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The Personal Norm of Reciprocity

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Abstract

Reciprocity is here considered as an internalized social norm, and a questionnaire to measure individual differences in the internalized norm of reciprocity is presented. The questionnaire, Personal Norm of Reciprocity (PNR), measures three aspects of reciprocity: positive reciprocity, negative reciprocity, and beliefs in reciprocity. The PNR has been developed and tested in two cultures, British and Italian, for a total of 951 participants. A cross-cultural study provides evidence of good psychometric properties and generalizability of the PNR. Data provide evidence for criterion validity and show that positive and negative reciprocators behave in different ways as a function of the valence (positive or negative) of the other's past behaviour, the type of feasible reaction (reward versus punishment), and the fairness of their reaction. Copyright © 2002 John Wiley & Sons, Ltd.

INTRODUCTION

Rewarding those who have behaved nicely and punishing those who behaved badly is a basic principle in most human societies: it is embedded in civil laws and is prescribed by many religious beliefs. It is not surprising therefore that one of the least controversial hypotheses in social science is that human beings have a general tendency to reciprocate (Gouldner, 1960; Homans, 1961; Thibaut & Kelley, 1959). On closer inspection, however, this assumption becomes more problematic. First, it is not obvious that everybody would reciprocate in several circumstances. Are there different propensities to reciprocate in different individuals? If so, is there any personality dimension that can explain and consistently predict these differences? Would this personality dimension be an overall factor or composed of different aspects?

Second, it is unclear how to precisely define reciprocity. At a general level there would be ample consensus in stating that reciprocity is a social norm defined as a pattern of

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reciprocal behaviour, yet many questions would still be left open. Is reciprocity in one-shot anonymous exchanges with different partners and in repeated interactions with the same identifiable partner the same concept? Is reciprocity just a specific pattern of behaviour or a motivation to abide by a rule? Is it more useful to consider just an overall general concept of reciprocity or rather should we distinguish between rewarding and punishing reciprocity?

In the present contribution we focus our attention on reciprocity as an internalized social norm and propose a scale to measure individual differences in the propensity to follow the internalized norm. We distinguish between beliefs and behaviours and, among the latter, between positive and negative forms of reciprocity. Then we propose a questionnaire specifically developed to measure this internalized propensity to reciprocate and we present studies supporting the validity of this scale. Finally, we discuss the implications and suggest further research.

The norm of reciprocity

Perhaps the most classical reference to the norm of reciprocity can be found in the work of Gouldner (1960), who proposed that it is a general basic tendency that can be found in most human societies throughout history. The norm prescribes that one should help those who have helped him/her in the past and retaliate against those who have been detrimental to his/her interests. Reciprocity has been used in social psychology to explain a wide range of phenomena, such as attitude change (Cialdini, Green, & Rusch, 1992), intimacy in close relationships (Surra & Longstreth, 1990), interpersonal perception (Kenny, Bond, Mohr, & Horn, 1996), altruism (Krebs, 1975), aggression (Robarchek & Robarchek, 1998), cooperation (Komorita & Parks, 1999), intergroup interactions (Goren & Bornstein, 1999), consumer shopping (Miller & Kean, 1997), restaurant tipping (Rind & Strohmets, 1999), and gift giving (Cialdini, 1988).

The concept of reciprocity has also been used in several other disciplines, such as sociology, sociobiology, economics, political science, anthropology, animal behaviour, and evolutionary psychology (see e.g. Axelrod, 1984; Cosmides & Tooby, 1989; de Waal & Berger, 2000; Fehr, Gächter, & Kirchsteiger, 1997; Hoffman, McCabe, & Smith, 1998; Nowak & Sigmund, 1998; Trivers, 1971; Wedekind & Milinski, 2000). Reciprocity has been also used often to explain patterns of outcomes in social dilemma situations. Axelrod (1984; Axelrod & Dion, 1988) has shown that the tit-for-tat strategy, a reciprocity-based strategy ideated by Anatol Rapoport, can guarantee the highest payoff in the long run given certain features of the situations analysed. Many studies in the repeated prisoner dilemma game (Komorita & Parks, 1999; Pruitt & Kimmel, 1977) have investigated the effectiveness of reciprocity in inducing cooperation among self-interested actors. Recent research in experimental economics also supports the importance of reciprocity in inducing equal share and efficient social outcomes in social dilemmas (see Hoffman et al., 1998, for a review).

Despite the amount of work on reciprocal behaviour, less effort has been devoted to providing a clear theoretical definition of what reciprocity is. In most of these studies reciprocity has been defined as a strategy applicable to repeated interactions, mainly described as repeated social dilemma (or two-person mixed motive) games. In these games, if actors use reciprocating strategies such as tit-for-tat, cooperative outcomes beneficial for the actors' self-interest can be achieved in the long term (Axelrod, 1984; Friedman, 1971; Fudenberg & Tirole, 1991; Kreps, Milgrom, Roberts, & Wilson, 1982).

The position taken by this line of theorizing is that reciprocity is merely a strategic behaviour. The shortcoming of the self-interest maximization assumption is that such an assumption is not able to account for reciprocal behaviour when some specific situational features are not met. When a situation implies few interactions, for instance, reciprocity does not pay off, but still people reciprocate. Furthermore, if self-interested gain maximization is a motivation that is assumed to operate for all people, then all people should reciprocate. Several experimental studies provide strong evidence that this is not the case (Bolton & Zwick, 1995; Bethwaite & Tompkinson, 1996; Kelley & Stahelski, 1970; Van Lange, 1999), and clear individual differences in reciprocating behaviour can be observed. Moreover, reciprocal behaviour can be observed even when people behave anonymously with unknown partners, ruling out social approval as a potential alternative explanation (Gallucci & Perugini, 2000; Goren & Bornstein, 1999; Komorita & Parks, 1999; Rind & Strohmets, 1999).

To summarize, assumptions about reciprocity relying exclusively on some form of self-interest fall short in explaining reciprocal behaviour that is not materially rewarding and not leading to social approval. Anonymous exchanges and interactions among unknown people are examples of such situations. To account for reciprocity in these situations, a different meaning of the norm of reciprocity should be emphasized: reciprocity as an internalized social norm.

The internalized norm of reciprocity

Authors have pointed to the concept of internalized social norms (Etzioni, 1989; Kerr, Garst, Lewandowski, & Harris, 1997; Lindbeck, 1995; Schlenker, 1980) and personal norms (Cialdini, Kallgren, & Reno, 1991; Schwartz, 1977). The main distinctive feature is that an individual who holds an internalized social norm is likely to conform to the dictates of the rule even when s/he is not observed or externally sanctioned. Schwartz (1977) defines a personal norm as a self-based standard based on one's internalized values, or expectation for behaviour, which is enforced through the anticipation of self-punishments and self-rewards. Therefore, reciprocity can also be considered as an individual tendency to reciprocate others' behaviour, that is, to reward others' helping behaviour and to retaliate against others' hurting behaviour, which is based on the individual's own preference in so doing. In other words, reciprocity can also be conceptualized as a goal in itself rather than exclusively as a means to achieve a goal (e.g. better material outcomes).

Several studies have investigated the role of reciprocity in situations of interdependence of outcomes where no economic incentive can explain acting in a reciprocal manner. In social dilemmas, individuals show the tendency to reciprocate both previous cooperation (reward) and defection (punishment), even when unconditional non-cooperation would guarantee higher outcomes (Komorita, Hilty, & Parks, 1991; Komorita, Parks, & Hulbert, 1992; Fehr & Gächter, 2000). In bargaining situations concessions are often reciprocated (Benton, Kelley, & Liebling, 1972; Esser & Komorita, 1975), even when the strategic aspect of the interaction has minimal impact (e.g. no expectation of future interactions, Berg, Dickhaut, & McCabe, 1995). Moreover, reciprocation of the other's strategy is present when the other's strategy is either observed or only anticipated (Liebrand, Wilke, Vogel, & Wolters, 1986; Wilke & Braspenning, 1989), and can act as an enforcement device for some forms of labour contract (Fehr et al., 1997). In accordance with these results, Perugini and Gallucci (1998) have recently proposed a game-theoretic model of reciprocity, where reciprocity is defined as an internalized social norm with different

weights for different individuals. The model was tested in an experimental situation specifically developed to allow for an unambiguous interpretation of the results (Gallucci & Perugini, 2000). The situation was modelled as a game (Reciprocity Game), consisting of a prisoner dilemma followed by a dictator game. Participants allocated money in the dictator game as a function of the previous history of interactions in the prisoner dilemma by rewarding cooperators and punishing defectors. This occurred even though it was not in their best monetary interest (i.e. there were no future interactions) and they did not know nor would have the chance to know their opponent in the future. In contrast with the view that individuals reciprocate only as a means to an end (e.g. to gain more in or build credibility for future interactions), we provided strong evidence that individuals reciprocate also as an end in itself (e.g. because they felt that the opponent deserved to be punished or rewarded for his/her previous behaviour).

Individual differences in reciprocity

A closer look at several experimental results with monetary consequences shows clear evidence of variation in the decision to reciprocate and its strength. For instance, the results of Gallucci and Perugini (2000) are qualified by a relevant interaction effect with individual differences, with some individuals reciprocating very stringently and some more weakly or not at all. However, reciprocity is a peculiar personality dimension, producing contextualized reactions to someone else's behaviour. Thus, a reciprocal behaviour needs specific reference to previous or expected behaviour by someone else interacting with the individual (in order to be meaningful at all). The same individual might be cooperative or vengeful *depending on* whether someone else previously performed (or s/he is expected to perform) a helpful or harming action against that individual. Moreover, people have both beliefs and expectations about other's people reciprocity and preferences for performing positive or negative reciprocity behaviours. Given the central importance in the development of our proposed measure of reciprocity, we shall turn our attention to these three components.

The distinction between beliefs in reciprocity, positive reciprocity, and negative reciprocity

A first main distinction between beliefs and behaviours can be drawn. Beliefs in the efficacy and widespread use of reciprocity-based behaviours and expectations of others' reciprocal behaviour certainly play an important role in predicting reciprocating behaviours (see e.g. Cotterell, Eisenberger, & Speicher, 1992). However, these beliefs should be conceptually distinguished from the actual performance of a reciprocal behaviour. Whereas in a broad sense it is reasonable that beliefs concerning the efficiency of following a reciprocity rule, or that most people are likely to follow it, should be related to actually performing a reciprocal behaviour, the two levels are different. This is particularly true if the reciprocal behaviour is defined as deriving from an internal motivation. In fact, as an internal motivation, reciprocity should lead to behaviour according to the rule without necessarily being accompanied by a correspondent belief that most people do it or that it is strategically advantageous to do so. Moreover, in general the beliefs dimension should be a more distal determinant of actual reciprocal behaviour than more specific behavioural dimensions and therefore it should be expected to show more modest links with specific behavioural criteria.

