# Pro-environmental Behavior

Paul Harland

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# Pro-environmental Behavior

**PROEFSCHRIFT**

ter verkrijging van
de graad van Doctor aan de Universiteit Leiden,
op gezag van de Rector Magnificus Dr. D.D. Breimer,
hoogleraar in de faculteit der Wiskunde en Natuurwetenschappen
en die der Geneeskunde, volgens besluit van het College voor Promoties
te verdedigen op
donderdag 6 september 2001 te klokke 14.15 uur



door

Paul Harland

geboren te Den Haag in 1964

Promotiecommissie

| | |
|---|---|
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ISBN 90-76269-24-6

Cover design and photography: Ton Harland

# Stellingen

Behorende bij het proefschrift *Pro-environmental Behavior* van Paul Harland

1. Begrip van milieuvriendelijk gedrag op basis van de constructen attitude, subjectieve norm en waargenomen gedragscontrole uit de Theory of Planned Behavior (Ajzen, 1991) verbetert wanneer het construct persoonlijke norm als voorspellende variabele wordt toegevoegd (dit proefschrift).
*Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50, 179-211.*

2. De bevinding dat de concepten effectiviteit en gedragscontrole uit de Norm-Activation Theory (Schwartz & Howard, 1984) determinanten van milieurelevant gedrag zijn (dit proefschrift) toont aan dat het gangbare gebruik in milieupsychologisch onderzoek van slechts twee concepten uit deze theorie - bewustzijn van nood en acceptatie van verantwoordelijkheid - een beperkt inzicht geeft in milieurelevant gedrag.
*Schwartz, S. H., & Howard, J. A. (1984). Internalized values as moderators of altruism. In E. Staub, D. Bar-Tal, J. Karylowski, & J. Reykowski (Eds.), Development and maintenance of prosocial behavior (pp. 229-255). New York, NY: Plenum Press.*

3. Er is weinig empirische steun voor de aanname in de Norm-Activation Theory dat persoonlijke normen bij de totstandkoming van gedrag een centrale rol innemen. Wel worden verbanden tussen activatoren en persoonlijke normen en tussen persoonlijke normen en gedrag gevonden (dit proefschrift). De positie van persoonlijke normen zou daarom nader onderzocht moeten worden.

4. Een algemene bevinding in milieupsychologisch onderzoek is dat interventies die gericht zijn op vrijwillige verbetering van milieurelevant gedrag vrijwel nooit tot blijvende gedragsveranderingen leiden. Het EcoTeam Programma is hierop een uitzondering (dit proefschrift).

5. De veronderstelling dat mensen die papier afval scheiden ook ander milieuvriendelijk gedrag vertonen berust op niet bestaande associaties tussen milieurelevante gedragingen (Ebreo & Vining, 2001). De veronderstelling dat mensen die vormen van milieuvriendelijk gedrag vertonen ook gezond eten en zich bekommeren om het lot van koffieboeren of het welzijn van dieren, getuigt van geloof in een achterhaald stereotype.
*Ebreo, A., & Vining, J. (2001). How similar are recycling and waste reduction? Future orientation and reasons for reducing waste as predictors of self-reported behavior. Environment and Behavior, 33, 424-448.*

6. "U staat niet in de file, u *bent* de file" is een mooie illustratie van de in de Norm-Activation Theory belangrijk geachte gedragsdeterminant *acceptatie van verantwoordelijkheid.*

7. De oproep in het openbaar vervoer dagblad Spits: "Denk om het milieu en laat Sp!ts niet achter in het openbaar vervoer" is een aanmoediging tot milieuonvriendelijk gedrag en voldoet bovendien niet aan de voorwaarde van waarachtigheid die Habermas aan communicatie stelt.
*Habermas, J. (1981). Theorie des kommunikativen Handelns. Frankfurt, Duitsland: Suhrkamp.*

8. Het titelblad van proefschriften die aan de Universiteit Leiden zijn geschreven bevat geen verwijzing naar het vakgebied waarbinnen het promotieonderzoek heeft plaatsgevonden, maar wel naar het vakgebied waarbinnen de leeropdracht van de Rector Magnificus valt. Een eenvoudige wijziging van het promotiereglement kan de hieruit voortvloeiende onduidelijkheid opheffen.

