



Social norms and cooperation in real-life social dilemmas

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Abstract

The hypothesis, that injunctive and descriptive norms interact positively or synergistically to promote cooperation in social dilemmas, is tested in the context of a survey study focusing on environmentally responsible behaviour. Measurement error and strong and positive correlations between the two types of normative beliefs make it difficult to test the interaction hypothesis. By using structural equation modelling with residual centering, these problems are overcome and the interaction hypothesis is confirmed. The result is stable across three replications spanning a two-year period.

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1. Introduction

Members of modern human societies frequently encounter situations where acting to the benefit of society conflicts with their own narrow self-interest. For example, it is more convenient to throw litter in the street than to search for a waste bin. It is more convenient

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to put all one's household waste in the same garbage bin than to source-separate it and bring recyclable fractions to designated collection points. It is usually cheaper and often also more convenient to ignore possible environmental or ethical qualities of consumer products. Hence, although it can be safely assumed that most people prefer a clean environment, that their garbage is recycled, and that the products they buy live up to certain environmental and ethical standards, there is a temptation to litter, to not sort one's garbage, and to ignore possible environmental or ethical problems related to products we buy. In situations such as these, individuals confront a 'social dilemma' (Dawes, 1980; Dawes & Messick, 2000). Irrespective of whether or not other people cooperate, that is, restrain themselves when drawing on common resources, contribute to a clean environment, etc., it pays better off (in a narrow sense) for each individual to defect, that is, not show restraint, not contribute, etc., than to cooperate. Hence, it is individually rational to defect. However, if everybody behaves in this way, the common good will eventually be spoiled, which leaves everybody worse off than if everybody cooperated (and saved the common good).

According to simple theories of rational choice, such as the one expressed in the 'economic man' metaphor, cooperation in social dilemmas is a mystery. However, it is common knowledge that many people show restraint and contribute to the common good in everyday social dilemmas, such as the ones described earlier. Understanding why people cooperate, and why they defect, is important for developing conditions and interventions that maximize cooperation for the common good.

In recent years, there has been increasing focus on the role of social norms in social dilemmas (e.g., Bicchieri, 2006; Biel & Thøgersen, 2007; Kerr, 1995; Kopelman, Weber, & Messick, 2002) and there is mounting evidence suggesting that social norms play an important role in fostering cooperation in social dilemmas (e.g., Bicchieri, 2002; Bicchieri, 2006; Biel, 2000; Biel, Borgstede, & Dahlstrand, 1999; Kerr, 1995; Kerr, Garst, Lewandowski, & Harris, 1997; Kerr & Kaufman-Gilliland, 1997). In this connection, the term "social norm" refers to informal norms as opposed to formal, codified norms such as legal rules (Bicchieri, 2006). Social norms are functional in regulating social life and they especially evolve when individual actions cause negative side-effects for others (Coleman, 1990). In these cases, social norms serve the function of restraining egoistic impulses in favour of collective outcomes (Biel et al., 1999). Social norms imply that (certain) people should perform a prescribed behaviour or not perform a proscribed behaviour. Bicchieri (2006) recently proposed a refinement of the theory of social norms in social dilemmas. It is the objective of the present paper to test a key proposition of Bicchieri's theory.

1.1. Bicchieri's social norm theory

According to Bicchieri (2006), a social norm is a behavioural rule for a situation (or type of situations) that lives up to two criteria: a sufficiently large share of the population (1) knows the rule and knows that it applies to this particular type of situations and (2) conditionally prefers to conform to the rule in this type of situation. The first criterion is uncontroversial. All prevailing definitions of social norms include this criterion. The second one is new. It implies that most people acknowledge the need for cooperation in social dilemmas and that they therefore prefer to cooperate, under certain conditions.

Preferences to conform – and actually conforming – depend on the following two conditions, according to Bicchieri (2006): that the individual believes (a) that a sufficient num-

ber of others will conform to the rule in the situation(s) and (b) that a sufficient number of others expect him or her to conform to the rule in the situation(s). Due to the temptation to defect, some individuals may need the latter belief to be backed by the fear of sanctions in case of failure to conform. Others may cooperate just because they accept the legitimacy of others' expectations and feel an obligation to fulfil them.

