Reverse appraisal: The importance of appraisals for the effect of emotion displays on people's decision making in a social dilemma

Celso M. de Melo (demelo@ict.usc.edu)
Jonathan Gratch (gratch@ict.usc.edu)
Institute for Creative Technologies, University of Southern California,
12015 Waterfront Drive, Building #4 Playa Vista, CA 90094-2536, USA

Peter Carnevale (peter.carnevale@marshall.usc.edu)
USC Marshall School of Business, Los Angeles, CA 90089-0808, USA

Stephen Read (read@rcf.usc.edu)
USC Department of Psychology, Los Angeles, CA 90089-1061, USA

Abstract

Two studies are presented that explore the interpersonal effect of emotion displays in decision making in a social dilemma. Experiment 1 (*N*=405) showed that facial displays of emotion (joy, sadness, anger and guilt) had an effect on perception of how the person was appraising the social dilemma outcomes (perception of appraisals) and on perception of how likely the person was to cooperate in the future (perception of cooperation). Experiment 1 also showed that perception of appraisals (partially and, in some cases, fully) mediated the effect of emotion displays on perception of cooperation. Experiment 2 (*N*=202) showed that manipulating perception of appraisals, by expressing them textually, produced an effect on perception of cooperation thus, providing evidence for a causal model where emotion displays cause perception of appraisals which, in turn, cause perception of cooperation. In line with Hareli and Hess' (2010) findings and a social-functions view of emotion, we advance the reverse appraisal proposal that argues people can infer, from emotion displays, how others are appraising a situation which, in turn, support inferences that are relevant for decision making. We discuss implications of these results and proposal to decision and emotion theory.

Keywords: Emotion Displays, Decision Making, Social Dilemma, Appraisal Theories, Reverse Appraisal

Introduction

Recent decades have seen growing interest on the interpersonal effect of emotion in decision making (e.g., Van Kleef, De Dreu, & Manstead, 2010). Complementing research on the impact of emotion in one's own decision making (for a recent review see Blanchette & Richards, 2010), this research explores how one's emotion displays impact another's decision making and emphasizes that emotional expressions are not simple manifestations of internal experience; rather, expressions are other-directed and communicate intentions, desired courses of actions, expectations and behaviors (Frijda & Mesquita, 1994; Keltner & Kring, 1998). The expression of emotion has also been argued to play a significant role in emergence of cooperation in social dilemmas (Boone & Buck, 2003; Frank, 1988). Social dilemmas, such as the prisoner's dilemma, are situations where people must choose between pursuing their own self-interest and collect a short-term reward or trust another person to reach mutual cooperation and maximize joint long-term reward (Kollock, 1998). Empirical evidence confirms that facial displays of emotion can impact cooperation (e.g., de Melo, Carnevale, & Gratch, 2012; Schug, Matsumoto, Horita, Yamagishi, & Bonnet, 2010). However, the mechanism by which such social effects of emotion are achieved is less well understood.

In this paper we address this issue and look at appraisal theories of emotion to understand what is the information people retrieve from emotion displays and how is that accomplished. In appraisal theories, emotion displays arise from cognitive appraisal of events with respect to an agent's goals, desires and beliefs (e.g., is this event congruent with my goals? Who is responsible for this event?). According to the pattern of appraisals that occurs, different emotions are experienced and displayed. Since displays reflect the agent's intentions through the appraisal process, it is also plausible to ask whether people can infer from emotion displays the agent's goals by reversing the appraisal mechanism. We refer to this proposal as *reverse appraisal*. The intuition is that if appraisal, abstractly, is a function that maps from <event, mental state> to emotion, reverse appraisal is a function that maps from <event, emotion> to mental state. Empirical evidence is still scarce but in a recent study Hareli and Hess (2010) showed that people could, from expressed emotion, make inferences about the character of the person displaying emotion. For instance, a person who reacted with anger to blame was perceived as being more aggressive, self-confident but also as less warm and gentle than a person who reacted with sadness. Moreover, the results showed that such inferences were mediated by appraisal variables. In our case, reverse appraisal predicts that people infer, from emotion displays, how the counterpart is appraising the social dilemma outcomes; then, from these *perceptions of appraisal*, people infer how likely the counterpart is to cooperate in the future, which we refer to as *perceptions of cooperativeness*. This causal model is shown in Figure 1. The goal of the paper is to establish this causal model.

