again. The majority of the participants (84.3%) passed this test the very first time, and 96.6% of the participants passed after having read the instructions twice, so the test questions revealed good comprehension by the participants. After the comprehension checks, participants did two practice trials. In the second practice trial, participants were asked to deliver the parcel as quickly as possible, to determine their maximum delivery speed. This measure gave us the ability to control for individual differences in task performance later on in the analysis.

The outcomes in the social dilemma task were presented in European currency. As in previous experiments (e.g., Van Lange, 1999; Van Lange & Visser, 1999), we informed participants that the amount of money was hypothetical but that by earning more money they would increase their chances of winning a €15 book or CD gift certificate. That is, we stated that the amount of hypothetical money earned for themselves corresponded to the number of tickets in a raffle for the gift certificates, making clear that their chances would increase by the amount of money they earned for themselves during the task, not by the amount of money they earned more than the other participants in this experiment.

Manipulation of the partner's strategy. The tit-for-tat partner was programmed to start delivering the parcel in 17 s, a moderately cooperative move (see also Tazelaar, Van Lange, & Ouwerkerk, 2004; Van Lange et al., 2002). In this way, the behavior of the preprogrammed partner was realistic, while, at the same time, the partner showed reasonably good intentions. In subsequent trials, the tit-for-tat partner was programmed to deliver the parcel in the same number of seconds as the participant had in the previous trials. The cooperative partner and the noncooperative partner were programmed to deliver the parcel in 9 s (high cooperation) and 22 s (low cooperation), respectively. To make sure that the behavior of the preprogrammed

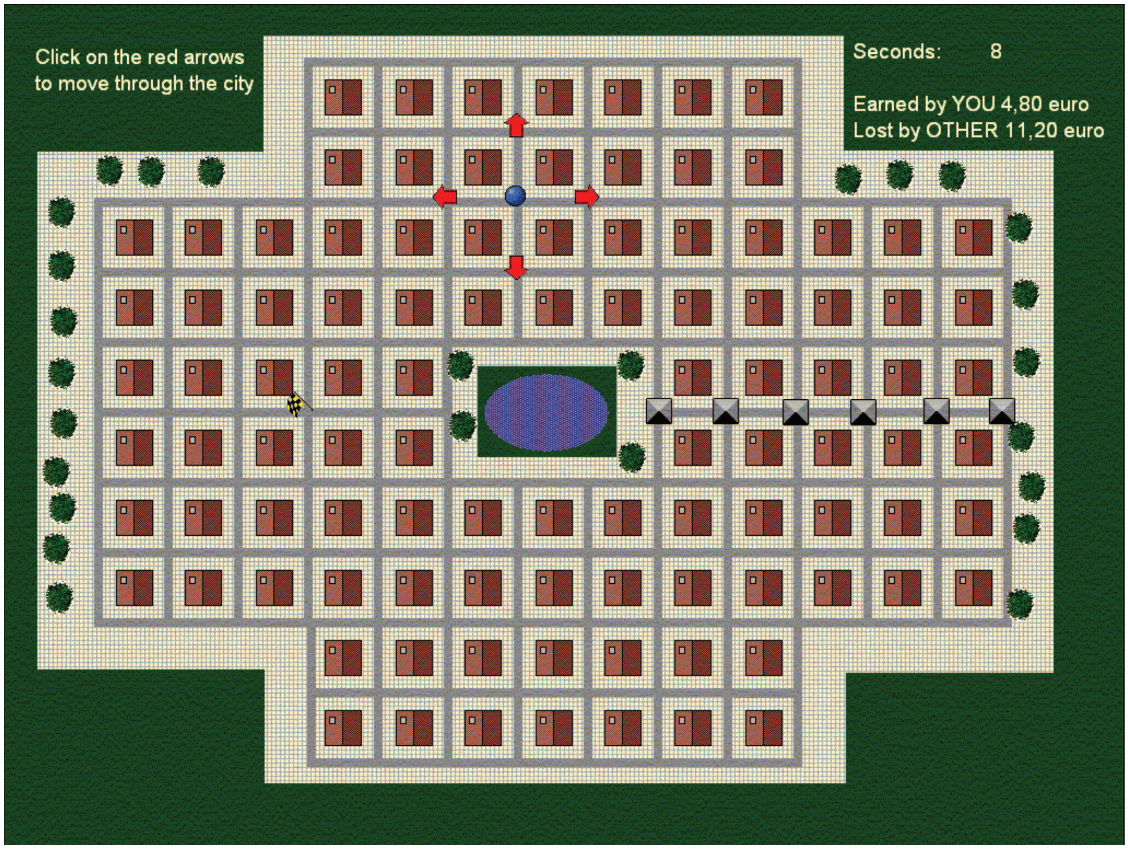

Figure 2. The screen that participants see when they are the deliverer (with roadblocks). Note that in the original experiment, the text was in Dutch.

partner was somewhat realistic, we programmed the computer to add or subtract 1 s in Trials 1, 3, 5, and 7 (these were the trials in which noise was absent in all conditions). In the other trials, we did not make such a correction, as it would influence the manipulation of noise.

Manipulation of noise for the preprogrammed partner. Prior to making choices in the social dilemma, participants were informed about the possible occurrence of noise during the experiment. In previous research (Van Lange et al., 2002), participants in the conditions without noise did not receive instructions about noise. Obviously, in real life, people may be aware of noise in their lives without actually experiencing it for a period of time. Consequently, in our new paradigm, we provided all the participants with exactly the same information. In doing so, we sought to establish a basic understanding of noise in all experimental conditions, while we manipulated the actual appearance of noise in the noise conditions only.

Table 2
Payoff Structure of the Parcel Paradigm

Own behavior	Partner's behavior: Maximum cooperation (5 s)	Partner's behavior: Minimum cooperation (25 s)
Maximum cooperation (5 s)	ε31/ε31	ε3/ε43
Minimum cooperation (25 s)	ε43/ε3	ε15/ε15

Note. This payoff structure meets the formal criteria set for prisoner's dilemmas: The temptation to defect (ε43) has the largest outcome, followed by reward for mutual cooperation (ε31), punishment for mutual defection (ε15), and the sucker's payoff (ε3). Also, the sum of the temptation to defect and the sucker's payoff is smaller than 2 times the reward for cooperation.

In the parcel delivery paradigm, noise was operationalized by supposedly random roadblocks that could appear at intersections of the city map (see Figure 2). We explained to the participants that for every trial, they and their interaction partner could face one of three options (which need not necessarily be the same for the two partners): (a) There were no roadblocks present; (b) there were roadblocks present, but they did not obstruct the path to the goal (i.e., unharmful roadblocks); and (c) there were roadblocks present that did obstruct the path to the goal and would cause a delay of about 7 s (i.e., harmful roadblocks).

In reality, only the preprogrammed partner encountered harmful roadblocks, resulting in a 7-s delay on top of the intended delivery time (which was dependent on the strategy conditions). After analyzing the results of a pilot study, we determined that 7 s seemed to be a reasonable noise intensity that was unlikely to go unnoticed by the participants. Participants, however, experienced occasional unharmful roadblocks in some of the trials, which served as a reminder of the possible occurrence of noise in their behavior.

As noted earlier, the actual social dilemma task included eight interaction trials, in some of which noise influenced the behavior of the preprogrammed partner. In the low-noise condition, two trials included noise (25%), and in the high-noise condition, four trials included noise (50%). In the high-noise condition, noise was introduced at Trials 2, 4, 6, and 8. For half of the participants in the low-noise condition, the partner experienced noise at Trials 4 and 8, and for the other half of the participants, the partner experienced noise at Trials 2 and 6. This was to control for differences in cooperation due to the onset of noise. We found no such differences (i.e., no main or interaction effects); therefore, we collapsed the data across the two conditions, which we refer to as the low-noise condition.

Measuring partner trust. Upon completion of the social dilemma task, participants proceeded with a questionnaire assessing trust they had in their partner during the task. In assessing partner-specific trust, we considered scales for assessing trust in ongoing relationships (which include items asking about specific behaviors, such as relying on the partner to keep the promises; e.g., Rempel, Holmes, & Zanna, 1985) and scales assessing generalized interpersonal trust (e.g., Rotter, 1967; Yamagishi, 1986). However, we do not know of any instrument that is designed to assess partner-specific trust that is based on a series of interactions with an otherwise unknown other person. Hence, we designed a five-item instrument assessing partner-specific trust (see the Appendix), thereby focusing on some key items or constructs derived from the above scales, such as self-reported trust ("I trust the other person completely"; see Rotter, 1967; Yamagishi, 1986) or dependability ("If push comes to shove, I do not want to rely on the other person," reverse coded; cf. Rempel et al., 1985; for more information, see Van Lange, 2008). Participants could indicate how much they agreed versus disagreed with these statements on scales ranging from 1 (*completely disagree*) to 7 (*completely agree*). The scale exhibited good internal consistency (Cronbach's $\alpha = .87$).

Measuring affective evaluations. Eight items assessed the feelings that the participants experienced during the task. Items of the positive scale were "The behavior of the other made me feel . . . happy, contented, proud, enthusiastic" (Cronbach's $\alpha = .93$), and items of the negative scale were "The behavior of the other made me feel . . . disappointed, frustrated, indignant, angry" (Cronbach's $\alpha = .91$). Participants could indicate how much they agreed with these statements on scales ranging from 1 (*not at all*) to 7 (*very much*).

Measuring perceived transformations. Fifteen items assessed participants' perceived transformations. Each transformation was indicated by three items, which showed good internal reliability: MaxJoint, $\alpha = .94$ (e.g., "The other person wanted to get the most outcomes for the two of us"); MinDiff, $\alpha = .93$ (e.g., "The other person wanted to minimize the differences in outcomes for me and the other"); MaxOther, $\alpha = .89$ (e.g., "The other person wanted that I would get the most outcomes"); MaxRel, $\alpha = .93$ (e.g., "The other person wanted to get more outcomes than I did"); and MaxOwn, $\alpha = .83$ (e.g., "The other person wanted to get the most outcomes for himself or herself").