A second main distinction is within the behavioural domain, made by differentiating between positive and negative reciprocity. This distinction involves at least three different aspects: (i) sensitivity to positive versus negative interpersonal events, (ii) preference for retaliatory versus cooperative behaviour (or positive versus negative sanctioning) directed towards someone else, and (iii) conceptualization of what represents a fair behaviour.¹

First, positive reciprocators are expected to be particularly prone to react to positive interpersonal behaviours whereas negative reciprocators are expected to be particularly reactive to negative ones. Therefore, whereas the former should be especially sensitive to kind behaviour, the latter should be especially sensitive to unkind behaviour. In other words, positive reciprocators are expected to be more attentive to and preferentially willing to react to positive interpersonal behaviour, whereas negative reciprocators should pay more attention and should react preferentially to negative interpersonal behaviour.

Second, positive reciprocators are expected to be particularly willing to perform positive behaviours, or to deliver positive sanctions, following the other's positive action (e.g. be kind with someone if the other is kind to you) whereas negative reciprocators should be especially willing to perform negative behaviours, or to negatively sanction, when receiving negative behaviours from the other (e.g. retaliate against someone who has behaved negatively towards you). Although the basic mechanism of reciprocity would call both for positive and negative sanctions, it is expected that people may develop over time a preference for one of the two. In fact, cultural differences and prevailing socialization practices are likely to shape an individual's internalized propensity to perform actions of such a different valence. Indeed, within mainstream personality research it is common practice to conceptualize positive forms of interpersonal behaviour (e.g. cooperation, altruism, kindness) as opposed to negative forms of interpersonal behaviour (e.g. retaliation, aggression, hostility). This perhaps is cleanly summarized in the label of the second of the Big Five, which is usually named Agreeableness versus Hostility (De Raad, 2000; Wiggins, 1996).

The third feature has to do with how and when a behaviour is perceived to be fair. Fairness is an elusive concept that can be achieved in different ways, for instance by splitting endowments equally (equality), by balancing out inputs and outputs in the transaction (equity), or by reciprocating in kind (reciprocity). The adoption of any of these rules in principle can allow one to subjectively perceive an interpersonal transaction as fair. Indeed, it appears that often fairness is more a justification of behaviour rather than a motive on its own (Hertel, Aarts, & Zeelenberg, 2002; Thompson & Loewenstein, 1992). It is important to distinguish between two meanings of fairness to appreciate the difference between positive and negative reciprocators: fairness in interpersonal transactions and in outcomes.

Both positive and negative reciprocators are expected to have a preference for the former type of fairness, that is, a preference for a behaviour that would restore the equity in the ongoing interpersonal exchange, hence achieving fairness in terms of interpersonal transactions. However, fairness in an interpersonal transaction might not be the same as fairness in the outcomes. There are many situations where to be fair in interpersonal terms (i.e. to give back what one feels the other deserves) is in conflict with being fair in terms of outcomes (i.e. giving to the other an equal or fair share). Only positive reciprocators are expected to be concerned also with this second meaning of fairness in the sense of equal outcomes. Hence, they might be experiencing some kinds of moral dilemma when faced with situations where the two aspects of fairness call for opposite actions.

¹Although reported here all together for the sake of clarity, it should be noted that the third feature has been identified reflecting on the outcomes of the first study, whereas the first two features were hypothesized beforehand and guided the design of both studies.

To summarize, we argue that different features of a specific interpersonal event (valence of other's behaviour) can create a frame triggering a specific aspect of individual differences in reciprocity (positive versus negative) that in turn leads to a behaviour whose sanctioning meaning (reward versus punishment) is congruent with the specific reciprocity dimension, and which is perceived to be fair by both positive and negative reciprocators, although the former are also concerned about the achievement of equal outcomes. This means that positive reciprocators are sensitive to positive interpersonal behaviour (e.g. when someone has been kind with them), they prefer to use positive sanctions (e.g. to reward somebody), and they are sensitive also to fairness meant as achieving equal outcomes (e.g. they would also like to be fair in terms of outcomes), whereas negative reciprocators are sensitive to negative interpersonal behaviour (e.g. when someone has behaved negatively towards them), they prefer to use negative sanctions (e.g. to punish somebody), and they are primarily sensitive to fairness in terms of interpersonal transactions rather than in terms of equal outcomes (e.g. they are concerned about 'getting even', but not so much in terms of achieving an equal split).

From a measurement perspective, we expect that individual differences in positive and negative reciprocity should not be strongly negatively correlated, otherwise it would become of dubious utility to consider them as two sides of the same mechanism. However, given the strict opposite valence of positive and negative behaviours required by the norm, it is not likely that they are positively related. Nonetheless, both sides of reciprocity should show a positive correlation with beliefs in reciprocity.

THE PERSONAL NORM OF RECIPROCITY QUESTIONNAIRE

The previous theoretical reasoning led us to focus on the development of a new questionnaire, called the Personal Norm of Reciprocity (PNR), aimed at measuring individual differences in reciprocity as an internalized norm. Consistent with the theoretical frame, we assumed a distinction between beliefs and positive and negative reciprocity. In the following we briefly sketch the development of the PNR (study 1) and present its properties as resulting from five samples in two countries (Italy and United Kingdom) for a total of 951 respondents. We present evidence of construct validity gathered across these samples and then focus on criterion-related validity.

Questionnaire development

In the first step we created a pool of 116 items designed to measure various aspects of the personal norm of reciprocity. The items were primarily focused on the descriptive (i.e. behavioural) aspects of a norm rather than on their injunctive ones² (cf. Cialdini et al., 1991). To reduce potential sources of confounding variance, we adopted the following generative guidelines.

First, the main generative criterion was to write items having the logical format 'If A does α to me, I do β to A', with α being of a similar valence to β . This format should therefore express conditional behaviour and should reduce confounding with general dispositional tendencies such as altruism or hostility (cf. Perugini & Gallucci, 2001, study 1). Second, the items emphasized the costs incurred in reciprocating, in order to reduce confounding with reward expectancies (i.e. reciprocal behaviours were generally

²We would like to thank an anonymous reviewer for pointing out to us this issue.

framed as being costly and therefore not rewarding). Third, the behaviour should refer to one-shot exchanges and the other (A) should not be somebody well known (e.g. friend, partner), in order to reduce confounding due to factors such as expectation of long term gains in reciprocating that might arise as a consequence of a strategic approach based on an enduring relation and relationship commitment.

The items were reduced to 68 after elimination on the basis of redundancy and poor face validity. Of the remaining items, 43 focused on positive (e.g. 'I go out of my way to help somebody who has been kind to me before') or negative (e.g. 'If someone is unfair to me, I prefer to give him/her what s/he deserves instead of accepting his/her apologies') reciprocity, whereas 16 items focused on beliefs about both positive and negative forms of reciprocity as a commonly used and widely effective norm (e.g. 'When I pay someone compliments, I expect that s/he in turn will reciprocate'), and nine were general and focused on both positive and negative behaviours (e.g. 'The way I treat others depends on how they treat me').

This set of 68 items represented the starting pool for the first empirical study, which was aimed at further identifying a workable subset of items clustered in few underlying dimensions.

Study 1: development of the Personal Norm of Reciprocity questionnaire

Method: participants and procedure

First year psychology students enrolled in a psychometric course at the University of Rome (Italy) formed the bulk of the sample. Students were also encouraged to contact other participants, preferably not students and more than 30 years old. Participants were motivated to participate through a lottery. Prizes varied between €12.5 and €25³ and the likelihood of winning was about 15%. The number of participants was 200, 126 of whom were psychology students (63%), with 131 females (65.5%) and 69 males, and an average age of 28.5 (SD = 12.3). The battery was composed of different parts, most of which will be described later, including the starting pool of 68 reciprocity items. The answer scale for these items was a seven-step Likert type, from 1 (not true for me) to 7 (very true for me).

Results and discussion

The first set of analyses was aimed at investigating the underlying dimensionality of the items and at identifying corresponding scales with subsets of items. The items were divided in two sets, behavioural (52) and beliefs (16), and analysed separately through principal component analyses. The need for separate analyses is straightforward, as the variables conceptually belong to two domains. Thus, any relation should be reflected at the level of the factors and not at the level of the items.

The PCA on the behavioural items showed two main factors, explaining 27.7% of the total variance.⁴ After oblique rotation, the two factors were weakly correlated ($r = 0.14$). The two factors clustered together items concerning negative forms of reciprocity (e.g. 'If someone is unfair to me, I prefer to give him/her what s/he deserves instead of accepting his/her apologies') and items referring to positive forms of reciprocity (e.g. 'I go out of my way to help somebody who has been kind to me before'). An iterative strategy of elimination was then pursued. In the first round, 19 items with loadings lower than 0.30 or with loadings on both factors were eliminated and a PCA performed again with Varimax

³The actual currency was in Italian lira. The sums reported in the text are approximated on the fixed exchange rate of €1 = £1936.27.

⁴The first eight eigenvalues were 9.3, 5.1, 2.4, 2.1, 1.9, 1.8, 1.6, and 1.5 respectively.

rotation. Given that the aim was to identify short scales for each of two emerging factors, several relatively good items loading on the negative reciprocity factor had to be further discarded, as well as a few items loading on the positive reciprocity factor. A second elimination round was therefore performed with the aim of achieving a final set of nine items for each dimension. The PCA on the final set of 18 items showed two factors explaining 42.3% of the total variance and clearly defined as positive and negative reciprocity.⁵

The initial PCA performed on the beliefs in reciprocity items showed a main factor explaining 22.6% of the variance,⁶ with only three items showing loadings lower than 0.40. The target was to select nine items, similar to the scales of positive and negative reciprocity. Therefore, four of the 13 items were further discarded. The PCA on the final set of nine items showed a main factor explaining 29.3% of the variance, with loadings ranging from 0.45 to 0.62. Note that four items are focused on beliefs concerning positive reciprocity and five concerning negative reciprocity: nonetheless, a single main factor aggregates both types of belief.

