European Journal of Personality, *Eur. J. Pers.* **26**: 245–254 (2012)
Published online 15 July 2011 (wileyonlinelibrary.com) **DOI**: 10.1002/per.830

Personality, Punishment and Public Goods: Strategic Shifts Towards Cooperation as a Matter of Dispositional Honesty–Humility

BENJAMIN E. HILBIG[1,2]*, INGO ZETTLER[3] and TIMO HEYDASCH[4]

[1]*University of Mannheim, Germany*
[2]*Max Planck Institute for Research on Collective Goods, Germany*
[3]*University of Tübingen, Germany*
[4]*University of Hagen, Germany*

Abstract: Contributions in the public goods game—a classical social dilemma situation—have been shown to depend strongly on the presence versus absence of punishment or sanctions for free riders. Also, there appear to be noteworthy individual differences in the degree to which decision makers cooperate. Herein, we aimed to bring these two lines of research together. Firstly, we predicted that both presence of punishment and high dispositional Honesty–Humility (as conceptualized in the Honesty–Humility, Emotionality, eXtraversion, Agreeableness, Conscientiousness, Openness to experience model of personality) should yield higher contributions. Secondly, and more importantly, we expected an interaction, such that only those low in Honesty–Humility would condition their behaviour on the presence versus absence of punishment, thus employing cooperation strategically. In line with the hypothesis, the results of two experiments (one of which comprised a longitudinal design) corroborated that the degree to which decision makers shift towards higher contributions when punishment is introduced depends on their dispositional level of Honesty–Humility. Copyright © 2011 John Wiley & Sons, Ltd.

Key words: social dilemma; public goods game; punishment; Honesty–Humility; person–situation interaction; HEXACO

INTRODUCTION

Throughout their lives, people encounter situations in which maximization of individual gains and collective efficiency are at odds. In these so-called social dilemmas (Dawes, 1980; Kollock, 1998), self-interest implies non-cooperation or free riding, whereas collective outcomes are maximized if decision makers cooperate. Clearly, '[s]ocial dilemmas are everywhere' (Weber, Kopelman, & Messick, 2004, p. 281)—from one's everyday choice whether to behave in a more environmentally responsible way to matters of geopolitical importance such as arms races. Given the real-life importance of social dilemmas, it is hardly surprising that they have been subject to rigorous investigation. By now, it can be considered a known fact that humans display a robust tendency for cooperation (e.g. Andreoni & Miller, 1993; Cooper, de Jong, Forsythe, & Ross, 1996)—despite the predictions of standard economic theory (Colman, 2003). For example, typical cooperation rates in the prisoner's dilemma are around 50%, although they vary strongly depending on a multitude of factors (Sally, 1995).

A quintessential example of a social dilemma is the public goods game (PGG; e.g. Abele, Stasser, & Chartier, 2010; Bohm, 1972; Kurzban, McCabe, Smith, & Wilson, 2001). Herein, decision makers are each provided with an endowment that they can either keep or contribute, in part or whole, to the public good. This public good then accumulates interest; specifically, it is multiplied by some factor typically greater than one but smaller than the number of players. Finally, the public good is evenly re-distributed to all players, regardless of their contributions. Individually, self-interested behaviour would be to free ride, that is, contribute nothing (Dawes, 1980). However, if all players refrain from contributing, the final outcome is socially inefficient. Conversely, the Pareto efficient outcome is for all decision makers to contribute their entire endowment to the public good. As hinted previously, empirically observable contributions to public goods are often substantial (e.g. Croson & Marks, 1998; Rapoport & Suleiman, 1993), and several determinants of cooperative behaviour have been identified (for a meta-analysis, see Zelmer, 2003).

Determinants of free riding versus cooperation

One of the most consistently replicated determinants of PGG contributions is the presence versus absence of sanctions or punishment (Fehr & Gächter, 2000, 2002). That is, if players' contributions to the public good cannot be identified and bear no consequences, they are markedly lower as compared with situations in which free riding is visible to group members (Small & Loewenstein, 2005) and subject to potential sanctions (see also Sefton, Shupp, & Walker, 2007). These

*Correspondence to: Benjamin E. Hilbig, School of Social Sciences, University of Mannheim, Schloss Ehrenhof Ost, 68131 Mannheim, Germany.
E-mail: hilbig@psychologie.uni-mannheim.de

Received 6 December 2010
Revised 11 April 2011, Accepted 12 April 2011

robust findings imply that decision makers will typically adapt their behaviour to the situational risk of facing retaliation (Hsu, 2008) quite similarly to allocators in bargaining games who tend to shift toward fair behaviour as the power of the recipient to retaliate grows (Van Dijk, De Cremer, & Handgraaf, 2004).

A second, well-established determinant of cooperation in social dilemmas lies in the realm of individual differences (cf. Koole, Jager, van den Berg, Vlek, & Hofstee, 2001), as players in the PGG differ strongly in their contributions (Fischbacher, Gächter, & Fehr, 2001). In this vein, behavioural economists have identified different 'types', among which conditional cooperators and consistent free riders are most often found (Kocher, Cherry, Kroll, Netzer, & Sutter, 2008). Clearly, the notion that there are more or less cooperative types of people and that these consequently cooperate more or less often is a truism. Subdividing participants into such types is a mere re-description, rather than an explanation. The latter, by contrast, can be reached by considering well-established and theoretically grounded personality factors, which might predict one's degree of cooperation (or type) in different social dilemma situations (e.g. Hirsh & Peterson, 2009; Kocher, De Brabander, & van Witteloostuijn, 1999; Kurzban & Houser, 2001; Perugini & De Raad, 2001; Sabater-Grande & Georgantzis, 2002; Volk, Thöni, & Ruigrok, 2011).

Quite surprisingly, these two lines of research—one focusing on effects of sanctions and thus situational or institutional factors and the other investigating individual differences—co-exist rather separately. However, it is plausible to assume that there will be individual differences in the degree to which decision makers react to certain situational circumstances. In this very vein, Funder (2001, 2009), like many others, has pointed out that most will be gained from explaining behaviour through the person, the situation and the interaction of both. In the case of the PGG, one could thus ask whether there are personality factors that make it more or less likely to strategically increase contributions when punishment is present (versus absent).