The two individual-level conditions are based on social cognitive theory (Simonson, Carmon, Dhar, & Drolet, 2001) referring to beliefs about what most people do as *descriptive norms* and to beliefs about what others expect one to do as *injunctive norms* (e.g., Cialdini, Kallgren, & Reno, 1991; Cialdini, Reno, & Kallgren, 1990). Notice that what matters in this connection is not other people's objective behaviour or expectations, but the individual's subjective perception of these realities. Reflecting this, social cognitive research often refers to individual beliefs about others' expectations as *perceived* or *subjective* social norms (e.g., Ajzen, 1988; Ajzen & Fishbein, 1980; Schwartz, 1977). Although they are equally subjective, such qualifiers are usually not added when referring to descriptive norms (cf., e.g., Borsari & Carey, 2003; Larimer, Turner, Mallett, & Geisner, 2004). In the following, the terms "descriptive" and "injunctive norms" refer to subjective beliefs about others' behaviour and expectations.

According to Bicchieri, individuals will prefer *not* to cooperate if either their descriptive or their injunctive norm for cooperation in that particular situation is below their individual threshold. Hence, if one of them is below the threshold, variation in the other is of little consequence. This implies (but is not explicitly stated by Bicchieri, 2006) that the combined effect of descriptive and injunctive norms on cooperation is bigger than their additive effects. In other words, descriptive and injunctive norms are assumed to interact positively or synergistically to promote cooperation.

1.2. Supporting evidence

Bicchieri (2006) backs her norm theory by a review of laboratory experiments testing various facets of the proposition that cooperation is the product of activated social norms, pitted against alternative explanations, such as group identity or inequality aversion. She convincingly argues that social norms provide a better and more versatile explanation for a range of laboratory observations than alternative explanations. However, none of the cited experiments actually speak to the proposition that descriptive and injunctive norms interact synergistically to promote cooperation. Hence, this key proposition is backed by reasoning only, not by empirical evidence.

An additional limitation to the evidence mustered in support of Bicchieri's norm theory is that it all originates from the artificial setting of the laboratory. The strength of laboratory experiments is their ability to identify causal effects, but what is true in the laboratory does not always manifest itself in "real life" (e.g., Lynch, 1982; Winer, 1999). Hence, the external validity of the theory can be questioned. It is obviously of great practical interest whether Bicchieri's norm theory can explain why people sometimes cooperate in the social dilemmas of everyday-life – participate in voluntary recycling programmes, buy environmentally and/or ethically sound products, etc. – and sometimes do not. Field data are needed to document the practical value of the theory.

Consistent with Bicchieri's basic proposition, that social norms are an important source of cooperation in social dilemmas, a large number of survey studies have confirmed the positive relationship between injunctive norms and cooperation with regard to a wide

range of everyday social dilemmas, not least in the environmental field (for a recent review, see [Biel & Thøgersen, 2007](#)). However, hardly any of these studies controlled for descriptive norms, which means that they are mute about the proposition that descriptive and injunctive norms interact synergistically to promote cooperation.¹ The proposed influence of descriptive norms has also been confirmed with regard to a number of social dilemmas in the environmental field, such as littering (e.g., [Cialdini et al., 1991](#); [Cialdini et al., 1990](#); [Reno, Cialdini, & Kallgren, 1993](#)), recycling (e.g., [Schultz, 1999](#)), and water conservation (e.g., [Aronson & O’Leary, 1983](#)). However, also these studies did not explicitly control for the other type of norms (i.e., injunctive norms in this case) and therefore have no bearing on the question whether both descriptive and injunctive norms need to be above a certain threshold for cooperation to result.