The final outcome of this study was the development of three scales with nine items each composing the PNR.⁷ The three scales were named Positive Reciprocity, Negative Reciprocity, and Beliefs in Reciprocity. In the next section we review their psychometric properties and overall characteristics based on five samples, two Italians and three English, collected during the last three years.

Psychometric properties

Method: participants

The descriptive and psychometric properties are based on five samples for a total of 951 participants, 363 males and 588 females, with an average age of 22.5 (SD = 8.5). The first sample (IT1) is composed of 200 participants and has already been described in study 1. The second sample (IT2) is composed of 170 Italian students at the University of Rome, the third sample (UK1) of 114 students at the University of Leicester, the fourth sample (UK2) of 142 students at the University of Leeds, and the fifth sample (UK3) of 325 students at the University of Essex, all the last three in the United Kingdom. The Italian sample was thus composed of 370 participants, 125 males and 245 females, with an average age of 25.0 (SD = 10.0), whereas the British sample was composed of 581 participants, including 238 males and 343 females, with an average age of 20.9 (SD = 6.9).

Results and discussion

Factor structure, reliability, and generalizability. Considering first the scales of positive and negative reciprocity, the PCA on the total sample showed two clear factors, explaining 40.8% of the total variance, with the first six eigenvalues being 4.2, 3.1, 1.3, 1.0, 0.9, and 0.9, respectively. The first factor was defined by items of negative reciprocity and explained 23.1% of variance, whereas the factor of positive reciprocity explained 17.1% of variance. The loadings, which are reported in Table 1(a), were reasonably good, ranging from a low of 0.33 (pr7) to a high of 0.74 (nr4).

⁵More details on the factorial structures will be presented later on considering the combined samples.

⁶The first six eigenvalues were 3.6, 1.7, 1.5, 1.1, 1.0, and 0.9 respectively.

⁷See Appendix A for the full list of numbered items. Hereinafter, when referring to a specific item, we shall use *pr* for positive reciprocity, *nr* for negative reciprocity, and *br* for beliefs in reciprocity, followed by the item's number.

Table 1. Principal component analyses for PNR questionnaire ($N = 951$)

(a) Positive and negative reciprocity

Items	Loadings	
	Negative reciprocity	Positive reciprocity
nr1	0.72	0.02
nr2	0.58	0.03
nr3	0.71	0.06
nr4	0.74	0.01
nr5	0.72	0.01
nr6	0.65	-0.16
nr7	0.40	0.12
nr8	0.69	0.09
nr9	0.63	0.13
pr1	0.14	0.71
pr2	0.05	0.71
pr3	-0.04	0.61
pr4	0.11	0.63
pr5	0.16	0.59
pr6	-0.14	0.51
pr7	0.11	0.33
pr8	-0.03	0.42
pr9	-0.01	0.73
Eigenvalues	4.15	3.07
% variance ^a	23.1	17.1

(b) Beliefs in reciprocity

Items	Loadings
	Beliefs in reciprocity
br1	0.50
br2	0.62
br3	0.50
br4	0.45
br5	0.58
br6	0.64
br7	0.46
br8	0.50
br9	0.45
Eigenvalues	2.48
% variance	27.6

^aAfter Varimax rotation.

The first factor for the PCA on beliefs in reciprocity explained 27.6% of the variance and it was clearly to be preferred over alternative solutions on the basis of the scree-test (the first six eigenvalues were 2.5, 1.1, 1.0, 0.9, 0.8, and 0.7). Loadings were comprised between 0.45 and 0.64 (Table 1(b)). The reliabilities, as measured by Cronbach's alpha, were 0.83 for negative reciprocity, 0.76 for positive reciprocity, and 0.67 for beliefs in reciprocity. The values were substantially similar for both countries (in Italy, 0.84, 0.79,

and 0.65, and in the UK, 0.82, 0.74, and 0.68, for negative, positive, and beliefs in reciprocity respectively).

The issue of the generalizability of the factorial structures was investigated in different ways. First, congruence among factorial structures between countries and gender was calculated using Tucker's phi after Varimax and after orthogonal Procrustes rotations (cf. McCrae, Zonderman, Costa, Bond, & Paunonen, 1996). In both cases values were extremely high, ranging from 0.96 to 1. Second, a multi-group approach using structural equation models (LISREL 8; Jöreskog & Sörbom, 1993) was adopted. A confirmatory approach to the issues of across-sample generalizability allows formal testing of some key hypotheses. First, it is possible to test whether the same factor loadings across samples are defining the same factors. Second, the equality of error variances can be tested. Given the equality of factor loadings, error invariance implies that the measurements are equally reliable across samples. Finally, the equality of correlations among the factors across samples can be tested. This shows whether the constructs covary in the same way across samples.⁸

Table 2 displays the findings of the models for country and gender both for positive and negative reciprocity and for beliefs in reciprocity.

For positive and negative reciprocity, considering the country, the model with all fixed loadings was statistically significantly different from the baseline, meaning that it cannot be assumed that loadings are invariant in Italy and the UK. An inspection of the loadings however led to a revised model (M1a) where the loadings for four items (nr7, nr8, pr4, pr5) were left free across countries. The revised model was not statistically different from the baseline, meaning that invariance of loadings was achieved for all but the previous four items. The correlations and the errors were also different between countries. For gender, the results show that the samples have the same loadings and the same correlations, but not the same errors. A similar result was obtained for beliefs in reciprocity across countries: only the errors were statistically different in the two samples. Note however that in this case there is one factor only and therefore the second model actually tested the equivalence of factor variances. Finally, for gender there was a marginal difference between factor loadings, but not between factor variance and errors.

The psychometric properties of the three scales are therefore reasonably good. Three clear factors emerge, and the scales have reasonable reliabilities, even though the beliefs in reciprocity scale is less coherent than the other two scales. Results were also supportive of the generalizability of the factorial structure across countries and gender. The partial exceptions resulting from the multiple group approach should be taken in perspective. A confirmatory approach is much more powerful and it may reject models that are empirically replicable (McCrae et al., 1996). Moreover, it is known that the chi-square is heavily influenced by the sample size, leading to the rejection of good models when using large samples (Bagozzi & Baumgartner, 1994; Bentler, 1990). This is also the case here: the Tuckers' phi congruence coefficients, with or without Procrustes rotation, are so high that by any psychometric standard the corresponding factors would be considered as equivalent. The additional power brought by using a confirmatory approach allowed the detection of minor discrepancies that would have gone completely unnoticed with an exploratory technique.

⁸It should be stressed that to ascertain factorial invariance, factor loadings should be invariant across samples, whereas error variances and factor variances and covariances can be considered sample specific without questioning generalizability across samples (cf. Reise, Widaman, & Pugh, 1993; MacCallum & Tucker, 1991).

Table 2. Generalizability across countries and gender

(a) Positive and negative reciprocity.

(i) Across countries (Italy, $N = 370$, UK, $N = 581$)Baseline (B) $\chi^2(268) = 962.69, p \cong 0.00$, RMSEA = 0.059 ($p = 0.14$), CFI = 0.85, NNFI = 0.83

Models	Goodness of fit	Test of hypotheses
M1: fixed loadings	$\chi^2(284) = 1031.96, p \cong 0.00$	M1-B: $\chi^2_d(16) = 69.27, p < 0.001$
M1a: free nr7, nr8, pr4, pr5	$\chi^2(280) = 982.65, p \cong 0.00$	M1a-B: $\chi^2_d(12) = 19.96, p \cong 0.07$
M2: M1a + fixed corr.	$\chi^2(283) = 994.24, p \cong 0.00$	M2-M1a: $\chi^2_d(3) = 11.59, p \cong 0.01$
M3: M1a + fixed errors	$\chi^2(298) = 1047.15, p \cong 0.00$	M3-M1a: $\chi^2_d(18) = 64.5, p < 0.001$

(ii) Across gender (female, $N = 588$, male, $N = 363$)Baseline (B) $\chi^2(268) = 952.87, p \cong 0.00$, RMSEA = 0.077 ($p = 0.07$), CFI = 0.84, NNFI = 0.82

Models	Goodness of fit	Test of hypotheses
M1: fixed loadings	$\chi^2(284) = 967.99, p \cong 0.00$	M1-B: $\chi^2_d(16) = 15.12, p \cong 0.52$
M2: M1 + fixed corr.	$\chi^2(287) = 973.54, p \cong 0.00$	M2-M1: $\chi^2_d(3) = 5.55, p \cong 0.14$
M3: M1 + fixed errors	$\chi^2(302) = 999.07, p \cong 0.00$	M3-M1: $\chi^2_d(18) = 31.08, p \cong 0.03$

(b) Beliefs in reciprocity.

(i) Across countries (Italy, $N = 370$, UK, $N = 581$)Baseline (B) $\chi^2(54) = 233.84, p \cong 0.00$, RMSEA = 0.085 ($p = 0.06$), CFI = 0.80, NNFI = 0.74

Models	Goodness of fit	Test of hypotheses
M1: fixed loadings	$\chi^2(62) = 243.36, p \cong 0.00$	M1-B: $\chi^2_d(8) = 9.52, p \cong 0.30$
M2: M1 + fixed factor var.	$\chi^2(63) = 247.17, p \cong 0.00$	M2-M1: $\chi^2_d(1) = 3.81, p \cong 0.051$
M3: M1 + fixed errors	$\chi^2(71) = 285.99, p \cong 0.00$	M3-M1: $\chi^2_d(9) = 42.63, p < 0.001$

(ii) Across gender (female, $N = 588$, male, $N = 363$)Baseline (B) $\chi^2(54) = 207.12, p \cong 0.00$, RMSEA = 0.079 ($p = 0.18$), CFI = 0.83, NNFI = 0.77

Models	Goodness of fit	Test of hypotheses
M1: fixed loadings	$\chi^2(62) = 226.43, p \cong 0.00$	M1-B: $\chi^2_d(8) = 19.31, p \cong 0.013$
M2: M1 + fixed factor var.	$\chi^2(63) = 226.51, p \cong 0.00$	M2-M1: $\chi^2_d(1) = 0.08, p \cong 0.78$
M3: M1 + fixed errors	$\chi^2(71) = 243.25, p \cong 0.00$	M3-M1: $\chi^2_d(9) = 16.82, p \cong 0.052$

Descriptive statistics. The average scores in the three scales in the total sample were 3.96, 3.60, and 4.99, for beliefs in reciprocity and negative and positive reciprocity, respectively. The associated skewness and kurtosis were very low, ranging from -0.37 to 0.25 , showing that the underlying scores were normally distributed. The scores in the scales were further analyzed in 2×2 between ANCOVAs, with gender and country as independent factors and age as a covariate.