The Honesty–Humility factor

Fortunately, a currently emerging view on personality structure provides a well-specified theoretical backdrop for questions of exactly this nature. Since the late 1980s, personality has mostly been considered in terms of five broad factors, namely neuroticism, extraversion, agreeableness, conscientiousness and openness to experience (e.g. John & Srivastava, 1999; McCrae & Costa, 1987; McCrae & John, 1992). Recent psycholexical studies across various languages, however, have shown that a sixth broad factor should be considered in addition. This factor comprises differences on attributes, such as being sincere, honest, modest, faithful, etc. versus sly, deceitful, greedy, pretentious, etc. (Ashton et al., 2004), and has thus been termed *Honesty–Humility*. So, Honesty–Humility represents the sixth broad personality dimension in the HEXACO (*H*onesty–Humility, *E*motionality, e*X*traversion, *A*greeableness, *C*onscientiousness, *O*penness to experience) model of personality (e.g. Ashton & Lee, 2007; Lee & Ashton, 2008).[1] Recent research has repeatedly shown that the HEXACO model, and the Honesty–Humility factor in particular, explains incremental variance beyond the classical five-factor approach with respect to a whole host of criteria (Ashton & Lee, 2008; Ashton, Lee, Visser, & Pozzebon, 2008; Lee, Ogunfowora, & Ashton, 2005; Marcus, Lee, & Ashton, 2007; Zettler & Hilbig, 2010b).

The Honesty–Humility dimension is especially useful for the current research question because it explicitly represents 'the tendency to be fair and genuine in dealing with others, in the sense of cooperating with others *even when one might exploit them without suffering retaliation*' (Ashton & Lee, 2007, p. 156; emphasis added). So, those high in Honesty–Humility should not only cooperate more in general; rather, they should also be less likely to condition their behaviour on the situation (Zettler & Hilbig, 2010b). Their counterparts, those low in Honesty–Humility, on the other hand, should seek to exploit others if they need not fear retaliation. As such, the Honesty–Humility dimension is specifically defined to signify individual differences in the extent to which one would strategically employ fairness. This notion is well in line with findings showing that more greedy individuals strategically cooperate or behave less selfishly whenever they must expect retribution (Haselhuhn & Mellers, 2005). Indeed, Hilbig and Zettler (2009) showed that those low in Honesty–Humility made selfish allocations in the dictator game (in which the recipient is powerless; cf. Suleiman, 1996) but shifted towards the equal split in the ultimatum game (when the recipient can reject the offer). Those high in Honesty–Humility, by contrast, made more fair allocations independent of the recipients' power. Similar findings—although based on self-attributed benevolence rather than Honesty–Humility—were reported by Brandstätter and Güth (2002).

From the theoretical notions and empirical findings outlined so far, it is straightforward to make predictions about the degree to which effects of the presence versus absence of punishment on PGG contributions depend on individual differences in Honesty–Humility. Firstly, both the presence of punishment and higher Honesty–Humility scores should yield positive main effects, implying larger PGG contributions. Secondly, and more importantly, we hypothesize an interaction between Honesty–Humility and the situation (the presence versus absence of punishment), such that those low in this personality dimension will react strategically to the situational risk of facing retaliation: if there are no punishments or sanctions, these individuals should free ride, whereas they should contribute to the public good if their contribution is identifiable and may attract subsequent punishment if it is too low. Those high in Honesty–Humility, by contrast, should contribute more to the public good in general and do so quite independent of whether the situation involves potential punishment. These hypotheses were tested in two experiments, which are reported in the following sections.

[1]Note that there are other differences between the five-factor model and the HEXACO model, especially concerning the exact content of the Emotionality and Agreeableness factors. However, these are not central to the current investigation and therefore not considered further.

DOI: 10.1002/per

EXPERIMENT 1

As a first instance of testing the aforementioned hypotheses, we conducted a web-based experiment, which was constructed in close adherence the standards for Internet experimentation (Reips, 2002a, 2002b). Previous research has established that investigations of personality can be conducted in the Web without limitations or biases because of the medium (Chuah, Drasgow, & Roberts, 2006; Cronk & West, 2002). At the same time, Web studies reduce those demand effects that are due to the presence of an experimenter in the lab (Birnbaum, 2004).

Seventy participants (aged 18 to 33 years, $M = 21.6$, $SD = 2.9$, 50 women) were recruited at the University of Mannheim, Germany. All received partial course credit for their participation. The obtained sample size yields satisfactory statistical power ($1 - \beta = 0.89$) to detect medium-sized ($f^2 = 0.15$) effects in an omnibus F-test of the R^2 deviation from zero in a multiple regression with one predictor (Faul, Erdfelder, Lang, & Buchner, 2007).

Materials and procedures

After providing consent and demographical information, participants worked on the German 104-item version of the HEXACO-PI-R (Ashton & Lee, 2008; Lee & Ashton, 2004, 2006), which has been used successfully in previous web-based studies (Zettler & Hilbig, 2010a; Zettler, Hilbig, & Haubrich, 2011). Each of the six HEXACO personality factors comprises 16 items. Participants responded on a five-point Likert-type scale ranging from 'strongly disagree' to 'strongly agree'. Sample Honesty–Humility items are 'I wouldn't use flattery to get a raise or promotion at work, even if I thought it would succeed' or 'If I knew that I could never get caught, I would be willing to steal a million dollars' (reversed). For more information on the HEXACO-PI-R, see http://hexaco.org.

Next, participants were thoroughly introduced to the PGG. Translated instructions are provided in the Appendix. Specifically, they were asked to imagine that they and four strangers had been randomly selected to play together. They were then familiarized with the game's rules and told that each player would be given an initial endowment of 100 points. The multiplication factor for the public good was 1.5. Thus, the pay-off for the ith person was given by

$$p = (100 - c_i) + 0.3 \sum_{j=1}^{5} c_j \qquad (1)$$

where c_i is the individual contribution and c_j is the contribution of each jth group member. Participants were told that individual contributions would not be identifiable to the group at large and that each group member would only find out the amount of points contributed to the public good in total. In this situation, punishment or potential sanctions were thus absent. Participants were asked to indicate the number of points (out of 100) they would contribute to the public good.

After participants had stated their contribution,[2] they were asked to imagine that the same game would be played again—with a new group of strangers. However, the rules were changed such that each contribution would be visible to all other group members after the contribution phase. Also, all group members would then be given the chance to punish others by investing points. For each point invested, the punished group member would lose three. In this situation, decision makers must fear retaliation for free riding (Fehr & Gächter, 2000; Nikiforakis & Normann, 2008). Again, participants stated the number of points (out of 100) they would contribute.[3]

Finally, participants were given feedback about the outcome of the latter game—based on the contributions of four fictitious group members (which we simulated) and their own. In line with the 'cover story' for the punishment condition, participants could then decide to invest points to punish other group members. However, given that these other group members were merely simulated (and given that participants were fully aware of this), we were not interested in these data.

