



Explaining prosocial intentions: Testing causal relationships in the norm activation model

Linda Steg^{1*} and Judith de Groot²

¹Faculty of Behavioural and Social Sciences, Department of Psychology, University of Groningen, The Netherlands

²Department of Psychology, Bournemouth University, Poole, UK

This paper examines factors influencing prosocial intentions. On the basis of the norm activation model (NAM), we propose that four variables influence prosocial intentions or behaviours: (1) personal norms (PN), reflecting feelings of moral obligation to engage in prosocial behaviour, (2) awareness of adverse consequences of not acting prosocially, (3) ascription of responsibility for the negative consequences of not acting prosocially, and (4) perceived control over the problems. We conducted a series of experimental studies to examine how the NAM variables are causally related. As hypothesized, problem awareness, responsibility, and outcome efficacy played an important role in the development of PN and various types of prosocial intentions in the social as well as environmental domain.

Why do people donate money to charity, demonstrate to fight child labour, donate blood, or recycle, even when these behaviours are associated with relatively high individual costs or discomfort? Acts like these are examples of prosocial behaviour, that is, acts that benefit another person or other persons (Aronson, Wilson, & Akert, 2005). Schwartz and colleagues (Schwartz, 1977; Schwartz & Howard, 1981) proposed the norm activation model (NAM) to explain prosocial behaviours, in which prosocial behaviour is expected to follow from personal norms (PN) reflecting ‘feelings of moral obligation to perform or refrain from specific actions’ (Schwartz & Howard, 1981, p. 191). According to Schwartz (1977), PN are activated by four key situational variables. First, problem awareness (PA), which is defined as the extent to which someone is aware of the adverse consequences of not acting prosocially for others or for other things one values. Schwartz (1977) labelled this variable as awareness of need. Second, ascription of responsibility (AR) reflecting feelings of responsibility for the negative consequences of not acting prosocially. Third, outcome efficacy (OE) defined as the identification of actions to relieve the needs of others or things one values. Fourth, one should recognize own ability to provide relief.

* Correspondence should be addressed to Professor Dr Linda Steg, Faculty of Behavioural and Social Sciences, Department of Psychology, University of Groningen, Grote Kruisstraat 2/1, 9712 TS Groningen, The Netherlands (e-mail: e.m.steg@rug.nl).

Initially, the NAM has typically been applied to explain various types of prosocial intentions and behaviours, such as blood or bone marrow donations (e.g., Schwartz, 1970, 1973; Zuckerman & Reis, 1978), volunteering (Schwartz & Fleishman, 1982; Schwartz & Howard, 1980), and helping in emergency situations (Schwartz & Clausen, 1970; Schwartz & David, 1976). These studies did not test the full NAM; in most cases, only a limited set of NAM variables were included.

Later, the NAM has been applied to study why people engage in pro-environmental actions (e.g., Thøgersen, 1996). Pro-environmental behaviour is considered to be prosocial behaviour, because pro-environmental behaviour also entails that people benefit others, whereas often, no direct individual benefits are received by engaging in these behaviours (e.g., De Groot & Steg, 2009). These studies typically did not include all variables included in the original NAM either. In particular, ability was typically not included in the studies, and mostly, either AR or OE was included. The NAM appeared to be successful in explaining various types of pro-environmental intentions and behaviours, among which energy conservation (Black, Stern, & Elworth, 1985; Tyler, Orwin, & Schurer, 1982), willingness to pay for environmental protection (Guagnano, 2001; Guagnano, Dietz, & Stern, 1994), willingness to reduce car use (Eriksson, Garvill, & Nordlund, 2006), using the car for short distances and closing the faucet while brushing teeth (Harland, Staats, & Wilke, 2007), recycling (Bratt, 1999; Hopper & Nielsen, 1991; Schultz, 1999; Vining & Ebreo, 1992), political behaviour (e.g., Gärling, Fujii, Gärling, & Jakobsson, 2003), environmental citizenship (e.g., Stern, Dietz, Abel, Guagnano, & Kalof, 1999), policy acceptability (e.g., De Groot & Steg, 2009; Steg, Dreijerink, & Abrahamse, 2005), and general pro-environmental behaviour (Nordlund & Garvill, 2002; Schultz *et al.*, 2005).

Thus, various studies found support for the NAM, in the social as well as environmental domain. However, there is some confusion about how to interpret the NAM, which makes it hard to draw definite conclusions on the merits of this model. Three major issues can be identified. First, the operationalization of the main constructs of the NAM differs across studies.¹ Some studies measured PA, OE and AR beliefs on a general level such as beliefs on general environmental conditions (e.g., Gärling *et al.*, 2003; Stern *et al.*, 1999), while other studies included behaviour-specific PA, OE and AR beliefs (e.g., De Ruyter & Wetzels, 2000; Hunecke, Blöbaum, Matthies, & Höger, 2001; Nordlund & Garvill, 2003; Steg *et al.*, 2005; Van Liere & Dunlap, 1978; see also Harland *et al.*, 2007). As behaviour-specific beliefs are generally more strongly related to intentions and behaviours than are general beliefs (e.g., Ajzen, 1985; Eagly & Chaiken, 1993; Nordlund & Garvill, 2003), the predictive power of the NAM can be enhanced by tuning PA, OE and AR beliefs as well as PN towards the particular intention or behaviour to be explained (see also Schwartz, 1977). Therefore, we propose that PA, OE and AR beliefs can best be measured on a behaviour-specific level.

Second, scholars have confused AR and OE. Some scholars conceptualize AR as feelings of responsibility for (social or environmental) problems caused by individual behaviour (e.g., Bamberg & Schmidt, 2003; Hopper & Nielsen, 1991; Schwartz, 1977), whereas others focused on the evaluation of the extent to which one can contribute to effective solutions and thus OE (e.g., Stern *et al.*, 1999; Van Liere & Dunlap, 1978). It is important to clearly distinguish responsibility feelings from perceptions of being able to

¹ Another problem is that the key constructs of the NAM are labelled differently across studies. This implies that the labels we use in this paper may differ from those employed by the authors we refer to.

control the outcomes of behavioural choices, as Schwartz (1977) did. Even though people may feel responsible for a particular problem, OE can be low (and the other way around). In line with Schwartz (1977), we define AR as feelings of responsibility for the problems, while we label the extent to which a person believes he or she can control the relevant problems as OE² (cf. Bandura, 1977; Kerr, 1992). OE is particularly important in case of large-scale problems that can only be solved when many people cooperate, such as reducing harmful emissions, donating money to charity, and banning slavery and child labour. In such cases, perceived control over the outcomes strongly depends on the expectation that others will engage in prosocial actions. In fact, many social and especially environmental problems are related to collective actions, which makes it highly relevant to study the role of OE (cf. Harland *et al.*, 2007). In such cases, it is likely that feelings of moral obligation will only be felt and prosocial intentions or behaviours will only develop when people have the idea that their contribution will matter, and that others will contribute too. We will include either AR or OE in our studies to examine whether both are related to PA and PN in a similar way.