Scores in beliefs in reciprocity showed a small significant main effect of gender ($F(1, 948) = 9.56, p = 0.002$), meaning that males hold stronger beliefs in reciprocity than females (4.08 versus 3.89)⁹ and of the covariate age ($F(1, 948) = 4.29, p < 0.05$), meaning

⁹All the average values presented for the ANCOVAs are adjusted means.

that beliefs in reciprocity tend to decrease with age. Remarkably, there was no difference between countries. For negative reciprocity there was a significant main effect of country ($F(1, 948) = 31.08, p < 0.001$) and of gender ($F(1, 948) = 22.56, p < 0.05$). Negative reciprocity was more present in Italy than in the United Kingdom (3.91 versus 3.48) and more between males than females (3.87 versus 3.52). For positive reciprocity, there was a significant main effect of country ($F(1, 948) = 15.19, p < 0.001$), and a significant interaction with gender ($F(1, 948) = 7.78, p < 0.01$). A simple main effect analysis of the interaction showed that the significant effect was due to females, who showed more positive reciprocity in Italy than in England (5.21 versus 4.82), whereas males did not differ (5.05 versus 4.99). Finally, age had a significant covariating effect ($F(1, 948) = 9.38, p < 0.01$), meaning that scores were higher for older participants.

The most interesting finding is perhaps the dissociation across countries between the beliefs in reciprocity and the adoption of reciprocal behaviours. It appears that both the English and Italians are equally convinced about the effectiveness and widespread adoption of the norm of reciprocity, but Italians are more willing to engage in both positive and negative reciprocal behaviours than the English. It is reasonable to assume that these differences are mainly due to the socialization process and the prevailing social norms in the two countries. To ascertain those issues, however, a more representative sample would be necessary.

Relations among the scales. An important test of the content validity of the three scales is that both positive and negative reciprocity should show positive correlations with beliefs in reciprocity and should not show negative correlations among each other. Positive reciprocity, in fact, refers to behaviour that is related to helpfulness and kindness, although of a conditional nature. Negative reciprocity concerns vengefulness and others' harming behaviour. Despite the fact that these two domains are opposite in the consequences they produce, the scales are not negatively associated in the Italian sample ($r = -0.02, ns$) and positively associated in the English sample ($r = 0.16, p < 0.001$), suggesting that they are not measuring general personality factors tapping an uncontextualized positive versus negative attitude toward others, such as Agreeableness or Hostility. Both sides of reciprocity, moreover, correlate positively with beliefs in reciprocity, ranging from 0.15 to 0.44, showing that this domain is linked to both aspects of the mechanism (see Table 3(a)). In the Italian sample the link is higher for negative reciprocity and beliefs in reciprocity, whereas in the English sample the links are substantially equivalent.

A feature of the PNR scales is that they do not contain reverse-keyed items. One may argue that this may inflate the positive correlations between positive and negative reciprocity due to acquiescent responding and perhaps mask a negative correlation. To check for this possibility, we applied the procedure proposed by Ten Berge (1999). An acquiescence scale was computed by considering 28 opposite pairs of FFPI items. This standardized score was partialled out from the PNR items (for details on the procedure, see Ten Berge, 1999). The PNR scales were then recomputed after correction for acquiescence. The correlation between the positive reciprocity and the negative reciprocity scale was -0.01 (ns) for the Italian sample and 0.04 (ns) for the English sample, therefore supporting once more the lack of negative correlation between the two dimensions.

Questionnaire validation

The validity of the PNR questionnaire was investigated both considering the relations with other personality measures (construct-related validity) and the prediction of specific

Table 3. Intercorrelations of the PNR scales and relations with other scales in the Italian and English samples

(a) Intercorrelations

Scale	Beliefs in reciprocity	Negative reciprocity	Positive reciprocity
Beliefs in reciprocity	1 ^a	0.41**	0.43**
Negative reciprocity	0.44**	1	0.16**
Positive reciprocity	0.15**	-0.02	1

(b) Correlations with other scales

Scale	Beliefs in reciprocity	Negative reciprocity	Positive reciprocity	Sample
Creditor Ideology	0.27**	0.06	0.49**	IT1, UK1
Reciprocation Warmth	0.30**	0.39**	-0.23**	IT1, UK1
Reciprocity-norm				IT1, UK1
Acceptance	0.29**	0.42**	0.02	
Empathy/Attachment	-0.10	-0.23**	0.21**	UK3a
Forgiveness/Non-Retaliatio	-0.10	-0.64**	0.12	UK3a
Fairness/Non-Exploitation	-0.01	-0.43**	0.39**	UK3a
FFPI—Extraversion	0.07	0.08	-0.01	IT1, UK1, UK2
FFPI—Agreeableness	0.01	-0.31**	0.33**	IT1, UK1, UK2
FFPI—Conscientiousness	0.11*	0.14*(-0.19**) ^b	0.01	IT1, UK1, UK2
FFPI—Emotional stability	-0.18**	-0.11*	-0.08	IT1, UK1, UK2
FFPI—Autonomy	-0.19**	0.04	0.05	IT1, UK1, UK2
Social Desirability—	0.08	0.16**(-0.29**) ^b	0.08	IT1, IT2, UK1
Impression Management				
Social Desirability—	0.01	0.04	0.09	IT1, IT2, UK1
Self-Deceptive Enhanc.				

(c) Distributions for reduced Social Value Orientation types (samples IT2, UK1, UK2).

(i) Italy ($N = 146$)^c

	Prosocial	Proself
Beliefs in reciprocity		
Low	55.8% ^d	65.0%
High	44.2%	35.0%
$r = -0.09$		
Negative reciprocity		
Low	65.1%	58.3%
High	34.9%	41.7%
$r = 0.07$		
Positive reciprocity		
Low	31.4%	58.3%
High	68.6%	41.7%
$r = -0.27**$		

Continues

Table 3. Continued

(ii) The United Kingdom ($N = 226$)^c

	Prosocial	Proself
Beliefs in reciprocity		
Low	55.3%	47.0%
High	44.7%	53.0%
$r = 0.08$		
Negative reciprocity		
Low	69.1%	42.4%
High	30.9%	57.6%
$r = 0.26^{**}$		
Positive reciprocity		
Low	47.9%	54.5%
High	52.1%	45.5%
$r = -0.07$		

IT1, $N = 200$; IT2, $N = 170$; UK1, $N = 114$; UK2, $N = 142$; UK3a, $N = 230$.* $p < 0.05$; ** $p < 0.01$.^aCorrelations for the Italian (lower diagonal, $N = 370$) and for the English sample (upper diagonal, $N = 581$).^bSignificant difference; value for the English sample between parentheses.^cThe number refers to classifiable participants. In Italy there were 170 potential participants, with 24 not classifiable according to the SVO procedure. In the United Kingdom the participants were 256, with 30 not classifiable.^dPercentages add up to 100% for SVO reduced types.

results (criterion-related validity). The first kind of validity provides also information regarding the positioning of the personal norm of reciprocity in the personality map. The second kind of validity shows that the questionnaire has predictive power, and also suggests what situational characteristics interact with the individual differences in promoting reciprocal behaviour. The five samples previously summarized provided data related to both aspects of validity.

Construct-related validity

The PNR scales have been administered together with a variety of other measures and scales. The full pattern of relations is reported in Table 3. As a general rule, weighted correlations are presented whenever the same measure has been administered in two or more samples. Equality of correlations between samples has been checked by means of r -to- z transformations. Different values are reported if the z -difference is statistically significant.

Reciprocation Ideology scale. Developed by Eisenberger, Cotterell, and Marvel (1987), the questionnaire is composed of 23 items measuring three dimensions: *creditor ideology* (nine items), that is, the tendency to believe in the power of the reciprocity norm, with emphasis on the positive side (e.g. to return a favour), *reciprocation wariness* (ten items), that is, the cautiousness in reciprocating help, resulting from a fear of being taken advantage of, and *reciprocity-norm acceptance* (four items), that is, a person's general acceptance of the norm of reciprocity. Beliefs in reciprocity is correlated with all three scales of reciprocation ideology. Negative reciprocity is related only with reciprocation wariness ($r = 0.39$), and reciprocity-norm acceptance ($r = 0.42$), whereas positive reciprocity is related positively with creditor ideology ($r = 0.49$) and negatively with reciprocation wariness ($r = -0.23$). The pattern of relations is therefore complex yet

substantially conforming to theoretical expectations. Especially interesting is that beliefs in reciprocity correlates with all scales, as one would expect on a theoretical basis, whereas positive and negative reciprocity have opposite relations with reciprocation wariness. In other words, negative and positive reciprocity may represent opposite biases in favouring the corresponding aspect of reciprocity and they appear to involve different levels of caution in performing reciprocal behaviours.

Empathy/Attachment, Forgiveness/Non-Retaliatio, and Fairness/Non-Exploitation scales. Ashton and colleagues have recently proposed three scales as related to different aspects of altruism (Ashton & Lee, 2001; Ashton, Paunonen, Helmes, & Jackson, 1998). The scale of *Empathy/Attachment* should represent dimensions facilitating kin altruism, that is the tendency to behave in such a way to benefit a close friend or relative (kin) even at a personal cost. The scale of *Forgiveness/Non-retaliatio* should mainly facilitate reciprocal altruism and should be associated with proneness to forgive, which is one of the features highlighted by Axelrod (1984) as important in the 'tit-for-tat' strategy, and predict willingness to behave altruistically toward non-relatives. The scale of *Fairness/Non-Exploitation* should represent the reluctance to exploit other people and is reminiscent of the 'Pavlov' strategy (Nowak & Sigmund, 1993), based on the exploitation of people who do not retaliate but not of those who do retaliate. Empathy was associated positively with positive reciprocity ($r = 0.21$) and negatively with negative reciprocity ($r = -0.23$), whereas forgiveness/non-retaliatio showed only a strong negative association with negative reciprocity ($r = -0.64$). Fairness was positively associated with positive reciprocity ($r = 0.39$) and negatively with negative reciprocity ($r = -0.43$). However, note that this latter correlation is much weaker when controlling for forgiveness ($r = -0.16$).¹⁰ Finally, beliefs in reciprocity are not associated with any of the altruism scales, lending further support to the distinction between reciprocity and altruism.