Results and discussion

Descriptive statistics and correlations of the six HEXACO factors and the number of points contributed in each of the two hypothetical PGGs can be found in Table 1. As expected, participants contributed more points to the public good when they faced the risk of being punished for free riding, $t(68) = -4.8$, $p < .001$, Cohen's $d = 0.55$. So, the typical main effect of the presence versus absence of punishment was replicated.

Secondly, there was a main effect of Honesty–Humility: we regressed the mean number of points each participant contributed to the public good across both situations (with and without punishment) on individual Honesty–Humility scores. As expected, there was a positive relationship ($\beta = .27$, $R^2 = .07$, $F(1,68) = 5.1$, $p = .03$). Moreover, regressing mean PGG contributions on the remaining five factors of the HEXACO model did not entail significant predictions

[2]So as not to bias participants in any way, no feedback was given after the first contribution.

[3]It may be argued that this within-subjects design with fixed order of conditions may produce specific differences between conditions that would not hold in case of counterbalancing. To rule out this possibility, we conducted an additional lab experiment in retrospect (we thank an anonymous reviewer for pointing out this necessity). Thirty-nine students of the University of Mannheim (26 women, aged 18 to 35 years, $M = 22.7$, $SD = 3.4$) participating in an otherwise unrelated lab study were given the exact same PGG instructions as in Experiments 1 and 2. That is, all indicated their contributions in a situation with and without punishment, respectively. Additionally, we manipulated (between participants) the order of these two conditions. Result from a mixed ANOVA revealed a main effect of the PGG condition ($F(1,37) = 11.9$, $p < .001$), corresponding to a very large effect of Cohen's $f^2 = 0.57$ in the same direction as in Experiments 1 and 2. At the same time, there was no main effect of the presentation order condition ($F(1,37) = 1.4$, $p = .25$, $f^2 = 0.19$) and, much more vitally, no interaction ($F(1,37) = 0.33$, $p = .57$, $f^2 = 0.09$). Using a Bayesian approach to estimate the posterior probability of the interaction hypothesis from the corresponding sums of squares (Glover & Dixon, 2004; Wagenmakers, 2007) yielded $p(H|D) = .16$ and thus clear evidence against the interaction hypothesis. So, in sum, the order was irrelevant for the effect of punishment on PGG contributions.

DOI: 10.1002/per

Table 1. Means (SD in parentheses) and intercorrelations between the six HEXACO factors and public goods game contributions in Experiment 1 ($n = 70$)

			Correlations						
		M (*SD*)	1	2	3	4	5	6	7
1.	Honesty–humility	3.50 (0.53)	.83						
2.	Emotionality	3.75 (0.48)	.19	.79					
3.	Extraversion	3.53 (0.53)	.12	.01	.85				
4.	Agreeableness	2.90 (0.51)	.24*	−.45**	−.15	.83			
5.	Conscientiousness	3.58 (0.50)	.17	.14	.22	−.05	.82		
6.	Openness to experience	3.58 (0.43)	.07	.03	.12	.05	.09	.70	
7.	PGG contribution without punishment	53.1 (28.5)	.33**	.04	.07	.03	.02	.11	—
8.	PGG contribution with punishment	63.9 (22.9)	.15	.05	.04	.03	.07	.23	.73**

Note: Internal consistency reliabilities (Cronbach's alpha) are given in the diagonal.
PGG, public goods game.
*$p < .05$; **$p < .01$ (all two sided).

($R^2 = .04$, $F(5,63) = 0.5$, $p = .79$), whereas adding Honesty–Humility in the second step of a hierarchical multiple regression yielded a significant increase in explained variance ($\Delta R^2 = .06$, $F(1,62) = 4.2$, $p = .045$). Thus, Honesty–Humility predicted PGG contributions beyond the remaining five factors.

Finally, and most centrally, we tested the interaction hypothesis. Following methodological recommendations (Judd, Kenny, & McClelland, 2001), we regressed the difference in the number of points contributed in each of the two PGG conditions on individual Honesty–Humility scores. Again, Honesty–Humility yielded a noteworthy prediction ($\beta = .31$, $R^2 = .10$, $F(1,68) = 7.1$, $p = .01$), which confirms that differences in the number of points decision makers contributed—depending on the presence of punishment—were explained by individual differences in Honesty–Humility. Once more, this result held when first controlling for the remaining five factors in the HEXACO model: although the five factors alone did not explain any variance ($R^2 = .02$, $F(5,63) = 0.3$, $p = .92$), the addition of Honesty–Humility in the second step of a hierarchical multiple regression yielded a significant increase in explained variance ($\Delta R^2 = .12$, $F(1,62) = 4.2$, $p = .004$).

For clarity, the interaction is depicted in Figure 1, which shows that the findings are exactly in line with the hypothesis: individuals low in Honesty–Humility exploited others by free riding when there was no punishment possible; however, when faced with other group members who could retaliate, they clearly increased their contributions. Indeed, individuals in the lowest quartile of Honesty–Humility increased their mean contributions from $M = 34.1$ ($SE = 7.9$) in the anonymous game to $M = 53.3$ ($SE = 5.3$) when punishment was introduced. This corresponds to a factor of 1.6. Individuals high in Honesty–Humility, by contrast, generally contributed more to the public good and did so quite irrespective of others' power to retaliate. For illustration, those in the highest quartile of Honesty–Humility contributed $M = 60.2$ ($SE = 6.7$) and $M = 62.4$ ($SE = 6.4$), respectively, thus showing practically no increase at all (factor 1.04).

In sum, the results consistently corroborated the hypotheses. Firstly, we replicated that decision makers will

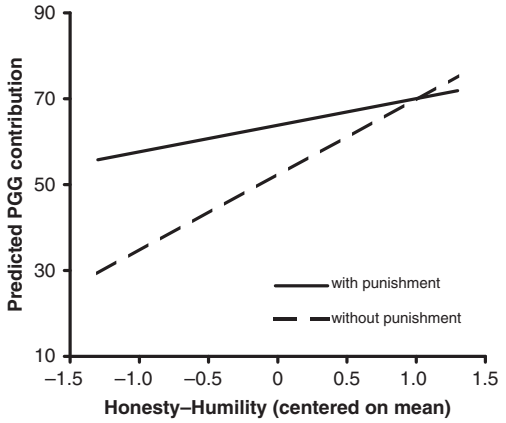

Figure 1. Predicted number of points contributed to the public good depending on Honesty–Humility (centred on its mean) and presence versus absence of punishment in Experiment 1. The beta weights for the simple slopes were .33 in the condition without punishment and .15 in the condition with punishment. PGG, public goods game.

contribute more to a public good, if their contributions are visible to others and if they must fear retaliation for free riding (Fehr & Gächter, 2002). Secondly, we obtained the novel result that individual differences in Honesty–Humility positively predicted participants' mean contributions to be public good across both conditions. Finally, and most centrally, there was an interaction between Honesty–Humility and the punishment condition as only those participants low in Honesty–Humility conditioned their behaviour on the presence versus absence of punishment. Note that each effect of Honesty–Humility held when controlling for the remaining five HEXACO factors.