1.3. *Methodological difficulties*

It complicates matters that it can be difficult to disentangle the influence of the two norm constructs in practice. As argued by several authors (e.g., [Bicchieri, 2006](#); [Deutsch & Gerard, 1955](#)) and confirmed empirically (e.g., [Rivis & Sheeran, 2003](#)), also with regard to environmentally responsible behaviours (e.g., [Cialdini, 2003](#); [Thøgersen, 2006](#)), descriptive and injunctive norms are likely to be positively correlated. What most people approve of is usually also what most people do ([Bicchieri, 2006](#)). At the individual level, the two types of norms may converge because other people’s behaviour serves as a cue to what is expected of the individual (e.g., [Bicchieri, 2002, 2006](#); [Rimal & Real, 2003](#)). Logically, this mechanism is likely to be strongest for behaviours that are readily observed by others, such as travelling behaviours and to some extent shopping behaviours. A positive correlation between descriptive and injunctive norms may also be produced by the reverse inference, that is, that we expect that most others conform to the injunctive norm (e.g., [Bicchieri, 2006](#)). This mechanism may explain the convergence of the two types of norms even for private behaviours.

The psychological mechanisms that facilitate a convergence of descriptive and injunctive norms make it difficult to disentangle their effects in practice. In experimental studies, it is difficult to design interventions that activate one of these norm constructs without also activating the other. In survey-based research, the shared variance between the two norm constructs implies a risk of multicollinearity if both are included in the same multivariate analysis. If, on the other hand, one of them is left out, an inflated correlation between the remaining norm construct and behaviour is likely to result (cf., [Sheeran & Orbell, 1999](#)) because the remaining norm construct will capture not only its own behavioural impact, but also (part of) the behavioural impact of the omitted norm construct and/or of the possible interaction between the two constructs ([Cohen, Cohen, West, & Aiken, 2003](#)). Hence, in order to achieve a correct picture of how social norms influence behaviour, both injunctive and descriptive norms need to be accounted for.

In sum, it is the objective of this study to test [Bicchieri’s \(2006\)](#) proposition that descriptive and injunctive norms interact synergistically to promote cooperation in social dilemmas. By means of survey data obtained from representative samples of the adult Danish

¹ In some survey studies, both descriptive and injunctive norm items were included to measure subjective social norms as recommended by [Ajzen \(2001\)](#), but this, of course, does not allow one to distinguish between the effects of the two types of norms or to identify possible interactions.

population it is investigated whether cooperation in everyday social dilemmas depends on both descriptive and injunctive norms being supportive and congruent. Cooperation is studied with regard to a type of behaviour that has great practical relevance, namely behaving in an environmentally responsible way, such as recycling, using non-car means of transportation, and buying environmentally friendly products. In the next section, the specific hypotheses guiding the research are derived.

2. Hypotheses

The proposition that individuals have a strong tendency to imitate other people's behaviour has a solid backing in psychological theory and research, including Asch's (1951) conformity experiments, Festinger's (1954) social comparison theory, and Bandura's (1977) social learning theory. These psychological theories all suggest that individuals use other people's behaviour as information about or cues to what is correct or prudent behaviour in a situation. Because we are often uncertain about the best course of action, other people's behaviour represents valuable information. In recent years, Cialdini and his colleagues have published several experimental studies documenting our tendency to imitate what others do or have done (also) with regard to environmentally responsible behaviour (e.g., Cialdini et al., 1991; Cialdini et al., 1990; Kallgren, Reno, & Cialdini, 2000). In another line of research, misperceptions about the majority's behaviour have been singled out as an important cause of unhealthy and/or anti-social behaviour (e.g., Campo, Brosard, & Frazer, 2003; Neighbors, Larimer, & Lewis, 2004; Wenzel, 2005), which has led to the development of a "social norms approach" to behaviour change (e.g., Campo et al., 2003; Haines & Spear, 1996; Yanovitzky, Stewart, & Lederman, 2006). Experimental research on social dilemmas has focused more on another aspect, social uncertainty and the fear of being a "sucker" (Wiener & Doescher, 1991), which has been identified as an important reason for defection (Van Dijk, Wit, Wilke, & Budescu, 2004). Expectations about others' behaviour are to a high extent based on the observation of (cues to) their previous behaviour (Bicchieri, 2006). The first hypothesis is derived from these lines of research.

H1: Cooperation in everyday social dilemmas, such as participating in a recycling programme, buying environmentally friendly products, or being environmentally responsible in other ways, increases with the belief that others cooperate, that is, with the strength of descriptive norms for that particular behaviour.