Measuring morality and strength judgments. Six items intended to assess participants' judgment of the partners in terms of morality and strength. The items were based on earlier research on impressions in social dilemmas (might vs. morality; e.g., Liebrand et al., 1986; Van Lange & Kuhlman, 1994). Items of the morality scale were "How . . . honest /dishonest, just/unjust, moral/immoral . . . do you think the other is?" (Cronbach's $\alpha = .93$). Items of the strength scale were "How . . . weak/strong, powerless/powerful, soft/firm . . . do you think the other is?" (Cronbach's $\alpha = .65$). Participants could indicate their judgments on s7-point scales.

Measuring tendency to reciprocate. Finally, we included a six-item measure of participants' inclination to reciprocate the partner's behavior (Cronbach's $\alpha = .78$). This was to provide evidence (albeit somewhat indirect) that reciprocity is a fairly common response, which is important for understanding why noise causes detrimental effects (i.e., if people were very generous, even a reciprocal strategy would not suffer from noise). A positive item was "If the other started to deliver the parcel slower, I immediately decided to deliver slow as well," and a negative item was "My decisions were not influenced by the behavior of the other" (reverse coded). Again, participants could indicate how much they agreed versus disagreed with these statements on scales ranging from 1 (*totally disagree*) to 7 (*totally agree*).

Results and Discussion

All dependent variables were analyzed in a 3 (partner's strategy: unconditional cooperation, tit for tat, or unconditional noncooperation) $\times$ 3 (noise: absent, low, or high) ANOVA. For level of cooperation only, we included the performance of the participants on the second practice trial as a covariate in the analysis (thereby making it formally an analysis of covariance [ANCOVA]). In doing so, we sought to correct for possible individual differences in performance on the social dilemma task (i.e., recall that, unlike the first practice trial, we assessed participants' maximum speed in the second practice trial).[5] We also examined the development of cooperation level across four blocks of trials within participants. Because we hypothesized that the noise-absent condition would be different from the two noise conditions, we computed a noise-versus-no-noise contrast. This planned contrast compared the noise-absent condition with the two noise-present conditions. To test whether the detrimental effects of noise are specifically more pronounced for the tit-for-tat partner, we also computed a tit-for-tat-versus-unconditional-strategies contrast. To find support for Hypothesis 2, the interaction between these two contrasts should be significant.[6]

Main effects for noise. Were there any detrimental effects for noise (Hypothesis 1)? To find support for this hypothesis, the analysis should yield significant effects for noise but, more importantly, for the noise-versus-no-noise contrast. For reasons of conciseness, we report only the main effects of the contrast (whenever the contrast was significant, the main effect of noise

[5] There were no between-conditions differences regarding the covariate, and the uncorrected means were therefore quite similar to the estimated marginal means; the latter are reported. Also, we did not include performance as a covariate in the analysis of trust, transformations, perceived morality and strength, and positive and negative effect. We should note that an analysis including the covariate yielded virtually identical results.

[6] For reasons of conciseness, we do not report the overall interaction effects between partner's strategy and noise. Whenever the hypothesized effect between the noise-versus-no-noise contrast and the tit-for-tat-versus-unconditional-strategies contrast was significant, the overall interaction effect was also significant, with three exceptions: MaxRel, MaxOwn, and negative affect, Fs(4, 195) = 1.28, 1.39, and 1.47, all *ns,* respectively.

was also significant). As we demonstrate below, the analysis revealed the predicted effects for all dependent measures except level of cooperation. Relevant means are displayed in Tables 3 and 4 (for significance tests of differences between the means, see subscripts).

With respect to cooperation, we analyzed the time (in seconds) that remained after the parcel was delivered such that a higher score indicated a greater level of cooperation. The analysis revealed no significant main effects for the noise-versus-no-noise contrast, $F(1, 194) = 1.32$, *ns*. However, we did find significant effects for the contrast for trust,[7] $F(1, 195) = 16.87$, $p < .001$; for all the perceived transformations: MaxJoint, MaxOther, MinDiff, and MaxRel, Fs(1, 195) = 41.44, 36.64, 25.02, and 27.65, all ps < .001, respectively, and MaxOwn, $F(1, 195) = 9.76$, $p < .01$); and for perceived morality, $F(1, 195) = 12.12$, $p < .01$. As predicted, we found no effects for perceived strength, $F(1, 195) = 1.61$, *ns*. With respect to the affective outcomes, we found the predicted detrimental effects of the noise-versus-no-noise contrast, $F(1, 195) = 23.76$, $p < .001$, on positive affect, whereas we found somewhat weaker support for the notion that noise promoted negative affect, $F(1, 195) = 3.00$, $p = .09$.

Main effects for partner's strategy. We found main effects of partner's strategy for cooperation, $F(2, 194) = 21.30$, $p < .001$; trust, $F(2, 195) = 46.15$, $p < .001$; and all perceived transformations: MaxJoint, MaxOther, MinDiff, MaxRel, and MaxOwn, Fs(2, 195) = 78.73, 55.00, 61.46, 48.24, and 45.02, all ps < .001, respectively. We also found main effects for partner's strategy for perceived morality, $F(2, 195) = 53.72$, $p < .001$; perceived strength, $F(2, 195) = 9.72$, $p < .001$; positive affect, $F(2, 195) = 61.18$, $p < .001$; and negative affect, $F(2, 195) = 42.47$, $p < .001$. As can be seen in Table 3, the cooperative partner scored highest on cooperation and on trust and elicitation of positive affect and lowest on elicitation of negative affect and on perceived strength. For significance tests of differences between the means, see subscripts in Table 3.

Interaction effects of noise and partner's strategy. Were the effects of noise more pronounced for a tit-for-tat partner than for both unconditional partners (Hypothesis 2)? To find support for this hypothesis, the analysis should yield a significant interaction between the noise-versus-no-noise contrast and the tit-for-tat-versus-unconditional-strategies contrast. Also, we should find significant effects of the noise-versus-no-noise contrast for the tit-for-tat partner, whereas these effects should be absent for the two unconditional strategies. As we demonstrate below, we found strong support for this pattern for cooperation, trust, three types of perceived transformations (i.e., MaxJoint, MinDiff, and MaxOwn), perceived morality, and positive affect, thereby supporting our Hypotheses 2a through 2e. Relevant means are displayed in Tables 3 and 4.

For cooperation, the predicted interaction effect between the noise-versus-no-noise contrast and the tit-for-tat-versus-unconditional-strategies contrast was significant, $F(1, 194) = 4.02$, $p < .05$. Moreover, simple main effect analysis yielded an effect for the noise-versus-no-noise contrast for the tit-for-tat partner, $F(1, 194) = 5.53$, $p < .05$, but no effects for the contrast for the cooperative partner, $F(1, 194) < 1$, *ns,* or the noncooperative partner, $F(1, 194) < 1$, *ns.*[8] Thus, as predicted in Hypothesis 2a, the detrimental effects of noise on cooperation were more pronounced for the tit-for-tat partner than for the cooperative partner and the noncooperative partner.

For trust, the predicted interaction effect between the noise-versus-no-noise contrast and the tit-for-tat-versus-unconditional-strategies contrast was significant, $F(1, 195) = 4.29$, $p < .05$. Moreover, the analysis yielded the predicted effect for the no-noise-versus-noise contrast for the tit-for-tat partner, $F(1, 195) = 17.26$, $p < .001$, and the noncooperative partner, $F(1, 195) = 5.20$, $p < .05$, but no effects for the cooperative partner, $F(1, 195) < 1$, *ns*. Thus, our Hypothesis 2b was largely supported: The detrimental effects of noise on trust were more pronounced for the tit-for-tat partner than for the cooperative partner, but the noncooperative partner was also affected by noise.

For all perceived transformations except MaxOther, we found significant—albeit some marginally—interaction effects between the noise-versus-no-noise contrast and the tit-for-tat-versus-unconditional-strategies contrast: For MinDiff and MaxJoint, Fs(1, 195) = 8.39 and 31.67, ps < .01 and .001, respectively; and for MaxRel and MaxOwn, Fs(1, 195) = 3.00 and 3.08, ps = .09 and .08, respectively. Simple main effects analysis revealed the predicted pattern for MaxJoint and MaxOwn, that is, effects for the noise-versus-no-noise contrast for the tit-for-tat partner, Fs(1, 195) = 70.46 and 10.82, both ps < .001, respectively, but no effects for the noncooperative partner, Fs(1, 195) = 1.76 and 2.93, both *ns,* or the cooperative partner, Fs(1, 195) = 2.19 and 0.23, both *ns*. For MinDiff, we found effects of the contrast for both the tit-for-tat partner and the noncooperative partner, Fs(1, 195) = 28.27 and 10.26, ps < .001 and .05, respectively, but not for the cooperative partner, $F(1, 195) = 1.13$, *ns*. For MaxRel, the analysis revealed effects of the noise-versus-no-noise contrast for all partners, Fs(1, 195) = 20.27, 5.87, and 5.03, ps < .001, .05, and .05, for the tit-for-tat partner, the noncooperative partner, and the cooperative partner, respectively. Inspection of the means indi-

[7] All secondary dependent variables that were used in this article were not used before in studies examining strategies and noise. Van Lange et al. (2002) assessed participants' general impressions of benign intent of the partner. We also used this measure, which supported our hypotheses. Positive items of this scale were "The other was generous, nice, forgiving, kind, trustworthy," and negative items were "The other was self-centered, greedy, competitive, stingy, vengeful, selfish" (Cronbach's $\alpha = .90$). Participants could indicate how much they agreed versus disagreed with these statements on scales ranging from 1 (*totally disagree*) to 7 (*totally agree*). We found effects for the noise-versus-no-noise contrast, $F(1, 195) = 28.87$, $p < .001$, and for partner's strategy, $F(1, 195) = 116.91$, $p < .001$, as well as a significant interaction effect for the two contrasts, $F(1, 195) = 17.68$, $p < .001$. Moreover, the analysis yielded a significant effect for the noise-versus-no-noise contrast for the tit-for-tat partner, $F(1, 195) = 43.72$, $p < .001$, but no effects for the cooperative partner, $F(1, 195) = 2.56$, *ns,* or the noncooperative partner, $F(1, 195) = 1.49$, *ns*.