However, the current experiment yielded two drawbacks that need to be addressed. First, the sample size ($n = 70$) was relatively small, which implies that the confidence interval around the effects obtained is necessarily large. In accordance with Steiger (2004), we tested the minimal effect of Honesty–Humility on the difference in contributions between the two conditions (i.e. the interaction hypothesis): computing the 95% confidence interval for the obtained effect ($R^2 = .10$) by

DOI: 10.1002/per

using the procedures supplied by Kelley (2007) revealed a lower bound of .01; one the one hand, this demonstrates that the effect in question can be considered greater than zero within a conventional level of confidence. However, it also shows that the effect size may only be very small. Replication of the current findings with a substantially larger sample of participants thus seemed in order. Secondly, it may be criticized that participants 'played' the PGG immediately after responding to the HEXACO-PI-R items. Specifically, working on this questionnaire may have made participants more aware of their traits and thereby produced spurious personality-consistent behaviour in the PGG. An experimental set-up in which assessment of the HEXACO factors and the PGG are separated in time would consequently further increase confidence in the results and in the causal inferences drawn from them (Hedeker & Gibbons, 2006). We therefore implemented both enhancements in a second experiment.

EXPERIMENT 2

The second experiment was conducted to remedy shortcomings in Experiment 1 with respect to sample size and the independence of measuring personality and PGG contributions. Undergraduate psychology students of the distance teaching University of Hagen (Germany) were recruited via mail and the University's online studies webpage, which hosts links to several different studies at a time. All received course credit for participating. We merged data of two entirely separate online studies for the current investigation: the first comprised assessment of the HEXACO factors, and the second measured PGG contributions. The resulting mean time lag between filling in the HEXACO-PI-R and working on the PGG in our final sample was 162 days, that is, almost half a year.

To enable matching of participants' responses in the two studies while ensuring complete anonymity for participants, we let them create the same individual pseudonymous code in each of the studies. We obtained a total of 355 one-to-one code matches from participants (273 women) aged between 19 and 66 years ($M = 32.7$, $SD = 9.1$ years) who completed both parts of the current experiment. About half of the participants (53%) were in employment besides their academic education.

The materials and procedure were virtually identical to Experiment 1. In the first part of the experiment, participants responded to the items of the German 100-item version of the HEXACO-PI-R (Lee & Ashton, 2004), as previously used by Hilbig & Zettler (2009) in the Web context. In the second part, the exact same instructions and PGG conditions as in Experiment 1 were presented to the participants. Again, they were first asked to state their hypothetical contribution (out of 100 points) given that there were no sanctions for free riding. Next, they again played the PGG, although this time with identifiability of individual contributions and the possibility for punishment.

Results and discussion

As the analyses exactly mirrored those in Experiment 1, we will report the findings in condensed form. Table 2 provides descriptive statistics and bivariate correlations of the six HEXACO factors and the number of points contributed in each of the two hypothetical PGGs. Contributions to the public good were highly comparable with those found in Experiment 1 and again larger when participants faced the risk of being punished for free riding, $t(354) = -11.4$, $p < .001$, Cohen's $d = 0.56$.

The effects of personality on PGG contributions were also fully compatible with those found in Experiment 1 and were aligned with the hypotheses. Firstly, Honesty–Humility positively predicted individuals' mean contribution to the public good across both punishment conditions ($\beta = .16$, $R^2 = .03$, $F(1,353) = 9.6$, $p = .002$), which again held when controlling for the remaining five factors of the HEXACO model ($\Delta R^2 = .02$, $F(1,348) = 5.8$, $p = .017$). We will elaborate on the main effect of Honesty–Humility in the succeeding section, addressing the impact of group composition on overall PGG pay-offs in a simulation.

Most centrally, the interaction hypothesis was once more corroborated: Honesty–Humility explained significant variance in the degree to which individuals conditioned their PGG contributions on the presence versus absence of punishment ($\beta = .27$, $R^2 = .08$, $F(1,353) = 28.6$, $p < .001$). This latter effect, too, was unaffected when the remaining five HEXACO factors were initially considered in the first step of a hierarchical multiple regression ($\Delta R^2 = .07$, $F(1,348) = 26.3$, $p < .001$). The interaction pattern was practically equivalent to the one in the first experiment as depicted in Figure 1.

Note that all results remained intact when we considered only those participants for whom the lag between personality assessment and the PGG experiment was *at least* half a year ($\geq$182 days, $n = 175$ in total). Taken together, the current experiment replicated all effects found in Experiment 1, although findings were now based on a larger and more heterogeneous sample and given that the assessment of personality factors and decision-making criteria were separated in time.

A simulation of social efficiency depending on Honesty–Humility

As the main effect of Honesty–Humility reported previously indicates, individuals higher in this factor tend to contribute more to the public good. Because of the structure of the PGG, the group composition in such a game—that is, the number of individuals with higher Honesty–Humility scores—must thus be decisive for the social efficiency of the group. Stated simply, the more group members are high in Honesty–Humility, the larger PGG contributions will be and, by implication, the larger the overall social gain. To provide a straightforward visualization of these effects, we ran a simulation based on the sample of participants in Experiment 2. Note, however, that this is not a test that could yield different results from those reported previously. Rather, it demonstrates the main effect of Honesty–Humility in a directly interpretable fashion, that is, in terms of differences in (social) gains.