Injunctive norms are assumed to influence individual behaviour because of others' ability to administer sanctions (reward or punishment). However, it is often acknowledged that the threat of sanctions is not always needed for injunctive norms to produce cooperation (e.g., Bicchieri, 2006; Cialdini et al., 1991; Kallgren et al., 2000). Injunctive norms are an important determinant of behaviour according to widely used social cognitive theories such as the theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the theory of planned behaviour (Ajzen, 1988, 1991) and Schwartz's norm-activation theory (Schwartz, 1977; Schwartz & Howard, 1982). As previously mentioned, a large number of studies based on these theories have confirmed the positive relationship between injunctive norms and cooperation in the context of a wide range of everyday social dilemmas, not least in the environmental field (for a recent review, see Biel &

Thøgersen, 2007). Also, experimental studies have confirmed the causal influence of injunctive norms on behaviour both in contexts where social sanctioning was a possibility (e.g., Gächter & Fehr, 1999) and where it was not (e.g., Ajzen, 1971; Ajzen & Fishbein, 1970; Cialdini et al., 1991; Kallgren et al., 2000). The second hypothesis is derived from these lines of research.

H2: Cooperation in everyday social dilemmas, such as participating in a recycling programme, buying environmentally friendly products, or being environmentally responsible in other ways, increases with the belief that relevant others expect one to cooperate, that is, with the strength of injunctive norms for that particular behaviour.

According to Bicchieri (2006), individuals will prefer to conform to a norm of cooperation in a social dilemma if and only if they both believe that a sufficient number of others will conform (a descriptive norm) and that a sufficient number of others expect them to conform (an injunctive norm). The rationale behind this proposition can be summarized as follows: People who expect that few others will cooperate also expect that their own sacrifice would be in vain and they will therefore prefer not to contribute, irrespective of what they believe that others expect. People who believe that most others do not expect them to cooperate (i.e., that they are for some reason exempt from the rule) can (in principle) enjoy the benefits of others' cooperation without contributing and they will therefore prefer not to contribute, irrespective of what others do. Preference is not the same as doing, but people will in general conform more to a cooperation norm if they prefer to do so than if they prefer not to. Hence, it is likely that the behavioural impact of any of the two types of norms (descriptive and injunctive) is stronger if the other norm is strong (i.e., above the individual's threshold) than if it is weak (i.e., below the threshold). The third hypothesis is derived from this line of reasoning.

H3: There is a positive interaction between descriptive and injunctive norms with regard to fostering cooperation in everyday social dilemmas, such as participating in a recycling programme, buying environmentally friendly products, or in general behaving in an environmentally responsible way, meaning that the combined effect of the two types of norms is bigger than their additive effects.

3. Method

The three hypotheses are tested by means of a multiple survey study based on representative samples of the Danish population age 18+. Hence, this study brings Bicchieri's norm theory out of the laboratory and tests it in a "real life" setting. The surveys focused on behaving in an environmentally responsible way. Three surveys were collected using the same questionnaire with three different samples in three consecutive years. Hence, the study design makes it possible to test the stability of the results over time.

Basically, the interaction hypothesis is tested by regressing behaviour on the two norm constructs and the product of the two constructs (i.e., the interaction term, cf. Aiken & West, 1991). Like other psychological measures, norm measures are obviously fallible and the problem is multiplied when analyzing for interactions effects by means of multi-

plicative terms (Aiken & West, 1991). In order to correct for measurement error, AMOS 6 and structural equation modelling (SEM) are used for the analyses in this study (Arbuckle & Wothke, 1999). In SEM, the measurement model is a confirmatory factor analysis (CFA) model and the theoretical constructs (two types of norms and their interaction) are latent factors extracted from the manifest variables (four for each of the two norm constructs and 16 product terms for the interaction in this case). With SEM, measures of how well a hypothetical variance–covariance matrix, which would exactly produce the parameter estimates, replicates the observed sample variance–covariance matrix can be used to determine whether the hypothesized model gives an acceptable representation of the analyzed data. Among other advantages, SEM makes it easy to compare parameter estimates across samples (by using multiple group designs and nested models).