Third, the causal relationships between model variables have been interpreted differently. As mentioned above, besides PA, PN, and behaviour, most studies include either AR or OE, and use AR and OE in an interchangeable way. Therefore, we will refer to AR/OE. At least three model interpretations have appeared in the literature: (1) the relationship between PN and intention or behaviour is moderated by PA and AR/OE (e.g., Hopper & Nielsen, 1991; Schultz & Zelezny, 1998; Schwartz, 1973, 1977; Schwartz & Howard, 1980; Vining & Ebreo, 1992), (2) PA influences AR/OE, AR/OE influence PN, and PN influence intention and behaviour (e.g., Gärling *et al.*, 2003; Nordlund & Garvill, 2002, 2003; Steg *et al.*, 2005; Stern *et al.*, 1999; see also Schwartz & Howard, 1981 and Figure 1a), and (3) both PA and AR/OE influence PN, while PN in turn influence intention and behaviour (e.g., Bamberg & Schmidt, 2003; Harland *et al.*, 2007, see Figure 1b). The first interpretation refers to a moderator model, while the other two interpretations assume a sequential or mediation model.

De Groot and Steg (2009) compared the moderator model in which it is assumed that PA and AR/OE moderate the relationship between PN and behaviour with the model shown in Figure 1a in a series of five studies, and found most consistent support for the mediation model. Osterhus (1997) compared the same moderator model with the model shown in Figure 1b, and found that PN mediated the relationship between PA and behaviour, while a moderator effect was found for AR. However, Osterhus conceptualized AR differently, as the extent to which households in general (rather than the particular individual) are responsible for energy problems, and whether households can do something about it. De Ruyter and Wetzels (2000) found support for the mediation model, but not for the moderator model. Unfortunately, however, they did not include PA in their study. Overall, these studies seem to validate the mediation models, while support for the moderator model was very weak and inconsistent, suggesting that the moderator model is less likely. Therefore, we will not test the moderator model in this study. Besides, theoretically, it makes sense that PA and AR/OE play an important role in the development of PN, that is, it is not likely that

² Schwartz (1977) and Schwartz and Howard (1981) conceptualized OE as identification of particular actions which can relieve the problem. We think this definition is too limited in case of large-scale social problems, because people may perceive possible actions, but still think these actions are not worthwhile because they do not expect that others would engage in these actions too. So, we prefer to conceptualize OE as the extent to which a person feels in control over the problem.

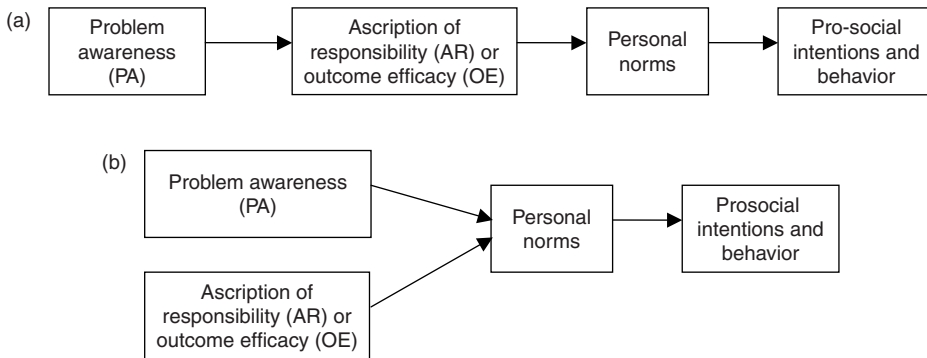


Figure 1. (a) First interpretation of the NAM (referred to as model 1 in the text). (b) Second interpretation of the NAM (referred to as model 2 in the text).

people will think about their obligation to help others or the biosphere when they are not aware that their help is needed, and when they do not think they can do anything to reduce a particular problem (cf. De Groot & Steg, 2009). This implies that the moderator model is theoretically less plausible.

This leaves the question open which of the two sequential or mediation models is most credible. To the authors' knowledge, the plausibility of both sequential or mediator models has not been compared. This is the major aim of the present paper. As correlational (path) analyses have some serious problems (e.g., Trafimow, 2006), and to be able to draw solid conclusions on causal relationships between the NAM variables, we will follow experimental research designs. Most confusion concerns the causal relationships between PA and AR or OE: does PA influence AR or OE (model 1, see Figure 1a), or does PA not influence AR or OE (model 2, see Figure 1b)? We hypothesize that we would find most support for model 1 (see Figure 1a). This model is in line with the original propositions of Schwartz and Howard (1981), who argued that an individual will consider whether effective actions can be taken to reduce the problem (OE) when PA is high. Also, this model is theoretically most plausible, because it is not likely that one will feel responsible for acting prosocially or think about the effectiveness of possible actions without knowing whether not acting prosocially is a problem (cf. De Groot & Steg, 2009). After all, why would a person consider his or her responsibility for social problems and possible ways to contribute to the solution of these problems when he or she is not aware of the particular problems? This implies that we assume that AR or OE do not influence PA (which is in line with both models 1 and 2).³ Model 1 will be supported if PA does influence AR or OE, while AR or OE does not influence PA. If PA does not influence AR or OE, model 2 is supported. Moreover, in case model 2 is true, AR or OE should again not influence PA. Furthermore, both models assume that PA and AR/OE influence PN, intentions, and behaviour. We will also examine possible interactions between PA and AR or OE, and thus examine whether AR or OE moderate the effect of PA on PN and intentions, or whether PA moderates the relationship between AR/OE and PN and intentions, for example, are PN or intentions

³ By manipulating OE, we inform respondents about possible actions to reduce a social problem. This can result in a stronger PN or intention, even when PA is low, because respondents might feel obliged to contribute to the solution of the relevant problem, even when this problem is not very severe. Gardner and Stern (2002) refer to this as 'why take any chance' behaviour.

only developed when both PA and AR or OE are high, or is PA or AR/OE sufficient to activate PN? We conduct these analyses only for the sake of completeness, and not to test the plausibility of models 1 or 2.

Following the procedure above, it is not clear whether AR or OE mediate the relationship between PA and PN (in the sense that PA should only affect behaviour indirectly, via AR or OE), or whether we should rather speak of a sequential model in which PN are activated through successive steps, as suggested by Schwartz and Howard (1981). A sequential model implies that PA should influence AR/OE, while AR/OE should not influence PA, but PA may have an indirect as well as a direct effect or even only a direct effect on PN, independent on AR/OE. We will conduct tests of mediation to examine if AR/OE mediate the effect of PA on PN. This reveals whether the NAM should be interpreted as a mediator or a sequential model.