[8] The analysis did not reveal any significant interaction effects involving blocks of trials, $F(6, 585) = 1.23$, $F(6, 585) < 1$, and $F(12, 585) < 1$, all *ns,* for Strategy × Blocks, Noise × Blocks, and Strategy × Noise × Blocks, respectively. These results indicate that there were no differences in the development of cooperation levels among conditions. This is perhaps not surprising as the strategies used in Study 1 (unconditional cooperation and unconditional noncooperation) were very clear and thus revealed their true intentions from the start. Further analyses that examined possible interaction effects of the noise-versus-no-noise contrast and the linear polynomial contrast within each partner's strategy revealed no significant effects.

Table 3
Means (and Standard Deviations) for Level of Cooperation, Trust, Perceived Morality and Strength, and Affective Outcomes as a Function of Noise and Partner's Strategy (Study 1)

Dependent variables/partner's strategy	Noise			
	Absent	Low	High	Total
Level of cooperation				
Cooperative	12.77 (4.99)	13.80 (3.60)	10.33 (3.85)	12.28_{a} (4.39)
Tit for tat	13.55 (4.60)	11.71 (5.10)	9.38 (6.05)	11.45_{a} (5.54)
Noncooperative	6.42 (5.67)	6.23 (4.71)	8.73 (6.45)	7.09_{b} (5.68)
Total	10.85_{d} (5.99)	10.63_{d} (5.48)	9.50_{d} (5.52)	10.32 (5.68)
Trust in partner				
Cooperative	4.03 (1.21)	4.25 (0.69)	3.44 (0.96)	3.91_{a} (1.03)
Tit for tat	3.98 (0.99)	3.27 (1.18)	2.63 (0.95)	3.27_{b} (1.17)
Noncooperative	2.64 (1.12)	2.00 (0.91)	2.10 (0.96)	2.27_{c} (1.03)
Total	3.54_{d} (1.28)	3.19_{e} (1.32)	2.74_{f} (1.09)	3.16 (1.27)
Perceived morality				
Cooperative	4.86 (1.15)	5.03 (0.71)	4.57 (0.95)	4.81_{a} (0.96)
Tit for tat	4.94 (0.81)	4.13 (1.11)	3.49 (1.17)	4.16_{b} (1.17)
Noncooperative	3.21 (1.20)	2.67 (1.30)	2.81 (1.37)	2.91_{c} (1.29)
Total	4.32_{d} (1.33)	3.96_{e} (1.43)	3.64_{e} (1.33)	3.97 (1.38)
Perceived strength				
Cooperative	3.70 (1.04)	3.61 (0.61)	3.86 (0.79)	3.72_{a} (0.83)
Tit for tat	3.90 (1.00)	4.33 (0.95)	4.42 (0.85)	4.22_{b} (0.95)
Noncooperative	4.42 (0.93)	4.73 (1.25)	4.17 (1.22)	4.44_{b} (1.14)
Total	4.01_{d} (1.30)	4.21_{d} (1.06)	4.16_{d} (0.97)	4.13 (1.02)
Positive affect				
Cooperative	4.79 (1.19)	4.26 (1.46)	4.23 (1.10)	4.43_{a} (1.26)
Tit for tat	4.66 (1.36)	3.14 (1.13)	2.63 (1.08)	3.45_{b} (1.47)
Noncooperative	2.30 (1.14)	1.94 (0.97)	2.07 (1.48)	2.11_{c} (1.20)
Total	3.90_{d} (1.68)	3.13_{e} (1.53)	2.99_{e} (1.50)	3.34 (1.62)
Negative affect				
Cooperative	2.65 (1.28)	2.27 (0.88)	2.68 (1.15)	2.54_{a} (1.12)
Tit for tat	2.39 (0.95)	3.36 (1.32)	3.33 (1.74)	3.03_{b} (1.45)
Noncooperative	4.46 (1.31)	4.76 (1.50)	4.70 (1.93)	4.63_{c} (1.57)
Total	3.19_{d} (1.50)	3.45_{e} (1.61)	3.53_{e} (1.81)	3.38 (1.64)

Note. Means of level of cooperation are the seconds remaining after the parcel was delivered: the more time remained, the greater levels of cooperation. Standard deviations are presented within parentheses. Overall means for partner's strategy and noise that do not share subscripts differ significantly at $p < .05$ or smaller.

cates that for all the partners, participants perceived the relative gain transformations (i.e., competition) more when noise was present than noise was absent. As noted earlier, we found no interaction effects between the two contrasts for MaxOther, $F(1, 195) = 2.04$, *ns*.

For perceived morality, the predicted interaction effect for the noise-versus-no-noise contrast and the tit-for-tat-versus-unconditional-strategies contrast was significant, $F(1, 195) = 6.76$, $p = .01$. Simple main effect analysis revealed a detrimental effect for the noise-versus-no-noise contrast for the tit-for-tat partner, $F(1, 195) = 17.72$, $p < .001$, but no effects for the cooperative partner ($F < 1$, *ns*), or the noncooperative partner, $F(1, 195) = 2.84$, *ns*. As we predicted, for perceived strength, we found no significant interaction effects for the noise-versus-no-noise contrast and the tit-for-tat-versus-unconditional-strategies contrast, $F(1, 195) = 2.20$, *ns*. Thus, as we predicted in Hypothesis 2d, we found detrimental effects of noise on perceived morality that were more pronounced for the tit-for-tat partner than for the cooperative partner and the noncooperative partner, but we did not find such effects for perceived strength.

Regarding affective outcomes, we found the predicted interaction effects of the noise-versus-no-noise contrast and the tit-for-tat-versus-unconditional-strategies contrast for both positive affect, $F(1, 195) = 13.06$, $p < .001$, and negative affect, $F(1, 195) = 4.28$, $p < .05$. For positive and negative affect, simple main effect analysis revealed effects for the noise-versus-no-noise contrast only for the tit-for-tat partner, $F(1, 195) = 33.89$, $p < .001$, for positive affect, and $F(1, 195) = 7.31$, $p < .01$, for negative affect, but no effects for the cooperative partner ($F = 3.08$, *ns,* and $F < 1$, *ns,* for positive and negative affect, respectively) or the noncooperative partner (both Fs < 1, *ns,* for positive and negative affect). Thus, as we predicted in Hypothesis 2e, the detrimental effects of noise on positive affect were more pronounced for the tit-for-tat partner than for the cooperative partner and the noncooperative partner. We found reverse effects for negative affect (see also Table 3).

Correlational analyses. Which psychological processes underlie our findings? To address this issue, we performed a series of correlational analyses. (A regression analysis was not judged to be suitable because the various judgments were assessed after measuring cooperation and hence do not fully qualify as a mediator; also, we included a variety of judgments, which we expected to be fairly strongly interrelated.) Thus, the links of cooperation with the various judgments were assessed in an exploratory manner.

Table 4
Means (and Standard Deviations) for Perceived Transformations as a Function of Noise and Partner's Strategy (Study 1)

Dependent variable/partner's strategy	Noise			
	Absent	Low	High	Total
MaxOther (altruism)				
Cooperative	4.30 (1.76)	3.65 (0.94)	3.42 (1.07)	3.79_{a} (1.35)
Tit for tat	3.65 (0.95)	2.48 (0.95)	2.19 (1.15)	2.76_{b} (1.20)
Noncooperative	2.31 (1.35)	1.49 (0.95)	1.40 (0.68)	1.76_{c} (1.11)
Total	3.40_{d} (1.61)	2.56_{e} (1.29)	2.36_{e} (1.28)	2.78 (1.47)
MaxJoint (cooperation)				
Cooperative	4.91 (1.84)	4.89 (1.26)	3.99 (1.22)	4.59_{a} (1.51)
Tit for tat	5.33 (1.03)	2.87 (1.39)	2.40 (1.12)	3.50_{b} (1.75)
Noncooperative	2.14 (1.17)	1.75 (1.33)	1.67 (0.89)	1.86_{c} (1.15)
Total	4.10_{d} (1.99)	3.20_{e} (1.86)	2.70_{f} (1.44)	3.34 (1.86)
MinDiff (equality)				
Cooperative	4.80 (1.99)	4.71 (1.16)	4.14 (1.00)	4.55_{a} (1.46)
Tit for tat	4.81 (1.25)	3.22 (1.62)	2.73 (1.35)	3.56_{b} (1.65)
Noncooperative	2.49 (1.33)	1.71 (1.33)	1.62 (1.09)	1.96_{c} (1.30)
Total	4.01_{d} (1.89)	3.24_{e} (1.84)	2.86_{e} (1.53)	3.37 (1.82)
MaxOwn (individualism)				
Cooperative	3.04 (1.61)	3.03 (0.96)	3.39 (1.02)	3.16_{a} (1.23)
Tit for tat	3.78 (1.19)	4.65 (1.66)	5.21 (1.32)	4.57_{b} (1.50)
Noncooperative	5.03 (1.51)	5.75 (1.32)	5.54 (1.84)	5.42_{c} (1.57)
Total	3.97_{d} (1.65)	4.45_{e} (1.74)	4.71_{e} (1.68)	4.37 (1.71)
MaxRel (competition)				
Cooperative	2.74 (1.54)	3.32 (1.20)	3.75 (1.03)	3.27_{a} (1.33)
Tit for tat	3.55 (1.40)	4.90 (1.36)	5.35 (1.34)	4.62_{b} (1.56)
Noncooperative	5.06 (1.69)	6.08 (1.27)	5.76 (1.58)	5.61_{c} (1.57)
Total	3.80_{d} (1.81)	4.74_{e} (1.70)	4.95_{e} (1.57)	4.49 (1.76)

Note. Standard deviations are presented within parentheses. Overall means for partner's strategy and noise that do not share subscripts differ significantly at $p < .05$ or smaller. MaxJoint = enhancing joint outcomes; MinDiff = minimizing (absolute) differences between own and partner's outcomes; MaxOther = enhancing the partner's outcome; MaxRel = enhancing relative advantage over partner's outcomes; MaxOwn = enhancing one's own outcomes.