Until recently, it has been complicated to model interactions in SEM due to the need to specify complicated non-linear constraints. That changed when Marsh, Wen, and Hau (2004) documented the veracity of an unconstrained product-indicator approach, which is simple to apply and which even performs well when first-order variables are non-normal. A further development of the unconstrained approach proposed by Little, Bovaird, and Widaman (2006) is applied in this study.

It is standard procedure to reduce the risk of multicollinearity between first-order and interaction terms by standardizing independent variables before multiplying them to form the interaction term (Jaccard, Turrisi, & Wan, 1990). Under most circumstances, this is sufficient. However, sometimes the product term still has some degree of correlation with its first-order constituent variables, which results in regression coefficients that may still show some instability (Little et al., 2006). This problem can be remedied by means of a two-step regression technique called residual centering, which ensures full orthogonality between a product term and its first-order constituents (Lance, 1998). In residual centering, a product term is regressed onto its first-order constituent constructs. The residual of this regression is then saved and subsequently used to represent the interaction effect. Little et al. (2006) proposed a straightforward method to apply residual centering in SEM analyses of interaction effects. The method is basically Marsh et al.'s (2004) unconstrained approach, but the manifest interaction terms are produced by means of the residual centering procedure, which means that they are uncorrelated with the indicators used to calculate the first-order effects. This approach is used in the following to test the hypotheses.

3.1. *Participants*

The participants are three random samples of Danish adults contacted in 1998, 1999, and 2000, respectively, for a telephone interview.² In total, 1112 individuals were interviewed in the first interview, which was 58% of those cases where a contact with the right person was established. There were 316 interviewees in 1999 and 279 in 2000. These two latter groups can serve as independent replications to test the stability of the results obtained in the first survey. The mean age was 45/47/46 years (s.d. 15.9/16.7/15.9), 58/54/60 percent were females and 42/46/40 percent males, 31/43/35 percent were college graduates, 75/73/73 percent had children, 80/74/71 percent owned at least one car, and 27/32/35 percent lived in an apartment versus 73/68/65 percent in a single-family house.

² The interviews were carried out by a professional marketing research company, Jysk Analyseinstitut.

3.2. Variables

The questionnaires contained questions about descriptive and injunctive norms as part of a larger instrument consisting of 42 attitudinal items concerning various environmentally responsible behaviours. Answers were given on a 5-point scale. Behaviour questions were asked before the attitude and norm questions. The behaviour item battery was preceded by questions about basic human values (a subset of Schwartz's Value Survey, cf., Schwartz, 1992, 1994) and a battery of questions about the respondent's level of concern about a number of social issues, including, but not limited to, environmental issues. Questions about background characteristics concluded the questionnaire.

Descriptive norms about environmentally responsible behaviour were measured by means of four items: I believe that most of my acquaintances (1) source-separate their "green" kitchen waste for composting or the like, (2) choose organic instead of conventional milk, (3) use energy saving light bulbs anywhere it is possible, (4) take public transport to work, shopping, and the like if the choice is between public transport and the car. Registered on a scale from "totally disagree = 1" to "totally agree = 5." The construct has an acceptable composite reliability ($CR_1 = .82$, $CR_2 = .82$, $CR_3 = .73$).

Injunctive norms about environmentally responsible behaviour were also measured by means of four items: I believe that most of my acquaintances expect that I (1) source-separate my "green" kitchen waste for composting or the like, (2) choose organic instead of conventional milk, (3) use energy saving light bulbs anywhere it is possible, (4) take public transport to work, shopping, and the like if the choice is between public transport and the car. Registered on a scale from "totally disagree = 1" to "totally agree = 5." The construct has an acceptable composite reliability ($CR_1 = .82$, $CR_2 = .79$, $CR_3 = .76$).

Following Kaiser (1998; Kaiser and Wilson, 2000; Kaiser et al., 1999), environmentally responsible behaviour was measured by means of a battery of behaviour items, which varied from very "easy" to very "difficult" ones (i.e., varied in how demanding they were on individual abilities and resources). The 17 behaviour items include a wide range of environmentally responsible behaviours, from purchasing behaviours (organic foods, environment-friendly shampoo, environment-friendly paint, energy saving light bulbs), over travel mode choice (using public transport or cycling when going to work or shopping), to conservation of energy (switch off light, lower the temperature when laundering) and water (close faucet during tooth brushing), and waste handling (source-separating kitchen waste, recycling paper and glass, delivering hazardous waste to special treatment). The behaviour items were questions of the type "How often do you X," where X refers to each of the 17 behaviours, and using a 5-point scale with the labels "never," "rarely," "half the time," "often," and "always/every time."