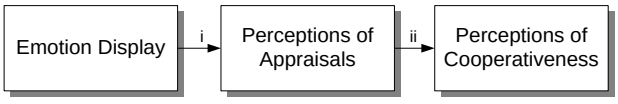

Figure 1: Causal model for the effect of emotion displays in cooperation in a social dilemma.

In a previous study (de Melo, Carnevale, & Gratch, 2011) we began gathering evidence for this causal model. Participants played the iterated prisoner's dilemma with two computer players, or *agents*, that, even though following the same strategy to choose their actions, showed emotion displays that reflected different social value orientations (e.g., cooperative or competitive). Computer agents that show emotion have been argued in the past to be a useful research tool for basic human-human interaction research (Blascovich et al., 2001). In our case, following the intuition from appraisal theories that what matters is not the emotion display in itself but the appraisals that elicited it, the agents differed only in the context in which joy was expressed. For instance, a cooperative agent showed a smile in mutual cooperation, whereas a competitive agent showed a smile when the agent exploited the participant. As predicted by appraisal theories, the results showed that people interpreted the same smile differently and cooperated more with the cooperative than the competitive agent. In the present paper we go further and study whether the information people retrieve from emotion displays pertains to how the counterpart is appraising the interaction and, if such perceptions of appraisals lead to inferences about the counterpart's likelihood of cooperation. To accomplish this, in a first experiment we asked participants to imagine playing the prisoner's dilemma with different agents; participants were always told the same outcome occurred but were shown videos of different emotional reactions from the counterpart and were, then, queried about how they thought the counterpart was appraising the situation and how likely it was to cooperate in the future. We hypothesized that: following previous findings, emotion displays would impact perceptions of the counterpart's cooperativeness (H1); and, according to reverse appraisal, emotion displays would impact perceptions of the counterpart's appraisals (H2). A statistical analysis of mediation (Preacher & Hayes, 2008) was also conducted to test whether appraisal variables (conduciveness to goals or blameworthiness) mediated the effect of emotion displays on people's perception of the counterpart's cooperativeness. The hypothesis was that appraisal variables would mediate, at least partially, the interpersonal effect of emotion (H3). To further test the mediating role of appraisals, a second experiment explicitly manipulated appraisals and measured the effect on people's perception of how cooperative the counterpart was. The manipulation consisted of having the agents, instead of showing facial displays of emotion, express how they were appraising the outcome through text (e.g., "I really don't like this outcome and I blame you for it"). The hypothesis was that, in line with reverse appraisal, expression of appraisals would lead to effects on perception of the counterpart's cooperativeness that were consistent with findings in the previous experiment (H4). This experiment, thus, establishes the remaining link (ii, Figure 1) in the proposed causal model. Therefore, Experiments 1 and 2, together, provide experimental evidence for the proposed model (Spencer, Zanna, & Fong, 2005).

Experiment 1

Method

Scenarios. Participants imagined playing the iterated prisoner's dilemma with agents that displayed emotion. Each scenario pertained to the first round (of a 5-round game) and corresponded to a particular outcome of the game. Participants were then shown a video of the agent reacting emotionally to the outcome. Following the approach by Kiesler, Waters and Sproull (1996), and similarly to our previous study (de Melo et al., 2011) the game was recast as an investment game.

Design. The experiment followed a mixed design with two factors: Outcome (between-participants) with 4 levels (one for each possible outcome of the game); and, Emotion (repeated-measures) with 5 levels (Neutral vs. Joy vs. Anger vs. Sadness vs. Guilt). Building on experience from previous studies, we only explored 4 emotions and did not consider, for the time being, a full factorial design but, rather, only pairings of outcome and emotion that produced effects in those studies, as shown in Table 1. Considering only this subset of the possible pairings had, at least, two advantages: (1) each participant experienced at most 3 pairings (as opposed to 5 if all were considered), which constrained total participation time and, thus, reduced fatigue and boredom effects; (2) pairings that did not have a clear intuitive interpretation (e.g., displaying sadness or anger in mutual cooperation) were excluded from analysis.

Table 1: Emotions explored in Experiment 1.