9. Toepassing van de Wet van Daamen helpt bij het vaststellen van haalbare *deadlines* en voorkomt daardoor de negatieve gevolgen van het te optimistisch schatten van de tijd die nodig is voor het doen van onderzoek. Deze wet stelt dat de aanvankelijke schatting van de benodigde tijd met een factor 7 vermenigvuldigd moet worden en een latere, realistisch geachte schatting nog eens met een factor 2 (D. D. L. Daamen, persoonlijke communicatie, 23 december, 1997).

10. Hoe meer Henken hoe beter!

*Voor Annemiek*

# Contents

# 1 Introduction

# Introduction

Human behavior is jeopardizing environmental quality. A clear call is made to psychology to help in understanding the reasons for this maladaptive environmental behavior, and ultimately to provide the means to change it (e.g., McKenzie-Mohr, 2000; Winter, 2000). A response to this call needs, in my view, to address the issue of identifying the backgrounds or determinants of pro-environmental behavior,[1] as well as the related issue of the effectiveness of behavior change attempts. In social psychology, attitude-behavior models have been developed that seem viable means of addressing the first issue, whereas a psychological analysis of the effectiveness of behavior change techniques may offer suggestions for addressing the second. This thesis aims to provide answers to four research questions that address both issues. Two questions are related to the viability of attitude-behavior models to identify determinants of pro-environmental behavior. The other two questions are related to attempts to encourage pro-environmental behavior. I will start with a close look at the characteristics of pro-environmental behavior.

## PSYCHOLOGICAL ASPECTS OF PRO-ENVIRONMENTAL BEHAVIOR

Virtually all behaviors have some detrimental effect on the environment. Given the intensity, duration, and scale on which these effects manifest themselves, this has created a situation in which stimulating people to behave pro-environmentally has become an important societal issue. To be effective, such stimulation should be based on a thorough analysis of determinants of pro-environmental behavior. Identification of advantages and disadvantages of pro-environmental behavior seems to be a straightforward way of detecting these determinants. However, in the pro-environmental domain this identification process is complicated because the salience of advantages and disadvantages of pro-environmental behaviors seems to depend on the perspective from which they are evaluated. Governments and environmental institutions, for instance, may attach great importance to negative environmental, that is, collective consequences of daily human behavior. Large scale international conferences (e.g., the UNFCCC climate conference in the Netherlands in

[1] In line with common practice, the label 'pro-environmental' is used here in a broad sense. As such, in addition to reference to the very few behaviors with an actual pro-environmental impact, the label refers to behavioral performance in a way that is presumed to result in less environmental harm than alternative ways (such as choosing to buy organically grown vegetables instead of regularly grown vegetables). Also other commonly used labels that refer to the environmental impact of behaviors (such as environmentally relevant behavior) are used throughout this thesis.

2000) are organized to discuss negative environmental consequences of human conduct, such as depletion of the ozone layer, acid rains, and global warming or "the greenhouse effect" (e.g., Oskamp, 2000; World Commission on Environment and Development, 1987). On the other hand, however, most individual daily behavioral decisions are largely based on personal consequences, that is, on their personal advantages and disadvantages, whilst collective, that is, environmental consequences not easily come to mind (Vlek & Keren, 1992). Not surprisingly, the quantity of environmental resources required for modern consumption levels increases consistently (Gatersleben, 2000). The fact that a collective evaluation (e.g., by governments) of behavioral consequences is not easily made by an individual decision maker may be explained by the fact that behavioral decisions in the environmental domain often have the characteristics of a social dilemma (Samuelson, 1990).