The pattern of correlations suggests that all dimensions of altruism (conditional or unconditional) are positively linked to positive reciprocity and negatively linked to negative reciprocity, yet not overlapping. The strong negative relation of forgiveness with the negative aspects of reciprocity is pointing out how the retaliatory element is central to the reciprocity mechanism in its negative side. Fairness seems to emerge as another main feature differentiating between positive and negative reciprocators: the former are very concerned about being fair whereas the latter are not. It is likely that the negative association between fairness and negative reciprocity is also due to the willingness to retaliate of negative reciprocators. In fact, a retaliatory behaviour can be unfair in terms of outcomes yet subjectively perceived as fair in interpersonal terms (e.g. to give back what the other deserves). We shall elaborate further on the links between reciprocity and fairness in study 2.

Social value orientation types. The concept of social value orientation reflects different ways in which outcomes for self and others are allocated. Most research has focused on a three-category typology, including prosocial, individualistic, and competitive orientations (Kuhlman & Marshello, 1975; Messick & McClintock, 1968; for the definition of the constructs, details on the measure, and scoring procedure see Van Lange, De Bruin, Otten, & Joireman, 1997). A reduced classification is often used, based on theoretical similarities and practical considerations: individualists and competitors are aggregated together and referred to as proself, as opposed to prosocial (Van Lange & Semin-Goossens, 1998). Data

¹⁰The scales of forgiveness and fairness were strongly related (0.50). No other correlation changed remarkably when controlling for the other scales.

concerning the SVO were available for a total of 426 participants considering both countries (170 in Italy and 256 in the United Kingdom). Of these, 54 (12.7%) were not classifiable. The remaining 372 respondents were classified as prosocials (47.4%), individualists (40.4%), or competitors (12.2%). A median split within each country for each reciprocity scale was performed and therefore the participants were classified as either low or high for each reciprocity scale. Cross-frequency tables were then produced separately for each country. As the frequency of competitors was low, the reduced SVO types were considered. The resulting three 2 (reciprocity, high versus low) \times 2 (reduced SVO, prosocial versus proself) cross-tables are presented in Table 3(c), reporting for simplicity percentages by columns and the overall correlation coefficients. The association between reduced SVO types and reciprocity types was generally low, lending further support to the conceptual distinction between being inclined to reciprocate and being either self-focused or preoccupied with others' well-being. In particular, no associations were present with beliefs in reciprocity. In Italy, there was a moderate association with positive reciprocity, meaning that high positive reciprocators were more likely to be also prosocials. In the United Kingdom an association was instead present with negative reciprocity, implying that low negative reciprocators were more likely to be prosocial. In both cases, but in different ways, to be prosocial bears some relevance to being a reciprocator (see also Van Lange, 1999), either as being associated with a greater inclination to positive reciprocity (Italy) or a lesser inclination to negative reciprocity (United Kingdom).

Five Factor Personality Inventory (FFPI). The FFPI is a measure of the Big Five that has been validated in several countries (see e.g. Hendriks, Hofstee, & De Raad, 1999; Perugini & Ercolani, 1998). It is composed of 100 brief items with a five-point Likert-type answer scale. Note that whereas the first four factors share the basic definitions of the Big Five (*Extraversion, Agreeableness, Conscientiousness, Emotional Stability/Neuroticism*), the fifth factor is defined as *Autonomy* instead of *Openness to Experience or Intellect*, with emphasis on the capability to take independent decisions, to maintain an independent opinion on topics, and to not be influenced by social pressures to conform. Agreeableness was correlated negatively with negative reciprocity ($r = -0.31$) and positively with positive reciprocity ($r = 0.33$), as expected theoretically. It is interesting to note that in contrast beliefs in reciprocity did not correlate at all with Agreeableness. Minor negative correlations emerged between beliefs in reciprocity and emotional stability ($r = -0.18$) and autonomy ($r = -0.19$). Finally, note that conscientiousness was positively correlated with negative reciprocity in the Italian sample ($r = 0.14$) and negatively correlated in the English sample ($r = -0.19$). It is interesting to note the almost total lack of relations between the PNR scales and the two dimensions of extraversion and emotional stability, which have been suggested elsewhere as defining the concept of reciprocity orientation (Brandstätter & Königstein, 2001). It might be the case that the functional relationships between the PNR scales and these two dimensions change depending on the level of each dimension (i.e. each dimension functions as a moderator of the relation between the PNR scales and the other dimension).¹¹ To check for this possibility, we ran a moderator analysis, by calculating the correlations between the PNR scales and each dimension (e.g. Extraversion) at different levels of the other dimensions (e.g. Emotional Stability). The results confirmed the existence of moderator effects for beliefs in reciprocity and positive reciprocity, but not for negative reciprocity. In particular, beliefs in reciprocity was

¹¹We would like to thank an anonymous referee for this insightful suggestion.

negatively associated with Emotional Stability but only for low levels of Extraversion ($r = -0.28, p < 0.001$) and positively associated with Extraversion, but only for high levels of Emotional Stability ($r = 0.19, p < 0.01$), whereas positive reciprocity was negatively associated with Emotional Stability only for low levels of Extraversion ($r = -0.23, p < 0.001$) and positively associated with Extraversion for high levels of Emotional Stability ($r = 0.17, p < 0.01$) and negatively associated for low levels of Emotional Stability ($r = -0.19, p < 0.01$). This latter result is perhaps the most intriguing. The direction of the association between extraversion and positive reciprocity changes depending on the level of emotional stability, which acts as a moderator. We prefer not to speculate further at this stage and call for further research to corroborate these findings, but this result opens up interesting possibilities in terms of exploring key mechanisms connecting reciprocity to basic personality dimensions.

Social desirability scales. The social desirability scales are composed of ten items measuring two facets of social desirability, *impression management* and *self-deceptive enhancement*, using a seven-step Likert-type answer scale. The items have been selected from the Balanced Inventory of Desirability Responding (Paulhus, 1994; Paulhus & Reid, 1991) on the basis of a previous study involving a different sample (Gallucci & Perugini, 2000).¹² Impression management focuses on forms of conscious over-reporting of performance of a variety of desirable behaviours and under-reporting of undesirable behaviours, whereas self-deceptive enhancement focuses on forms of self-deception functional to ego-enhancement (cognitive over-confidence). All but one of the correlations between the reciprocity scales and the social desirability scales were not significant, the exception being negative reciprocity and impression management. Interestingly, whereas in the Italian sample the correlation was positive ($r = 0.16$), in the English sample it was negative ($r = -0.29$). A survey of results under no impression management demands led Paulhus (1994, p. 23) to argue that there is a component in this scale that could be labelled *social conventionality*. We suspect that this component helps in explaining the results. In fact, one may argue that negative reciprocity in the Italian context is considered as more legitimate than in the United Kingdom and therefore it is subject to opposite social desirability forces in the two countries. This interpretation, although speculative, is supported by the difference in average scores in negative reciprocity between the two countries.¹³

Criterion-related validity

Two hundred Italian students (sample IT1) also provided data concerning the criterion-related validity of the scales. After completion of a first booklet including the reciprocity items and other questionnaires, they were given a second booklet containing five hypothetical scenarios involving monetary outcomes. With the exception of the last, all scenarios were constructed explicitly to allow for one-shot decisions as opposed to iterated choices after having made available one piece of information concerning a previous allocation choice of the opponent. The scenarios included elicitation of positive or negative reactions that should have been predicted differentially by the positive or negative reciprocity dimensions. That is, the criteria were chosen to capture both positive and

¹²In the English sample the full BIDR scale (40 items) was used. Results are the same as considering the brief form (ten items).

¹³The presence of these significant correlations with impression management does not imply that the scale of negative reciprocity has reduced predictive power. All results involving negative reciprocity reviewed in the criterion-related validity section are substantially unaffected when including the impression management score as a covariate.

negative reciprocity in its behavioural counterpart, rewarding or punishing behaviour. The full list of scenarios is reported in Appendix B.

The first four criteria had the following common characteristics: first, a fictitious other made an allocation of payoff between self and the participant. Then, the participant was asked to allocate a given endowment. For each scenario, a table containing all values for all combinations summarized the effects of the possible choices. The allocation choices of the participants were transformed into a reciprocity score. Two criteria were relevant for *reward*, with participants asked to allocate money to the fictitious other, whereas two criteria were relevant for *punishment*, with the participant asked to invest a portion of their endowment to reduce the gains of the fictitious other.

The fifth criterion was a decomposed form of the Ultimatum Game (Guth, Schmittberger, & Schwarze, 1982; Thaler, 1988). The Ultimatum Game can be formally analysed in terms of reciprocity (Gallucci & Perugini, 1997). For individuals high in reciprocity there are different degrees of satisfaction for different combinations of proposal and acceptance decisions and it is possible to order them as a function of their distances from the optimal combination. An index of optimality of the combination between proposals and responses from the perspective of a reciprocator can therefore be created and used as a criterion.¹⁴

Positive reciprocity was expected to be especially related to the two reciprocity scores regarding reward allocations, whereas negative reciprocity was expected to predict the punishment allocations. We also expected that positive reciprocity would have been linked with the decomposed Ultimatum Game's criterion. As far as the beliefs in reciprocity scale is concerned, we expected it to show weaker links with the criteria than the other two scales, as this dimension is likely to play a more distal role than the two behavioural dimensions of reciprocity. The data were analysed by means of a canonical correlation analysis.¹⁵ This analysis allows us to investigate the relationship between the two sets of variables (criteria and predictors), by extracting the significant canonical roots that maximize the common variability between them. The results are presented in Table 4, including the basic correlations, and they generally support the predictions.

