Cooperation in Mixed-Motive Games: The Role of Individual Differences in Selfish and Social Orientation

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Abstract

In mixed-motive games, people must choose between acting upon selfish interests and concerns for others. Yet, the consistency of people's behavior across these various games is still unclear. If the same conflict between self and others is at the core of all mixed-motive situations, three hypotheses can be stated: (1) behaviors in different mixed-motive games should be substantially related, (2) all these games should substantially appeal to dispositional variables that probe in the psychological conflict between self and others, and (3) these dispositional variables should explain the shared variance among various games. These hypotheses were tested among undergraduate students (N = 219) who played seven different single shot mixed-motive games and one sequential game. Social Value Orientation as well as the ideological attitudes Social Dominance Orientation and Right-Wing Authoritarianism were included as dispositions. Our findings, however, showed evidence that did not fully substantiate our hypotheses, which calls into question the general idea that all mixed-motive games render the conflict between selfish interests and concern for others salient. In the discussion, we focus on implications for research on mixed-motive situations, and elaborate on the role of ideology in this domain.

Keywords: cooperation; mixed-motive games; Social Value Orientation; Social Dominance Orientation; Right-Wing Authoritarianism

1. Introduction

The conflict between self-interest and concerns for others forms the basis of many of the most challenging problems our society faces (see Kollock, 1985; Van Lange, Joireman, Parks, & Van Dijk, 2013), which implies that the importance of understanding the situational and dispositional conditions that produce cooperation in such mixed-motive situations cannot be overestimated (Simpson, 2003). Scholars in behavioral economics and decision making have modeled this conflict into so-called mixed-motive games. In such games, people have to choose between acting upon self-interest and concern for others, which results in the choice for non-cooperative or cooperative alternatives, respectively (Dawes, 1980; Dawes & Messick, 2000). Previous research using these games resulted in the sad conclusion that maintaining cooperation is difficult (e.g., Mankiw & Taylor, 2006; Yamagishi & Cook, 1993). Moreover, prior studies revealed that cooperation in mixed-motive situations also depends on individual differences that are inherently related to the motivational conflict between self-interest and concern for others (see Kelley & Stahelski, 1970a; Koole, Jager, Van Den Berg, Vlek, & Hofstee, 2001; Liebrand, Jansen, Rijken, & Suhre, 1986; Van Lange 1999; for a review see Au & Kwong, 2004).

Despite the common basis of all mixed-motive games, there is some variability as well. Indeed, mixed-motive games can differ from each other on a range of different dimensions, such as the number of actors involved and whether these actors has to make a dichotomous or continuous choice. Other important dimensions include the number of rounds, the framing of the outcomes, and whether the actors make their choice simultaneously or sequentially. An exhaustive description of these dimensions goes beyond the scope of the present paper (for reviews on this matter, see Pruitt & Kimmel, 1977; Rapoport & Orwant, 1962; Van Lange et al., 2013), but an important conclusion that follows from this observation

is that there is a lot of variability between mixed-motive games (see Balliet & Van Lange, 2013a, 2013b; also see Rusbult & Van Lange, 1996, 2003).

Because on the one hand the conflict between selfish and social motivations is hypothesized to underlie all mixed-motive games, while on the other hand these games also differ on a number of dimensions, the question arises whether choice behavior should display substantial consistency. In psychology it is common practice to accept that the conflict between self and others is indeed a central characteristic of all mixed-motive games, and it is therefore generally expected that people's decisions are consistent across different games. In other words, when a person cooperates in one game, it is expected that he or she will also cooperate in other games. The question rising here is whether such generalizations are warranted? This is a question difficult to answer because virtually no previous studies have investigated responses to various mixed-motive games simultaneously (for some notable exceptions, see Blanco, Engelmann, & Norman, 2010; Yamagishi et al., 2012, 2013), and extant research therefore provides only limited insight into this question. In the present study, we thus compared choice behavior across a range of different mixed-motive games. Moreover, we also investigated the role of individual differences in selfish and social orientation, as these are the two most prominent motives in all mixed-motive situations.

1.1 Mixed-Motive Games

The psychological literature describes a wide range of games in which the conflict between self and others is embedded. Below follows an overview of the most prominent mixed-motive games (for more detailed descriptions, see Pruitt & Kimmel, 1977; Kollock, 1998; Komorita & Parks, 1995; Van Lange et al., 2013).

1.1.1 Prisoner's Dilemma Game and Assurance Game

The *Prisoner's Dilemma Game* (Axelrod, 1984; Axelrod, Riolo, & Cohen, 2002) is the most straightforward example of a mixed-motive game in that it involves only two players

who each face a dichotomous choice between cooperation and non-cooperation. The relative value of the four possible outcomes defines this game (Axelrod, 1984; Kollock, 1998). That is, the best possible outcome for an individual is to defect while the other cooperates, the second best outcome is mutual cooperation, the second worst outcome is mutual defection, and the worst outcome is to cooperate while the other defects.

By switching the relative value of these outcomes, an interesting variant of the Prisoner's Dilemma Game, namely the *Assurance Game* can be created. In this game, mutual cooperation leads to a better personal outcome than unilateral defection (see Bornstein, Mingelgrin, & Rutte, 1996; also see Kollock, 1998; Sen, 1967). A common misunderstanding is that the Assurance Game represents no mixed-motive situation and leads inevitably to mutual cooperation. However, if an individual suspects that the other will defect, the best that he or she can do is to defect as well because being exploited results in the worst possible outcome (Kollock, 1998).

1.1.2 Public Good Dilemma Game and Commons Dilemma Game

The *Public Good Dilemma Game* (or give-some dilemma, see Kollock, 1998; McCarter, Budescu, & Scheffran, 2011) comprises a situation in which multiple players choose between withholding resources for private use and contributing resources towards the development or sustaining of a public good. A public good is a resource from which all may benefit, regardless of whether they have helped to provide the good. It is in individuals' self-interest to "give" as little as possible, but if too many players contribute little or nothing the public good will cease to exist (Allison & Kerr, 1994; Olson, 1965).

The *Commons Dilemma Game* (or take-some dilemma, see Dawes, 1980; Van Dijk & Wilke, 2000) involves a situation in which multiple players share a limited common resource pool from which everyone may harvest, with the potential danger of overuse since the good is

in limited supply. It is in individuals' self-interest to "take" as much as possible, but if too many players consume too much the common good will be lost (Hardin, 1968).

1.1.3 Dictator Game, Ultimatum Bargaining Game, and Trust Game

In the present research we will supplement the games described above with three other mixed-motive games, namely: the *Dictator Game* (Kahneman, Knetsch, & Thaler, 1986), the *Ultimatum Bargaining Game* (Rubinstein, 1982), and the *Trust Game* (Berg, Dickhaut, & McCabe, 1995). In psychology and economics these three games are studied extensively because they form a critical test of whether people are motivated only by selfish motives (i.e., the non-cooperative choice which reflects egoism), such as the classic economic theory assumes, or also by other motives (i.e., the cooperative choice which reflects concerns for others), like it is assumed in psychology (see Bolton, Katok, & Zwick, 1998).