Generally, in a social dilemma, short-term rationality favors behavioral choices that, irrespective of others' choices, maximize personal gains at the expense of collective gains (e.g., Messick & Brewer, 1983). For example, imagine a person who goes to work and considers travelling by car or by public transportation. Salient personal gains, that is, comfort, time gain, and feelings of independence, are maximized when this person travels by car. At the same time, the environmental costs of this choice, e.g., air pollution, depletion of fossil fuels, and $CO_2$ emission (an important contributor to the greenhouse effect), are borne by the collective (i.e., the society as a whole) and are diffused on such large scale that they are not particularly salient to this person. Thus, this "environmental social dilemma", emphasizes personal gains whereas collective, that is, environmental losses seem of minor concern.

The described pay-off structure in which individual rational decisions lead to common losses is characteristic of pro-environmental behavior, and has been labeled a "social trap " (Platt, 1973). The low salience of the environmental costs may contribute to these traps because of the ease with which costs can be diverted to the collective. Moreover, factors related to (a) the uncertainty, (b) the location, and (c) the time perspective in respect of the occurrence of environmental costs, enhance differences in salience between these costs and personal benefits (Vlek & Keren, 1992). In the environmental domain, certain, immediate, local and individually enjoyed benefits tend to go together with uncertain, postponed and distant environmental risks. Applied to the above transportation decision, this means that the comfort, which is individually and immediately gained, and that a person enjoys locally when the car is used, is much more salient and has a stronger influence on transportation decisions than the potential risks of, for instance, climate changes that may arise after several decades and which possibly influence quality of life, mainly of people living in developing countries.

The decisional dilemma sketched above may lead to the conclusion that pro-environmental behavior, from an individual, short-term perspective should be considered as irrational. Nevertheless, pro-environmental choices are not extremely rare (e.g., Sparks & Shepherd, 1992) and this implies that in order to understand environmental decisions an analysis is needed that goes beyond a rational calculation of costs and benefits. Given the

influence that pro-environmental behaviors have on others' welfare, moral considerations about behavioral choice may be expected. Thøgersen (1996) even argued that behavioral decisions such as recycling are based on moral, rather than on rational considerations. Additionally, because many pro-environmental behaviors are performed in public, social influences might be important determinants. Vining and Ebreo (1992) found that, with regard to recycling, this indeed seems to be the case. Finally, situational factors such as the efficacy of pro-environmental behaviors or the ability to perform them, may also affect behavioral decisions. Thus, there may be more involved than a strict weighing of personal advantages and disadvantages when making choices in the environmental domain. This means that efforts to explain pro-environmental behavior need to focus on additional factors. Two social psychological models that take more factors into account than individual pros and cons and that seem important instruments with which to study determinants of pro-environmental behavior are the Theory of Planned Behavior (TPB; Ajzen, 1991) and the Norm-Activation Theory (NAT; Schwartz, 1977).

## EXPLAINING PRO-ENVIRONMENTAL BEHAVIOR WITH SOCIAL PSYCHOLOGICAL ATTITUDE-BEHAVIOR MODELS

### The Theory of Planned Behavior

The TPB (Ajzen, 1991) is an extension of the theory of reasoned action (Fishbein & Ajzen, 1975). It assumes that behavior is predicted by behavioral intention which in turn is determined by (a) a person's attitude toward the behavior, which is shaped by an evaluation of advantages and disadvantages of behavioral performance, (b) a subjective norm, shaped by the perception of what important others expect with regard to the person's behavior, and (c) perceived behavioral control, shaped by the person's estimation about the strength with which behavioral performance may be hindered (or facilitated) by the person's capabilities or situational factors.