The first two canonical components were significant, with values of 0.36 and 0.26, respectively. The first canonical component was defined by the two reward criteria and the decomposed Ultimatum Game (-0.50 , 0.73 , and 0.61 , respectively) and by the scale of positive reciprocity (0.99), whereas the second canonical component was defined by the two punishment criteria (0.84 and 0.67 , respectively) and by the two scales of negative reciprocity and beliefs in reciprocity (0.81 and 0.88 , respectively). In total, 51.6% of the variance of the criteria and 81.0% of variance of the predictors was explained by the two canonical components. Overall, the pattern of results indicates a clear difference between positive and negative reciprocity. In general, whenever the game allows for punishments and the history of allocations elicits negative reactions, individual differences in negative reciprocity are affecting the likelihood of reciprocating the previous unfair allocation of the other person, although this does not always achieve significance in the canonical correlation analysis. On the contrary, when the emphasis is on the possibility to reward, as in the reward allocations, individual differences in positive reciprocity come into play. The negative correlation of positive reciprocity with the unfair-reward criterion and the lack of

¹⁴A formal prediction of the model of reciprocity when applied to the Ultimatum Game is that individuals high in reciprocity will offer 50% of the endowment when proposers and accept 33% of the endowment when responders (Gallucci & Perugini, 1997; Perugini & Gallucci, 1998). Any other combination would give decreasing utility according to a reversed U-shaped curve and this is reflected in diminishing values of the criterion.

¹⁵We thank an anonymous reviewer for suggesting this analysis.

Table 4. Canonical correlation analysis of the PNR scales with decision-making criteria ($N = 200$)

(a) Correlations

Criterion		Reciprocity scales		
Other choices	Reaction type	Beliefs in reciprocity	Negative reciprocity	Positive reciprocity
1. Unfair	Reward	0.00	0.05	-0.18*
2. Fair-cooperative	Reward	-0.05	0.00	0.25**
3. Unfair	punishment	0.18*	0.20**	0.01
4. Unfair-individualist	Punishment	0.17*	0.14*	0.11
5. Decomposed Ultimatum Game		0.09	0.06	0.21*

(b) Regression weights (β values)

Criterion		Reciprocity scales		
Other choices	Reaction type	Beliefs in reciprocity	Negative reciprocity	Positive reciprocity
1. Unfair	Reward	0.00	0.04	-0.18*
2. Fair-cooperative	Reward	-0.11	0.07	0.27**
3. Unfair	Punishment	0.11	0.15 ⁺	0.00
4. Unfair-individualist	Punishment	0.12	0.09	0.11
5. Decomposed Ultimatum Game		0.03	0.06	0.21*

⁺ $p = 0.06$; * $p < 0.05$; ** $p < 0.01$.

significant relations of the latter with negative reciprocity are interesting, as they indicate that not only the valence of the previous behaviour (fair versus unfair) but also the preference for the type of reaction (reward versus punishment) are playing a role.

Study 2

The previous study has shown that sensitivity to the other's previous behaviour (positive versus negative) is not the only determinant of whether individual differences in positive or negative reciprocity are relevant. In fact, higher scores in positive reciprocity were related to stronger reactions to unfair (negative) behaviour, expressed as allocating lower rewards (positive sanction). However, the relation between individual differences in reciprocity and fairness seems peculiar: the pattern of correlations with the scales of altruism (see Table 3(b)) suggests that positive reciprocators are also concerned with being fair in terms of outcomes whereas negative reciprocators are not. The second study was therefore designed to investigate further these aspects. With this aim, we manipulated the other's behavioural valence (kind versus unkind), the way participants could react to this behaviour (reward versus punishment), and the consequence of their reaction (fair versus unfair).

Method: participants and procedure

The participants were 95 university students at the University of Essex (United Kingdom), with 38 females and 57 males (average age = 21.2, SD = 2.0). They were given a small booklet containing the PNR scales and two scenarios. Participants were asked to imagine as vividly as they could these hypothetical situations. The first scenario (negative event) described the participant as asking a colleague for some help in understanding an

assignment. This person refused to help by claiming that he/she did not know anything about it, whereas the participants knew that this was not true. The second scenario (positive event) described the participant carrying many heavy bags from the supermarket and walking home. A passer-by insisted on helping the participant and went out of his/her way to carry some of the bags to the participant's house. The events were presented in counterbalanced order in the booklets.

Participants could react to these events as follows. The participant was asked to imagine that he/she was participating in an experiment at the Department of Psychology and, to his/her surprise, discovered that he/she was paired with the person mentioned in the previous event (the help-denier or the help-giver). In this experiment the participant could divide at his/her discretion a certain number of tokens between him/her and the other, who could only accept the participant's decision (i.e. a Dictator Game, DG). The dependent variable was the number of tokens given to the other. For each scenario, participants were asked to react using three different allocation rules, all presenting 11 possible divisions of tokens. The first allocation task was a standard DG, with divisions ranging from give nothing (0 tokens) to the other or to give all to other (500 tokens). The second allocation task was such that the first division was unfair and advantageous for the participant (2500 versus 1000 tokens) and the last division was fair (1500 versus 1500). The participant had to give increasing rewards to the other at increasing expenses to him- or herself to approach a fair division. Finally, for the third allocation rule, the first choice was unfair and advantageous for the other (500 versus 750 tokens) and the last division was fair (250 versus 250). In this case, the participant had to give increasing punishments to the other at increasing personal costs to approach a fair division. Therefore, both the second and the third allocation rule were approaching a fair allocation (50% each), but either from a disadvantageous or an advantageous starting point, and either by using rewards or punishments, always at a cost for self.

Hypotheses

We had three within-subject experimental designs, one for each allocation task, whereby the manipulated variable was the valence of the previous other's behaviour (positive versus negative). The other two key variables (reaction type and reaction consequences) were embedded in the type of allocation task as explained in the following.

The hypotheses for the first allocation rule (standard DG) were straightforward. It was expected that positive reciprocators want to give more to the other after a positive event whereas negative reciprocators want to give less to the other after a negative event. Therefore, this allocation rule allows testing the differential sensitivity to positive and negative behaviours by positive and negative reciprocators, respectively. This is the first of the three differences assumed between positive and negative reciprocators (cf. p. 5).

The second and third allocation tasks allow for a more complex pattern of predictions that are exploiting the second and third defining differences between positive and negative reciprocators, that is their preference for positive versus negative sanctioning and their different definition of what constitutes a fair behaviour.

Second allocation task (fair-reward DG). If the previous event is positive, positive reciprocators are expected to be especially sensitive to this sanctioning aspect that combines both rewarding someone and being fair in terms of outcomes. If the event is negative, to punish the other through lower rewards would also imply being less fair in terms of outcomes, and this undesirable feature should prevent positive reciprocators from giving lower rewards. Negative reciprocators have been shown not to be concerned with this fairness aspect, and therefore they are expected to be especially sensitive to the possibility of

using negative sanctions if the other deserved (i.e. s/he behaved in a negative way). *Third allocation task (fair–punishment DG)*. With positive events, a positive sanction should be expressed by not punishing the other and, crucially, by not approaching a fairer split. We know that positive reciprocators have also a desire to achieve equal splits. However, in this specific case it would imply punishing the other, which is something undesirable for them. It follows that they should experience a dilemma between behaving fairly and punishing the other, with the two features calling for opposite choices and which would possibly result in a lack of significant effects. In contrast, negative reciprocators should not experience this dilemma because as we have hypothesized they are less concerned with approaching an equal split. It follows that they might be more willing to reward a positive action through lower punishments, being less important for them to achieve fairness in the sense of equal outcomes. When the previous interpersonal event is negative, positive reciprocators should have an additional reason to punish the other, given that higher punishments have the important feature of increasing the fairness of the final distribution. Finally, negative reciprocators should be still willing to punish the other, but possibly to a lower extent than positive reciprocators given that they do not have the additional reason of increasing the fairness of the distribution. The predicted pattern of results in the second and third allocation tasks is therefore a consequence of the hypothesized difference between positive and negative reciprocators in terms of preference for a type of reaction (reward versus punishment) combined with the difference in terms of concern for consequence of their reaction (fair versus unfair), and with different prescriptions depending on whether the other has behaved positively or negatively.

Results and discussion

Results were obtained as follows: a factorial analysis of covariance¹⁶ was performed for each dependent variable, with the within factor valence of the previous event (negative versus positive) and the scores in the two scales of positive and negative reciprocity as covariates.¹⁷ Considering first the standard 11-step DG, there was a strong main effect of valence ($F(1, 92) = 201.891, p < 0.001$), meaning that the allocation to the other after a positive event was much more generous than after a negative event (49.7% versus 11.1%) and a main effect of positive reciprocity ($F(1, 92) = 20.69, p < 0.001$) and of negative reciprocity ($F(1, 92) = 10.04, p < 0.01$). The main effects were qualified by significant interactions (positive reciprocity \times valence, $F(1, 92) = 4.51, p < 0.05$; negative reciprocity \times valence, $F(1, 92) = 7.72, p < 0.01$). Simple effects analyses showed that positive reciprocators were more likely to allocate more after a positive event ($\beta = 0.45, p < 0.001$) but not to allocate less after a negative event ($\beta = 0.16, ns$), whereas negative reciprocators were more likely to allocate less after a negative event ($\beta = -0.48, p < 0.001$) but not to allocate more after a positive event ($\beta = -0.00, ns$).

For the second allocation task (fair–reward DG), there were again main effects of valence ($F(1, 92) = 99.67, p < 0.001$), positive reciprocity ($F(1, 92) = 18.85, p < 0.001$) and negative reciprocity ($F(1, 92) = 19.39, p < 0.01$), qualified by significant interactions (positive reciprocity \times valence, $F(1, 92) = 5.44, p < 0.05$; negative reciprocity \times valence, $F(1, 92) = 6.67, p < 0.01$). Consistent with expectations, positive reciprocators were more likely to

¹⁶As kindly suggested by an anonymous referee, we have also analysed the data by a more complex 3×2 MANCOVA design. The results are basically unchanged, especially as far as the simple effects are concerned. For the sake of simplicity, we report the results of three separate ANCOVAs.

¹⁷The results are virtually unchanged when introducing as a third covariate the scale of beliefs in reciprocity. See the discussion for more on this issue.

reward more after a positive event ($\beta = 0.48, p < 0.001$) whereas negative reciprocators were more likely to reward less after a negative event ($\beta = -0.55, p < 0.001$).

For the third allocation task (fair-punishment DG), the main effect of valence was significant ($F(1, 92) = 54.78, p < 0.001$) but not for positive and negative reciprocity ($F(1, 92) = 2.45, ns$, and $F(1, 92) = 1.57, ns$, respectively). However the main effect was qualified by significant interactions with positive reciprocity ($F(1, 92) = 6.68, p < 0.05$) and negative reciprocity ($F(1, 92) = 6.60, p < 0.05$). Positive reciprocators were more likely to sanction more after a negative event ($\beta = 0.29, p = 0.01$) whereas negative reciprocators were more likely to punish less after a positive event ($\beta = -0.27, p < 0.05$). Finally, note that negative reciprocators were also likely to punish more after a negative event, although this difference did not reach the conventional level of statistical significance ($\beta = 0.16, p = 0.11$), confirming therefore our theoretical reasoning about the additional influence of fairness for positive reciprocators.