We report results of three studies that focus on different types of prosocial intentions as indicators for prosocial behaviour. We investigate the role of responsibility feelings (Study 1) as well as OE (Studies 2 and 3). In the first study, we manipulate PA and examine how PA influences AR, PN, and behavioural intention. In Studies 2 and 3, we manipulate PA and OE, and examine how these variables influence each other and how they influence PN, and behaviour intention. We operationalized all model variables on a behaviour-specific level, as explained earlier. To test the robustness of our findings, we focus on three different types of prosocial intentions (intention to demonstrate against the establishment of methadone point in one's neighbourhood, willingness to ban products that are produced by children) and pro-environmental intention (intention to participate in actions to reduce emissions of particulate matters). Also, we included different samples in our studies, that is, general population as well as student samples.

STUDY 1

Study 1 examined the effect of PA on AR, PN, and intention. More specifically, we examined to what extent information about health problems associated with emissions of particulate matters by diesel-driven vehicles influenced perceived responsibility to reduce these problems, feelings of moral obligation to contribute to solutions to reduce these problems, and intention to participate in actions to reduce emissions of particulate matters.

Method

Participants and design

In total 74 respondents completed the questionnaire, of which 22 were male and 50 female; for 2 respondents sex is not known. Age varied from 18 to 80 years ($M = 27$, $SD = 12.84$). The study had a single factor (PA: low or high) between-subjects design.

Procedure

Participants were recruited in a restaurant of a department store in the city of Groningen, The Netherlands. They were randomly assigned to one of the experimental conditions. Participants filled out a paper-and-pencil questionnaire consisting of four parts. First, they completed a brief questionnaire on values (not to be discussed here). The second task contained the manipulation of PA. Third, participants completed

measures of the manipulation check and dependent variables. The fourth part comprised questions on socio-demographics.

Manipulation of PA

Respondents were presented with a text on particulate matters. In the high PA condition ($N = 39$), health problems associated with particulate matters were stressed, whereas in the low PA condition ($N = 35$), these health problems were trivialized. In both conditions, participants were informed that they could help to reduce the emissions of particulate matters by participating in actions to persuade the municipality to establish distribution centres at the outskirts of the town where goods can be transferred from diesel-driven trucks to smaller and cleaner vehicles that can supply stores and companies in the city.

Manipulation check

PA was measured by three items: 'I worry about health problems caused by emissions of particulate matters by diesel-driven trucks', 'Particulate matters are a problem for society', and 'I believe that particulate matters cause serious health problems, such as problems with bronchi'. Scores on all items could range from 1 'fully disagree' to 5 'fully agree'. Mean scores on the three items were computed ($M = 3.1$, $SD = 1.07$, $\alpha = .85$). The manipulation of PA proved to be successful: PA was higher in the high PA condition ($M = 3.5$, 95% CI = 3.2, 3.9) compared to the low PA condition ($M = 2.9$, 95% CI = 2.6, 3.2; $F(1, 72) = 7.54$, $p = .005$).

Dependent variables

Items reflecting AR and PN were put in random order (together with items reflecting the manipulation check, see above). Scores on all items could range from 1 'fully disagree' to 5 'fully agree'. AR was measured by four items: 'I feel responsible to demonstrate for the establishment of distribution centres', 'I feel responsible to do something against the high concentration of particulate matters in Groningen', 'I feel responsible to demonstrate for the reduction of emissions of particulate matters', and 'I believe that I am co-responsible for the reduction of particulate matters in the city'. So, the measure of AR focused on feeling responsible for doing something to reduce the problems rather than feeling responsible for causing the problem because the emission of particulate matters are mainly caused by diesel-driven trucks and not by participants' behaviour. Mean scores of AR items were computed ($M = 1.8$, $SD = 0.91$, $\alpha = .90$). The following items were included to measure PN: 'I feel morally obliged to demonstrate against particulate matters', 'I feel good when I demonstrate against particulate matters', 'I feel guilty when I would *not* dedicate myself for the problems due to particulate matters in Groningen', 'I feel morally obliged to try to reduce the emission of particulate matters in Groningen'. Mean scores were computed ($M = 2.5$, $SD = 0.50$, $\alpha = .88$). One participant did not complete all four items, and was omitted from the analyses.

Intention to participate in actions to reduce emissions of particulate matters was measured by asking participants to what extent they would be prepared to participate in the following actions to convince the municipality to establish distribution centres at the outskirts of the town: sign a petition, put an action poster on the window at home, place flyers at their work or school, collect signatures, participate in a demonstration, and write a letter to the municipality. For each action, scores could range from

1 'definitively not', 2 'probably not', 3 'probably', and 4 'definitively'. Mean scores were computed ($M = 1.9$, $SD = 0.60$, $\alpha = .82$).

Results

Multivariate analysis of variance (MANOVA) revealed that, as expected, a higher PA resulted in stronger AR, PN, and intention to participate in actions to reduce the emission of particulate matters: $F(3, 70) = 5.06$, $p = .003$. In line with our prediction, participants in the high PA condition felt more responsible to reduce the emission of particulate matters ($M = 2.2$, 95% CI = 1.8, 2.5) compared to participants in the low PA condition ($M = 1.5$, 95% CI = 1.2, 1.7); $F(1, 72) = 13.24$, $p < .001$. Moreover, PN were significantly higher in the high PA condition ($M = 2.6$, 95% CI = 2.4, 2.8) compared to the low PA condition ($M = 2.3$, 95% CI = 2.2, 2.4); $F(1, 72) = 7.49$, $p = .008$. Also, intention to take action was higher in the high PA condition ($M = 2.1$, 95% CI = 1.8, 2.3) compared to the low PA condition ($M = 1.6$, 95% CI = 1.5, 1.8); $F(1, 72) = 9.71$, $p = .003$.

A test of mediation, following the procedure proposed by Baron and Kenny (1986),⁴ revealed that AR indeed mediated the effect of PA (as measured in the manipulation check) on PN (Sobel test: $t = 5.25$, $p < .001$): PA was no longer significantly related to PN when AR was controlled for.

Discussion

The results support the first interpretation of the NAM: a higher PA resulted in a stronger AR. Thus, PA influenced AR, which implies that AR is not independent from PA, as suggested in the second interpretation of the NAM. Also, we found that AR fully mediated the effect of PA on PN.

The measures of AR and PN were strongly correlated ($r = .73$), suggesting that the conceptual difference between both concepts is not strong. This may be due to the way we conceptualized AR, that is, we focused on feeling responsible for doing something to reduce the problems rather than feeling responsible for causing the problem. In fact, we needed to do so because we indicated that particulate matters are particularly emitted by diesel-driven trucks. So, participants could only feel responsible for doing something to reduce the problems, since they were not responsible for causing the problems. Our results suggest that in such cases, AR has little added value to PN. Other studies also reported strong relationships between AR and PN. For example, Hunecke *et al.* (2001) found that AR and PN items loaded on the same factor in a principal components analysis, and formed a reliable scale. Therefore, in Studies 2 and 3, we focus on OE rather than AR. We argue that, theoretically, it is plausible to focus on OE, as one has to become aware of problems (high PA), and realize that something can be done about it (high OE)

⁴ All mediation analyses were conducted following the procedure suggested by Baron and Kenny (1986). We used the manipulation check data to test for mediation effects. Due to space restrictions, we do not report full results, but in all cases, the key criteria to establish mediation were met, that is direct relationships were found between (1) the independent variable and the mediator, (2) the independent variable and the dependent variable, and (3) the mediator and the dependent variable. We only report the extent to which the direct effect of the independent variable weakened or even disappeared when the mediator was included into the model as well. We used the Goodman version of the Sobel test (Preacher & Leonardelli, 2005) to test the significance of the mediation effects.

to activate PN and promote prosocial intentions and behaviour. If OE is low, feelings of moral obligation can be easily trivialized (see Lindenberg & Steg, 2007), especially in cases where collective action is needed to alleviate these problems. If people are not convinced that their contribution will matter, and that others will do their bit as well, it is likely that feelings of moral obligation will be low.