		Agent	
		Cooperation	Defection
Participant	Cooperation	Neutral, Joy	Neutral, Joy, Guilt
	Defection	Neutral, Anger, Sadness	Neutral, Joy, Anger

Emotion displays. In this experiment, participants watched videos of agents expressing facial emotion displays. Three agents were used–Ethan, William and David–and the respective facial displays are shown in Figure 2. These facial displays were validated elsewhere (de Melo et al., 2012). The agents were referred to by their names throughout. Each participant saw a different agent in each condition, and they were randomly assigned to conditions.

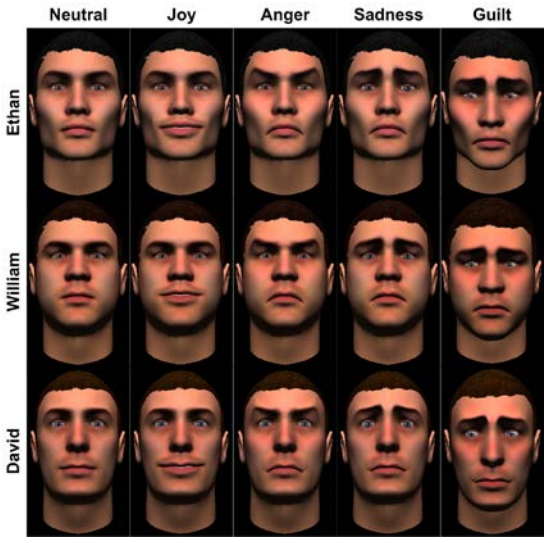

Figure 2: The emotion facial displays used in Experiment 1.

Measures. After watching the video of the agent's emotional reaction, we asked participants the following questions (the questions referred to the agents by their respective names): How much did the agent experience each of the following emotions: a) Joy b) Sadness c) Anger d) Guilt? (scale goes from 1, *not at all*, to 7, *very much*).

Even though several appraisal theories have been proposed (Ellsworth & Scherer, 2003), there tends to be agreement on which appraisals predict the emotions we consider in this experiment: joy occurs when the event is conducive to one's goals; sadness occurs when the event is not conducive to one's goals; anger occurs when the event is not conducive to one's goals and is caused by another agent; guilt occurs when the event is not conducive to one's goals and is caused by the self. Thus, two appraisal variables are of relevance here: (a) *conduciveness to goals*, which measures whether the event is consistent or inconsistent with the individual's goals; and, (b) *blameworthiness*, which measures whether the self or another agent is responsible for the event. After watching the video of the agent's emotional reaction, participants were asked the following questions about how was the agent appraising the outcome (Ellsworth & Scherer, 2003):

1. How pleasant for him was it to be in this situation?
2. At the time of experiencing the emotion, do you think he perceived that the consequences of the event did or would bring about positive, desirable consequences for him (e.g., helping him reach a goal, or giving pleasure)?
3. Was the situation obstructive or conducive to his goals?
4. Was what happened something that he regarded as fair?
5. How much did you think he blamed himself for the event?
6. How much did you think he blamed you for the event?

Following the appraisal perception questions, we asked the participant one question about perception of the agent's cooperativeness (scale goes from 1, *not at all*, to 7, *very much*): How likely is he to *cooperate* in the next round? (where "cooperate" was replaced by the respective action in the investment game).

Participants. We recruited four-hundred and five (N=405) participants online using Amazon Mechanical Turk. This resulted in approximately 100 participants for each outcome. Gender distribution was as follows: *males*, 47.4%; *females*, 52.6%. Age distribution was as follows: *18 to 21 years*, 14.1%; *22 to 34 years*, 59.5%; *35 to 44 years*, 13.6%; *45 to 54 years*, 7.9%; *55 to 64 years*, 4.2%; *65 years and over*, 3.0%. Most participants were from the United States (57.8%) and India (29.6%). The education level distribution was as follows (current or expected degrees): *high school*, 15.8%; *college*, 57.5%; *Masters*, 23.0%; *Ph.D. or above*, 3.7%. Education majors and profession were quite diverse. Participants were paid USD $1.02 and average participation time was 23 minutes.

Results

Effects on perception of cooperativeness. For each outcome, we conducted a repeated-measures ANOVA to analyze the effect of emotion display on perception of cooperativeness. The means, standard deviations, significance levels and effect sizes are shown in Table 2. In the table, "Participant exploits" corresponds to the outcome where the agent cooperated but the participant defected. "Agent exploits" corresponds to the outcome where the participant cooperated but the agent defected.