First, we examined the intercorrelations among all secondary dependent variables. We found that all these variables were correlated, ranging (in absolute terms) from $r = .32$ (between negative affect and perceived strength) to $r = .81$ (between positive affect and MaxJoint), all ps $< .001$. The analysis revealed a clear distinction between two groups of variables. One group included the positive variables: the other-regarding transformations (MaxJoint, MaxOther), the equality transformation (MinDiff), trust, perceived morality, and positive affect. The other group included the (presumably) negative variables: the self-regarding transformations (MaxOwn, MaxRel), perceived strength, and negative affect. The variables in both groups were positively correlated to all the variables in their own group but negatively correlated to all the variables in the other group.

Now how do these two groups of variables relate to the main dependent variable, level of cooperation? For the positive group, we found significant correlations with cooperation for all but one variable: MaxJoint ($r = .29$, $p < .01$), positive affect ($r = .22$, $p < .01$), trust ($r = .19$, $p < .01$), MinDiff ($r = .18$, $p < .01$), and perceived morality ($r = .16$, $p < .05$). MaxOther was not related to cooperation levels ($r = .027$, *ns*). For the negative group, we found (marginally) significant correlations for negative affect ($r = -.36$, $p < .001$), MaxRel ($r = -.14$, $p < .05$), and MaxOwn ($r = -.13$, $p = .06$). Perceived strength was not correlated to cooperation ($r = -.026$, *ns*).

Thus, the correlational analyses provide preliminary support for the idea that an atmosphere of trust and benign intent may promote cooperative interaction and may be shaped by cooperative interaction. As such, the impression that the partner has benign intentions (translated into other-regarding transformations, trust, and perceived morality) rather than malignant intentions (translated into self-regarding transformations) may be crucial for the development of cooperation levels. The finding that perceived strength, which is less strongly linked to intentions (if at all), was virtually uncorrelated with cooperation, is also in line with this argument. We further suggest that the strong affective reactions (and their relatively strong association with cooperation levels; see also Study 2), may be driving factors underlying people's behavioral response toward the partner's strategy and toward noise (above and beyond the reverse causation—that feelings are also a product of the other's strategy).

Participants' tendency to reciprocate. In the introduction, we suggested that, in addition to the building of trust and benign intent, the tendency of most people to reciprocate others' behavior may be an important factor for the functionality of other-regarding strategies to cope with noise. Were the participants behaving reciprocally toward their interaction partners? We used two measures: a behavioral measure and a self-report measure. For each participant, we computed a *reciprocity index* by averaging the absolute differences between the cooperation level of the other and

the cooperation level of the participant. The higher participants scored on this index, the lower was their reciprocal behavior. The theoretical range of the scores within the index was 20, ranging from 0 (strict reciprocation) to 20 (maximum possible difference). We divided the participants into five equivalent reciprocity categories, each with a range of 4 s (thereby acknowledging some inherent variability). As we expected, almost 60% (58.8%) of the participants were represented in the first category (ranging from 0 to 4 s difference) of the reciprocity index, indicating that the majority of the participants behaved in a reciprocal manner. Another 24.5% of the participants were represented in the second category, so 83.3% of the participants were in the first two categories of the reciprocity index. A chi-square test revealed a significant difference among the five categories, $\chi^2(4, N = 204) = 222.08$, $p < .001$.

These results are in line with previous research showing that more than 50% of participants acted reciprocally (cf. Van Lange, 1999). In addition to the reciprocity index described above, we analyzed the six items intended to measure self-reported reciprocity. This scale exhibited a significant correlation with the reciprocity index ($r = .49$, $p < .001$). A 3 (partner's strategy: unconditional cooperation, tit for tat, or unconditional noncooperation) $\times$ 3 (noise: absent, low noise, or high noise) ANOVA did not reveal any significant effects for noise, $F(2, 194) = 1.13$, *ns,* or for partner's strategy, $F(2, 194) = 1.52$, *ns*. Neither did the analysis reveal a significant interaction effect, $F(4, 194) = 1.23$, *ns*. These results indicate that participants' reported levels of reciprocity were not significantly different between the conditions.

To summarize, Study 1 provided strong support for our framework. First, although noise did not exert detrimental effects on cooperation across all three partners (no support for Hypothesis 1a, but see Hypothesis 2a), noise exerted detrimental effects on trust (Hypothesis 1b). Also, noise challenged perception of other-regarding transformations to the partner and promoted the perception of self-regarding transformations (Hypothesis 1c). Additionally, noise challenged judgments of morality but did not challenge judgments of strength (Hypothesis 1d), and noise challenged positive feelings and promoted negative feelings regarding the partner (Hypothesis 1e). Second, the results consistently revealed that the effects of noise were more pronounced for the tit-for-tat partner than for the unconditional partners for cooperation (Hypothesis 2a), trust in the partner (Hypothesis 2b), the perception of three transformations (i.e., MaxJoint, MinDiff, and MaxOwn; Hypothesis 2c), judgments of morality (Hypothesis 2d), and the experience of positive and negative feelings (Hypothesis 2e).

Most importantly, relative to tit for tat, unconditional cooperation (i.e., maximizing joint outcomes, maximizing other's outcomes) turned out to be an effective strategy in coping with noise. When an individual adopted this other-regarding strategy, noise exerted no negative effects on trust and perception of other-regarding transformations of this person. This is a remarkable finding because previous research has shown that unconditionally cooperative partners are often exploited. A possible explanation may be that participants are more impressed by cooperative behavior that takes effort (i.e., delivery of parcels) than by receiving a certain number of virtual coins and as a consequence are less motivated to exploit the partner. Another explanation may be that the variability inherently present in the environment called for clearer communication of trust and benign intentions. That is, an unconditionally cooperative strategy leaves little if any doubt about its intentions: communicating very cooperative intentions (i.e., maximization of joint and other's outcomes) at every interaction may make unintended errors that occur occasionally matter less.

Study 2

In Study 2, we sought to extend and complement Study 1 by comparing tit for tat with two strategies that were conditional (rather than unconditional, as in Study 1), in that they often tended to reciprocate the partner's behavior in the previous interaction; as such, these conditional strategies are characterized by equality in outcomes (see Table 1). At the same time, the strategies differed in that they either delivered the parcel 4 s faster than the partner did in the previous situation (generous), or delivered the parcel 4 s slower than the partner did in the previous situation (stingy). We refer to these strategies as generous and stingy because generosity is defined in terms of acting more cooperatively than a partner (i.e., combining MaxJoint/MaxOther with MinDiff), whereas stinginess is defined in terms of acting less cooperatively than a partner (combining MaxOwn/MaxRel with MinDiff; see Bendor et al., 1991; Kollock, 1993; Van Lange et al., 2002). As such, Study 2 extended Study 1 in at least two important respects.

First, the generous and stingy strategies are more realistic than the unconditional strategies examined in Study 1. In particular, the unconditionally cooperative strategy is not widely used because people are averse to the risk of exploitation either in an economical sense (getting lower outcomes than others) or in a psychological sense (e.g., the feeling of being the sucker; cf. Vohs, Baumeister, & Chin, 2007). Indeed, most people tend to converge on a strategy that is at least somewhat reciprocal in nature (see Study 1 findings). Thus, Study 2 adds mundane realism to the social environment studied in the experiment.

Second, from a transformational point of view (see Table 1), the unconditional strategies provide fairly unambiguous evidence regarding the other-regarding (MaxOther, MaxJoint) versus self-regarding (MaxOwn, MaxRel) nature of the intentions underlying behavior. Indeed, Study 1 revealed that the level of cooperation differed for the three strategies fairly soon and did not change much over the course of the interaction. However, the differences among generous, tit for tat, and stingy are smaller, and so, differences are more subtle and less clear. The important implication is that the other-regarding nature of the generous strategy or the self-regarding nature of the stingy strategy may not be perceived immediately. Rather, these qualities are likely to be detected and responded to during the course of interaction. Hence, it is plausible that the detrimental effects of noise will be revealed by decreases in cooperation over time for tit for tat and the stingy strategy and by no decreases or even increases (i.e., learning) for the generous strategy. Thus, we added an extra hypothesis, which we refer to as the noise-through-interaction hypothesis.

Method

Participants and experimental design. One hundred twenty-two participants (50 men, 72 women) with an average age of 21 years took part in the present research. They were recruited at the campus of the VU University by printed flyers. Each participant

was paid €5 in exchange for participation (at the time the experiment was conducted, €5 equaled $5 in American currency). The experimental design was a 3 (partner's strategy: generous, tit for tat, or stingy) × 2 (noise: absent or present) × 3 (blocks of trials) ANOVA, with the latter variable being a within-participant variable (this variable is discussed shortly). The primary dependent variable was level of cooperation.

Procedure. The procedure of Study 2 was identical to the procedure of Study 1 except for differences in the initial choice of the preprogrammed partners and the distribution of the noise over the trials. These differences are discussed in greater detail shortly.

Manipulation of partner's strategy. After analyzing the data of Study 1, we decided that a moderately cooperative initial choice would be 13 s,[9] rather than 17 s as in Study 1. Consequently, all the partners (generous, tit for tat, and stingy) were programmed to start with delivering the parcel in 13 s in the first trial. In subsequent trials, the tit-for-tat partner was programmed to deliver the parcel in the same number of seconds as the participant had in the previous trials. The generous partner was programmed to deliver the parcel 4 s faster than the participant had in the previous trial (generous strategy), and the stingy partner was programmed to deliver the parcel 4 s slower than the participant had (stingy strategy).