Specifically, we split the sample at the median of Honesty–Humility ($MD = 3.69$), and participants above this median were classified as high in Honesty–Humility,

DOI: 10.1002/per

Table 2. Means (SD in parentheses) and intercorrelations between the six HEXACO factors and public goods game contributions in Experiment 2 ($n = 355$)

			Correlations						
		M (*SD*)	1	2	3	4	5	6	7
1.	Honesty–humility	3.59 (0.59)	.82						
2.	Emotionality	3.29 (0.51)	−.11*	.79					
3.	Extraversion	3.46 (0.58)	.16**	−.19***	.86				
4.	Agreeableness	2.90 (0.51)	.28***	−.27***	.19***	.82			
5.	Conscientiousness	3.52 (0.47)	.16**	−.11*	.21***	.07	.78		
6.	Openness to experience	3.70 (0.49)	.17**	−.07	.17**	.01	.01	.76	
7.	PGG contribution without punishment	53.1 (28.7)	.25***	−.04	.01	.11*	−.06	.20***	—
8.	PGG contribution with punishment	66.2 (25.5)	.04	−.11*	−.05	.07	−.07	.18**	.69***

Note: Internal consistency reliabilities (Cronbach's alpha) are given in the diagonal.
PGG, public goods game.
*$p < .05$; **$p < .01$; ***$p < .001$ (all two sided).

whereas their counterparts with below-median scores were classified as low on this factor. Next, we created 20 000 pseudo-groups by randomly sampling (with replacement) five participants out of the total sample to form a group. For each of these groups, the number of participants high (above the median) in Honesty–Humility was determined. Then, participants' contributions to the PGG (from the condition without punishment, that is, the standard version of the PGG) were considered, and the pay-off of each individual was determined by using Equation 1. Finally, the groups' total gain was computed as the sum of individual pay-offs, subtracting the sum of initial endowments (500 points in total). Figure 2 displays the results, showing the mean group gain conditional upon the number of group members high in Honesty–Humility. As can be seen, there was a linear increase in the average gain as more group members were above the median of Honesty–Humility. Indeed, groups composed solely of below-median Honesty–Humility individuals were least efficient ($M = 118.8$). By comparison, groups with all members scoring above the median in Honesty–Humility achieved an increase in gains by 25% ($M = 148.8$). So, despite the fact that the variance in PGG contributions explained by Honesty–Humility was quite moderate in the results reported previously, substantial (up to 25%) increases in gains and social efficiency can be demonstrated as more group members score relatively higher on Honesty–Humility.

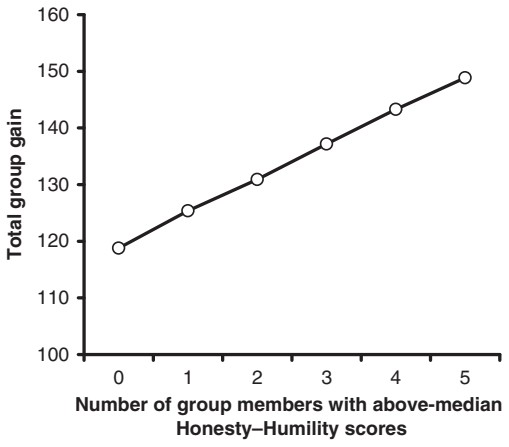

Figure 2. Simulated group gains (sum of individual pay-offs subtracting initial endowments) in the public goods game, depending on the group composition for 20 000 random pseudo-groups. Note that participants are classified as high versus low in Honesty–Humility based on a median split of the sample in Experiment 2 ($n = 355$).

GENERAL DISCUSSION

Social dilemmas—defined as situations in which individual and social interests clash (Kollock, 1998)—have been vastly studied across various subfields within psychology and beyond. A situation that represents a typical social dilemma is the PGG (e.g. Kocher et al., 2008), a 'give-some' dilemma in which decision makers contribute (part of) their endowment to a public good, which then accumulates interest and is finally re-distributed to all group members in equal proportions. For each individual player, it is gain maximizing to free ride, that is, contribute nothing to the public good. However, for the group as a whole, such behaviour is inefficient and leads to detrimental outcomes. Several factors influencing PGG contributions have been identified (Zelmer, 2003), including the presence versus absence of punishment or sanctions, which group members can impose on free riders (Fehr & Gächter, 2000; Sefton et al., 2007). Also, large individual differences in PGG contributions and cooperation in social dilemmas in general have been confirmed (Balliet, Parks, & Joireman, 2009; Kocher et al., 2008; Kurzban & Houser, 2001).

In the current work, we aimed to bring such different factors together, thus broadening the view on behaviour in social dilemmas to include the person, the situation and, most importantly, the interaction of both (cf. Funder, 2009). In this vein, we expected to replicate that decision makers cooperate more when they face an increased risk of retaliation (Fehr & Gächter, 2002), which has also been confirmed in bargaining games (Van Dijk et al., 2004). In addition, we predicted that both cooperation in general and the degree to which players

DOI: 10.1002/per

shift from free riding towards cooperation (when free riding can be punished) will depend on their personality. To this end, we considered the HEXACO model of personality (Ashton & Lee, 2007). Specifically, we focused on the Honesty–Humility factor, which predicts that individuals with low scores will strategically adapt to the situational risk of retaliation whereas those with high scores cooperate more—and quite independent of others' power to retaliate. Corresponding interaction effects have previously been reported in bargaining games (Hilbig & Zettler, 2009), showing that strategically employing fairness may indeed be a mark of individuals low in Honesty–Humility.

In two experiments, we assessed individuals' Honesty–Humility scores by using the HEXACO-PI-R (Ashton & Lee, 2008; Lee & Ashton, 2004, 2006) and manipulated (within participants) the situational risk of retaliation through the rules in two hypothetical PGGs. The results confirmed the hypotheses outlined previously. In line with much previous research, our analyses corroborated that PGG contributions increase as the possibility to punish free riders is introduced. Secondly, we obtained the novel result that those scoring high on the Honesty–Humility factor contributed more points in both PGG situations, on average. Two potential mechanisms may be responsible for this link between Honesty–Humility and cooperation. On the one hand, individuals high in Honesty–Humility might have stronger social or other-regarding preferences (Fischbacher et al., 2001); this is in line with the findings of Hilbig and Zettler (2009) who reported a substantial correlation between Honesty–Humility and individuals' social value orientation (Balliet et al., 2009; Van Lange, 1999; Van Lange, De Bruin, Otten, & Joireman, 1997). On the other hand, those high in Honesty–Humility may hold more positive beliefs of what others will do. If players assume that others are like them (e.g. Krueger, 2007; Krueger & Acevedo, 2007), those high in Honesty–Humility may simply (or additionally) consider it less likely to be exploited. This, too, could lead to more cooperation. Future research ought to dissect these possible mechanisms for the main effect of Honesty–Humility on cooperativeness.

Finally, and most importantly, the degree to which participants increased their contributions when punishment was introduced also depended on Honesty–Humility. Individuals with low scores shifted from free riding towards substantially larger contributions when faced with the possibility of retaliation; they thereby employed cooperative behaviour strategically. Their counterparts, those high in Honesty–Humility, by contrast, did not condition their contribution on the power of other players; rather they contributed consistently and at a higher overall level. The reported findings thus answer the call for considering individual differences in social dilemma decision making (Boone, De Brabander, & van Witteloostuijn, 1999; Rapoport & Suleiman, 1993) and contribute to the question of how the person and the situation mutually shape behaviour (Krueger, 2009; Webster, 2009). To the best of our knowledge, we are the first to show that strategic shifts in PGG contributions can be predicted from a broad and basic individual difference dimension. Importantly, the reported person–situation interaction is a specific prediction of Honesty–Humility (Zettler & Hilbig, 2010b). We consider this a particular theoretical advantage of this personality factor as it allows for deriving hypotheses, which can be tested experimentally. Although the latter is perhaps not the most typical methodological approach in research on personality and individual differences, it certainly is the methodological hallmark of psychological science and is often considered the superior vehicle on the path towards causal inference.