Table 2: Effects on perception of cooperativeness.

Mutual cooperation (n=103)		*Participant exploits (n=101)*	
Neutral	3.18 (1.613)	Neutral	3.67 (1.715)
Joy	4.70 (1.739)	Anger	2.81 (2.077)
-	-	Sadness	2.99 (1.841)
Sig. (r)	.000* (.542)	Sig. (partial η^2)	.000* (.078)
Agent exploits (n=98)		*Mutual defection (n=103)*	
Neutral	3.11 (1.716)	Neutral	3.55 (1.856)
Joy	2.37 (1.755)	Joy	3.47 (1.835)
Guilt	4.56 (2.081)	Anger	3.53 (2.100)
Sig. (partial η^2)	.000* (.286)	Sig. (partial η^2)	.920 (.001)

* $p < .05$.

Effects on perception of appraisals. Questions 1 to 4 were highly correlated (α = .850) and, thus, were collapsed (averaged) into a single measure called *conduciveness to goals*. For each outcome, we conducted a repeated-measures ANOVA to analyze the effect of emotion display on conduciveness to goals, self-blameworthiness (question 5) and participant-blameworthiness (question 6). Means, standard deviations, significance levels and effect sizes are reported in Table 3.

Table 3: Effects on perception of appraisal.

	Conduciveness to Goals	Self-Blame	Participant-Blame
Mutual cooperation (n=103)			
Neutral	3.68 (0.896)	2.97 (1.620)	3.23 (1.746)
Joy	5.51 (0.852)	2.64 (1.652)	2.57 (1.551)
Sig. (r)	.000* (.853)	.067 (.181)	.000* (.362)
Agent exploits (n=98)			
Neutral	4.19 (1.089)	2.80 (1.699)	2.88 (1.633)
Joy	5.92 (0.823)	3.05 (2.078)	2.83 (1.759)
Guilt	3.23 (1.179)	4.39 (1.672)	2.84 (1.558)
Sig. (partial η^2)	.000* (.671)	.000* (.224)	.950 (.000)
Participant exploits (n=101)			
Neutral	3.56 (1.038)	2.85 (1.676)	2.79 (1.768)
Anger	2.19 (0.868)	3.49 (1.659)	5.20 (1.588)
Sadness	2.40 (0.901)	4.56 (1.590)	3.92 (1.730)
Sig. (partial η^2)	.000* (.545)	.000* (.248)	.000* (.466)
Mutual defection (n=103)			
Neutral	3.72 (0.757)	2.92 (1.453)	3.12 (1.635)
Joy	5.32 (0.856)	2.29 (1.493)	2.39 (1.523)
Anger	2.69 (0.856)	3.36 (1.726)	5.02 (1.621)
Sig. (partial η^2)	.000* (.733)	.000* (.119)	.000* (.477)

* $p < .05$.

Mediation analysis. In this subsection we present a causal steps approach multiple mediation analysis (Preacher & Hayes, 2008) of perceptions of appraisal on the effect of emotion displays on perception of cooperativeness. This method is an extension to multiple mediators of the single-mediation analysis proposed by Baron and Kenny (1986). Figure 3 summarizes the mediation model. The independent variables (IVs) were the classification questions for perception of joy, anger, sadness and guilt. The dependent variable (DV) was perception of cooperativeness. The proposed mediators were the perception of appraisal variables: conduciveness to goals, self-blame and participant-blame. According to this approach, there is

Table 4: Mediation analysis of perceptions of appraisals on the effect of emotions on perception of cooperativeness.