An important dimension that distinguishes these three games from the aforementioned game situations is the factor sequentiality. That is, in the Dictator Game, the Ultimatum Bargaining Game, and the Trust Game one player always chooses his or her action before the other makes his or her choice. More specifically, in the first stage of these games the first actor (the allocator) makes a choice concerning the allocation of an amount of resources between him- or herself and a second actor (the recipient). In contrast, in the Prisoner's Dilemma Game, the Assurance Game, the Public Good Dilemma Game, and the Commons Dilemma Game (which are described above) the players usually make their choices simultaneously (although these latter games also exist in sequential form, see for example Gächter, Nosenzo, Renner, & Sefton, 2010).

However, there are differences among the three sequential games as well. The main difference resides in the amount of power the recipient possesses in the second stage. In the Dictator Game, the recipient has no power and thus must accept any offer of the allocator, while in the Ultimatum Bargaining Game the recipient has the power to reject the offer of the

allocator, in which case the resources will be lost for both players. In the Trust Game, the amount of resources offered by the allocator is multiplied and then transferred to the recipient who, in turn, has the power to allocate the received amount of resources between both actors. Despite of these differences in the second stage, the amount of resources that the allocator offers in the first stage can be seen as an indicator of cooperation in all three games.

1.2 Individual Differences in Selfish and Social Orientation

When examining consistency in people's decisions in various mixed-motive games and the contrast between selfish and social motives that they are suggested to reflect, it is important to also consider the role of individual differences. In this vein, there is a growing body of research on the relationship between personality and cooperation (e.g., Au & Kwong, 2004; Hilbig & Zettler, 2009; Hilbig, Zettler, Moshagen, Heydasch, 2013; Hirsh & Peterson, 2009; Kollock, 1998; Kurzban & Houser, 2001), which mostly revealed significant correlations of cooperative behavior with different personality factors (such as Social Value Orientation, Agreeableness, and Honesty-Humility). Based on the results of these prior studies, it can be argued that behavior in mixed-motive games should at least be partially attributable to dispositional factors that make people more or less likely to cooperate. More specifically, in the present study we assume that if all games provoke the same psychological conflict between selfish interests and concern for others, dispositional factors that inherently relate to this conflict should consistently be associated with cooperative or defective behaviors across the different games.

1.2.1 Social Value Orientation

Social Value Orientation (SVO) is the dispositional factor that has been studied the most extensively in relation to cooperation in mixed-motive games. SVO refers to stable individual differences in preferences for particular distributions of outcomes for oneself and others (see Messick & McClintock, 1968; Van Lange, 1999). Specifically, people's SVO

reflects the relative importance they attach to outcomes for themselves, compared to the importance they ascribe to outcomes for others. This construct thus probes into the conflict between maximizing selfish interests and concern for others that is supposed to be at the basis of all mixed-motive situations. Four major categories are typically distinguished in the literature: (1) *altruistic orientation,* which mirrors a preference for maximizing others' interest regardless of the outcomes for oneself; (2) *cooperative orientation,* which reflects a preference for maximizing joint outcomes and for achieving equality in outcomes; (3) *individualistic orientation,* which mirrors a preference for maximizing self-interest with little or no regard for others' outcome; and (4) *competitive orientation*, which reflects a preference for maximizing one's relative advantage over the outcome of others (see Messick & McClintock, 1968; Van Lange, 1999; Van Lange, De Cremer, Van Dijk, & Van Vugt, 2007). Because both competitors and individualist have a preference for maximizing outcomes for oneself (either relatively or absolutely to others), these categories are typically aggregated into the superordinate category of proself orientation. Cooperative and altruistic individuals are often labelled as prosocials (see Balliet, Parks, & Joireman, 2009; Van Lange, Bekkers, Schuyt, & Van Vugt, 2007).

Previous research revealed that SVO influences cooperation in a range of mixed-motive games (such as Prisoner's Dilemma Games, Public Good Dilemma Games, Commons Dilemma Games, and negotiation tasks, see De Cremer & Van Lange, 2001; Kramer, McClintock, & Messick 1986; Parks & Rumble, 2001; Van Dijk, De Cremer, & Handgraaf, 2004; Van Kleef & Van Lange, 2008; for two reviews see Au & Kwong, 2004; Bogaert, Boone, & Declerck, 2008; for a recent meta-analysis see Balliet et al., 2009). Moreover, in real world situations that are characterized by a conflict between self and others (like decisions whether or not to volunteer or carpool), SVO also predicts cooperativeness (see Joireman, Lasane, Bennett, Richards, & Solaimani, 2001; McClintock & Allison, 1989; Van

Lange, Bekkers, et al., 2007; Van Lange, Van Vugt, Meertens, & Ruiter, 1998; Van Vugt, Van Lange, & Meertens, 1995; also see the reviews of Au & Kwong, 2004; Bogaert et al., 2008). The typical finding is that prosocial individuals are more likely to behave cooperatively and more inclined to expect cooperation from interdependent others, compared to proself individuals (De Cremer & Van Lange, 2001; Rusbult & Van Lange, 2003; Utz, Ouwerkerk, & Van Lange, 2004). Based on these previous findings, we expect that proselfs will maximize their own interests by making non-cooperative choices in mixed-motive games, whereas prosocials will maximize collective interests by choosing cooperative alternatives.

1.2.2 Ideological Attitudes

The conflict between self-interest and concern for others that underlies mixed-motive situations is also a central feature of another personality construct, namely social ideological attitudes. Although studies have related ideological attitudes to SVO (Van Lange, Bekkers, Chirumbolo, & Leone, 2011) and cooperative behavior in real-life settings (Weiner, Osborne, & Rudolph, 2011), these attitudes have not yet been linked to cooperation in mixed-motive games. Therefore, in the present research we also included ideological attitudes. This represents an important and new perspective on cooperation, particularly because broad ideological traits include a wider range of preferences than more specific social values. Hence, by taking ideology into account a more multifaceted perspective on cooperation in mixed-motive situations becomes possible.

A first variable that reflects the difference between left and right-wing ideological attitudes is *Social Dominance Orientation* (SDO). SDO relates to economic hierarchical right-wing beliefs, and represents an individual's tendency to classify social groups along a superiority-inferiority dimension, and to favour policies that maintain social inequality (Pratto, Sidanius, Stallworth, & Malle, 1994). Moreover, individuals who score high in SDO

desire to maintain or increase the differences between different groups as well as between individual group members (Pratto et al., 1994). Therefore, we assume that in different mixed-motive games, high SDO will lead to non-cooperative choices, whereas low SDO will result in cooperative alternatives. Put otherwise, we argue that SDO will be negatively related to cooperation in different games.