Manipulation of noise. Prior to making choices in the social dilemma, participants were informed about the possible occurrence of noise during the experiment. As in Study 1, noise was implemented by creating roadblocks on the city map. Again, we manipulated noise only in the partner's strategy, so the participants could only see roadblocks that did not obstruct their way to the flag. In Study 2, we used just one noise condition, with a noise frequency of 33.3%, which was between the two conditions of Study 1 (25% and 50%). The task included nine trials of which three trials (i.e., Trials 2, 5, and 8) were influenced by noise. As in Study 1, incidents of noise were operationalized by adding 7 s to the choice of the preprogrammed partner. Also, to induce some variability in the partner's choices, we added or subtracted 1 s in every other trial.

Postexperimental questionnaires. After the social dilemma task, participants of Study 2 proceeded with exactly the same questionnaires as in Study 1, that is, trust (5 items, $\alpha = .83$), MinDiff (3 items, $\alpha = .89$), MaxJoint (3 items, $\alpha = .93$), MaxOther (3 items, $\alpha = .83$), MaxRel (3 items, $\alpha = .94$), MaxOwn (3 items, $\alpha = .81$), morality judgments (3 items, $\alpha = .91$), strength judgments (3 items, $\alpha = .64$), positive affect (4 items, $\alpha = .90$), and negative affect (4 items, $\alpha = .91$). We also included the reciprocity scale as used in Study 1 (6 items, $\alpha = .67$).

Results and Discussion

We analyzed all dependent variables in a 3 (partner's strategy: generous, tit for tat, or stingy) × 2 (noise: absent or present) ANOVA, again using performance on the second practice trial as a covariate in the analysis of cooperation only.[10] We also examined the development of cooperation level across three blocks of trials within participants. To test whether the detrimental effects of noise are specifically more pronounced for the tit-for-tat partner than for the generous and stingy partners, we computed a tit-for-tat-versus-generous-stingy contrast.[11]

Main effects for noise. Were there any detrimental effects of noise (Hypothesis 1)? The analysis revealed the predicted effects of noise for all dependent measures: cooperation,[12] $F(1, 115) = 4.45$, $p < .05$; trust,[13] $F(1, 116) = 7.51$, $p < .01$; all the perceived transformations: MaxJoint, MinDiff, MaxRel, and MaxOwn, Fs(1, 116) = 20.37, 15.00, 21.47, and 14.17, all ps $< .001$, respectively; MaxOther, $F(1, 116) = 6.52$, $p < .01$; perceived morality, $F(1, 116) = 9.55$, $p < .01$; positive affect, $F(1, 116) = 9.98$, $p < .01$; and negative affect, $F(1, 116) = 20.03$, $p < .001$. As predicted in Hypothesis 1d, we found no effects of noise for perceived strength ($F < 1$, *ns*). All means are displayed in Tables 5 and 6.

These findings support Hypotheses 1a through 1e stating that noise would exert detrimental effects on cooperation, trust, perception of other-regarding transformations (i.e., MaxOther, MaxJoint, and MinDiff), judgments of morality, and positive affective outcomes and that noise would promote perceptions of self-regarding transformations (i.e., MaxOwn, MaxRel) and negative affective outcomes. Also, as predicted in Hypothesis 1d, noise did not exert effects on perceptions of strength.

Main effects for partner's strategy. The analysis yielded main effects for partner's strategy for cooperation, $F(2, 115) = 10.46$, $p < .001$; trust, $F(2, 116) = 28.94$, $p < .001$; and all perceived transformations: MaxJoint, MaxOther, MinDiff, MaxRel, and MaxOwn, Fs(2, 116) = 46.75, 40.40, 39.22, 55.30, and 34.63, all ps $< .001$, respectively. We also found main effects for partner's strategy for perceived morality, $F(2, 116) = 24.17$, $p < .001$; perceived strength, $F(2, 116) = 7.19$, $p < .01$; positive affect, $F(2, 116) = 29.88$, $p < .001$; and negative affect, $F(2, 116) = 28.48$, $p < .001$. All means are displayed in Table 5. As can be seen in Table 5, the generous partner exerted greater trust and more positive affect than the tit-for-tat partner and the stingy partner but was perceived as weaker than those partners. Also, the generous partner and the tit-for-tat partner elicited equal levels of cooperation, were perceived as equally moral, elicited equal levels of negative affect, and scored higher in this respect than the stingy partner. For tests of significance, see the subscripts in Table 5.

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[9] Participants delivered the parcel on average in 13.49 s in the first trial of Study 1.

[10] As in Study 1, there were no between-conditions differences regarding the covariate, and the uncorrected means were therefore quite similar to the estimated marginal means; the latter are reported. Also, we did not include performance as a covariate in the analysis of trust, transformations, perceived morality and strength, and positive and negative effect. We should note that an analysis including the covariate yielded virtually identical results.

[11] As in Study 1, we do not report the overall interaction effects between partner's strategy and noise for reasons of conciseness. Whenever the hypothesized effect between the tit-for-tat-versus-generous-stingy contrast and noise was significant, the overall interaction effect was also significant; exceptions to this rule were trust, negative affect, MaxOther, Fs(4, 116) = 2.38, 2.93, and 2.56, all ps $< .10$, respectively, and positive affect, $F(4, 116) = 2.33$, $p = .10$.

[12] As in Study 1, we analyzed the time (in seconds) that remained after the parcel was delivered such that a higher score indicated a greater level of cooperation.

[13] As in Study 1, we also assessed participants' impressions of benign intent (10 items, $\alpha = .90$). The analysis revealed main effects for noise, $F(1, 116) = 26.40$, $p < .001$, and partner's strategy, $F(2, 116) = 59.80$, $p < .001$, and an interaction effect for noise and the tit-for-tat-versus-generous-stingy contrast, $F(1, 116) = 11.59$, $p < .01$. Simple main effect analysis revealed detrimental effects for noise within the tit-for-tat condition, $F(1, 117) = 33.26$, $p < .001$, but no effects for the generous partner, $F(1, 116) = 3.76$, *ns,* or the stingy partner, $F(1, 116) = 1.47$, *ns*. The means showed the same pattern as trust.

Table 5
Means (and Standard Deviations) for Level of Cooperation, Trust, Perceived Morality and Strength, and Affective Outcomes as a Function of Noise and Partner's Strategy (Study 2)

Dependent variables/partner's strategy	Noise conditions		
	No noise	Noise	Total
Level of cooperation			
Generous	15.14 (2.37)	13.15 (3.34)	14.17_{a} (3.02)
Tit for tat	13.42 (4.74)	11.80 (5.64)	12.63_{a} (5.20)
Stingy	10.32 (3.92)	9.59 (5.63)	9.95_{b} (4.80)
Total	13.00_{d} (4.24)	11.51_{e} (5.12)	12.27 (4.74)
Trust in partner			
Generous	4.30 (1.20)	4.22 (0.71)	4.26_{a} (0.98)
Tit for tat	4.17 (1.08)	3.18 (0.64)	3.69_{b} (1.02)
Stingy	2.83 (1.06)	2.47 (0.96)	2.65_{c} (1.01)
Total	3.78_{d} (1.28)	3.29_{e} (1.05)	3.54 (1.20)
Perceived morality			
Generous	5.00 (1.28)	5.05 (0.93)	5.02_{a} (1.11)
Tit for tat	5.49 (0.71)	4.23 (0.96)	4.88_{a} (1.05)
Stingy	3.82 (1.16)	3.25 (1.20)	3.53_{b} (1.20)
Total	4.78_{d} (1.27)	4.18_{e} (1.26)	4.49 (1.30)
Perceived strength			
Generous	3.68 (1.16)	3.95 (1.19)	3.81_{a} (1.04)
Tit for tat	4.43 (0.68)	4.57 (0.83)	4.50_{b} (0.75)
Stingy	4.53 (0.93)	4.53 (1.25)	4.53_{b} (1.05)
Total	4.21_{d} (1.02)	4.35_{d} (0.99)	4.28 (1.00)
Positive affect			
Generous	4.99 (0.83)	4.59 (0.64)	4.99_{a} (1.40)
Tit for tat	4.80 (0.92)	3.43 (1.06)	4.13_{b} (1.20)
Stingy	2.89 (0.88)	2.56 (0.87)	2.73_{c} (1.30)
Total	4.25_{d} (1.58)	3.52_{e} (1.41)	3.89 (1.54)
Negative affect			
Generous	1.87 (0.92)	2.35 (0.98)	2.10_{a} (0.97)
Tit for tat	1.79 (0.80)	3.43 (1.01)	2.59_{a} (1.22)
Stingy	3.64 (1.62)	4.33 (1.40)	3.98_{b} (1.53)
Total	2.41_{d} (1.43)	3.37_{e} (1.39)	2.88 (1.48)

Note. Means of level of cooperation are the seconds that were remaining after the parcel was delivered: the more time remained, the greater levels of cooperation. Standard deviations are presented within parentheses. Overall means for partner's strategy and noise that do not share subscripts differ significantly at $p < .05$ or smaller.

Interaction effects of noise and partner's strategy. Were the effects of noise more pronounced for a tit-for-tat partner than for the generous and stingy partners (Hypothesis 2)? Support for this prediction would be revealed by a significant interaction between noise and the tit-for-tat-versus-generous-stingy contrast. Also, we should find significant effects for noise for the tit-for-tat partner, whereas these effects should be absent for the generous and stingy partners. As we demonstrate below, we found strong support for this pattern for trust, all perceived transformations, perceived morality, and positive affect. For cooperation, we found the hypothesized temporal increase for a generous partner and a temporal decrease of cooperation levels for a tit-for-tat partner and a stingy partner, an important finding that we discuss first.