The results of the significant interactions are recapped compactly in Figure 1, dividing for purposes of simplicity the groups into high and low scorers for each of the two dimensions of reciprocity.

The results clearly sustain the hypotheses. The pattern of results shows evidence of validity for both dimensions. First, overall both positive and negative reciprocators are reacting differentially to a friendly versus unfriendly partner. However, the results also suggest evidence of differential validity between the two scales. Positive reciprocators are more generous in the allocation following a positive behaviour (Figure 1(a)), are more willing to reward a positive behaviour when this additionally increases the overall fairness of the distribution (Figure 1(b)), and are more willing to punish a negative behaviour, but only if this additionally imply achieving a fairer split (Figure 1(c)). On the other hand, negative reciprocators are less generous when the other has behaved negatively (Figure 1(e)) they are willing to reward less a negative behaviour when rewarding is the only way to express a negative sanction (Figure 1(b)), and they are willing to punish less after a positive behaviour and, to a minor extent, to punish more after a negative behaviour when punishment is the only way to express sanctioning (Figure 1(c)).

These outcomes reveal a complex yet systematic relation between personality dimensions, reciprocal behaviour, and important situational features. The specific behavioural reaction in terms of reciprocity seems in fact to be heavily influenced by the type of reciprocator (positive versus negative), which in turn implies differences in sensitivity to previous events (positive versus negative), sanction opportunities (reward versus punishment), and sanction consequences (fair versus unfair). These results obviously call for further investigation that should confirm and extend the pattern found in this study.

Additional studies

The PNR scales have been used also in other studies and there is additional evidence of criterion validity for the three scales. Perugini and Gallucci (working manuscript) have found that individuals with high scores in negative reciprocity strongly decreased the payoffs allocated to others who behaved negatively, regardless of whether they were expecting future interactions with them, whereas individuals with high beliefs in reciprocity significantly decreased the payoff to others who behaved negatively only when there was no expectation of future interactions. The link between the negative reciprocity dimension and the allocation of payoffs to others who behaved negatively was confirmed in another study, where it was found that this link was unaffected by the type of expected future interaction (i.e. with a friend or with a potential acquaintance) (Perugini & Gallucci,

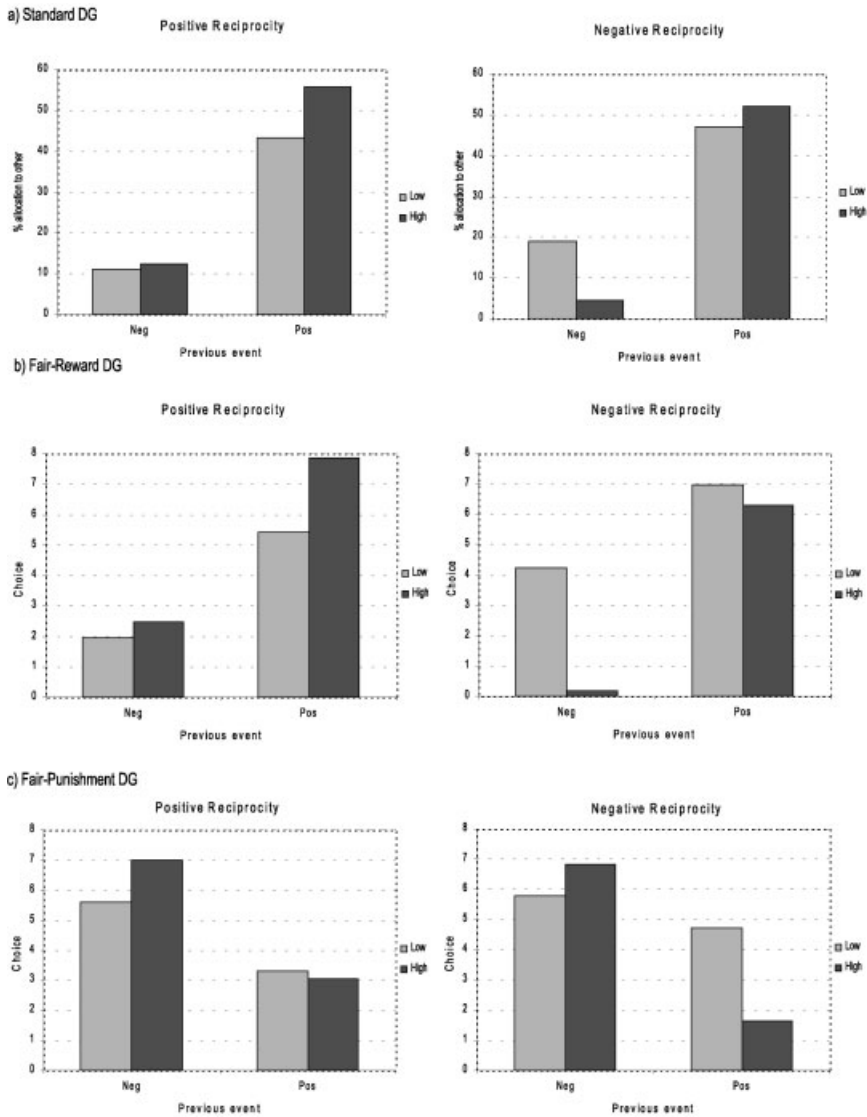


Figure 1. Study 2: graphical representation of the significant interactions for the three dependent variables.

2001). Finally, Gallucci and Perugini (2002) have found in a three-stage experimental game (the so-called Information Game), involving actual monetary decisions, that participants with a combination of high scores in positive reciprocity and beliefs in reciprocity are willing to forego possible economic gains in the first stage in order to acquire information about what the other did in the previous interaction (i.e. information which is essential to reciprocation). Moreover, participants with high scores in positive reciprocity are more likely to reciprocate the observed behaviour, again at a monetary cost, both when acquiring the past information (second stage) and when, being the opponent, informed about the first player's choice (third stage). The results were substantially confirmed in a second experiment with a simplified version of the Information Game.

GENERAL DISCUSSION

The results of the two studies demonstrate the good psychometric properties and validity of the PNR. The PNR is structured in three dimensions: positive reciprocity, which encompasses positive reactions to positively valued behaviours with the emphasis on rewarding someone else's behaviour; negative reciprocity, where the emphasis is on punishing someone else's behaviour and to match negative reactions to negatively valued behaviour; and beliefs in reciprocity, concerning the view that both forms of reciprocity are generally effective and widely used. The three scales showed good factorial structures and reasonable reliabilities, were generalizable to gender and two countries and showed a pattern of relations with other constructs supporting their validity. They were predictive of specific outcomes in specific ways. It should be acknowledged that the two studies were scenario based and therefore only partly informative about actual reciprocal behaviour. However, other studies (e.g. Gallucci & Perugini, 2002) have confirmed the predictive validity of the PNR scales for actual behaviours. Among others, two main points emerged from our results: (i) reciprocity can also be defined as an internalized social norm, which is endorsed in different degrees by different individuals, and (ii) three main dimensions of reciprocity as a personality dimension can be reliably distinguished and lead to different predictions.

Internal norm versus strategy

A body of experimental results, including our own, suggests that reciprocity is not only a strategy of behaviours useful to increase personal gains, but also a personal norm that can be active in conditions where there are no obvious material advantages in so doing (Gallucci & Perugini, 2000, 2002; Goren & Bornstein, 1999; Komorita & Parks, 1999; Rind & Strohmetz, 1999; Van Lange, 1999). The PNR scales aim to measure individual differences in the strength of this internalized norm, and therefore they are mostly targeted at conditions that might defy usual explanations in terms of reciprocal benefits (e.g. tit-for-tat, reciprocal altruism). This does not imply that reciprocal behaviours supported by material advantages and strategic considerations are not important or widespread, but they do not exhaust the field of all possible reciprocal behaviours. There also exist behaviours, equally important and widespread, which are of a reciprocal nature but not mainly opportunistic. These behaviours cannot be easily accounted for by other factors. In this sense, the reciprocators as detected by the PNR scales are a subset of all who in general might be likely to reciprocate. They are individuals who are inclined to reciprocate because they feel satisfied when they do it. Anecdotal evidence based on explanations given by reciprocators for their behaviour after being debriefed in some of our experiments points to an overwhelming majority of individuals reporting that they reciprocated because they felt it was the proper thing to do. Usual explanations were in terms of the deservingness of the other with whom they interacted, and of their willingness to sanction (reward or punish) the other's behaviour. Future studies should look more systematically at the links between self-reported explanations and individual differences in the propensity to reciprocate.

Three dimensions of reciprocity

The results of the studies have shown that it is feasible and useful to distinguish three aspects of reciprocity as a personality dimension. The results of the second study have also clarified some of the important differences between positive and negative reciprocators. This is a very important issue that needs additional research to corroborate and extend the

differences that we have sketched. It is also important to point out the role played by other mechanisms that have not been explored in this contribution. Particularly important appears the role played by emotions as potential mediator of the impact of positive and negative reciprocity on reciprocal behaviour. There is increasing evidence that emotional factors play an important role in situations of interdependence of outcomes (Fehr & Gächter, 2002) and in decision making in general (Greene, Sommerville, Nystrom, Darley, & Cohen, 2001). It is very likely that reciprocal behaviour is associated with specific emotional reactions, which appear also very important in differentiating between positive and negative reciprocity. Whereas negative reciprocity should be associated with emotional states of anger and distress (e.g. Mikula, Scherer, & Athenstaedt, 1998), one would expect positive reciprocity to be associated with states of happiness and satisfaction, as well as with anticipation of guilt if one did not reciprocate a positive behaviour. These differences may explain according to what mechanism negative reciprocators react preferentially to negative actions and positive reciprocators to positive actions. Moreover, it remains to be seen whether different emotional reactions fully mediate the impact of positive versus negative reciprocity on reciprocal behaviour, or whether this mediation is only partial. Future research should address these important issues.