In the literature on ideological attitudes, SDO is often supplemented with *Right-Wing Authoritarianism* (RWA; e.g., see Asbrock, Sibley, & Duckitt, 2010; Duckitt, 2006; Duckitt & Sibley, 2007; Heaven & Bucci, 2001). RWA (Altemeyer, 1981) is a typical indicator of social-cultural right-wing beliefs, and has been defined as the covariation of conventionalism (a strict adherence to conventional norms and values), authoritarian submission (an uncritical subjection to authorities), and authoritarian aggression (feelings of aggression towards norm violators). Because previous studies showed that authoritarianism is negatively related to cooperative behavior in the real world (see McFarland, Ageyev, & Djintcharadze, 1996; Peterson, Doty, & Winter, 1993; Schultz & Stone, 1994), we assume that RWA will influence cooperation in mixed-motive games accordingly. That is, high RWA scores are expected to be negatively related to cooperation in the games.

1.3 The Present Studies

While ample research has compared decision making between two related games (e.g., by comparing responses in Public Good Dilemma Games and Commons Dilemma Games, see McCarter et al., 2011; Van Dijk & Wilke, 2000; Van Dijk, Wilke, & Wit, 2003), or has examined the role of social values in the context of a single game (e.g., the Public Good Dilemma Game, see De Cremer & Van Lange, 2001; McClintock & Liebrand, 1988; the Commons Dilemma Game, see Kramer et al., 1986; Pruyn & Riezebos, 2001; or bargaining games, see Van Dijk et al., 2004), so far only a few researchers investigated whether people behave consistently across a range of different games (e.g., Blanco et al., 2010; Yamagishi et

al., 2012, 2013). Moreover, the results of these previous studies are not very consistent. That is, Yamagishi and colleagues (2012, 2013) found relatively strong consistency in behavior across different games, as well as moderate correlations between game behavior and SVO; whereas Blanco et al. (2010) reported rather small to moderate correlations across games, with even a substantial number of non-significant associations. The present research extends these previous studies by examining cooperative behavior across a greater range of mixed-motive games, focusing on both single-shot and iterative games, and including a broader range of dispositional factors by also taking into account ideological traits.

In sum, the present research examines the convergence of behavior in a set of mixed-motive games and their relation to individual differences in selfish and social orientation. These games have been defined in terms of the conflict between maximizing selfish interests and maximizing others' or collective interests, and this conflict is considered to be at the basis of all mixed-motive situations. Although there is a lot of variability among games, this common ground implies that (1) behavior in different games should be substantially related, suggesting that we should be able to draw a common factor from behaviors displayed in the various games. Such a strong relationship among the games would indicate "motivational consistency". (2) Dispositional variables that relate to concerns for self and others (i.e., SVO, SDO, and RWA) should yield substantial behavioral effects in these different games. All mixed-motive games should thus appeal to the individual's tendency to deal with the psychological conflict between selfish interests and social concerns. (3) The associations among the different games should be explained by these individual motivational tendencies. Hence, the indicators of the motivational conflict in the form of the dispositions should explain the shared variance among the different games. Only when these three conditions are met, we can confidently infer that the conflict between selfish and social motivations is at the core of all included games.

In addition to these three hypotheses, the present research also investigates how individuals react to particular opponents' choices over time. More specifically, we examined whether the development of response patterns in reaction to a competitive and a cooperative opponent strategy over multiple rounds is influenced by dispositional variables that relate to concerns for self and others.

2. Method

2.1 Participants and Procedure

Two hundred and nineteen undergraduate psychology students from a Belgian University (47 men, 172 women; M_{age} = 18.84, SD = 3.26) participated in the study in exchange for course credits. Students were invited in groups of 45 persons. Upon arrival to the laboratory, each participant was placed in front of a computer. Participants were told that they would first answer some personality measures and then play a series of games. It was clarified that participants would play each of these games with one or more other participants who were present in the lab via connected computers. Furthermore, participants were told that they would never play more than one game with the same partner.

Participants first played a series of eight one-shot games, the order of which was randomized. Importantly, all decisions in these games were to be made without any information about other subjects' choices and without any communication. Next, participants played several rounds of an iterative game against two simulated players, whose behavior was preprogrammed. In this stage, participants received feedback on their partner's decisions, and on each player's earnings in each round. At the end of the experiment, one game was randomly selected and participants were randomly matched with other subjects and paid according to their earnings in this game. Participants were instructed of this procedure in advance. This procedure is appropriate for preventing participants from averaging their earnings across games (for a similar setup, see Blanco et al., 2010; Charness & Rabin, 2002).

2.2 Individual Difference Measures

2.2.1 Social Value Orientation

First, we assessed participants' *Social Value Orientation* (SVO) by means of the paper-based SVO Slider Measure[1] (Murphy, Ackermann, & Handgraaf, 2011). Each item of this measure presents a resource allocation choice over a well-defined continuum of joint payoffs. Specifically, participants have to make decisions about how to allocate monetary resources between themselves and an unspecified anonymous other person who would remain unknown to them (for further details, see Murphy & Ackerman, 2013; Murphy et al., 2011).

The SVO Slider Measure allows for the assessment of a person's general SVO on a continuous scale in terms of an angle. An SVO angle of 0◦ indicates perfect selfishness. A positive score indicates an increase in positive concern about the payoff for another person (increasing concern for others), while a negative score reflects an increase in the negative concern about the payoff for another person (i.e., increasing competitiveness). Moreover, based on their SVO angle, participants can also be categorized according to the classical category-based classification of SVO (see Van Lange, 1999): Altruists have an angle greater than 57.15°, cooperators have an angle between 22.45° and 57.15°, individualists have angles between -12.04° and 22.45°, and competitors have an angle smaller than -12.04°. Accordingly, we identified one altruist (0.5%), 160 cooperators (73.1%), 56 individualists (25.5%), and two competitors (0.9%). However, because such a categorical classification discards a considerable amount of information regarding the relative strength of participants' social preferences, we employed SVO as a continuous measure in our analyses.

2.2.2 Ideological Attitudes

Next, we assessed ideological attitudes by means of a *Social Dominance Orientation* (SDO) scale (Pratto et al., 1994) and a *Right-Wing Authoritarianism* (RWA) scale (Altemeyer, 1981). The SDO scale consisted of 16 items, an example of which is, "To get

ahead in life, it is sometimes necessary to step on other groups". The RWA scale consisted of 24 items, an example of which is, "Being kind to loafers or criminals will only encourage them to take advantage of our weakness, so it's best to use a firm, tough hand when dealing with them". Both constructs were measured using seven-point Likert-scales (1 = *strongly disagree*, 7 = *strongly agree*). After reversing negatively stated items, scores were computed by averaging the items for SDO (α = .87, M = 2.94, SD = 0.86) and RWA (α = .81, M = 3.14, SD = 0.63).