With respect to cooperation levels, we found, as expected, no overall interaction effects for the contrast and noise (no support for Hypothesis 2a), but we did find support for the noise-through-interaction hypothesis, in which we predicted that detrimental effects of noise would be revealed by a decline of cooperation over time for a tit-for-tat and a stingy partner, but no such decline for a generous partner. First, a 3 (partner's strategy: generous, tit for tat, or stingy) × 2 (noise: absent or present) × 3 (blocks of trials) ANCOVA with polynomial contrasts revealed a significant interaction effect for noise, partner's strategy, and blocks of trials, $F(4, 230) = 2.46$, $p < .05$, while the overall interaction effect for noise and strategy was not significant, $F(2, 115) < 1$, *ns*. Second, the analysis revealed an interaction effect for noise, strategy, and the linear contrast, $F(2, 116) = 3.53$, $p < .05$ (we found no effects for other [i.e., quadratic, cubic] contrasts). Third, to precisely test the noise-through-interaction hypothesis, we computed a generous-versus-tit-for-tat-stingy linear contrast. Planned comparisons analysis yielded a significant interaction effect for noise and this contrast, $F(1, 116) = 7.04$, $p < .01$, indicating that noise exerted different effects on the temporal development of cooperation for a generous partner than for a tit-for-tat or a stingy partner.[14] Fourth, simple effects analysis with polynomial contrast revealed no effects for the generous-versus-tit-for-tat-stingy linear contrast within the noise-absent condition ($F < 1$, *ns*), indicating that the development of cooperation levels was similar for all partners

[14] The second contrast was not significant ($F < 1$, *ns*), indicating that there were no differences between the tit-for-tat and the stingy partners regarding the effects of noise on the temporal development of cooperation levels.

Table 6
Means (and Standard Deviations) for Perceived Transformations as a Function of Noise and Partner's Strategy (Study 2)

Dependent variable/partner's Strategy	Noise conditions		
	No noise	Noise	Total
MaxOther (altruism)			
Generous	4.18 (1.34)	4.05 (0.93)	4.11_{a} (1.14)
Tit for tat	3.41 (0.68)	2.35 (1.06)	2.89_{b} (1.00)
Stingy	2.20 (1.07)	1.97 (1.01)	2.08_{c} (1.03)
Total	$3.28\ (1.33)_{d}$	$2.79\ (1.33)_{e}$	3.04 (1.34)
MaxJoint (cooperation)			
Generous	5.25 (1.45)	4.92 (0.94)	5.09_{a} (1.22)
Tit for tat	5.43 (1.12)	3.15 (1.69)	4.32_{b} (1.82)
Stingy	2.67 (1.18)	2.15 (1.15)	2.41_{c} (1.18)
Total	$4.48\ (1.77)_{d}$	$3.41\ (1.72)_{e}$	3.95 (1.82)
MinDiff (equality)			
Generous	5.06 (1.52)	4.68 (1.00)	4.88_{a} (1.29)
Tit for tat	5.14 (1.10)	3.20 (1.34)	4.20_{b} (1.56)
Stingy	2.63 (1.21)	2.33 (1.23)	2.48_{c} (1.21)
Total	$4.31\ (1.72)_{d}$	$3.41\ (1.53)_{e}$	3.86 (1.69)
MaxOwn (individualism)			
Generous	2.95 (1.24)	3.47 (0.87)	3.20_{a} (1.10)
Tit for tat	3.22 (1.05)	5.10 (1.22)	4.14_{b} (1.47)
Stingy	5.35 (1.09)	5.30 (1.33)	5.33_{c} (1.20)
Total	$3.82\ (1.54)_{d}$	$4.62\ (1.41)_{e}$	4.21 (1.53)
MaxRel (competition)			
Generous	2.65 (1.37)	3.05 (0.74)	2.85_{a} (1.11)
Tit for tat	2.84 (1.05)	5.23 (1.32)	4.01_{b} (1.69)
Stingy	5.50 (1.11)	5.65 (1.30)	5.58_{c} (1.19)
Total	$3.63\ (1.74)_{d}$	$4.64\ (1.61)_{e}$	4.13 (1.75)

Note. Standard deviations are presented within parentheses. Overall means for partner's strategy and noise that do not share subscripts differ significantly at $p < .05$ or smaller. MaxJoint = enhancing joint outcomes; MinDiff = minimizing (absolute) differences between own and partner's outcomes; MaxOther = enhancing the partner's outcome; MaxRel = enhancing relative advantage over partner's outcomes; MaxOwn = enhancing one's own outcomes.

when there was no noise (see Figure 3A). However, within the noise-present condition, the analysis yielded a significant effect for the contrast, $F(1, 117) = 14.34$, $p < .001$, indicating that the development of cooperation levels elicited by the generous partner was different from that of the tit-for-tat and the stingy partners. As can be seen in Figure 3B, over all blocks, the generous strategy displayed an increase in levels of cooperation, $F(1, 19) = 11.98$, $p < .01$, whereas this increase was absent for the tit-for-tat and the stingy partners, $F(1, 19) = 1.42$ and 2.42, both *ns,* respectively.

Did the development of cooperation levels elicited by a tit-for-tat partner decline when noise was present? As we point out below, we found some evidence that it did. First, it is important to note that at the onset (i.e., the first block; see Figure 3B), cooperation levels for the tit-for-tat partner and the generous partner within the noise-present condition were not different, $F(1, 115) = 1.15$, *ns*. Second, for the first two blocks of trials, we found a significant increase for the generous partner $F(1, 19) = 5.78$, $p < .05$, and a significant decrease—albeit marginally—for the tit-for-tat partner, $F(1, 19) = 3.50$, $p = .077$. Surprisingly, we found no significant decrease for the stingy partner ($F < 1$, *ns*). Third, although the means in Figure 3B might suggest otherwise, we found no increases or decreases between Blocks 2 and 3 for any of the strategies, *F*s(1, 19) = 1.66, 2.47, and 1.38, all *ns,* for tit for tat, generous, and stingy, respectively, suggesting that the beneficial effects of noise for the generous partner and the detrimental effects of noise for the tit-for-tat partner are established between Blocks 2 and 3 and thereafter remain stable (although it would be interesting to see what would have happened if we had used more rounds). To summarize, our noise-through-interaction hypothesis was largely supported: we found detrimental effects of noise—that were revealed by decreases in cooperation over time—for the tit-for-tat partner and no decreases (indeed, even increases) for the generous partner.

For trust, we found the predicted interaction effect (Hypothesis 2b) for noise and the tit-for-tat-versus-generous-stingy contrast, $F(1, 116) = 4.35$, $p < .05$. Simple main effect analyses yielded a significant effect for noise for the tit-for-tat partner, $F(1, 116) = 10.83$, $p < .01$, but no effects for the generous partner, $F(1, 116) < 1$, *ns,* or the stingy partner, $F(1, 116) = 1.39$, *ns*. Participants trusted the tit-for-tat partner more when noise was absent ($M = 4.17$, $SD = 1.08$) than when noise was present ($M = 3.18$, $SD = 0.64$). Trust in the generous partner was equally high when noise was absent ($M = 4.30$, $SD = 1.20$) and when noise was present ($M = 4.22$, $SD = 0.71$). Similarly, trust in the stingy partner was equally low when noise was absent ($M = 2.83$, $SD = 1.06$) and noise was present ($M = 2.47$, $SD = 0.96$). Thus, Hypothesis 2b was supported.

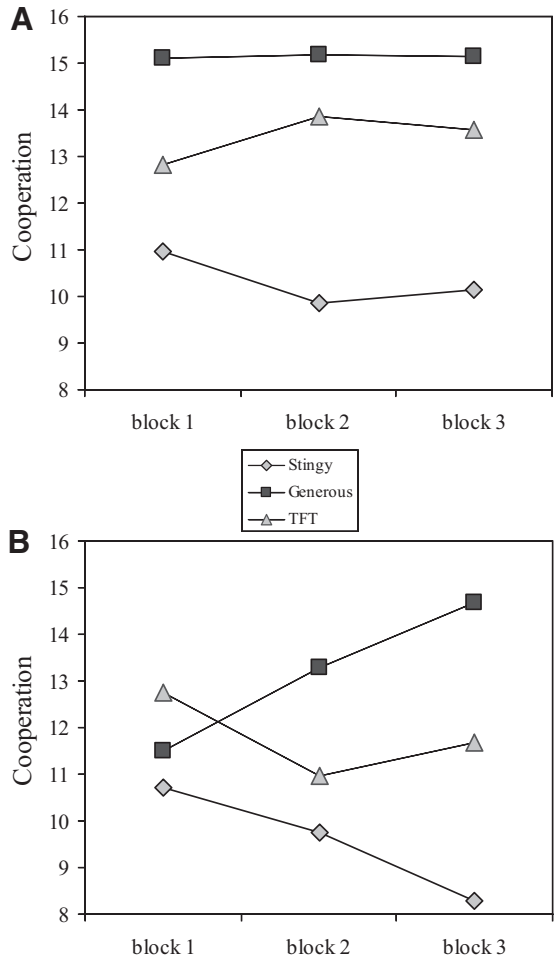

Figure 3. A: Mean levels of cooperation elicited by a tit-for-tat (TFT) partner, a generous partner, and a stingy partner under no noise over three blocks of three trials (Study 2). B: Mean levels of cooperation elicited by a TFT partner, a generous partner. and a stingy partner under noise over three blocks of three trials (Study 2).

With respect to the perceived transformations, we found the predicted interaction effects (Hypothesis 2c) for noise and the tit-for-tat-versus-generous-stingy contrast for MaxJoint, MinDiff, MaxOwn, and MaxRel, Fs(1, 116) = 14.31, 11.24, 13.99, and 22.31, all ps $< .001$, respectively, and for MaxOther, $F(1, 116) = 5.07$, $p < .05$. Table 7 provides an overview of the F values of the simple main effects of noise for each partner. As can be seen in Tables 6 and 7, the results provide good support for Hypothesis 2c: The detrimental effects of noise on the perception of other-regarding transformations (MaxJoint and MaxOther) and the equality transformation (MinDiff) and the promoting effects of noise on the perception of self-regarding transformation (MaxOwn and MaxRel), were more pronounced for the tit-for-tat partner than for the generous and stingy partners.