Two additional results deserve attention. Firstly, the Honesty–Humility factor explained unique variance beyond the remaining five factors of the HEXACO model both in participants' average contributions as well as in their strategic shift from free riding towards cooperation after the introduction of punishment. This echoes several recent findings (e.g. Ashton & Lee, 2008; Lee et al., 2005; Marcus et al., 2007), which cast doubts on whether the classical five-factor approach to personality (e.g. John & Srivastava, 1999; McCrae & John, 1992) is sufficiently broad—although it has explained criteria in other areas of judgment and decision making (e.g. Hilbig, 2008; Maner et al., 2007; Milgram & Tenne, 2000) and beyond. Secondly, a simulation revealed more clearly how notably the social efficiency of groups can be affected by the traits of group members. Specifically, as individuals high in Honesty–Humility join the group, the higher overall outcomes in the public goods dilemma will be. Despite our reliance on a simulation with pseudo-groups for this demonstration, the latter has noteworthy societal implications, from the composition of teams in a workplace setting to groups of policy makers tackling public goods problems of global importance.

As a possible limitation, it should be acknowledged that the PGG presented to the participants in our experiments was hypothetical and did not comprise monetary incentives. The findings may therefore not necessarily generalize to situations in which real benefits are at stake (Kollock, 1998). Nonetheless, our results principally mirror effects found in experiments in which games are played in actual groups and with real monetary incentives: in typical PGG experiments, '[g]roups of participants on average contribute between 40% and 60%' (Chaudhuri, 2011, p. 48), which is well in line with the contributions in our current experiments (see Tables 1 and 2). More importantly, we obtained a clear effect of the presence versus absence of punishment, despite the hypothetical design. If anything, the absence of incentives in our PGG reduced the difference between the conditions and thus rendered our tests more conservative. For example, Fehr and Gächter (2000) reported similarly high average contributions in the punishment condition (58%) as compared with our own results; however, in their experiments, contributions in the no-punishment condition were markedly lower (around 20%). We are thus reasonably confident that any systematic effect because of the lack of monetary incentives will actually have worked against our hypotheses.

Similarly, it should be acknowledged that social desirability may play a role in hypothetical games without monetary incentives. Arguably, cooperative behaviour is socially desirable (Hoffman, McCabe, Shachat, & Smith, 1994), as are higher scores in Honesty–Humility. Part of the main effect of Honesty–Humility on PGG contributions may

DOI: 10.1002/per

thus be due to socially desirable responding—although the latter does not explain the more central person–situation interaction that we obtained. In any case, future research will need to replicate the current findings while controlling for socially desirable responding, for example, by using peer reports of personality (Lee, Ashton, Morrison, Cordery, & Dunlop, 2008) or by adding noise to responses in the social dilemma game (Moshagen, Hilbig, & Musch, 2011). As an aside, providing monetary incentives is not necessarily an advisable method to reduce socially desirable responding: if participants are paid conditional on their cooperativeness, the degree of subjective anonymity in the experimental situation may be reduced, which, in turn, could actually increase socially desirable responding (cf. Hoffman et al., 1994, who designed a double-blind dictator game to deal with exactly this problem).

In sum, decision making in social dilemma situations may indeed depend on a complex interplay of situational or institutional and dispositional factors. Of course, this conclusion does not render investigations that focus on either type of determinant less valuable. Rather, behaviour may simply be explained to an even larger extent and predicted with more precision when this interplay of person and situation is considered.

REFERENCES

Abele, S., Stasser, G., & Chartier, C. (2010). Conflict and coordination in the provision of public goods: A conceptual analysis of continuous and step-level games. *Personality and Social Psychology Review*, *14*, 385–401.

Andreoni, J., & Miller, J. H. (1993). Rational cooperation in the finitely repeated prisoners' dilemma: Experimental evidence. *The Economic Journal*, *103*, 570–585.

Ashton, M. C., & Lee, K. (2007). Empirical, theoretical, and practical advantages of the HEXACO model of personality structure. *Personality and Social Psychology Review*, *11*, 150–166.

Ashton, M. C., & Lee, K. (2008). The prediction of Honesty–Humility-related criteria by the HEXACO and Five-Factor Models of personality. *Journal of Research in Personality*, *42*, 1216–1228.

Ashton, M. C., Lee, K., Perugini, M., Szarota, P., de Vries, R. E., Di Blas, L.,…De Raad, B. (2004). A six-factor structure of personality-descriptive adjectives: Solutions from psycholexical studies in seven languages. *Journal of Personality and Social Psychology*, *86*, 356–366.

Ashton, M. C., Lee, K., Visser, B. A., & Pozzebon, J. A. (2008). Phobic tendency within the five-factor and HEXACO models of personality structure. *Journal of Research in Personality*, *42*, 734–746.

Balliet, D., Parks, C., & Joireman, J. (2009). Social value orientation and cooperation in social dilemmas: A meta-analysis. *Group Processes & Intergroup Relations*, *12*, 533–547.

Birnbaum, M. H. (2004). Human research and data collection via the Internet. *Annual Review of Psychology*, *55*, 803–832.

Bohm, P. (1972). Estimating demand for public goods: An experiment. *European Economic Review*, *3*, 111–130.

Boone, C., De Brabander, B., & van Witteloostuijn, A. (1999). The impact of personality on behavior in five prisoner's dilemma games. *Journal of Economic Psychology*, *20*, 343–377.

Brandstätter, H., & Güth, W. (2002). Personality in dictator and ultimatum games. *Central European Journal of Operations Research*, *10*, 191–215.

Chaudhuri, A. (2011). Sustaining cooperation in laboratory public goods experiments: A selective survey of the literature. *Experimental Economics*, *14*, 47–83.

Chuah, S. C., Drasgow, F., & Roberts, B. W. (2006). Personality assessment: Does the medium matter? No. *Journal of Research in Personality*, *40*, 359–376.

Colman, A. M. (2003). Cooperation, psychological game theory, and limitations of rationality in social interaction. *The Behavioral and Brain Sciences*, *26*, 139–198.