The measurement philosophy behind this behaviour scale is that the probability of a "correct" response (in this case, performing a specific environmentally responsible behaviour) is a function of person and item parameters (Wright & Masters, 1982). Item parameters refer to the difficulty of the item (i.e., performing the specific environmentally responsible behaviour) while person parameters refer to the individual's attainment level (with regard to behaving in an environmentally responsible way). The higher a person's ability and effort relative to the difficulty of a behaviour item, the higher the probability that he or she performs that behaviour. A behaviour index was constructed as the sum of the scores on the 17 behaviour items. The greater the total score on the behaviour index, the greater the individual level of attainment with regard to environmentally responsible

behaviour. The behaviour scale has an acceptable separation reliability coefficient (.63/.63/.64).

3.3. Results

Table 1 reports the maximum likelihood correlations between descriptive norms, injunctive norms and behaviour in the three surveys, based on confirmatory factor analysis (CFA).

There is a significant ($p < .001$) positive correlation between both of the two norm constructs and behaviour in all three cases, which confirms H1 and H2 (that cooperation in everyday social dilemmas – environment-friendly behaviour in this case – increases with the strength of descriptive as well as injunctive norms for this behaviour). In addition, although not strong enough to cast doubt about the discriminant validity between them (John & Benet-Martinez, 2000), the correlation between the two latent norm constructs is strong and positive. Hence, it seems that if one of these normative beliefs is strongly held, so is the other one in most cases. The strong correlation means that there is a risk of multicollinearity, which needs to be kept in mind when testing the interaction hypothesis (H3). As mentioned previously, residual centering is used in to remove collinearity with regard to the interaction term.

For the test of the interaction hypothesis, a structural equation model using the two norm constructs and their interaction as predictors of behaviour was fitted to the data. A latent interaction variable was estimated based on the 16 product terms that can be calculated from the four items for each of the two norm constructs. Before the calculation of the product terms, the manifest norm items were standardized and the standardized items were used for the SEM. Following Little et al. (2006), each of these product terms were regressed on the eight manifest norm items and the residuals were saved to the data set and used as manifest variables for the latent interaction variable in the SEM analyses. Because each of these residual centered interaction terms is likely to share unique variance with others calculated from one of its constituent variables, the 16 residual centered interaction terms were parcelled into four more aggregate indicators, each based on a cluster of intercorrelated residuals, before including them in the structural equation model.^{3,4}

The small differences between parameter estimates in the three samples reported in Table 1 suggests that the relationships between the analyzed constructs might in fact be identical across samples and time points. In order to test this possibility, a multiple group SEM was performed where an increasing number of equality constraints were successively imposed on the three samples. Parameters were constrained to be equal in the following order: (1) factor loadings, (2) covariances between exogenous constructs, (3) variances of exogenous constructs, (4) regression weights of the structural model, and (5) structural model residual variances. The successively imposed constraints produced a series of nested models, meaning that chi-square difference tests could be used to test their admissibility. According to these tests, which are reported in Table 2, all the equality constraints could

³ A SEM analysis using all 16 interaction terms as manifest variables produces substantially identical results but a worse overall model fit. For space reasons, this analysis is not reported, but it can be acquired from the author.

⁴ The parcelling was based on exploratory factor analysis with varimax rotation and using the Kaiser criterion. The factor analysis produced a four-factor solution with four items loading heavily on each factor. For space reasons, the factor analysis is not reported, but it can be acquired from the author.

Table 1

Maximum likelihood correlations (based on a confirmatory factor analysis) between descriptive norms, injunctive norms and behaviour in three surveys

	Survey 1, $n = 1112$	Survey 2, $n = 316$	Survey 3, $n = 279$
IN-DN	0.73	0.70	0.74
Beh-IN	0.33	0.38	0.41
Beh-DN	0.37	0.37	0.45
CFI	0.98	0.99	0.97
RMSEA	0.05	0.04	0.06
Chisquare/df/ p	75.819/21/.000	30.275/21/.087	44.244/21/.002

Note: For space reasons, only the structural models are reported. The rest of the AMOS output can be acquired from the author.