The manipulation of PA was a bit unbalanced as different information was provided in both conditions. For example, in the low PA condition, we referred to norms on emissions of particulate matters in Groningen, while we did not so in the high PA condition. This may have affected the results, that is, the effects may not purely be caused by differences in the seriousness of the problems described, but also because slightly different information was provided. To rule out this probability, we will manipulate PA in a more controlled way in the next studies.

STUDY 2

In Study 2, we manipulated both PA and OE and examined to what extent these variables affect PN and prosocial intentions in the social domain. We studied to what extent PA and OE affect individuals' intention to demonstrate to prevent the establishment of methadone point in their neighbourhood.

Method

Participants and design

In total 102 citizens of Groningen completed a questionnaire, of which 53 (51%) were male. Age varied from 20 to 70 years ($M = 40$, $SD = 11.75$); 14 respondents did not indicate their age. The study had a two-factor (PA: low or high; OE: low or high) between-subjects design.

Procedure

Participants were selected from different neighbourhoods in the city of Groningen that would be likely locations for a methadone point. A research assistant rang at the door at each house in the selected neighbourhoods, and asked whether people were willing to participate in a study on methadone points in the city. Those who agreed to participate received a questionnaire. The research assistant made an appointment to collect the questionnaire 4–5 days later; at this time, participants were debriefed.

The questionnaire consisted of five parts. First, respondents completed questions on values. The second task contained the manipulation of PA and OE. Participants were randomly assigned to one of the experimental conditions. The third task comprised the manipulation check and dependent variables. Fourth, they completed questions on socio-demographics. Finally, respondents completed the rational–experiential inventory (Epstein, Pacini, Denes-Raj, & Heier, 1996). The first and last parts of the questionnaire are not discussed here.

Manipulation of PA

Participants were presented with a text on the possible establishment of a methadone point in their close neighbourhood. In both conditions, it was stressed that the

municipality needs to establish a new methadone point in a residential area, because they aim to replace the use of heroin by methadone. The methadone point would provide methadone 5 mornings and 3 evenings a week, and provide washing and showering facilities for drug addicts. In the low PA condition ($N = 49$), it was indicated that methadone points do not affect criminality and safety of neighbourhoods (e.g., residents feel very safe because drug addicts are taken care of at the methadone point), while in the high PA condition ($N = 53$), it was stressed that methadone points attract criminal and violent activities (e.g., residents feel unsafe due to the presence of drug addicts). The text was illustrated with a picture of a neighbourhood with a methadone point, showing a run-down (low PA), or a nice neighbourhood (high PA). Also, two graphs were shown. The first graph showed that in the low PA condition, mean satisfaction with the neighbourhood was high and did not differ for neighbourhoods with and without a methadone point, while in the high PA condition mean satisfaction was much lower and below the mid-point of the scale in the neighbourhood with a methadone point compared to a neighbourhood without a methadone point. The second graph showed that the number of burglaries and violent offences in neighbourhoods with a methadone point was similar (low PA) or about 10 times as high (high PA) compared to a neighbourhood without a methadone point.

Manipulation of OE

OE was manipulated by providing information on the number of neighbours willing to participate in demonstrations, and the extent to which the municipality is responsive to such demonstrations. In the low OE condition ($N = 54$), it was argued that only six residents indicated that they are willing to demonstrate, and that the municipality usually does not adapt her plans, whereas in the high OE condition ($N = 48$), it was argued that 180 residents are willing to demonstrate and that the municipality is likely to change their plans when citizens provide good arguments to do so.

Manipulation check

To examine whether our manipulations had been successful, manipulation checks of PA and OE were included.⁵ These items were put in random order, together with items reflecting PN (see dependent variables). Scores could range from 1 'fully disagree' to 6 'fully agree'. Problem awareness was measured with six items: 'A methadone point in my neighbourhood will result in increased levels of violent offences and criminality', 'I will be less satisfied with my living conditions when a methadone point will be established in my neighbourhood', 'A methadone point will result in more injection needles on the streets which causes a risk of infections (HIV) to children', 'A methadone point in my neighbourhood will result in increasing burglaries', 'I will be more satisfied with my living conditions when a methadone point would be established in my neighbourhood (reverse coded)', and 'I would feel less safe when a methadone point would be established in my neighbourhood'. Mean scores on these six items were computed ($M = 4.2$, $SD = 1.29$, $\alpha = .93$). One participant did not complete all six problem awareness items, and was omitted from the analyses. Outcome efficacy was measured by five items: 'I think we can prevent the establishment of a methadone point

⁵ PA and OE were used as dependent variables as well, when examining effects of PA on OE and vice versa. In this case, we used the manipulation check data as dependent variable, and do not use the acronyms PA and OE.

by demonstrating', 'It is pointless to collect signatures to prevent the establishment of a methadone point (reverse coded)', 'I think collecting signatures can prevent the establishment of a methadone point', 'Organising a demonstration to prevent the establishment of a methadone point will be a waste of time and not be effective (reverse coded)', and 'I think it is useful to demonstrate against the establishment of a methadone point in my neighbourhood'. Mean scores on these items were computed ($M = 3.9$, $SD = 1.17$, $\alpha = .88$).

Analysis of variance (ANOVA) revealed that the manipulation of PA was successful: $F(1, 98) = 108.16$, $p < .001$. In the low PA conditions, respondents reported lower levels of PA ($M = 3.2$, 95% CI = 2.9, 3.5) compared to the high problem awareness condition ($M = 5.1$, 95% CI = 4.9, 5.3). The manipulation of outcome efficacy was successful as well: $F(1, 98) = 37.82$, $p < .001$. OE was lower in the low OE condition ($M = 3.3$, 95% CI = 3.0, 3.6) compared to the high OE condition ($M = 4.5$, 95% CI = 4.3, 4.8).

Dependent variables

PN were measured by means of five items: 'I feel guilty when I would not donate money to an action committee that tries to prevent the establishment of a methadone point in my neighbourhood', 'I feel morally obliged to demonstrate against the establishment of a methadone point in my neighbourhood', 'I feel morally obliged to sign a petition against the establishment of a methadone point in my neighbourhood', 'I feel morally obliged to collect signatures against the establishment of a methadone point in my neighbourhood', and 'I feel guilty if others demonstrate against the establishment of a methadone point while I do nothing'. Mean scores on the 5 items were computed ($M = 2.8$, $SD = 1.30$, $\alpha = .90$).