We would like now to draw attention to the dimension of beliefs in reciprocity. This dimension captures the more ideological and cognitive side of the reciprocity mechanism, as shown by its pattern of correlations with relevant measures. It can also predict specific reciprocal behaviour, but in general it is expected to be a more distal determinant, whose influence is likely to be mediated or moderated by specific behavioural propensities to reciprocate. The second study offers an example of mediation. When considered in isolation as a covariate in the basic designs of the second study, the beliefs in reciprocity dimension interacted significantly with the factor valence for all three allocation tasks ($F = 8.824, p < 0.01, F = 11.057, p < 0.001, F = 12.315, p < 0.001$, for the first, second, and third allocation task, respectively; all F values with 1, 93 df). Its influence completely disappeared when considered alongside the two scales of positive and negative reciprocity ($F = 0.059, ns, F = 0.051, ns, F = 0.087, ns$, for the first, second, and third allocation rules, respectively; all F values with 1, 91 df). In contrast, a study by Gallucci and Perugini (2002) offers an example of moderation. Players in an experimental game, before making their allocation choices (second stage), were more likely to request information concerning the other player's first stage allocation choice (strategically irrelevant but essential for reciprocation) if they had higher scores in both beliefs in reciprocity and positive reciprocity. Note that it was possible (50% chance) that the other player was going to play a third allocation stage. Hence, expectations about whether the other player was going to reciprocate in turn could have played a role, although by design there was no strategic advantage in eliciting the other player's reciprocity in the third allocation stage by being generous in the second allocation stage. In general, the role of the beliefs in reciprocity dimension should be more relevant whenever expectations and beliefs are likely to play a primary role in a specific situation.

Conclusions

Reciprocity can be a subjectively internalized mechanism that can be reliably measured in the individual differences it produces. This is the main message of the present contribution. So far, theoretical elaborations have not focused specifically on reciprocity as an internalized norm and no measure has been available to quantify individual

differences in this propensity. The PNR scales might fill this gap. There are several behaviours with a reciprocal flavour that cannot be easily understood and predicted within a frame emphasizing repeated interactions or general unconditional personality dispositions. Reciprocity can be understood also as a conditional contextualized personality construct that can explain, in conjunction with a careful analysis of the situational contingencies, otherwise seemingly irrational or costly behaviours. The studies reported here, as well as other recent studies, provide robust evidence of the validity of the PNR scales. The PNR scales seem particularly promising whenever the emphasis is on reciprocity as an internalized motivation. Whereas the studies reported in this contribution have mostly focused on behaviours with economic consequences, we would expect that the scales might be usefully applied also to behaviours having materially or psychologically costly consequences without being necessarily of an economic nature.

Another very interesting area concerns cross-cultural studies. Being mostly a precipitate of prevailing socialization practices and socio-cultural differences, it is likely that in different countries different aspects of the personal norm of reciprocity are differently endorsed by individuals. The differences between Italy and the United Kingdom in average values and correlations with some other constructs concerning negative and positive reciprocity are a good example of how cross-cultural research might be revealing. Future studies might unravel the complex interactions among the basic norm of reciprocity and the cultural forces that shape it into individual values.

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APPENDIX A: PNR QUESTIONNAIRE

Beliefs in reciprocity

- Br1 To help somebody is the best policy to be certain that s/he will help you in the future
- Br2 I do not behave badly with others so as to avoid them behaving badly with me
- Br3 I fear the reactions of a person I have previously treated badly
- Br4 If I work hard, I expect it will be repaid
- Br5 When I pay someone compliments, I expect that s/he in turn will reciprocate
- Br6 I avoid being impolite because I do not want others being impolite with me
- Br7 If I help tourists, I expect that they will thank me nicely
- B8 It is obvious that if I treat someone badly s/he will look for revenge
- Br9 If I don't leave a good tip in a restaurant, I expect that in future I will not get good service

Positive reciprocity

- Pr1 I am ready to undergo personal costs to help somebody who helped me before
- Pr2 If someone does a favour for me, I am ready to return it
- Pr3 If someone is helpful with me at work, I am pleased to help him/her

- Pr4 I'm ready to do a boring job to return someone's previous help
 Pr5 When someone does me a favour, I feel committed to repay him/her
 Pr6 If someone asks me politely for information, I'm really happy to help him/her
 Pr7 If someone lends me money as a favour, I feel I should give him/her back something more than what is strictly due
 Pr8 If somebody suggests to me the name of the winning horse at the race, I would certainly give him/her part of my winnings*
 Pr9 I go out of my way to help somebody who has been kind to me before

Negative reciprocity

- Nr1 If I suffer a serious wrong, I will take my revenge as soon as possible, no matter what the costs
 Nr2 I am willing to invest time and effort to reciprocate an unfair action
 Nr3 I am kind and nice if others behave well with me, otherwise it's tit-for-tat
 Nr4 If somebody puts me in a difficult position, I will do the same to him/her
 Nr5 If somebody offends me, I will offend him/her back
 Nr6 If someone is unfair to me, I prefer to give him/her what s/he deserves instead of accepting his/her apologies
 Nr7 I would not do a favour for somebody who behaved badly with me, even if it meant foregoing some personal gains
 Nr8 If somebody is impolite to me, I become impolite
 Nr9 The way I treat others depends much on how they treat me

*The Italian item is 'If somebody suggests to me the winning numbers at the Lottery, I would certainly give him/her part of my winnings'.

APPENDIX B: DECISION MAKING SCENARIOS OF STUDY 1 (N = 200)

All scenarios were preceded by a general instruction as follows.

'In this final part of the booklet you will be asked to read a series of description of some situations and to indicate how you would choose if you had been in the situation as described. Please try to become involved in each situation and to make your involvement in the scene as realistic as possible. Remember, there are no right or wrong answers, but only answers that reflect what you would actually do in such circumstances. Please concentrate on yourself in the experience depicted and on how you would behave.'

1. Unfair-reward

- The other has divided £100 000 as follows: £70 000 for self and £30 000 for you. Now it's up to you. You have £100 000 and can decide how to allocate the money between you and the other among the options presented below.

(please tick one)

For you	£0	£10 000	£20 000	£30 000	£40 000	£50 000	£60 000	£70 000	£80 000	£90 000	£100 000
For the other	£100 000	£90 000	£80 000	£70 000	£60 000	£50 000	£40 000	£30 000	£20 000	£10 000	£0

2. Fair/cooperative–reward

(between brackets are the values used in the second scenario)

- The other had the possibility to choose one of the following three options, and they chose the one ticked.

<i>Other's choice</i> ⇒	X	[X]	
Gains ↓			
	£70 000	£60 000	£40 000
For the other	[£70 000]	[£60 000]	[£40 000]
	£60 000	£40 000	£30 000
For you	[£30 000]	[£50 000]	[£20 000]

Therefore, the other has gained £70 000 [£60 000] and you £60 000 [£50 000]. Now you have £50 000 at your disposal. You can decide to allocate this amount in any way you wish between you and the other.

(Tick your choice)

Choice ⇒

Your part	£50 000	£45 000	£40 000	£35 000	£30 000	£25 000	£20 000	£15 000	£10 000	£5 000	£0
Other's part	£0	£5 000	£10 000	£15 000	£20 000	£25 000	£30 000	£35 000	£40 000	£45 000	£50 000

3. Unfair–punishment

- The other has divided £100 000 as follows: £80 000 for self and £20 000 for you. Now it's up to you. You can decide how much, if any, you want to spend of £50 000 at your disposal to reduce the other's overall gain. Your final gain will be given by £20 000 plus what is left of £50 000 after your decision. The other final gain will be given by £80 000 minus the amount that you will decide to reduce.

(please tick one)

Choice ⇒

Your costs	£0	£5 000	£10 000	£15 000	£20 000	£25 000	£30 000	£35 000	£40 000	£45 000	£50 000
Other's total gains	£80 000	£72 000	£64 000	£56 000	£48 000	£40 000	£32 000	£24 000	£16 000	£8 000	£0
Your total gains	£70 000	£65 000	£60 000	£55 000	£50 000	£45 000	£40 000	£35 000	£30 000	£25 000	£20 000

4. Unfair/individualist–punishment

(between brackets are the values used in the second scenario)

- The other had the possibility to choose one of the following three options, and they chose the one ticked.

<i>Other's choice</i> ⇒	X	[X]	
Gains ↓			
	£70 000	£60 000	£40 000
For the other	[£60 000]	[£70 000]	[£60 000]
	£30 000	£50 000	£20 000
For you	[£50 000]	[£40 000]	[£60 000]

Therefore, the other has gained £70 000 [£70 000] and you £30 000 [£40 000]. Now you have £50 000 at your disposal. You can decide how much, if any, you want to spend of £50 000 to reduce the other's overall gain. Your final gain will be given by £30 000 [£40 000] plus £50 000 minus what you have decided to spend to reduce the other's gains. The other's overall gains will be £70 000 [£70 000] minus the amount that you will decide to reduce.

(Please tick one)

Choice ⇒												
Your costs	£0	£5000	£10 000	£15 000	£20 000	£25 000	£30 000	£35 000	£40 000	£45 000	£50 000	
Other's total gains	£70 000	£63 000	£56 000	£49 000	£42 000	£35 000	£28 000	£21 000	£14 000	£7000	£0	
Your total gains	£80 000	£75 000	£70 000	£65 000	£60 000	£55 000	£50 000	£45 000	£40 000	£35 000	£30 000	

5. Decomposed ultimatum game [abbreviated scenarios]

First part: received offers

Now there are some situations whereby some offers are made first by another person to you and then by you to the other person. Your task in this first part will be to decide, for each proposed division, whether to accept it or refuse it, in which case neither you nor the other will receive any money.

- The other has **£100 000** lire, offers you **£40 000** lire and keeps for self **£60 000**; please tick your choice

- (A) **accept**, I will have **£40 000** and the other person will have **£60 000**
- (B) **refuse**, I will have **£0** and the other person will have **£0**.

[Four other proposals follow in random order: 10/90; 20/80; 30/70; 50/50].

Second part: proposal of divisions

In this second part you are asked to propose a division and the other now can either accept or refuse, in which latter case neither of you will receive any money. **Tick your chosen proposal**

↓	If the other:	You will have	The other will have
If you offer £10 000	accept	£90 000	£10 000
	refuse	£0	£0
If you offer £20 000	accept	£80 000	£20 000
	refuse	£0	£0
If you offer £30 000	accept	£70 000	£30 000
	refuse	£0	£0
If you offer £40 000	accept	£60 000	£40 000
	refuse	£0	£0
If you offer £50 000	accept	£50 000	£50 000
	refuse	£0	£0

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