Regarding perceived morality, the analysis yielded the predicted interaction effect (Hypothesis 2d) for noise and the tit-for-tat-versus-generous-stingy contrast, $F(1, 116) = 6.14$, $p < .05$. Simple main effect analysis revealed detrimental effects for noise for the tit-for-tat partner, $F(1, 116) = 14.52$, $p < .001$, but no effects for the generous partner, $F(1, 116) < 1$, *ns,* or the stingy partner, $F(1, 116) = 2.87$, *ns*. The tit-for-tat partner was perceived as quite moral within the noise-absent condition ($M = 5.49$, $SD = 0.71$) but as significantly less moral within the noise-present condition ($M = 4.23$, $SD = 0.96$). Participants perceived the generous partner as very moral in both the noise-absent ($M = 5.00$, $SD = 1.28$) and the noise-present conditions ($M = 5.05$, $SD = 0.93$), and they perceived the stingy partner as not so moral in both the noise-absent ($M = 3.82$, $SD = 1.16$) and the noise-present conditions ($M = 3.25$, $SD = 1.20$). For perceived strength, we found—as predicted in Hypothesis 2d—no interaction effect for partner's strategy and noise ($F < 1$, *ns*) or for the tit-for-tat-versus-generous-stingy contrast ($F < 1$, *ns*).

With respect to affective outcomes, we found the predicted interaction effects for noise and the tit-for-tat-versus-generous-stingy contrast for both positive affect, $F(1, 116) = 4.64$, $p < .05$, and negative affect, $F(1, 116) = 5.69$, $p < .05$ (see Hypothesis 2e). Simple main effect analysis revealed detrimental effects for noise on positive affect, $F(1, 116) = 12.91$, $p < .001$, and promoting effects of noise on negative affect, $F(1, 116) = 20.65$, $p < .01$, but only for the tit-for-tat partner. We found no such effects for either a generous partner, Fs(1, 116) = 1.10 and 1.07, both *ns,* for positive or negative affect, respectively, or a stingy partner, Fs(1, 116) < 1 and $= 3.55$, both *ns,* for positive or negative affect, respectively. As can be seen in Table 5, participants experienced greater positive affect (and less negative affect) about behavior of the tit-for-tat partner when noise was absent than when noise was present, whereas, for a generous or a stingy partner, there were no differences between noise conditions. These findings supported Hypothesis 2e.

The data supported Hypotheses 2a through 2e stating that the detrimental effects of noise on cooperation, trust, perception of other-regarding transformations (i.e., MaxOther, MaxJoint, MinDiff), judgments of morality, and positive affective outcomes and the beneficial effects of noise on perception of self-regarding

Table 7
An Overview of F Values of the Simple Main Effects of Noise Within the Strategy Conditions for Perceived Transformations (Study 2)

	Partner's strategy		
Transformation	Generous partner, $F(1, 116)$	Stingy partner, $F(1, 116)$	Tit-for-tat partner, $F(1, 116)$
Equality			
MinDiff	0.95	0.58	24.89***
Other-regarding			
MaxJoint	0.71	1.64	32.59***
MaxOther	0.15	0.52	11.03**
Self-regarding			
MaxRel	1.20	0.16	42.95***
MaxOwn	2.71	0.02	27.55***

Note. MinDiff = minimizing (absolute) differences between own partner's outcomes; MaxJoint = tendencies toward enhancing joint outcomes; MaxOther = enhancing the partner's outcome; MaxRel = tendencies toward enhancing relative advantage over partner's outcomes; MaxOwn = enhancing one's own outcomes.
** $p = .001$. *** $p < .001$.

transformations (i.e., MaxOwn and MaxRel) and negative affective outcomes were more pronounced for the tit-for-tat partner than for the generous and stingy partners. Also, as predicted in Hypothesis 2d, the detrimental effects of noise on perceived morality that were more pronounced for the tit-for-tat partner than for the generous partner and the stingy partner were not found for perceived strength.

Correlational analyses. As in Study 1, to provide some insight into the underlying processes, we performed a correlational analysis among the secondary dependent variables. We found significant correlations ranging (in absolute terms) from $r = .19$ (between positive affect and perceived strength) to $r = .86$ (between MinDiff and MaxJoint), all ps at least $<.05$. As in Study 1, the analysis revealed two groups of variables that correlated positively to all the variables in their own group but correlated negatively to all the variables in the other group. The positive group included the other-regarding transformations (MaxJoint, MaxOther), the equality transformation (MinDiff), trust, perceived morality, and positive affect. The negative group included the self-regarding transformations (MaxOwn, MaxRel), perceived strength, and negative affect. There was one exception to this pattern: Perceived morality and perceived strength were uncorrelated ($r = -.03$, *ns*).

As in Study 1, we examined the correlations of these two groups with cooperation levels. For the positive group, we found correlations with cooperation for all variables: MaxJoint (rs $= .45$, $p < .001$), trust ($r = .43$, $p < .001$), positive affect ($r = .37$, $p < .001$), MaxOther ($r = .35$, $p < .001$), MinDiff ($r = .31$, $p < .01$), and perceived morality ($r = .28$, $p < .01$). For the negative group, the analysis revealed correlations with cooperation for negative affect ($r = -.39$, $p < .001$), MaxRel ($r = -.35$, $p < .001$), and MaxOwn ($r = -.21$, $p < .01$). As in Study 1, we found no correlation between cooperation and perceived strength ($r = -.025$, *ns*). Thus, the correlational analysis confirmed the findings of Study 1, underlined the importance of communicating trust and benign intent (rather than strength), and once more suggested a key role for affective reactions. (However, we hasten to say that these findings should be considered as preliminary and that further examination of the underlying psychological processes is needed.)

Participants' tendency to reciprocate. Recall that in Study 1, almost 60% of the participants were behaving in a reciprocal manner. In Study 1, two of the interaction partners were adopting unrealistic unconditional strategies. However, in Study 2, all the partners were variants of tit for tat (generous, tit for tat, and stingy). Were the participants behaving more or less reciprocally toward these more realistic conditional strategies? As in Study 1, we computed a reciprocity index by averaging the absolute differences between the cooperation level of the other and the cooperation level of the participant. We categorized the scores into five distinct classes of 4 s (see results section of Study 1). Again, almost 60% (59.0%) of the participants were represented in the first category (ranging from 0 to 4 s difference) of the reciprocity index, indicating that the majority of the participants behaved in a reciprocal manner. The second category (ranging from 4 to 8 s) represented another 36.1% of the participants. In total, 95.1% of the participants were represented in the first two categories. There were no participants in the last two categories. A chi-square test revealed a significant difference between the categories, $\chi^2(2, N = 122) = 53.97$, $p < .01$.

In addition to the reciprocity index described above, we analyzed the six items that measured self-reported reciprocity. This scale exhibited a significant correlation with our reciprocity index ($r = .25$, $p < .01$). An ANOVA did not reveal any significant effects among experimental conditions (all Fs < 1, *ns*), suggesting that participants reported equal levels of reciprocity in all conditions.

General Discussion

The major purpose of the present research was to increase our understanding of the psychological consequences of various interpersonal strategies in social dilemmas with and without noise. Two experiments provided strong support for our hypotheses. First, Study 2 revealed that noise exerted detrimental effects on cooperation, thereby supporting Hypothesis 1a (this hypothesis was not supported by Study 1). Also, both studies revealed that noise exerted effects on trust, perceived transformations, impressions of other's morality, and overall affective evaluations (i.e., support of Hypotheses 1b–1e). Second, the results revealed that the effects of noise were more pronounced for tit for tat, which enhances equality in outcomes, than for other-regarding strategies, which enhance joint outcomes and partner's outcomes (and some equality in outcomes, in the case of a generous strategy). Study 1 revealed that, when noise was present, an unconditionally cooperative strategy was more effective in eliciting cooperation and was perceived as more moral and trustworthy and as being more inclined to make other-regarding transformations (and less inclined to make self-regarding transformations) than a tit-for-tat partner. Study 2 revealed that, in a noisy environment, the generous strategy was able to cause an increase in cooperation across three blocks of three trials, whereas tit for tat caused no such learning effect and the stingy strategy even seemed to cause a decrease in cooperation across the three blocks. Furthermore, when noise was present, a generous strategy was perceived as more moral and trustworthy and more inclined to make other-regarding transformations (and less inclined to make self-regarding transformations) than a tit-for-tat partner.

Notwithstanding decades of research suggesting otherwise, tit for tat seems not to be the best answer (or, at least, not to be the only answer) to the question which interpersonal strategy is most effective in eliciting lasting cooperation. This conclusion has very important implications, as it is diametrically opposed to hundreds of studies indicating that tit for tat is the winner (see Komorita & Parks, 1995). Moreover, our findings demonstrate that strategies that are directed at benefiting others are quite effective. In the following, we discuss our findings, implications, and possible limitations and provide avenues for future research.

The Functionality of Other-Regarding Strategies

Precisely why would strategies that benefit others (instead of the self) be more effective in dealing with noise than a strategy that pursues equality? In the introduction, we advanced two complementary mechanisms, both of which are rooted in the SABI model. The first mechanism rests on the idea that people tend to exhibit a strong tendency toward reciprocity and that it takes some generosity on the part of at least one of the persons to effectively cope with noise. Interestingly, both studies provided some support for the notion that a majority of the participants tended to adhere to a

pattern of responses very similar to the tit-for-tat strategy. These findings extend prior research (e.g., Parks & Rumble, 2001; Van Lange, 1999) by demonstrating strong tendencies toward reciprocity in a new paradigm (to be discussed later) involving a small number of alternating interactions.

More importantly, these findings give rise to a new and, in our view, intriguing scientific puzzle: Why do so many people tend to act in a tit-for-tat-like manner, if this strategy is so poor at coping with noise, which we assume to be so prevalent in everyday life? It is perhaps too early to speculate, but we suggest two possibilities. First, it is logically true—as suggested by computer simulations (Kollock, 1993; Nowak & Sigmund, 1992)—that only one of both interaction partners needs to start acting in a more other-regarding manner. So, the dilemma may be one in which they decide who is going to take the initiative. This argument has some similarities with international conflicts (e.g., the Israeli–Palestinian deadlock), where taking the initiative to disarm and show good will may be the first—but very difficult—step to peacemaking (cf. Komorita & Parks, 1995). Second, it is possible that generosity may become a more realistic alternative only after repeated failure, and perhaps the time span and the number of interactions in our studies were too limited for generosity to develop. The findings of Study 2 provide some indirect support for this line of reasoning, in that there was a positive learning curve for generosity, while even a tit-for-tat strategy may over time be effective because the person paired with tit for tat eventually realizes that it takes generosity—perhaps as an act of giving the other the benefit of the doubt—to revitalize cooperation.