Intention to demonstrate was measured by asking respondents to what extent they would be willing to participate in the following activities aimed at preventing the establishment of a methadone point in their neighbourhood: sign a petition, collect signatures, participate in a protest march, organize a protest march, and donate money to an action committee that tries to prevent the establishment of a methadone point. Scores varied from 1 (certainly not) to 6 (certainly yes). Mean scores on these items were computed ($M = 3.2$, $SD = 1.50$, $\alpha = .93$).

Analyses

As we were also interested in effects of problem awareness on outcome efficacy and effects of outcome efficacy on problem awareness, we conducted a 2 (PA) \times 2 (OE) MANOVA to examine effects of PA, OE, and the interaction of PA and OE on PA, OE, PN, and intention.

Results

We found a main effect of PA ($F(4, 95) = 29.23$, $p < .001$), a main effect of OE ($F(4, 95) = 9.79$, $p < .001$), and a marginally significant interaction effect ($F(4, 95) = 2.20$, $p = .075$). Below, we report the results of the univariate analyses for each variable separately.

As expected, outcome efficacy was lower in the low PA condition ($M = 3.6$, 95% CI = 3.3, 3.9) compared to the high PA condition ($M = 4.1$, 95% CI = 3.8, 4.4): $F(1, 98) = 5.22$, $p = .024$. In line with our expectations, OE did not influence problem awareness: $F(1, 98) = .31$, $p = .578$. Also, no significant interaction effects were found.

For PN, we found a main effect of PA, $F(1, 98) = 19.43$, $p < .001$, a marginally significant main effect of OE, $F(1, 98) = 3.15$, $p = .079$, and a significant PA \times OE interaction, $F(1, 98) = 5.96$, $p = .016$. As expected, PN were less strong in the low PA condition ($M = 2.3$, 95% CI = 1.9, 2.6) than in the high PA condition ($M = 3.3$, 95% CI = 3.0, 3.7). Moreover, as hypothesized, PN were somewhat weaker in the low OE condition ($M = 2.6$, 95% CI = 2.3, 3.0) compared to the high OE condition ($M = 3.1$, 95% CI = 2.7, 3.4). Interestingly, PN were weakest when both PA and OE were low (see Table 1). A contrast analysis revealed a significant contrast between the low PA and low OE condition and the other three conditions: $t(98) = 5.09$, $p < .001$.

Table 1. Means (SDs) scores on PN and intention to agitate against the establishment of a methadone point as a function of PA and perceived effectiveness of own contribution to prevent the establishment of a methadone point (OE)

	Low PA		High PA	
	Low OE, N = 27	High OE, N = 22	Low OE, N = 27	High OE, N = 26
Personal norm	1.9 (0.72)	2.8 (1.49)	3.4 (1.32)	3.3 (1.00)
Intention to agitate against methadone point	1.9 (0.82)	3.2 (1.58)	3.5 (1.33)	4.2 (1.23)

A test of mediation⁴ revealed that outcome efficacy (as measured in the manipulation check) indeed partly mediated the effect of problem awareness (as measured in the manipulation check) on PN (Sobel test: $t = 2.62$, $p = .009$): the relationship between PA and PN was significantly weaker when OE was controlled for.

For intention, we found a main effect of PA, $F(1, 98) = 28.62$, $p < .001$, a main effect of OE, $F(1, 98) = 15.15$, $p < .001$, but no PA \times OE interaction, $F(1, 98) = 1.05$, $p = .307$. Respondents in the high PA condition were more willing to agitate against a methadone point ($M = 3.9$, 95% CI = 3.5, 4.2) than respondents in the low PA condition ($M = 2.5$, 95% CI = 2.1, 2.9). Also, respondents in the high OE condition were more willing to demonstrate against a methadone point ($M = 3.7$, 95% CI = 3.3, 4.2) compared to respondents in the low OE condition ($M = 2.7$, 95% CI = 2.4, 3.1). Intention to demonstrate was lowest when both PA and OE were low and highest when both PA and OE were high, but, as indicated above, this interaction effect was not significant.

Discussion

This study again supports the first interpretation of NAM. As expected, PA influenced OE, but OE did not influence PA. Moreover, both PA and OE affected PN and intention in the expected direction. Also, OE partly mediated the effect of PA on PN. We also found an interaction effect: PN were weakest when both PA and OE were low. However, this interaction effect was not significant for intention, although mean scores differed in the same direction. The finding that PN are weakest when both PA and OE are low is not in contradiction with models 1 and 2. It suggests that either a high PA or a high OE is sufficient to arouse feelings of moral obligation to demonstrate against the

establishment of a methadone point in one's neighbourhood; a high PA and OE does not have a significant added effect, though.

In line with our conceptualization of OE, we manipulated OE by providing information on perceived control over the outcomes of acting prosocially as well as on whether others would demonstrate too. As explained in Introduction section, the latter is highly relevant when studying collective actions as individual efforts are negligible when others do not do their bit as well. However, information on the behaviour of others also makes behavioural norms salient, which may have had an independent effect on behaviour. To rule out this alternative explanation, in Study 3, we manipulate OE more narrowly, and stress perceived control over the outcomes only.

Intention to demonstrate against the establishment of a methadone point and intention to participate in actions to reduce local emissions of particulate matters are local problems, for which involvement of individuals is probably high. It has to be demonstrated yet whether these results will be replicated in another setting. Effects may be weaker when dealing with problems for which individual involvement is lower, e.g., in case of large-scale problems that are not apparent in one's close neighbourhood. This will be explored in the next study.

STUDY 3

Study 3 aimed to replicate the findings of Study 2 in another behavioural domain and with another indicator of behavioural intention. Again, both PA and OE were manipulated. This time, we examined to what extent PA and OE affect PN and individuals' willingness to ban products that are produced by children.

Method

Participants and design

Participants in the study were undergraduates at the University of Groningen who were recruited from the Psychology Department's Human Participant Pool in 2007 and received course credits for participation. In total 92 students completed a questionnaire, of which 25% were male. Age varied from 18 to 31 years ($M = 21$, $SD = 2.57$). The study had a two-factor (PA: low or high; OE: low or high) between-subjects design.

Procedure

The questionnaire consisted of four parts. First, respondents completed a brief questionnaire on values (not to be discussed here). The second task contained the manipulation of PA and OE. Participants were randomly assigned to one of the experimental conditions. The third task comprised the manipulation check and dependent variables. Fourth, they completed questions on socio-demographics.

Manipulation of PA

Respondents were presented with a text on child labour. This time, we manipulated PA by either stressing the negative aspects such as bad working conditions (high PA condition; $N = 47$) or the positive aspects of child labour such as the need to earn sufficient money to survive (low PA condition; $N = 45$).