Cooper, R., de Jong, D. V., Forsythe, R., & Ross, T. W. (1996). Cooperation without reputation: Experimental evidence from prisoner's dilemma games. *Games and Economic Behavior*, *12*, 187–218.

Cronk, B. C., & West, J. L. (2002). Personality research on the Internet: A comparison of web-based and traditional instruments in take-home and in-class settings. *Behavior Research Methods, Instruments, & Computers*, *34*, 177–180.

Croson, R., & Marks, M. (1998). Identifiability of individual contributions in a threshold public goods experiment. *Journal of Mathematical Psychology*, *42*, 167–190.

Dawes, R. M. (1980). Social dilemmas. *Annual Review of Psychology*, *31*, 169–193.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175–191.

Fehr, E., & Gächter, S. (2000). Cooperation and punishment in public goods experiments. *The American Economic Review*, *90*, 980–994.

Fehr, E., & Gächter, S. (2002). Altruistic punishment in humans. *Nature*, *415*, 137–140.

Fischbacher, U., Gächter, S., & Fehr, E. (2001). Are people conditionally cooperative? Evidence from a public goods experiment. *Economics Letters*, *71*, 397–404.

Funder, D. C. (2001). Personality. *Annual Review of Psychology*, *52*, 197–221.

Funder, D. C. (2009). Persons, behaviors and situations: An agenda for personality psychology in the postwar era. *Journal of Research in Personality*, *43*, 120–126.

Glover, S., & Dixon, P. (2004). Likelihood ratios: A simple and flexible statistic for empirical psychologists. *Psychonomic Bulletin & Review*, *11*, 791–806.

Haselhuhn, M. P., & Mellers, B. A. (2005). Emotions and cooperation in economic games. *Cognitive Brain Research*, *23*, 24–33.

Hedeker, D., & Gibbons, R. D. (2006). *Longitudinal data analysis*. Hoboken, NJ: Wiley Interscience.

Hilbig, B. E. (2008). Individual differences in fast-and-frugal decision making: Neuroticism and the recognition heuristic. *Journal of Research in Personality*, *42*, 1641–1645.

Hilbig, B. E., & Zettler, I. (2009). Pillars of cooperation: Honesty–Humility, social value orientations, and economic behavior. *Journal of Research in Personality*, *43*, 516–519.

Hirsh, J. B., & Peterson, J. B. (2009). Extraversion, neuroticism, and the prisoner's dilemma. *Personality and Individual Differences*, *46*, 254–256.

Hoffman, E., McCabe, K., Shachat, K., & Smith, V. (1994). Preference, property rights and anonymity in bargaining games. *Games and Economic Behavior*, *7*, 346–380.

Hsu, L.-C. (2008). Fairness and bargaining power in threshold public goods experiments. *Journal of Behavioral Decision Making*, *21*, 151–167.

John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin, & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 102–138). New York, NY: Guilford Press.

Judd, C. M., Kenny, D. A., & McClelland, G. H. (2001). Estimating and testing mediation and moderation in within-subject designs. *Psychological Methods*, *6*, 115–134.

Kelley, K. (2007). Confidence intervals for standardized effect sizes: Theory, application, and implementation. *Journal of Statistical Software*, *20*, 1–24.