2.3 Mixed-Motive Games

2.3.1 Single-Shot Games

In order to measure the full spectrum of behavioral choices in mixed-motive games, we included eight single-shot games: a *Prisoner's Dilemma Game*, an *Assurance Game*, a *Public Good Dilemma Game*, a *Commons Dilemma Game*, two *Dictator Games*, an *Ultimatum Bargaining Game*, and a *Trust Game.* In the first four games all players made their choice simultaneously. The latter four games are sequential games, in which all participants played the role of the allocator. We included two Dictator Games in order to get an estimate of reliability. Our analyses indicated the two Dictator Games to be very strongly correlated (r = .70, $p < .001$); therefore, the standardized scores of both games were combined in a single score that reflects participants' behavior in both games. Importantly, in order to avoid sequential effects, the eight games were presented to participants in a random order. Detailed descriptions of these games are provided in Appendix A.

2.3.2 Iterative Game

In order to investigate the possibility that individual differences may be reflected more in response patterns to particular opponent strategies, rather than single interactions, we also included multiple rounds of a dyadic *Public Good Dilemma Game* in which participants were

confronted with competitive and cooperative partner strategies (for more detailed information on this game, see Van Lange, 1999; Van Lange & Kuhlman, 1994).

The iterative game consisted of ten rounds. Before each round, both players received an endowment of ten coins. The task was presented to participants as a give-some situation in which both players in each round had to make a continuous choice ranging from giving no coins up to maximally giving all ten coins to the other player. Each coin held by the participant had a value of €0.50 to the participant and a value of €1.00 to the other player. Similarly, each coin held by the other player had a value of €0.50 to the other and a value of €1.00 to the participant. Participants' earnings in each round were determined by the number of coins that they had chosen to keep, and by the number of coins that they had received from the other player[2]. This game thus represents a mixed-motive situation as the best outcome for the participant is obtained by contributing no coins while at the same time the other player contributes all his or her coins. The best collective outcome, however, is obtained when both players allocate all their coins to each other.

The task consisted of two blocks of five rounds each. Before each block, participants were paired with a new opponent, whose strategy was preprogrammed. Participants played five rounds against a competitive partner and five rounds against a cooperative partner (the two blocks were presented in a random order). Decisions in the game were made sequentially, such that participants were first confronted with a decision from the other player, and then decided for themselves. The competitive partner allocated no coins to the participant in the first round (minimal cooperation), while the cooperative partner allocated all ten coins to the participant in the first round (maximum cooperation). In the subsequent four rounds of each block, the partner employed a tit for tat (TFT) strategy, and thereby reciprocated the number of coins that the participant had donated in the previous round.

3. Results

3.1 Descriptive Statistics

Table 1 reports for each of the mixed-motive games the number and percentage of participants who have chosen (not) to cooperate (in case participants had to make a dichotomous choice) as well as the means and standard deviations of the game behaviors (in case participants had to make a continuous choice).

3.2 Correlations among Behaviors in Single-Shot Games and Factor Structure

In psychological research, Cohen's (1988, 1992) conventions are often used to interpret effect sizes. Accordingly, a correlation coefficient greater than .50 represents a large association, a correlation coefficient between .30 and .50 is considered a moderate association, a correlation coefficient between .10 and .30 reflects a small association, while a correlation coefficient smaller than .10 can be considered trivial.

Based on this convention, it can be inferred from the correlation matrix (see Table 2) that the behaviors shown in the seven games display rather small to moderate relationships (5 trivial, 10 small, and 6 moderate associations), with a substantial number of non-significant correlations (ps > .05 for 7 out of the 21 correlations). Based on these inter-correlations, we computed the average correlation among the seven games. Therefore, we first applied Fisher's r to z transformation (Fisher, 1921; as described in Howell, 1992). The average correlation among the different games was small, but significant (r = .22, p = .001). This implies that, on average, only 4.84% of the variance of behavior in one particular game can be explained by behavior in another game. Consequently, it is fair to conclude that a participant's behavior in one game entails only little information about how he or she will behave in another game.

Next, to investigate whether the different games load on one single underlying dimension, we extracted factors from the inter-correlations among the scores on the seven games using the maximum likelihood method. Two factors with an eigenvalue of 2.44 and

1.15 (explained variances of 34.8% and 16.5%, respectively) were extracted. The goodness-of-fit test offers an indication of good fit, $\chi^2(8) = 12.04$, $p = .149$. Table 3 shows the communalities as well as the factor weights after OBLIMIN rotation. As can be inferred from this Table, the Public Good Dilemma Game, the Trust Game, the Commons Dilemma Game, and the Assurance Game loaded on the first factor. The Dictator Game and the Ultimatum Bargaining Game constituted the second, distinctive factor. The Prisoner's Dilemma Game loaded equally on both factors. Moreover, Table 2 also reveals that the correlation among the two factors was moderate ($r = .45$, $p < .001$).

These results thus clarify that even though mixed-motive games are thought to probe into the same psychological conflict between cooperation and non-cooperation, there is some distinctiveness as well (cf. hypothesis 1).

3.3 Correlations between Dispositional Variables and Behavior in Single-Shot Games

Table 2 also displays the correlations between the three dispositional variables SVO, SDO, and RWA, and the seven game behaviors. The positive relationship between SVO and the different games indicates that increased prosocial orientation is related to more cooperative choices; while higher SDO and RWA was associated with more competitive choices. As can be inferred from Table 2, most of these relationships were rather weak (with 6 trivial and 15 small associations). Moreover, of the 21 correlations, 9 failed to reach statistical significance (ps > .05).

For each disposition, we also calculated the average correlation with the seven mixed-motive games (after applying Fisher's r to z transformation). The average correlation between the dispositions and the seven games were small ($r = .16$, $p = .018$; $r = -.13$, $p = .055$; and $r = -.14$, $p = .038$, for SVO, SDO, and RWA, respectively). Hence, SVO explains on average 2.56% of the variance in game behavior, while SDO and RWA explain 1.69% and 1.96%, respectively.

We also computed the correlations between the dispositional variables and the two factor scores. The correlation matrix (see Table 2) shows that all association between both factors and SVO (r = .25, p < .001 and r = .30, p < .001, for respectively Factor 1 and 2), SDO (r = -.20, p = .003 and r = -.25, p < .001, for respectively Factor 1 and 2), and RWA (r = -.27, p < .001 and r = -.15, p = .023, for respectively Factor 1 and 2) were small or moderate.

Based on these findings, we can conclude that the dispositional variables do not yield substantial behavioral effects in the different games (cf. hypothesis 2).

3.4 Do Dispositional Variables account for Correlations among Single-Shot Game Behaviors?

Next, we investigated whether the shared variance among the different games and the factor scores can be explained by the dispositional variables. Therefore, we computed the correlations among the games and the factor scores, while controlling for SVO, SDO, and RWA. The results of this partial correlation analysis are displayed in Table 2 (see the values between the brackets). From the 26 significant correlations, only one correlation (i.e. between the Dictator Games and the Assurance Game) became non-significant.