Manipulation of OE

OE was manipulated by providing information on the extent to which protest actions to ban child labour are successful. First, all respondents read the following text: 'Various campaigns are organised at companies that sell products that are produced by children. Moreover, petitions are organised to pressurise these companies. Furthermore, a quality mark is being developed to recognise products that are not produced by children. These protest actions serve two goals. First, to urge companies to no longer offer products made by children. Second, to persuade consumers to boycott products that are produced by children'. Next, in the low OE condition ($N = 44$), it was stressed that the protest actions were not very successful, whereas in the high OE condition ($N = 48$), it was argued that the protest actions were successful. No reference was made about the number of others protesting.

Manipulation check

Manipulation checks of PA and OE were put in random order, together with items reflecting PN and intention (see dependent variables).⁵ Scores could range from 1 'fully disagree' to 7 'fully agree'. Problem awareness was measured by the following items: 'I think child labour is a serious problem', 'I am worried about child labour', 'Child labour seriously harms the health of children', 'Child labour is not a serious problem (reverse coded)', and 'Child labour is not a serious problem, because families in the Third World need the extra income to survive' (reverse coded). Mean scores on these 5 items were computed ($M = 4.8$, $SD = 0.75$, $\alpha = .72$). Outcome efficacy was measured by five items: 'I think it is pointless to demonstrate against child labour (reverse coded)', 'I think it is useful to donate money to an organizations that tries to ban child labour', 'I think I can contribute to the banning of child labour', 'It is not useful to develop quality marks to ban child labour (reverse coded)', and 'I think it is effective to demonstrate to ban child labour'. Mean scores on these items were computed ($M = 4.5$, $SD = 0.93$, $\alpha = .73$). ANOVA revealed that the manipulation of PA was successful: $F(1, 88) = 12.77$, $p < .001$. In the low PA conditions, respondents reported lower levels of problem awareness ($M = 4.5$, 95% CI = 4.3, 4.8) compared to the high PA condition ($M = 5.1$, 95% CI = 4.9, 5.2). ANOVA revealed that the manipulation of OE was successful as well: $F(1, 88) = 10.98$, $p < .001$. Outcome efficacy was lower in the low OE condition ($M = 4.2$, 95% CI = 3.9, 4.5) compared to the high OE condition ($M = 4.8$, 95% CI = 4.6, 5.0).

Dependent variables

PN were measured by means of the following items: 'I feel morally obliged to demonstrate against child labour', 'I feel guilty if I do not participate in actions against child labour', 'I feel personally obliged to support protest actions aimed to ban child labour', 'I would violate my principles when I would not fight for the banning of child labour', and 'I feel personally obliged to boycott products that are produced by children'. Mean scores on the five items were computed ($M = 3.5$, $SD = 1.15$, $\alpha = .89$). Willingness to ban products produced by children was measured by the following three items: 'I am willing to pay higher prices for products that have not been produced by children', 'I would boycott companies that sell products that are produced by children', and 'If I know that a product is produced by children, I will not buy it'. Mean scores on these three items were computed ($M = 4.6$, $SD = 1.30$, $\alpha = .83$).

Analyses

Again, we conducted a PA \times OE MANOVA to examine effects of PA, OE, and the interaction of PA and OE on problem awareness, outcome efficacy, PN, and intention.

Results

We found a main effect of PA ($F(4, 85) = 3.56, p = .010$), a main effect of OE ($F(4, 85) = 3.18, p = .018$), and no significant interaction effect ($F(4, 85) = 0.22, p = .926$). Below, we report the results of the univariate analyses for each variable separately.

As expected, outcome efficacy was lower in the low PA condition ($M = 4.2, 95\% \text{ CI} = 4.0, 4.5$) compared to the high PA condition ($M = 4.8; 95\% \text{ CI} = 4.6, 5.1$): $F(1, 88) = 11.10, p < .001$. In line with our expectations, OE did not influence problem awareness: $F(1, 88) = 1.65, p = .203$. No significant interaction effects were found.

PA had a significant effect on PN ($F(1, 88) = 6.52, p = .012$). Table 2 shows that PN were less strong in the low PA condition ($M = 3.2, 95\% \text{ CI} = 2.9, 3.5$) than in the high PA condition ($M = 3.9, 95\% \text{ CI} = 3.5, 4.1$). Also, PN were less strong in the low OE condition ($M = 3.3, 95\% \text{ CI} = 2.9, 3.6$) than in the high OE condition ($M = 3.7, 95\% \text{ CI} = 3.4, 4.1$): $F(1, 88) = 4.11, p = .046$. No significant interaction effect was found ($F(1, 88) = 0.106; p = .746$).

Table 2. Means scores (*SDs*) on PN and willingness to ban products produced by children as a function of PA and perceived effectiveness of own contribution to protest against child labour (OE)

	Low PA		High PA	
	Low OE, N = 27	High OE, N = 24	Low OE, N = 25	High OE, N = 28
Personal norm	2.9 (0.99)	3.5 (1.11)	3.6 (1.09)	4.0 (1.20)
Willingness to ban products produced by children	4.0 (1.38)	4.6 (1.12)	4.6 (1.30)	5.2 (1.19)

A test of mediation⁴ revealed that outcome efficacy (as measured in the manipulation check) did not mediate the effect of problem awareness (as measured in the manipulation check) on PN (Sobel test: $t = 0.76, p = .447$); the effect of PA on PN was not reduced when OE was controlled for.

For willingness to ban products produced by children, we found a main effect of PA, $F(1, 88) = 5.42, p = .022$, a main effect of OE, $F(1, 88) = 4.44, p = .038$, and no PA \times OE interaction, $F(1, 88) = 0.003, p = .956$. Table 2 shows that respondents in the low PA condition were more likely to buy products produced by children ($M = 4.3, 95\% \text{ CI} = 3.9, 4.7$) than respondents in the high PA condition ($M = 4.9, 95\% \text{ CI} = 4.6, 5.3$). Also, respondents in the low OE condition were less likely to ban products produced by children ($M = 4.3, 95\% \text{ CI} = 3.9, 4.8$) compared to respondents in the high OE condition ($M = 4.9, 95\% \text{ CI} = 4.6, 5.2$).

Discussion

Again, we found support for the first interpretation of the NAM. As expected, PA influenced OE, but OE did not influence PA. Also, in line with our hypotheses, both

PA and OE affect PN and intention in the expected direction. No significant interaction effects were found, although PN and intention were weakest when both PA and OE were low and strongest when both PA and OE were high. Interestingly, OE did not mediate the effect of PA on PN. We will come back to this issue in General discussion section.

GENERAL DISCUSSION

We examined how variables from the NAM are causally related. We compared two different interpretations of the model in three experimental studies. The first model interpretation assumes that PA influences AR or OE, which in turn influence PN, while PN influence intentions. The second model assumes that both PA and AR or OE influence PN independently, while PN influence intention and behaviour. We hypothesized that the first model interpretation, which is in line with original propositions by Schwartz and Howard (1981) is theoretically most plausible, because it is not likely that one will feel responsible for acting prosocially or think that possible actions may be effective in solving the problems without knowing whether not acting prosocially is a problem. Our results support the first model interpretation. As hypothesized, awareness of the consequences of behaviour influenced the extent to which individuals feel responsible to engage in this behaviour and the extent to which they acknowledged the usefulness of their own contribution, but OE did not influence PA. PA, AR, and OE increased feelings of moral obligation to act prosocially or pro-environmentally, and induced prosocial and pro-environmental intentions.