		IV→ Mediators *(a paths)*			Mediators → DV *(b paths)*			Total Effect *(c path)*	Direct Effect *(c' path)*	Indirect Effect *(ab paths)*			
		Cn	SB	PB	Cn	SB	PB			Tot	Cn	SB	PB
mutual coop	Joy	.457*	-.015	-.125	.305*	-.023	-.124	.372*	.217*	.155*	.139*	.000	.016
		(.000)	(.793)	(.037)	(.026)	(.820)	(.221)	(.000)	(.011)	(.011)	(.025)	(.862)	(.285)
mutual defect	Joy	.501*	-.140*	-.360*	.234	.254*	-.070	-.023	-.129	.107	.117	-.036*	.0251
		(.000)	(.002)	(.000)	(.067)	(.001)	(.332)	(.675)	(.103)	(.076)	(.066)	(.020)	(.332)
	Anger	-.411*	.235*	.624*	.153	.261*	-.131	.049	.131	-.083	-.063	.061*	-.081
		(.000)	(.000)	(.000)	(.122)	(.001)	(.099)	(.395)	(.089)	(.127)	(.122)	(.004)	(.098)
agent exploits	Joy	.496*	-.149*	.065	-.597*	.204*	-.152*	-.336*	-.001	-.336*	-.296*	-.030*	-.010
		(.000)	(.003)	(.132)	(.000)	(.000)	(.023)	(.000)	(.993)	(.000)	(.000)	(.021)	(.206)
	Guilt	-.480*	.469*	-.033	-.467*	.127*	-.127	.521*	.232*	.288*	.224*	.060*	.004
		(.000)	(.000)	(.548)	(.000)	(.038)	(.055)	(.000)	(.003)	(.000)	(.000)	(.043)	(.565)
human exploits	Sad	-.136*	.393*	.153*	.576*	.014	.075	*.076	-.015	-.061	-.078*	.005	.012
		(.000)	(.000)	(.004)	(.000)	(.842)	(.226)	(.143)	(.798)	(.060)	(.001)	(.841)	(.260)
	Anger	-.196*	.034	.543*	.568*	-.002	.109	-.112*	-.060	-.052	-.111*	-.000	.059
		(.000)	(.500)	(.000)	(.000)	(.977)	(.127)	(.038)	(.350)	(.198)	(.000)	(.977)	(.127)

Note. Cn = Conduciveness to goals; SB = Self-Blame; PB = Participant-Blame; CP = Coping Potential.
Values correspond to unstandardized regression coefficients (*p* values in parentheses).
* $p < .05$.

mediation by a specific mediator M_x if: (1) the path, a_x, from the IV to the mediator is significant; (2) the path, b_x, from the mediator to the DV, when controlling for the IV, is significant; (3) the indirect effect, $a_x b_x$, from the IV to the DV, when controlling for the mediator, is significantly different than zero and greater than zero by a non-trivial amount. Moreover, there is mediation of the *set* of mediators when the sum of the indirect effects of all mediators is significantly different than zero. Furthermore, there is full mediation when the direct effect, *c'*, of the IV on the DV, when controlling for all the mediators, is non-significant. Table 4 shows the analysis: the shaded cells on the *a*, *b* and *ab* path columns represent that the causal-step requirement on the respective path has been passed.

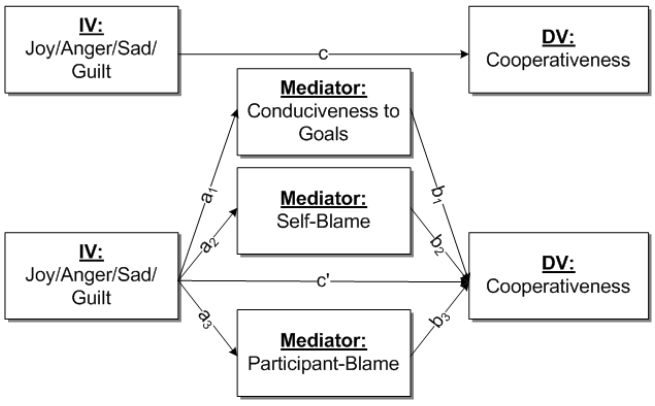

Figure 3: The multiple mediation model.

Discussion

The results in Table 2 show that emotion displays impacted perception of the counterpart's cooperativeness: in mutual cooperation, participants perceived the happy agent to be more likely to cooperate than a neutral agent; when the participant exploited, participants perceived the angry or sad agents to be less likely to cooperate than the neutral agent; finally, when the agent exploited, participants perceived the guilty agent to be more likely to cooperate than the neutral agent which, in turn, was more likely to cooperate than the happy agent. Notice these effects are compatible with findings in the literature (e.g., Van Kleef et al., 2010). Hypothesis H1 was, thus, confirmed. The results in Table 3 show that emotion displays impacted perception of appraisals in a way that was consistent with appraisal theories (Ellsworth & Scherer, 2003). For instance, happy agents were perceived to find the outcome conducive to their goals; sad or guilty agents were perceived to blame themselves for the (negative) outcome; and, angry agents were perceived to blame the participant for the (negative) outcome. Therefore, hypothesis H2 was also confirmed. Finally, the results in Table 4, show that appraisal variables, partially and sometimes fully, mediated the effect of emotion displays on perception of cooperativeness. For instance, in mutual cooperation, conduciveness to goals partially mediated the effect of joy; and, when the agent exploited, conduciveness to goals and self-blame fully mediated the effect of joy and partially mediated the effect of guilt. Hypothesis H3 was, thus, confirmed.