Next, we calculated whether there were significant differences between the zero-order correlations and the correlations controlled for the individual differences. Therefore, we calculated − for each of the 26 significant correlations – whether the difference between these two correlation coefficients was significant (after applying Fisher's r to z transformation). These analyses revealed that for none of the relationships such differences occurred (all Δrs < .09, all ps > .19).

These findings confirm that the associations among the different games and the factors scores cannot be explained by the dispositional variables (cf. hypothesis 3).

3.5 Cooperative Behavior in Iterative Game

Participants' behavior in the iterative game was investigated using a repeated measures analysis of variance (ANOVA). We employed a 5 (round) × 2 (strategy) within-subjects design. The centered scores of SVO, SDO, and RWA were included as covariates.

The results first of all revealed a significant main effect of strategy, $F(1, 215) = 664.95$, $p < .001$. As shown in Figure 1, participants were more likely to react with cooperation, and thus allocated a larger amount of their coins to the other, when playing with a cooperative partner (round 6 to 10), compared to a competitive partner (round 1 to 5). Moreover, significant main effects for the personality variables SVO and RWA also emerged, $F(1, 215) = 18.21$, $p < .001$, and $F(1, 215) = 14.88$, $p < .001$, respectively. Regardless of the strategy of the opponent, proselfs (low SVO) and high scoring authoritarians showed less cooperation. The main effect of SDO was non-significant, $F(1, 215) = 1.12$, $p = .29$.

Further, the results showed a significant two-way interaction of strategy × round, $F(4, 212) = 24.66$, $p < .001$. It can be inferred from Figure 1 that when playing with a competitive player, the low level of cooperation gradually increases over the different rounds; while when playing with a cooperative player, the level of cooperation slowly decreases over the different rounds (but still remains at a high level). With respect to the personality variables, only the two-way interaction of strategy × SVO was significant, $F(1, 215) = 4.18$, $p = .042$. Figure 1 shows that both proselfs (low scorers on SVO) and prosocials (high scorers on SVO) reacted with low cooperation to a competitive partner. However, against a cooperative partner, prosocials were more likely than proselfs to reciprocate cooperation. The interactions of strategy × SDO and strategy × RWA failed to reach statistical significance, $F(1, 215) = 2.52$, $p = .114$, and $F(1, 215) = 1.82$, $p = .179$, respectively.

Finally, the promptness at which participants adjust their behavior to a cooperative or a competitive partner is not dependent on personality. All third order effects of strategy ×

round × personality were non-significant, $F(4, 212) = 0.53$, $p = .711$; $F(4, 212) = 0.51$, $p = .727$; and $F(4, 212) = 0.45$, $p = .772$, for SVO, SDO, and RWA, respectively.

These results thus indicate that although cooperation in the iterative game strongly depends on the strategy of the opponent, individual differences in selfishness and social orientation play a role as well.

4. Discussion

In psychological research, a wide range of mixed-motive games is employed to study cooperative behavior. Although the basis of all mixed-motive games resides in the conflict between maximizing selfish and other's interests (see Dawes, 1980; Dawes & Messick, 2000; Messick & Brewer, 1983; Weber, Kopelman, & Messick 2004), different games also exhibit important differences on a range of dimensions, like the number of players involved and whether these players should make their choice simultaneously or sequentially. Such differences call into question whether different games can be regarded as equivalent and comparable, and whether findings can be extrapolated between different mixed-motive situations.

To answer these questions, the present research compared decision behavior across a wide range of mixed-motive games. We hypothesized that if the same conflict between self and others is at the basis of all these games, then: (1) behavior in the different mixed-motive games should be substantially related, (2) dispositional factors that probe in the psychological conflict between selfish and prosocial tendencies should yield substantial behavioral effects in these different games, and (3) the shared variance among the games should be explained by these individual motivational tendencies. Our findings, however, showed evidence that did not fully substantiate these hypotheses, which calls into question the general idea that all mixed-motive games bring the conflict between selfish interests and concern for others to the foreground.

In the remainder of this section, we further elaborate on three issues. First, we discuss the most important results of the present study. Next, we focus in more detail on the impact of ideological attitudes on behavior in situations in which there is a conflict between self-interest and concerns for others. Finally, we describe some important strengths and limitations of the present research.

4.1 The Motivational Basis of Mixed-Motive Games

Four important findings should be discussed. With regard to the first hypothesis, our results showed that the correlations among the decisions in the various games were typically smaller than one would expect. Specifically, if all mixed-motive games would strongly appeal to the conflict between concerns for self and others, one would expect strong consistency in behavior across games. However, our study revealed that behaviors in the different games were only weakly to modestly related. This is also reflected by the small average correlation among the different games (r = .22, p = .001), which implies that behavior in one game entails little information about how someone will behave in another game (explained variance of 4.84%). This finding corroborates Blanco et al. (2010) who also found small to moderate correlations among behaviors across different games, but does not corroborate the results of Yamagishi et al. (2012, 2013) who reported much stronger relationships between different game behaviors. Nonetheless, the rather weak correlations found in the current study indicate that each mixed-motive game comprises distinctive and unique elements that are not present in other games, which overshadow their common ground. Furthermore, in our study the seven games loaded on two distinct factors, which were only moderately inter-related.

These findings all indicate substantial variation in the behaviors exhibited in the various games, which suggests that conclusions drawn in one single game are not universal, and therefore may not extend to other games. For this reason, we argue that caution should be exercised when generalizing results in specific games to other situations. In the psychological

literature, however, it is common practice to extrapolate the findings regarding cooperation found in one specific game to cooperation in general. Our findings underline that results obtained in one game should only be interpreted in context of that particular game. Moreover, if one wants to generalize such results to other games or even to cooperation in real-life settings, it is important that findings obtained with one game are first uncovered in other mixed-motive situations.

A second important finding pertained to the relationships between the games and two types of individual difference variables, that is, social values and ideological attitudes (see hypothesis 2). These dispositional variables are both inherently related to the conflict between maximizing one's own outcomes and those of others. SVO, SDO, and RWA showed small correlations with behavior in the different games, and even a substantial number of non-significant correlations emerged. Although these results are consistent with previous studies that reported rather modest correlations between cooperation and personality (e.g., see Kurzban & Houser, 2001; Hilbig & Zettler, 2009), they do not align well with the assumption that all mixed-motive games should substantially appeal to the motivational conflict between selfish interests and concern for others. The correlations we obtained were weaker than expected, although the expectation of a perfect relationship would be unrealistic.

How can these weak correlations between the personality variables and cooperation be explained? An interesting approach in this regard is the "slot-machine model of interpersonal orientations" of Van Lange, De Cremer, Van Dijk, and Van Vugt (2007). These authors have argued that unlike the deterministic perspective which holds that prosocials and proselfs always behave in cooperative or non-cooperative ways, a more accurate characterization of the dispositional view is probabilistic. According to this assumption, prosocial and proself preferences only reflect an increase in the likelihood that a person will make a specific choice that is consistent with that particular orientation. Hence, dispositions or orientations do not

translate directly into behavior. Consistency with one's orientation may depend on a range of different factors such as the interaction partner and the specific payoff structure. Obviously, although this approach clarifies that one should not expect a perfect correlation of 1.0 between an individual's orientation and game behavior, it cannot explain the lack of strong relationships presently obtained.