In Study 1, we manipulated PA. As expected, a high PA resulted in stronger feelings of responsibility for the problems related to particulate matters, stronger PN to participate in actions to reduce particulate matters, and stronger intentions to participate in such actions. These results were replicated in Studies 2 and 3, in which we included different dependent variables, and manipulated PA and OE. The second study revealed that PA did influence OE, but OE did not influence PA. A high PA or a high OE resulted in stronger feelings of moral obligation to demonstrate against the establishment of a methadone point in one's neighbourhood, and a stronger intention to demonstrate. A similar pattern of results was found in Study 3: PA did influence OE, which again indicates that OE is influenced by PA. A high PA or a high OE elicited stronger PN to demonstrate against child labour, and a stronger willingness to ban products produced by children. Thus, we replicated our results in three studies that focused on different types of prosocial and pro-environmental actions, using different samples (and not only student samples), indicating that our results are quite robust.

We found that AR mediated the relationship between PA and PN in Study 1, and that OE partly mediated the relationship between PA and PN in Study 2. However, the latter was not confirmed in Study 3, in which we found that PA still had a direct effect on PN when OE was controlled for. So, Study 3 suggests that a sequential model is more plausible. Probably, child labour is more strongly connected to values and norms that are central to individual's life (such as social justice, equality), in which case PA activates PN irrespective of the level of OE. In sum, although PA influences OE (and OE does not affect PA), PA still may have a direct influence on PN in some cases, probably especially when not acting prosocially seriously threatens important human values. This suggests that under these circumstances, the NAM should be interpreted as a sequential model in which norms are activated via taking successive steps from PA to OE (as suggested by

Schwartz & Howard, 1981). Further research is needed to examine under which circumstances a mediation or a sequential model is more likely.

In Study 2, we found a significant interaction effect of PA and OE on PN, indicating that feelings of moral obligation to demonstrate against a methadone point in one's neighbourhood are elicited when either PA or OE is strong, or when both are strong. The interaction effect was not replicated for intention to demonstrate, nor replicated in Study 3, although the mean scores on PN and intentions were consistently lowest in the condition in which both PA and OE were low, while PN and intentions were generally stronger when both PA and OE were high, so a trend was visible. These results do not contradict models 1 and 2: they indicate that a high PA or high OE is sufficient to activate PN to engage in prosocial actions. Of course, we manipulated OE; it should be examined whether OE can be high in real-life situations even when PA is low.

Our results are largely in line with results reported by De Groot and Steg (2009), who found strong support for the mediation model interpretation following correlational designs. Our results also indicate that various types of PN, and prosocial and pro-environmental intentions were affected by PA and OE related to specific behaviours, which indicates that a normative model such as the NAM is highly relevant to explain these types of intentions and behaviours (see also Thøgersen, 1996).

Schwartz and Howard (1981) argued that PN are stronger when PA, AR, and OE are high, and when ability is high, that is, a person should feel able to execute the prosocial act. We did not include ability in our studies, because we did not want to complicate matters in this stage of the research. We focused on activist behaviour, such as signing a petition or donating money, for which ability is generally not a major barrier. However, ability may play a key role in some domains, e.g., replacing car trips by public transport. Future studies should examine the role of ability in activating PN, next to PA, AR, and OE.

We focused on actions that benefit others or the environment. However, what actions are considered to be prosocially or pro-environmentally may differ across individuals. For example, one may argue that the establishment of distribution centres harms industry, stores, or companies because of additional costs, or that the prevention of the establishment of methadone points threatens the well-being of drug addicts. Also, one may argue that the behaviours we included in our studies are not purely prosocial actions, as people may engage in the relevant actions out of self-interest. Indeed, Batson (1994) argued that many prosocial acts are motivated by egoism. However, our results revealed that the NAM is able to explain the relevant actions, suggesting that these problems are perceived in terms of morality and not in terms of self-interest only. This is probably due to the way we framed these problems, that is, in Studies 1 and 2, we focused on the interests of inhabitants of a particular neighbourhood or city, and what participants could do to protect the interests of these inhabitants (which would benefit themselves as well). We found that participants were willing to invest time and effort to protect the interests of others (including themselves), especially when PA and OE were high, even though free-riding (and trusting others will do their bit) would have been possible. Also, the pattern of results was similar to Study 3, in which we focused on prosocial actions that benefit others but have no clear individual benefits.

Our studies have several strengths. First, we used experimental designs, which allow us to establish causal relationships. Second, we included representative samples of the general population in our studies, and not only student samples. Third, we replicated our results, using different manipulations (that is, stressing vs. downplaying the problems, and stressing positive vs. negative consequences of a social problem), and different indicators of PN and behavioural intention. We included three different

types of behavioural intention in our studies, related to prosocial as well as pro-environmental actions, reflecting intention to demonstrate as well as willingness to act. Future studies should reveal whether results are also replicated when using other indicators of intentions and behaviour, including actual behaviour. Also, future studies could examine the role of other factors influencing prosocial behaviour, as discussed by Schwartz (1977) and Schwartz and Howard (1981), including personality factors (e.g., general awareness of consequences, denial of responsibility) and ability (see above).

Our studies have important implications for practice. The results clearly reveal that feelings of moral obligation can be strengthened and prosocial and pro-environmental actions can be promoted by making people aware of the relevant problems, by stressing their responsibility for the problems, and by indicating what they could do to alleviate the relevant problems. This may be accomplished by reducing the scale of social problems, because the significance of individual contributions will be higher when less people are involved. Moreover, people can be made aware of the relevant problems and the significance of their own contribution via communication and education programmes. Future studies are needed to examine how to best design strategies to increase PA and OE, and thus to strengthen PN and prosocial intentions.

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References

- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckman (Eds.), *Action-control: From cognition to behavior* (pp. 11-39). Heidelberg: Springer.
- Aronson, E., Wilson, T. D., & Akert, R. M. (2005). *Social psychology* (5th ed.). Upper Saddle River, NJ: Pearson Education.
- Bamberg, S., & Schmidt, P. (2003). Incentives, morality, or habit? Predicting students' car use for university routes with the models of Ajzen, Schwartz, and Triandis. *Environment and Behavior*, *35*, 264-285.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*, 191-215.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychology research: Conceptual, strategic, and statistic considerations. *Journal of Personality and Social Psychology*, *51*, 1173-1182.
- Batson, C. D. (1994). Why act for the public good? Four answers. *Personality and Social Psychology Bulletin*, *20*, 603-610.
- Black, J. S., Stern, P. C., & Elworth, J. T. (1985). Personal and contextual influences on household energy adaptations. *Journal of Applied Psychology*, *70*(1), 3-21.
- Bratt, C. (1999). The impact of norms and assumed consequences on recycling behavior. *Environment and Behavior*, *31*, 630-656.
- De Groot, J. I. M., & Steg, L. (2009). Morality and prosocial behavior: The role of awareness, responsibility and norms in the norm activation model. *Journal of Social Psychology*, *149*, 425-449.
- De Ruyter, K., & Wetzels, M. (2000). With a little help from my fans - extending models of prosocial behaviour to explain supporters' intentions to buy soccer club shares. *Journal of Economic Psychology*, *21*, 387-409.

- Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Fort Worth, TX: Harcourt Brace Jovanovich.
- Epstein, S., Pacini, R., Denes-Raj, V., & Heier, H. (1996). Individual differences in intuitive-experiential and analytical-rational thinking styles. *Journal of Personality and Social Psychology*, *71*, 390-405.
- Eriksson, L., Garvill, J., & Nordlund, A. M. (2006). Acceptability of travel demand management measures: The importance of problem awareness, personal norm, freedom, and fairness. *Journal of Environmental Psychology*, *26*, 15-26.
- Gardner, G. T., & Stern, P. C. (2002). *Environmental problems and human behavior* (2nd ed.). Boston, MA: Pearson Custom Publishing.
- Gärbling, T., Fujii, S., Gärbling, A., & Jakobsson, C. (2003). Moderating effects of social value orientation on determinants of proenvironmental intention. *Journal of Environmental Psychology*, *23*(1), 1-9.
- Guagnano, G. A. (2001). Altruism and market-like behavior: An analysis of willingness to pay for recycled paper products. *Population and Environment*, *22*, 425-438.
- Guagnano, G. A., Dietz, T., & Stern, P. C. (1994). Willingness to pay for public goods: A test of the contribution model. *Psychological Science*, *5*(6), 411-415.
- Harland, P., Staats, H., & Wilke, H. A. M. (2007). Situational and personality factors as direct or personal norm mediated predictors of pro-environmental behavior: Questions derived from norm-activation theory. *Basic and Applied Social Psychology*, *29*, 323-334.
- Hopper, J. R., & Nielsen, J. M. (1991). Recycling as altruistic behaviour. Normative and behavioural strategies to expand participation in a community recycling program. *Environment and Behavior*, *23*, 195-220.
- Hunecke, M., Blöbaum, A., Matthies, E., & Höger, R. (2001). Responsibility and environment: Ecological norm orientation and external factors in the domain of travel mode choice behavior. *Environment and Behavior*, *33*, 830-852.
- Kerr, N. L. (1992). Efficacy as a causal and moderating variable in social dilemmas. In W. B. G. Liebrand, D. M. Messick, & H. A. M. Wilke (Eds.), *Social dilemmas: Theoretical issues and research findings* (pp. 59-80). Elmsford, NY: Pergamon.
- Lindenberg, S., & Steg, L. (2007). Normative, gain and hedonic goal-frames guiding environmental behavior. *Journal of Social Issues*, *63*(1), 117-137.
- Nordlund, A. M., & Garvill, J. (2002). Value structure behind proenvironmental behavior. *Environment and Behavior*, *34*, 740-756.
- Nordlund, A. M., & Garvill, J. (2003). Effects of values, problem awareness and personal norm on willingness to reduce personal car use. *Journal of Environmental Psychology*, *23*, 339-347.
- Osterhus, T. L. (1997). Pro-social consumer influence strategies: When and how do they work? *Journal of Marketing*, *61*, 16-29.
- Preacher, K. J., & Leonardelli, G. J. (2005). *Calculation for the Sobel Test. An interactive calculation tool for mediation tests*. Available at: <http://www.unc.edu/~preacher/sobel/sobel.htm>
- Schultz, P. W. (1999). Changing behavior with normative feedback interventions: A field experiment on curbside recycling. *Basic and Applied Social Psychology*, *21*, 25-36.
- Schultz, P. W., Gouveia, V. V., Cameron, L. D., Tankha, G., Schmuck, P., & Franěk, M. (2005). Values and their relationship to environmental concern and conservation behavior. *Journal of Cross-Cultural Psychology*, *36*, 457-475.
- Schultz, P. W., & Zelezny, L. C. (1998). Values and pro-environmental behavior. A five-country survey. *Journal of Cross-Cultural Psychology*, *29*, 540-558.
- Schwartz, S. H. (1970). Elicitation of moral obligation and self-sacrificing behavior: An experimental study of volunteering to be a bone marrow donor. *Journal of Personality and Social Psychology*, *15*, 283-293.
- Schwartz, S. H. (1973). Normative explanations of helping behavior: A critique, proposal, and empirical test. *Journal of Experimental Social Psychology*, *9*, 349-364.

- Schwartz, S. H. (1977). Normative influences on altruism. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 10, pp. 221-279). New York: Academic Press.
- Schwartz, S. H., & Clausen, G. T. (1970). Responsibility, norms, and helping in an emergency. *Journal of Personality and Social Psychology*, 16, 299-310.
- Schwartz, S. H., & David, A. B. (1976). Responsibility and helping in an emergency: Effects of blame, ability and denial of responsibility. *Sociometry*, 39, 406-415.
- Schwartz, S. H., & Fleishman, J. A. (1982). Effects of negative personal norms on helping behavior. *Personality and Social Psychology Bulletin*, 8, 81-86.
- Schwartz, S. H., & Howard, J. A. (1980). Explanations of the moderating effect of responsibility denial on the personal norm-behavior relationship. *Social Psychology Quarterly*, 43, 441-446.
- Schwartz, S. H., & Howard, J. A. (1981). A normative decision-making model of altruism. In J. P. Rusbult & R. M. Sorrentino (Eds.), *Altruism and helping behavior* (pp. 89-211). Hillsdale, NJ: Erlbaum.
- Steg, L., Dreijerink, L., & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: Testing VBN theory. *Journal of Environmental Psychology*, 25, 415-425.
- Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human Ecology Review*, 6, 81-95.
- Thøgersen, J. (1996). Recycling and morality. A critical review of the literature. *Environment and Behavior*, 28, 536-558.
- Trafimow, D. (2006). Multiplicative invalidity and its application to complex correlational models. *Genetic, Social, and General Psychology Monographs*, 132, 215-239.
- Tyler, T. R., Orwin, R., & Schurer, L. (1982). Defensive denial and high cost prosocial behavior. *Basic and Applied Social Psychology*, 3(4), 267-281.
- Van Liere, K. D., & Dunlap, R. E. (1978). Moral norms and environmental behavior: An application of Schwartz's norm-activation model to yard burning. *Journal of Applied Social Psychology*, 8, 174-188.
- Vining, J., & Ebreo, A. (1992). Predicting recycling behavior from global and specific environmental attitudes and changes in recycling opportunities. *Journal of Applied Social Psychology*, 22, 1580-1607.
- Zuckerman, M., & Reis, H. (1978). Comparison of three models for predicting altruistic behavior. *Journal of Personality and Social Psychology*, 36, 498-510.

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