Experiment 2

Spencer et al. (2005) argue that showing mediation statistically, as proposed by Baron and Kenny (1986), is no substitute to showing mediation experimentally. As an alternative to the statistical approach, they propose the experimental-causal-chain design, where each link of the proposed causal model is shown experimentally. Applying the experimental-causal-chain approach to our case means showing, experimentally, each of the causal links in the proposed causal model (Figure 1). The effect of emotion displays on perception of appraisals (causal link i) was already shown, experimentally, in the previous experiment.

In turn, the goal of Experiment 2 was to show experimentally the effect of perception of appraisals on perceptions of cooperativeness (causal link ii).

Method

Experiment 2 used the same design and scenarios as Experiment 1. However, the manipulation consisted, instead of emotion displays, of textual expression of the appraisals. The mapping of emotion to appraisals followed predictions from appraisal theories (Ellsworth & Scherer, 2003) and is shown in Table 5. Participants were still introduced to the agents they imagined playing with, however, only a static image was shown of the (neutral) face. The textual expression of appraisals was simulated by typing at the bottom of the screen, as if simulating a chat interface.

Table 5: Mapping of emotions to expression of appraisals.

Emotion	Appraisal Expression
Neutral	I neither like, nor dislike this outcome
Joy	I like this outcome
Anger	I do NOT like this outcome and I blame YOU for it
Sadness	I do NOT like this outcome
Guilt	I do NOT like this outcome and I blame MYSELF for it

Regarding measures, after watching the video of the agent's reaction, we asked participants the same question about perception of cooperativeness as in Experiment 1.

We recruited two-hundred and two (N=202) participants online using Amazon Mechanical Turk. This resulted in approximately 50 participants for each outcome. Gender distribution was as follows: *males*, 51.0%; *females*, 49.0%. Age distribution was as follows: *18 to 21 years*, 10.4%; *22 to 34 years*, 56.4%; *35 to 44 years*, 12.9%; *45 to 54 years*, 12.4%; *55 to 64 years*, 5.9%; *65 years and over*, 2.0%. Most participants were from the United States (66.3%) and India (22.8%). The education level distribution was as follows (current or expected degrees): *high school*, 15.3%; *college*, 62.9%; *Masters*, 18.3%; *Ph.D. or above*, 3.5%. Education majors and profession were quite diverse. Participants were paid USD $1.02 and average participation time was 25 minutes.

Results

For each outcome, we conducted a repeated-measures ANOVA to analyze the effect of emotion display on perception of cooperativeness. The means, standard deviations, significance levels and effect sizes are shown in Table 6. If we collapse the data from the two experiments, it becomes possible to analyze whether there was any interaction between Sample (Experiment 1 vs. Experiment 2) and Emotion (Neutral vs. Joy vs. Anger vs. Sadness vs. Guilt). Because the argument is that appraisals are part of the information retrieved from emotion displays, we expected there to be no interactions. Table 6 also shows these interactions.

Discussion

The results in Table 6 show that expression of appraisals impacted perceptions of cooperativeness: in mutual cooperation, participants perceived the happy agent to be more likely to cooperate than a neutral agent; when the participant exploited, participants perceived the angry or sad agents to be less likely to cooperate than the neutral agent; finally, when the agent exploited, participants perceived the guilty agent to be more likely to cooperate than the neutral agent which, in turn, was more likely to cooperate than the happy agent. Notice these are the same patterns as in Experiment 1 and, thus, our hypothesis H4 was confirmed. Finally, notice the Sample x Emotion interaction was not significant for any of the outcomes.

Table 6: Effects on perception of cooperativeness.