Table 2

Test of equality constraints in structural equation models for the three samples and time points

Model	$\Delta\chi^2$	DF	p
Equal factor loadings	23.853	18	0.16
+ Equal covariances between exogenous variables	0.365	6	1.00
+ Equal variances of exogenous variables	0.886	6	0.99
+ Equal (structural) regression weights	3.761	6	0.71
+ Equal regression residuals	0.096	2	0.95

Table 3

Structural equation model estimating the relationship between two types of norm and environmentally responsible behaviour

	B	S.E.	C.R.	Beta	p
Injunctive norm (IN)	0.13	0.04	3.471	0.16	.000
Descriptive norm (DN)	0.29	0.06	5.321	0.27	.000
DN \times IN	0.08	0.03	2.806	0.08	.005

Note: $N = 1707$. Explained variance = .17. $\chi^2 = 207.406$ (206), $p = .46$. CFI = 1.00, RMSEA = .002 (90% confidence interval = .000 – .011). For space reasons, only the structural model is reported. The rest of the AMOS output can be acquired from the author.

be imposed without significantly worsening the model fit. Hence, for all practical purposes, the three samples can be treated as one.

Besides the practical advantage of a simpler pattern of results, the multiple group analysis leads to an important substantial conclusion. It shows that the relationships identified by the structural equation model, to be discussed next, are very stable, at least within a time horizon of 2 years. Table 3 reports the parameters of the structural model and the test statistics produced by the last and most restricted of the models reported in Table 2.

The SEM model reported in Table 3 produces an excellent fit to the data. Substantially, Table 3 shows that environmentally friendly behaviour increases with both injunctive and descriptive norms, also when controlling for the other norm construct (the significant first-order effects). In terms of effect sizes, it seems that descriptive norms has a stronger effect

than injunctive norms on environmentally friendly behaviour.⁵ The interaction effect is significant, as predicted by hypothesis 3. Although the effect size of the interaction term is rather modest, the study confirms the predictions made by Bicchieri's norm theory also on this point.

4. Discussion

This paper provides the first empirical test of a new theory about the relationship between social norms and cooperation in social dilemmas, recently proposed by Bicchieri (2006). Bicchieri argues that social norms are an important reason why (some) people cooperate, but only under certain conditions, the most important being that they know the norm and know that it applies to the specific situation. In addition, she suggests that willingness to conform and actually conforming to the norm depends on believing (a) that a sufficient number of others will conform and (b) that a sufficient number of others expect the person to conform. Extant research contains plenty of evidence from both laboratory experiments and survey studies supporting the suggested importance of both beliefs about others' compliance (i.e., descriptive norms) and about others' expectations (i.e., injunctive norms) for cooperation, but to my knowledge, this is the first study to empirically test the proposition that the two types of normative beliefs influence cooperation synergistically rather than additively (i.e., both need to be present for people to cooperate).

The present study provides a number of interesting findings about how social norms are involved in fostering cooperation in everyday social dilemmas. Most importantly, the study confirms that the two types of normative beliefs influence cooperation synergistically rather than additively, as suggested by Bicchieri (2006). In practice, this means that the behavioural impact of either of these norm constructs being below the individual's threshold is stronger than suggested by the linear relationship between the norm construct and behaviour.

As assumed by Bicchieri and also found in a number of previous studies, this study confirms that the two types of normative beliefs are positively and strongly correlated. The strong and positive correlation suggests that the requirement that people need to hold both types of normative beliefs in order to cooperate may be trivial for many everyday social dilemmas: If they hold one of these beliefs, they are likely to hold the other one as well. On the other hand, descriptive and injunctive norms obviously have clear and distinct theoretical meanings and the empirical measures possess discriminant validity. Hence, although they may often be strongly correlated phenomena, they are not one and the same thing. Still, a strong correlation can make it difficult to analytically separate the effects of the two constructs. In addition, when few people hold strong norms of one type without the other, there is not much information available to statistically estimate an interaction effect. This lack of statistical power may be one of the reasons why the interaction effect found in this study was of relatively modest size.