Our results showed that the shared variance among the different games cannot be explained by individual differences in social values and ideological attitudes, which is inconsistent with the third hypothesis. Another new contribution of the present research is thus the finding that these personality factors do not reduce the correlations between behavior exhibited in different games that should be simultaneously influenced by individual differences in selfish and prosocial tendencies. Hence, significant relationships between behaviors across two games do not appear to emerge because of their shared relationship with the individual difference variables. This implies that, if there is consistency over games, this can only for a small amount be attributed to the psychological conflict between selfish and prosocial tendencies.

To test these three hypotheses we only employed one-shot games, because in repeated games participants' behavior will also be influenced by the decisions of others, which weakens the impact of dispositions. However, to be able to study the question if individual differences may affect the development of response patterns to a particular opponent strategy over time, we also included an iterative version of a dyadic Public Good Dilemma Game in which participants played multiple rounds with a competitive and a cooperative player. Our results indicated that while in such a situation the level of cooperation strongly depends on the strategy of the opponent, proselfs and people scoring high on RWA exhibited less cooperation. Our findings also revealed a significant Person × Situation interaction for SVO, which corroborates Kelley and Stahelski (1970a, 1970b) and Van Lange and Visser (1999) by

showing that prosocials become just as selfish as proselfs when paired with a competitive partner.

4.2 The Role of Ideological Attitudes in Mixed-Motive Situations

Although all relationships between the dispositional variables and game behavior were rather small, our results confirm the basic finding of previous research that SVO is significantly associated with cooperative behavior in mixed-motive situations (e.g., see Au & Kwong, 2004; Balliet et al., 2009; Bogaert et al., 2008; also see the studies of Yamagishi et al., 2012, 2013). A particularly interesting contribution of the present research is uncovering the relationship between ideological attitudes and cooperation in games, which the present study was the first to show.

First, broad ideological attitudes include a wider range of preferences than the more specific social values, and thus allow us to relate game behavior to broad societal phenomena, like for instance political preferences, of which ideological attitudes are strongly predictive (Cornelis & Van Hiel, 2014; Van Hiel, Cornelis, Roets, & De Clercq, 2007). Hence, the consideration of ideology enables a framework in which game behavior can be linked to broader, societal preferences and attitudes which allows us to situate the literature on mixed-motive games within a broader framework than has hitherto been possible. As a result, a more multifaceted perspective on cooperation becomes possible.

Secondly, the consideration of ideology may prove to be important because ideological attitudes are relevant for attitudes and behaviors toward many real-life situations in which people experience a conflict between their own interests and the interests of others. More specifically, previous research has indicated that authoritarianism is directly related to environmental attitudes, like one’s attitude towards building a new power plant (see Schultz & Stone, 1994). More generally, ideological attitudes are highly predictive of support for political parties, which in turn take contrasting perspectives on many environmental issues.

For example, the Republican Party – which attracts support among high scorers on SDO and RWA – supports drilling oil in the Arctic National Wildlife Refuge (ANWR) in Alaska, while the Democrat Party − which attracts support among low scorers on SDO and RWA − opposes such drilling. Similarly, Republicans are against emission standards for CO2, whereas Democrats favor such a regulation. Such observations correspond with findings that politicized attitudes towards environmentalism are driven by ideology (e.g., see Peterson et al., 1993; also see McFarland et al., 1996; Schultz & Stone, 1994). These notions suggest that ideology may be important for understanding many real-life mixed-motive situations (such as blood donation, donations to noble causes, and tax paying), perhaps even more than in the context of fairly abstract games which are more distant from the societal beliefs that ideology reflects. Therefore, it is possible that the present studies have underestimated the "true" impact of ideological attitudes in mixed-motive situations.

4.3 Strengths, Limitations, and Further Research

Before closing, some strengths, limitations, and recommendations for further research should be discussed. An important contribution of our research is that we included a wide range of mixed-motive games (even including some games that received little research attention in psychological literature such as the Assurance Game) as well a variety of dispositional variables that appeal to the conflict between self and others (SVO, but also the novel – for the literature on game behavior – constructs of SDO and RWA). In this regard, a strength of the present study is that we employed the SVO Slider Measure to probe participants' SVO on a continuous scale instead of a categorical one in which a substantial amount of information related to peoples' social preferences is being discarded and ignored. Although our studies comprised many different mixed-motive games, which in our opinion reflect prominent games within the game behavior literature, we should note that this

selection was not exhaustive, as many other games exist (such as for example the Faith Game, the Chicken Game, and the Traveler's Dilemma, see Rapoport & Orwant, 1962).

While the present study revealed substantial uniqueness in the dimensions that underlie the various games, it did not offer many clues with respect to the exact nature of each of these games. It is nevertheless important to understand what exactly characterizes these different games. For instance, it might well be that behavior in the Prisoner's Dilemma Game is driven by beliefs concerning reciprocity, whereas in the Dictator Game selfish versus equality considerations might prevail. Hence, to get a better view on the unique characteristics of each mixed-motive game, future studies should examine these games in more detail with respect to their psychological basis and underlying motives. The study of games in greater detail in order to get a better view on its distinctive characteristics represents a key avenue for future research. We hope that the questions that this research has generated may provide a first step toward such initiatives.

Notes

[1]In addition to the SVO Slider Measure, we also included the Triple Dominance Measure (Van Lange, Otten, De Bruin, & Joireman, 1997) to probe participants Social Value Orientation. Similar results were obtained with both measures.

[2]After reading the instructions of the iterative game, participants answered four comprehension checks. Two hundred thirteen participants (97.3%) were able to answer at least three of the four checks correctly.

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Table 1. Number and percentage of participants who have chosen (not) to cooperate as well as the means and standard deviations of the game behaviors (N = 219).

Mixed-Motive Game	Cooperation	Non-cooperation	*M*	*SD*	Range
Prisoner's Dilemma Game	157 (71.7%)	62 (28.3%)	–	–	–
Assurance Game	183 (83.6%)	36 (16.4%)	–	–	–
Public Good Dilemma Game	–	–	3.06	1.76	0-6
Commons Dilemma Game	–	–	2.55	1.85	0-6
Dictator Game 1	–	–	3.87	2.02	0-10
Dictator Game 2	–	–	7.84	3.72	0-20
Ultimatum Bargaining Game	–	–	4.95	0.60	0-10
Trust Game	–	–	5.54	3.16	0-10
Iterative Game – Competitive Partner	–	–	1.90	2.68	0-10
Iterative Game – Cooperative Partner	–	–	8.11	3.07	0-10

Note. For the Iterative Game, the mean score reflects the average number of coins allocated to the competitive and the cooperative partner over the five rounds.