DOI: 10.1002/per

Kocher, M. G., Cherry, T., Kroll, S., Netzer, R. J., & Sutter, M. (2008). Conditional cooperation on three continents. *Economics Letters*, *101*, 175–178.
Kollock, P. (1998). Social dilemmas: The anatomy of cooperation. *Annual Review of Sociology*, *24*, 183–214.
Koole, S. L., Jager, W., van den Berg, A. E., Vlek, C. A. J., & Hofstee, W. K. B. (2001). On the social nature of personality: Effects of extraversion, agreeableness, and feedback about collective resource use on cooperation in a resource dilemma. *Personality and Social Psychology Bulletin*, *27*, 289–301.
Krueger, J. I. (2007). From social projection to social behaviour. *European Review of Social Psychology*, *18*, 1–35.
Krueger, J. I. (2009). A componential model of situation effects, person effects, and situation-by-person interaction effects on social behavior. *Journal of Research in Personality*, *43*, 127–136.
Krueger, J. I., & Acevedo, M. (2007). Perceptions of self and other in the prisoner's dilemma: Outcome bias and evidential reasoning. *The American Journal of Psychology*, *120*, 593–618.
Kurzban, R., & Houser, D. (2001). Individual differences in cooperation in a circular public goods game. *European Journal of Personality*, *15*, S37–S52.
Kurzban, R., McCabe, K., Smith, V. L., & Wilson, B. J. (2001). Incremental commitment and reciprocity in a real-time public goods game. *Personality and Social Psychology Bulletin*, *27*, 1662–1673.
Lee, K., & Ashton, M. C. (2004). Psychometric properties of the HEXACO personality inventory. *Multivariate Behavioral Research*, *39*, 329–358.
Lee, K., & Ashton, M. C. (2006). Further assessment of the HEXACO Personality Inventory: Two new facet scales and an observer report form. *Psychological Assessment*, *18*, 182–191.
Lee, K., & Ashton, M. C. (2008). The HEXACO personality factors in the indigenous personality lexicons of English and 11 other languages. *Journal of Personality*, *76*, 1001–1053.
Lee, K., Ashton, M. C., Morrison, D. L., Cordery, J., & Dunlop, P. D. (2008). Predicting integrity with the HEXACO personality model: Use of self- and observer reports. *Journal of Occupational and Organizational Psychology*, *81*, 147–167.
Lee, K., Ogunfowora, B., & Ashton, M. C. (2005). Personality traits beyond the Big Five: Are they within the HEXACO space? *Journal of Personality*, *73*, 1437–1463.
Maner, J. K., Richey, J., Cromer, K., Mallott, M., Lejuez, C. W., Joiner, T. E.,…Schmidt, N. B. (2007). Dispositional anxiety and risk-avoidant decision-making. *Personality and Individual Differences*, *42*, 665–675.
Marcus, B., Lee, K., & Ashton, M. C. (2007). Personality dimensions explaining relationships between integrity tests and counterproductive behavior: Big five, or one in addition? *Personnel Psychology*, *60*, 1–34.
McCrae, R. R., & Costa, P. T. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology*, *52*, 81–90.
McCrae, R. R., & John, O. P. (1992). An introduction to the five-factor model and its applications. *Journal of Personality*, *60*, 175–215.
Milgram, N., & Tenne, R. (2000). Personality correlates of decisional task avoidant procrastination. *European Journal of Personality*, *14*, 141–156.
Moshagen, M., Hilbig, B. E., & Musch, J. (2011). Defection in the dark? A randomized-response investigation of cooperativeness in social dilemma games. *European Journal of Social Psychology*. DOI: 10.1002/ejsp.793
Nikiforakis, N., & Normann, H.-T. (2008). A comparative statics analysis of punishment in public-good experiments. *Experimental Economics*, *11*, 358–369.
Perugini, M., & De Raad, B. (2001). Editorial: Personality and economic behaviour. *European Journal of Personality*, *15*, S1–S4.
Rapoport, A., & Suleiman, R. (1993). Incremental contribution in step-level public goods games with asymmetric players. *Organizational Behavior and Human Decision Processes*, *55*, 171–194.
Reips, U.-D. (2002a). Internet-based psychological experimenting: Five dos and five don'ts. *Social Science Computer Review*, *20*, 241–249.
Reips, U.-D. (2002b). Standards for Internet-based experimenting. *Experimental Psychology*, *49*, 243–256.
Sabater-Grande, G., & Georgantzis, N. (2002). Accounting for risk aversion in repeated prisoners' dilemma games: An experimental test. *Journal of Economic Behavior and Organization*, *48*, 37–50.
Sally, D. (1995). Conversation and cooperation in social dilemmas. A meta-analysis of experiments from 1958 to 1992. *Rationality and Society*, *7*, 58–92.
Sefton, M., Shupp, R., & Walker, J. M. (2007). The effect of rewards and sanctions in provision of public goods. *Economic Inquiry*, *45*, 671–690.
Small, D. A., & Loewenstein, G. (2005). The devil you know: The effects of identifiability on punishment. *Journal of Behavioral Decision Making*, *18*, 311–318.
Steiger, J. H. (2004). Beyond the *F* Test: Effect size confidence intervals and tests of close fit in the analysis of variance and contrast analysis. *Psychological Methods*, *9*, 164–182.
Suleiman, R. (1996). Expectations and fairness in a modified ultimatum game. *Journal of Economic Psychology*, *17*, 531–554.
Van Dijk, E., De Cremer, D., & Handgraaf, M. J. J. (2004). Social value orientations and the strategic use of fairness in ultimatum bargaining. *Journal of Experimental Social Psychology*, *40*, 697–707.
Van Lange, P. A. M. (1999). The pursuit of joint outcomes and equality in outcomes: An integrative model of social value orientation. *Journal of Personality and Social Psychology*, *77*, 337–349.
Van Lange, P. A. M., De Bruin, E. M. N., Otten, W., & Joireman, J. A. (1997). Development of prosocial, individualistic, and competitive orientations: Theory and preliminary evidence. *Journal of Personality and Social Psychology*, *73*, 733–746.
Volk, S., Thöni, C., & Ruigrok, W. (2011). Personality, personal values and cooperation preferences in public goods games: A longitudinal study. *Personality and Individual Differences*, *50*, 810–815.
Wagenmakers, E.-J. (2007). A practical solution to the pervasive problems of *p* values. *Psychonomic Bulletin & Review*, *14*, 779–804.
Weber, J. M., Kopelman, S., & Messick, D. M. (2004). A conceptual review of decision making in social dilemmas: Applying a logic of appropriateness. *Personality and Social Psychology Review*, *8*, 281–307.
Webster, G. D. (2009). The person–situation interaction is increasingly outpacing the person–situation debate in the scientific literature: A 30-year analysis of publication trends, 1978–2007. *Journal of Research in Personality*, *43*, 278–279.
Zelmer, J. (2003). Linear public goods experiments: A meta-analysis. *Experimental Economics*, *6*, 299–310.
Zettler, I., & Hilbig, B. E. (2010a). Attitudes of the selfless: Explaining political orientation with altruism. *Personality and Individual Differences*, *48*, 338–342.
Zettler, I., & Hilbig, B. E. (2010b). Honesty–Humility and a person–situation interaction at work. *European Journal of Personality*, *24*, 569–582.
Zettler, I., Hilbig, B. E., & Haubrich, J. (2011). Altruism at the ballots: Predicting political attitudes and behavior. *Journal of Research in Personality*, *45*, 130–133.

APPENDIX

The following are public goods game instructions presented to the participants. Please note that these are translated from German and should thus not be taken literally.

ANONYMOUS CONDITION

This task is about group decisions. Imagine that you are in a group with four other persons. These persons were randomly selected and assigned to the group. None of the group members know each other. So, you do not know anything about the other persons in your group, and they do not know anything about you or each other.

In the following, every group member receives an initial endowment of 100 points. These points have a positive value (e.g. €1). The more points you have at the end of the game, the better for you. The same goes for the other group members.

Now, every group member can decide how many of his or her 100 points he or she wants to contribute to a common account. This contribution is made anonymously, which means that the group members do not know the sum contributed by any of the other members. The points, which an individual does not contribute to the common account, remain on his or her private account.

As soon as everyone has anonymously made his or her contribution, the points in the account are multiplied by 1.5 and are distributed equally between all group members.

Consider the following example. Assume that each group member contributes 50 points to the common account (without the others knowing this). Accordingly, everyone keeps 50 points for himself or herself. Thus, a total of $5 * 50 = 250$ points have been contributed to the common account. This sum now is automatically multiplied by 1.5 ($250 * 1.5 = 375$), and the resulting sum is distributed between all group members in equal portions; that is, $375/5 = 75$ points for everyone. Together with the 50 points that were retained, each group member has 125 points at the end of the game. So, in this example, each would have gained an additional 25 points.

You will now be asked to state the amount of points out of your endowment (100 points) that you wish to contribute to the common account. As explained previously, you are asked to do this without knowing how much the other four group members contribute and vice versa.

Of my 100 points, I contribute _____ to the common account.

PUNISHMENT CONDITION

You will now be asked to make another decision of the exact same kind. To this end, please imagine that you have been randomly assigned to another (i.e. a different) group of four unknown persons.

However, before you make your decision, please pay attention to the following change in the procedure: the contributions of all five group members to the common account are now no longer anonymous. This means that group members will be informed about the amount of points contributed by each of the others. Once this information is available to everyone (i.e. after everyone has made his or her contribution), all are given the possibility to invest part of their points to punish other group members: for every point spent, the punished group member loses three points.

Please consider the following example: after everyone has made his or her investment, group member 4 thinks that group member 2 has contributed too little to the common account. As a result, group member 4 pays, say, 20 points to punish this person, resulting in group member 2 losing 60 points.

Now, you are first asked to once more state how many of your 100 points you wish to contribute to the common account. Please keep in mind the new rules when making this decision. Thereafter, you will be shown the contributions of the other group members, and you can then decide whether you want to 'punish' one or more of them.

Of my 100 points, I contribute _____ to the common account.

DOI: 10.1002/per