Other studies of behaviours involving a social dilemma also found a strong correlation between descriptive and injunctive norms (e.g., Cialdini, 2003). On the other hand, in a recent meta-analysis of research focusing on personal (mainly health-related) dilemmas, Rivas and Sheeran (2003) reported a moderate sample-weighted average correlation of

⁵ Fixing the first-order paths from the two norm constructs to behaviour to be equal results in a marginally significant worsening of the model fit ($\Delta\chi^2(1) = 3.495, p = .06$).

only .38 between the two constructs. Since social dilemmas are both more social and more moral in nature than personal dilemmas, it seems plausible that people are more likely to make inferences between the two norm constructs with regard to the former than the latter. Future research should investigate this possibility systematically.

Another important finding, which is by no means new, but too often ignored in empirical research, is that people obviously hold normative beliefs, descriptive as well as injunctive, with some uncertainty. In the present study, this uncertainty is reflected in acceptable, but far from perfect, construct reliabilities for multi-item norm constructs. An important implication is that it is vital to correct for measurement error when analyzing (also) this type of data.

Normative beliefs are subjective constructs and there are no other ways of measuring them than by asking people. By measuring norm constructs by means of multiple items and with replications based on independent, random samples of the general population, the evidence regarding the strength of perceived norms in this study is as strong as it comes. Behaviour, on the other hand, is in principle observable. Hence, it is an important limitation of the present study that behaviour is measured by self-reports. It is well documented that self-reported behaviour is often not accurate. People may be unable to accurately report their own behaviour and they may want to manage the impression they give of themselves, which may lead to both random and non-random error in their self-reports (e.g., [Hamilton, 1985](#)). By asking questions about very specific behaviours, which are probably known with less uncertainty and are more difficult to distort than more sweeping behaviour categories, by replicating the question with independent samples, and particularly by measuring a behaviour aggregate by means of a large battery of specific behaviour items, errors and biases are minimized in this study, but they are hardly eradicated completely ([Bazerman, 2006](#)).

A possible limitation of [Bicchieri's \(2006\)](#) theoretical framework is that she does not distinguish conceptually between external and internalized injunctive norms. She mentions that some individuals will need the threat of sanctions or the enticement of rewards to fight the temptation to defect while others will conform without this kind of external inducement, just because they find others' expectations legitimate. However, she treats these two types of motivation as functionally equivalent. In practice it makes a lot of difference whether people need external incentives or not to cooperate, however. Individuals face many everyday social dilemmas in the privacy of their home or in other contexts where social control is not possible. In instances such as these, cooperation will be higher if people need no external inducement to conform. Hence, it is common in social psychology to distinguish between perceived social norms and personal norms ([Schwartz, 1977](#); [Schwartz & Howard, 1982](#)), the latter being internalized norms which have turned into self-expectations and are felt as a personal obligation. A large number of studies have found that personal norms are more strongly related to cooperation than perceived social norms (e.g., [Black, Stern, & Elworth, 1985](#); [Bratt, 1999](#); [Guagnano, Stern, & Dietz, 1995](#); [Harland, Staats, & Wilke, 1999](#); [Heberlein, 1972](#); [Hopper & Nielsen, 1991](#); [Stern, Dietz, Abel, Guagnano, & Kalof, 1999](#); [Thøgersen, 1999](#)). Hence, had we focused on internalized rather than external injunctive norms in the present study, we might have found that injunctive norms had a stronger effect on behaviour and possibly a stronger effect than descriptive norms (cf., e.g., [Thøgersen, 2006](#)). When people conform to a social norm because they find it reasonable and legitimate, not because of the threat of sanctions, they do so for internal reasons. They resist the temptation to defect because they feel it is their obligation to cooperate. I believe that [Bicchieri's](#) theoretical

framework could be strengthened by making a clearer conceptual distinction between normative beliefs that are backed by fear of sanctions and those that need no such inducement, but affects behaviour because the person finds them reasonable and good.

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