Table 2. Correlation matrix (Pearson's *r*).

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. SVO	_										
2. SDO	-.23**	_									
3. RWA	-.13	.49***	_								
4. PDG	.26***	-.13	-.10	_							
5. AG	.09	-.12	-.18**	.10 (.07)	_						
6. PGDG	.25***	-.17*	-.20**	.37*** (.32***)	.28*** (.24***)	_					
7. CDG	.16*	-.14*	-.18**	.27*** (.23**)	.34*** (.31***)	.44*** (.40***)	_				
8. DG	.25***	-.26***	-.20**	.29*** (.23**)	.15* (.10)	.26*** (.18**)	25*** (.19**)	_			
9. UBG	.02	-.02	.09	.07 (.07)	-.04 (-.03)	-.01 (-.00)	.06 (.07)	.17* (.18**)	_		
10. TG	.06	-.09	-.22**	.19** (.17*)	.30*** (.27***)	.48*** (.46***)	.33*** (.30***)	.13 (.09)	.03 (.05)	_	
11. Factor 1	.25***	-.20**	-.27***	.47*** (.43***)	.51*** (.48***)	.87*** (.85***)	.68*** (.66***)	.36*** (.28***)	.01 (.03)	.72*** (.72***)	_
12. Factor 2	.30***	-.25***	-.15*	.60*** (.56***)	.11 (.07)	.37*** (.31***)	.40*** (.36***)	.89*** (.87***)	.38*** (.40***)	.07 (.03)	.45*** (.39***)

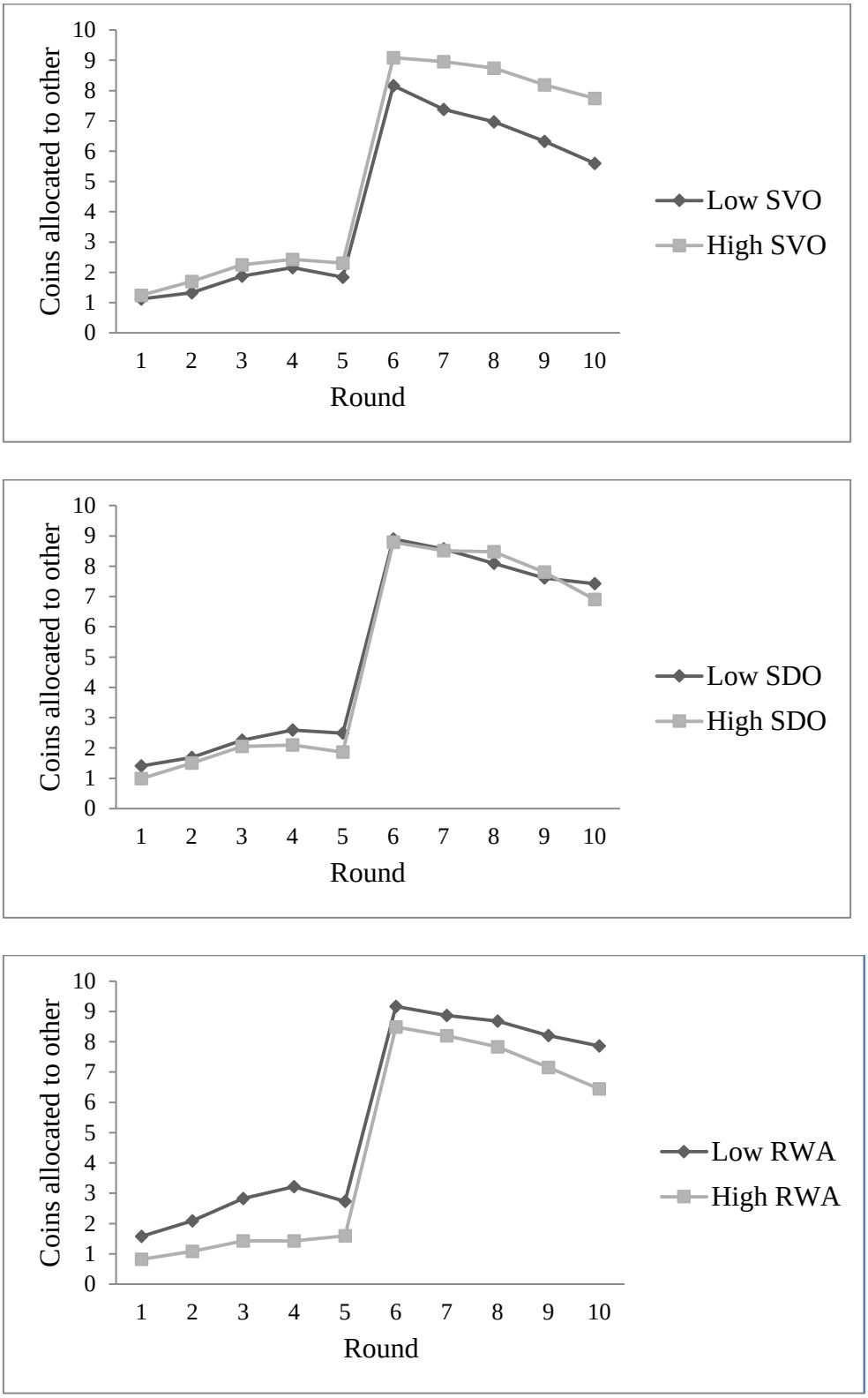
Note. SVO = Social Value Orientation, SDO = Social Dominance Orientation, RWA = Right-Wing Authoritarianism, PDG = Prisoner's Dilemma Game, AG = Assurance Game, PGDG = Public Good Dilemma Game, CDG = Commons Dilemma Game, DG = Dictator Game, UBG = Ultimatum Bargaining Game, and TG = Trust Game. The Dictator Game represents the mean standardized score of the two Dictator Games. For the Commons Dilemma Game, the sign of the correlations were adjusted. The values between the brackets represent the correlations when controlling for SVO, SDO, and RWA. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 3. Maximum likelihood analysis.

Mixed-Motive Game	Communalities		Pattern Matrix	
	Initial	Extraction	Factor 1	Factor 2
Public Good Dilemma Game	.38	.56	**.73**	.06
Trust Game	.27	.41	**.66**	-.13
Commons Dilemma Game	.28	.36	**-.55**	-.13
Assurance Game	.17	.19	**.45**	-.04
Prisoner's Dilemma Game	.19	.27	**.32**	**.32**
Dictator Game	.15	.39	.16	**.57**
Ultimatum Bargaining Game	.04	.07	-.06	**.28**

Note. The Dictator Game represents the mean standardized score of the two Dictator Games. Loadings greater than .30 in boldface.

Figure 1. Cooperation in the iterative game as a function of round and personality.