We also advanced a second mechanism, which assumes that repeated acts of generosity help maintain or build trust, which helps partners give one another the benefit of the doubt when coping with noise. We obtained good evidence for this mechanism as well, in that relative to a tit-for-tat partner, an other-regarding partner elicited greater trust, greater other-regarding transformations, smaller self-regarding transformations, and greater impressions of morality. (The only exception is that impressions of strength were not greater for other-regarding partners than for tit-for-tat partners—in fact, a tit-for-tat partner was in both studies perceived as stronger than other-regarding partners.)

Moreover, correlational analyses revealed positive associations between positive thoughts and feelings and cooperation, as well as negative associations between negative thoughts and feelings and cooperation. These results are perfectly consistent with the notion that repeated acts of generosity feed trust and impressions of benign intent, which has been demonstrated in prior work (Van Lange et al., 2002). The notion that perceived strength, which is less strongly linked to intentions (if at all), appeared to be uncorrelated with cooperation in both studies underlines this argument. The finding that tit-for-tat partners were perceived as stronger (but less moral) than other-regarding partners suggests that trust is related to a willingness, rather than an ability, to be other regarding.

We also noted that it is plausible that the two mechanisms described above go hand in hand, supporting each other rather than acting in a competitive fashion. Moreover, we suggested that generous partners may communicate and bring about an atmosphere in which people are more likely to adopt a relaxed accounting system (Kollock, 1993), so that they are less inclined to adhere to strict versions of tit for tat, by which they may develop relational trust (rather than calculus-based trust; cf. Kramer, 1999; Lewicki et al., 2006; Rousseau et al., 1998). Although the present research did not directly illuminate these processes, it is interesting to note that the overall affective evaluations were consistent with this line of reasoning. Indeed, noise undermined positive affective evaluations (and promoted negative affective evaluations) for tit-for-tat partners much more than for other-regarding strategies, suggesting that acts of generosity help maintain or improve a positive overall mood, which may very well help people give others the benefit of the doubt (cf. Fredrickson, Manusco, Branigan, & Tugade, 2000). Clearly, future research could address the surplus value of acts of generosity by examining whether generosity may give rise to more relaxed accounting, reduced bookkeeping, and stronger forms of relational trust.

As noted earlier, it is important to realize that information availability appears to be a key feature of situations and is essential to understanding the optimal strategy for maintaining cooperative interaction. Past research that focused on noise-free social dilemmas (in which partners have perfect information) revealed that tit for tat is the winner (or, at least, one of the winners) in eliciting and maintaining cooperative interaction. As the present findings indicate, incidents of noise seem to expose the Achilles' heel of tit for tat. Unlike other-regarding strategies, tit for tat under noise (a) does not give others the benefit of the doubt, (b) does not maintain high levels of trust, and (c) is, by itself, not able to get out the trap of noncooperative interaction. Moreover, we suggest that incidents of noise may be essential to misunderstanding (and reactions thereupon) in relationships, organizations, and international relations, where very poor outcomes (e.g., breakup and divorce, mismanagement, warfare) may be rooted to some degree in incidents of noise (cf. Bendor et al., 1991).

Theoretical and Methodological Contributions

It is noteworthy that noise not only received very little attention but also received quite specific attention. While computer simulations commonly used to study noise (e.g., Axelrod & Dion, 1988; Bendor et al., 1991; Fudenberg & Maskin, 1990; Kollock, 1993) are very useful for understanding the logic as to why, for example, a pair of two tit-for-tat partners should be especially vulnerable to incidents of noise, we suggest that such insights need to be complemented by a "psycho-logic" to illuminate why some strategies are better at coping with noise than others. This is exactly how the present research complements earlier empirical work on noise in social dilemmas (Van Lange et al., 2002). That is, the present research provides new insight into the various theoretically relevant processes (such as reciprocity inclination, trust, transformations, personality impressions, and affective evaluations) that helps us understand why people respond to other strategies under noise (and no noise) in the way they do.

The present research also extends earlier research by Van Lange et al. (2002) in three important respects. First, Study 1 revealed that an extreme other-regarding strategy (i.e., unconditional cooperation) was in fact quite effective at reducing or overcoming the detrimental effects of noise. We also note that the other-regarding

strategy used in Study 2 was somewhat more generous than the so-called tit-for-tat-plus-one strategy examined in earlier research. As such, the present research suggests that repeated acts of generosity that are more than simply symbolic (i.e., more substantial) may actually also be quite effective. It is interesting to link this to older research in which unconditional cooperation was demonstrated to be relatively ineffective at eliciting cooperation (see, e.g., McClintock & Liebrand, 1988; Oskamp, 1971). Thus, the present findings may well contribute to a shift in thinking about the functional aspects of generosity—a trend that we have recently witnessed in neighboring areas of research (e.g., research on gratitude, sacrifice, and forgiveness in ongoing relationships; McCullough, Tsang, & Emmons, 2004; Van Lange, Rusbult, et al., 1997).

Second, Studies 1 and 2 extend earlier research by examining the effectiveness of self-regarding strategies for coping with noise. The consistent finding is that unconditional noncooperation and the stingy strategy elicited very little cooperation overall, and indeed, there was a natural floor effect such that these strategies could not further suffer from noise. We do think it is quite important—and consistent with the overall message of this research—to note that a stingy strategy fairly quickly elicited noncooperative interaction. Also, Study 2 revealed that a stingy strategy (i.e., a strategy that combines reciprocity with stinginess) fairly quickly revealed a drop in cooperation (in the first three interactions), which continued over the course of the last six interactions. Such findings indicate that adding even small self-regarding tendencies to tit for tat is unlikely to be effective at eliciting cooperative interaction. Such tendencies tend to undermine trust, impressions of other's morality, and overall affective evaluations. While other-regarding strategies may promote cooperation through enhancing trust and promoting a relaxed accounting climate, self-regarding may reduce cooperation because it undermines trust and presumably triggers a climate of strict account along perhaps with tendencies toward getting even.

Third, the present research extends Van Lange et al. (2002) by using a novel paradigm designed to capture greater mundane realism by including (a) effort—one should actually do something for another, as in most everyday life situations—and (b) variability—our behavior in everyday life hardly ever has exactly the consequences for others that we anticipate or intend, as there is often some random variation (e.g., one is unlikely to help another for precisely one hour, even if planned). The present findings revealed that, even when there was no noise, the other-regarding strategies elicited equal or even greater cooperation levels (in case of a generous strategy) than did tit for tat. In particular, the finding that an unconditionally cooperative strategy did at least as well as tit for tat under noise-free circumstances is striking. Indeed, classic research spanning 3 decades or more has repeatedly shown that tit for tat outperforms a 100% cooperative strategy ("All C") because the latter is considered to be nice but too weak[15] (e.g., Kuhlman & Marshello, 1975; McClintock & Liebrand, 1988). We suggest that when cooperation takes effort and when variability is also part of the research environment, the conclusion seems to be quite different: Unconditional cooperation seems to be doing at least as well as tit for tat. The present findings suggest that the benefits (and costs) of generosity and even unconditional cooperation will become clearer in future research if we do greater justice to some key elements of social dilemmas as they naturally occur in everyday life.

Limitations and Avenues for Future Research

To begin with, it is important to note that we assessed trust, perceived transformations, personality impressions, and overall affective evaluations after the interactions had ended. We did this deliberately because we did not want participants' behavior to be affected by the questions we wanted to ask. At the same time, we realize the costs of doing so, as this design did not allow us to provide direct evidence for mediation. Future research may complement the present research by including implicit or explicit measures during the interactions, so that one can examine the mediating role of trust, transformations, and personality impressions.

Second, we have developed a new paradigm to capture relatively mundane aspects of cooperation and helping. Clearly, because the paradigm has never been used before or compared in some way with the more standard game theoretical paradigm, we do not know whether some of the findings may, in part, be explained by qualities of the present paradigm. Although future research is clearly needed, it is possible that the inherent variability contributes to an environment in which is important to communicate an other-regarding orientation.

Concluding Remarks

How should one behave to build trust and elicit lasting cooperation from others? Over the past 6 decades, researchers working in different fields and disciplines concluded that adopting a strictly reciprocal strategy (i.e., tit for tat) would be most effective. The present research indicates, however, that in a world where unintended errors (or incidents of noise) are doomed to happen, it is not advisable to adopt strict reciprocity. Two conclusions are especially important. First, strategies that deviate from tit for tat in a self-regarding manner—by acting less cooperatively than the partner—elicit very low levels of cooperation—and fairly rapidly so. Second, strategies that deviate from strict reciprocity in an other-regarding manner—by acting more generously—turn out to be more effective at coping with noise. Such strategies not only elicit greater cooperation levels but also tend to generate more positive thoughts and feelings by others. We believe that we have only just begun to understand the tremendous power of generosity for promoting trust and cooperation in real-life situations in which unintended errors and misunderstandings are bound to happen.

[15] Both Study 1 and Study 2 support this *nice but weak* notion, as, in both studies, the other-regarding partner was seen as the most moral but also as the weakest. However, both the unconditionally cooperative partner and the generous partner elicited most cooperation across noise conditions. These findings underline the importance of understanding the "psychologic" of interpersonal strategies.

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Appendix

Items of Trust Measure

1. I trust the other person completely.
2. If push comes to shove, I do not want to rely on the other person (reverse coded).
3. The other person considers my interests at all times.
4. The other person is concerned with my well-being.
5. I can build upon the other person.

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