Mutual cooperation (n=52)		*Participant exploits (n=48)*	
Neutral	3.27 (1.693)	Neutral	3.65 (1.839)
Joy	4.85 (1.841)	Anger	2.73 (2.029)
-	-	Sadness	3.00 (1.935)
Sig. (r)	.000* (.654)	Sig. (partial η^2)	.001* (.133)
Sample x Emotion, Sig. (r)	.267 (.005)	Sample x Emotion, Sig. (r)	.963 (.000)
Agent exploits (n=52)		*Mutual defection (n=50)*	
Neutral	4.06 (1.650)	Neutral	3.60 (1.990)
Joy	2.81 (2.077)	Joy	3.20 (1.874)
Guilt	5.31 (1.639)	Anger	3.46 (2.159)
Sig. (partial η^2)	.000* (.354)	Sig. (partial η^2)	.332 (.022)
Sample x Emotion, Sig. (r)	.473 (.005)	Sample x Emotion, Sig. (r)	.701 (.002)

* $p < .05$.

General Discussion

This paper presents insight into the mechanism for the social effects of emotion in a social dilemma. Two experiments were described that suggest a causal model (Figure 1) where emotion displays lead the receiver to infer how the sender is appraising the ongoing interaction and, these perceptions of appraisal, in turn, lead to inferences about the sender's propensity for cooperation in the dilemma. The experiments support this model by establishing experimentally both links in the model (Spencer et al., 2005) and by providing statistical evidence that perceptions of appraisal mediate the effect of emotion displays on perceptions of cooperativeness (Preacher & Hayes, 2008). We refer to the mechanism suggested by this causal model as reverse appraisal.

Implications for emotion theory. The results presented in the paper provide further evidence that emotions serve important social functions (Frijda & Mesquita, 1994; Keltner & Kring, 1998). For instance, whereas anger signaled a willingness to punish a non-cooperator with non-cooperation, guilt signaled regret for one's non-cooperation and a willingness to cooperate in the future. The paper further proposes that reverse appraisal is a useful framework for the social functions of emotion. Reverse appraisal suggests that an important component of the information retrieved from emotion displays refers to how the counterpart is appraising the ongoing interaction. This information is then used to infer the counterpart's mental states, such as his or her propensity for cooperation in a social dilemma. Finally, reverse appraisal can potentially generalize beyond social dilemmas and be viewed as a general mechanism for interpretation of emotion displays. This is, in fact, a promising line of future inquiry.

Implications for decision-theory. Van Kleef et al. (2010) argue emotion displays can influence people's decision

making through affective processes (e.g., emotional contagion) or inferential processes. Regarding the latter, Van Kleef et al. suggest that "each discrete emotion has its own antecedents, appraisal components, relational themes, and action tendencies" (p.48) and, thus, "observing a particular emotion in another person provides relatively differentiated information about how that person regards the situation" (p.53). This paper provides empirical evidence for such "differentiated information" in emotion displays which, as suggested by the results, pertains to perceptions of appraisal. Our results also reinforce findings regarding the importance of context for the interpretation of emotion (de Melo et al., 2011; Hareli & Hess, 2010; Van Kleef et al., 2010). For instance, the results showed that people reacted differently to the same smile when it was shown after mutual cooperation or after the agent exploited them. Finally, the results support Schug et al.'s (2010) contention that people are capable of identifying non-cooperators from emotion displays and punish accordingly.

Limitations and future work. Since the results from our experiments were promising, we plan in the near future to repeat both experiments with the complete factorial design. Such design will clarify the effect of emotion in pairings that were left unexplored (e.g., expression of anger in mutual cooperation). Moreover, complementing this paper's focus of comparing the effect of emotion within the same outcome, the factorial design will allow us to study the effect of emotion *across* outcomes. Another limitation we intend do address is that the current causal model does not predict what will people decide after making inferences about the counterpart's likelihood of cooperation. Notice the link between perceptions of cooperation and the decision to cooperate is not simple. For instance, whereas a pro-social might cooperate, a pro-self might exploit the cooperator (Steinel & de Dreu, 2004). Finally, to understand how reverse appraisal generalizes beyond the prisoner's dilemma, it is important to assess whether perceptions of appraisal also mediate the effects of emotion displays in more social decision making tasks such as other social dilemmas (e.g., public goods), trust games and negotiation.

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