Note. The first five rounds represent participants' choices to a competitive partner, while the last five rounds reflect participants' choices to a cooperative partner. Low SVO reflects participants with a SVO angle < 22.45° (i.e., individualistic and competitive individuals which are labeled as proselfs), while high SVO reflects a SVO angle ≥ 22.45° (i.e., cooperative and altruistic individuals which are labelled as prosocials). SDO and RWA were spitted into two groups based on the median score.

Appendix A

Description of the Single-Shot Mixed-Motive Games

Prisoner's Dilemma Game

For the *Prisoner's Dilemma Game,* the participant was linked to another subject who was also participating in the study. During this game, the participant and the other subject simultaneously had to make a dichotomous choice between cooperation and non-cooperation. First, the players were informed regarding the payoff scheme, which was as follows: (1) if the participant chooses not to cooperate and the other player to cooperate, the players receive 100 and 0 points, respectively, (2) if both players choose to cooperate, they both get 60 points, (3) if both players choose not to cooperate, they both get 20 points, and (4) if the participant chooses to cooperate and the other player not to cooperate, the players receive 0 and 100 points, respectively (each point has a monetary value of €0.10). Next, participants answered three comprehension checks regarding this payoff scheme. Two hundred and three participants (92.7%) were able to answer at least two out of three checks correctly. After answering these questions, both players had to indicate simultaneously whether they want to cooperate (score 1) or not (score 0) with the other person.

Hence, in this game, the best individual outcome is to defect while the other cooperates, while the worst individual outcome is to cooperate while the other defects. The best joint outcome, on the contrary, is obtained by mutual cooperation, whereas the worst joint outcome by mutual defection.

Assurance Game

The *Assurance Game* is a variant of the Prisoner's Dilemma Game with a different payoff structure. In this game, the participant was linked with another subject. The participant and the other subject each received an initial endowment of €10. During this game, both players simultaneously had to choose between keeping their endowment (i.e., non-

cooperation, score 0) and passing their endowment to the other player (i.e., cooperation, score 1). First, the payoff scheme was introduced: (1) if both players pass the €10, they both get €30, (2) if the participant keeps the €10 and the other player passes it, the players receive €20 and €0, respectively, (3) if both players keep the €10, they both get €10, and (4) if the participant passes the €10 and the other player keeps it, the players receive €0 and €20, respectively. Again, participants were presented with three comprehension checks of which 209 participants (95.4%) answered at least two correctly. Next, both players indicated simultaneously whether or not they want to pass their €10 to the other person.

In this game, mutual cooperation yields the best result for both the participant and the other player. At the same time, the worst individual outcome is to cooperate while the other defects.

Pubic Good Dilemma Game

In the *Public Good Dilemma Game,* the participant was linked to three other subjects. Each of these four players could simultaneously contribute to the provision of a valuable collective good. We opted for a linear model (see Komorita & Parks, 1995) in which each additional provision increases the value of the public good. Before the start of the game, all players received an initial endowment of €6. Participants learned that in the game, they could make a contribution to the public good from their initial endowment. They were informed that at the end of the game, the total amount contributed by the group would be multiplied by two and distributed equally between the four players, regardless of their contributions. Hence, at the end of the game, the players receive their share of the public good and the part of their initial endowment that they did not contribute to the public good. After reading these instructions, participants answered two comprehension checks. Two hundred thirteen participants (97.3%) were able to answer both checks correctly. Next, the four players

simultaneously indicated on a continuous scale from zero to six how much money they want to contribute to the collective good. The higher this score, the higher the level of cooperation.

As such, in this game the best outcome for the participant is to contribute nothing, while the best collective outcome is obtained if all individuals contribute their entire endowment.

Commons Dilemma Game

For the *Commons Dilemma Game,* the participant was again linked to three other subjects. Each of these four players could simultaneously harvest from a valuable collective resource. The common good was a collective asset that contained €24. They were informed that at the end of the game, the amount that was left in the asset by the group would be multiplied by two and distributed equally between the four players, regardless of how much they took from the common good. Hence, at the end of the game, the players receive their share of what was left of the common good and the part that they took from the common good. After reading these instructions, participants answered two comprehension checks. Two hundred and ten participants (95.9%) were able to answer both checks correctly. Next, the four players simultaneously indicated on a continuous scale from zero to six how much money they want to take from the common good. The higher this score, the higher the level of non-cooperation.

Hence, the best outcome for the participant is take as much money from the common good as possible, while the best collective outcome is obtained if all individuals take nothing from the collective good.

Dictator Game

In the two *Dictator Games* the participant was linked to another subject. In both games, all participants played the role of the allocator. The allocator has to divide an endowment (i.e., €10 in the first Dictator Game and 20 lottery tickets each worth €0.50 in the

second Dictator Game) between oneself and the other player. The other subject would play the role of the recipient. The recipient has no influence on this decision and must accept the division proposed by the participant. After the instructions were provided participants had to indicate how much of the endowment they want to allocate to the other subject (continuous choice ranging from zero to ten in the first game and from zero to 20 in the second game). The higher the amount allocated to the other, the higher the level of cooperation.

Hence, in this situation the participant achieves the best outcome by allocating nothing to the other player but from the other person's perspective this results is the worst outcome.

Ultimatum Bargaining Game

In the *Ultimatum Bargaining Game* an endowment must be divided between the participant and another subject. As in the Dictator Games, the participant was linked to another subject and played the role of the allocator. It was explained that participants had to make the other subject an offer on how to divide €10 between him- or herself and the other subject. Participants were told that the other would then be able to choose between accepting this offer, in which case the endowment would be divided as proposed, and rejecting it, in which case the endowment would be lost, and neither player would receive anything. After reading these instructions, participants were asked on a continuous scale ranging from zero to ten how much of the €10 they want to allocate to the other subject. The higher the amount allocated to the other, the higher the level of cooperation.

In this particular game the participant achieves the best individual outcome by allocating nothing to the other player, however, if the other rejects the offer, this results in the worst possible outcome for both players.

Trust Game

In the *Trust Game,* the participant played an investment game with another subject. It was explained that participants would play the role of the trustor (or allocator) while the other

subject would play the role of the trustee (or recipient). At the start of this game, the participant received an initial endowment of €10 while the other received nothing. The participants were told that in the first stage of the game they would have the chance to transfer this endowment to the other player. If the participant decided to keep the endowment, the participant ended up with the initially endowed €10 and the other ended up with nothing. However, if they decided to transfer at least a part of the endowment, the transferred amount of money would be multiplied by three and subsequently handed to the other subject. In the second stage of the game, the other player would have the change to decide how much of the received money he or she is willing to return back to the participant. After answering two comprehension checks, which were both answered correctly by 139 participants (63.5%), participants indicated on a continuous scale ranging from zero to ten how much of the €10 they want to allocate to the other subject. The higher the amount allocated to the other player, the higher the level of cooperation.

Thus, in the first stage the pursuit of selfish interests is rewarding for the participant but at the same time disadvantageous for the other subject. In the second stage the roles are reversed, that is, the pursuit of selfish interests is rewarding for the other subject but disadvantageous for the participant.