The research interest in the TPB is tremendous. Manstead and Van der Pligt (1998) found that several hundred empirical investigations were based on this model and its predecessor (the Theory of Reasoned Action). This popularity has been attributed to the specificity with which the instructions for applications of these models were outlined by Ajzen and Fishbein (1980) and by the fact that these models are highly parsimonious (Staats, in press; Sutton, 1998). With regard to the environmental domain, the TPB meets the criteria mentioned in the foregoing section as it includes factors that go beyond a rational calculation of pros and cons. The TPB thus seems a useful instrument to provide insights into the determinants of pro-environmental behavior. Indeed, in the environmental domain, several studies found support for relations specified in the TPB and its predecessor (e.g., Boldero, 1995; Cordano & Hanson-Frieze, 2000; Cheung, Chan, & Wong, 1999; Goldenhar & Connel, 1992-1993; Jones, 1990; Kantola, Syme, & Campbell, 1982; Lynne, Casey, Hodges, & Rahmani, 1995; Sparks & Shepherd, 1992). Nevertheless, there

is one issue that warrants additional research attention, especially when the theory is used to enhance understanding of pro-environmental behavior.

In the TPB, superiority of the attitudinal component over the normative component in determining behavioral intention has been found (Ajzen, 1991). This may have been caused by the fact that the normative component of the model is not very conspicuous. It occupied a more salient position in the predecessor of the theory of reasoned action (Fishbein, 1967). In addition to attitude and subjective norm, Fishbein's (1967) model consisted of a factor called personal normative beliefs. However, this personal norm concept was removed from the model soon after its first test, mainly because it correlated highly with intention, and was deemed an alternative measure for behavioral intention (Ajzen & Fishbein, 1970, p. 467). From then, the normative component of the model consisted only of the subjective norm, and thus lost its personal normative aspect. The above-mentioned arguments regarding a possible moral influence on behavioral decisions (e.g., Thøgersen, 1996) together with empirical support for the explanatory value of personal norms as found in other domains (see for an overview, Manstead, 2000), raises the question of whether adding personal norms to the TPB constructs might increase our understanding of behavioral decisions in the environmental domain.

## The Norm-Activation Theory

A theory that ascribes a significant role to personal norms is Schwartz's NAT (Schwartz, 1977; Schwartz & Howard, 1984). The theory describes the relationship between activators, personal norms, and behavior. It postulates that personal norms are intrinsically motivated self-expectations regarding morally appropriate behavior. According to the NAT, personal norms, if activated, are experienced as feelings of personal obligation to engage in a certain behavior. Behavioral expectations stemming from personal norms are anchored in the individual's self and not, as with social norms, in a specific social group. According to the norm-activation model, activation of personal norms occurs under the influence of four situational activators and two personality trait activators. The four situational activators are (a) *awareness of need,* or the extent to which a person's attention is focused on the existence of a person or a more abstract entity, such as the environment, in need, (b) a person's sense of feeling *responsible* for the behavioral consequences for the needy party's welfare, (c) *efficacy,* which refers to the extent to which persons recognize actions that might alleviate the need and (d) *ability,* or the extent to which one possesses the resources or capabilities needed to perform the focal action. Two personality traits refer to predispositional influences on norm-activation: *Awareness of consequences,* which refers to a person' s receptivity for situational need cues, and *denial of responsibility,* which refers to people's inclination to deny responsibility for the consequences of their behavioral choices for the welfare of others. The four situational activators and the two personality traits determine whether or not a behaviorally specific personal norm becomes activated.

The numerous applications of the NAT in the environmental domain have provided support for several of the relationships proposed in the model (e.g., Black, Stern, &

Elworth, 1985; Gärling, Fujii, Gärling, & Jakobsson, 2000). Gärling et al., for instance, found that pro-environmental behavioral intention was causally related to personal norms which, in turn, were related to awareness of need and situational responsibility.[2] Recent studies of the norm-activation model were mostly performed in the environmental domain (but see for an exception Diamond & Kashyap, 1997). A closer look at this line of research reveals several issues that warrant further investigation. First, these environmental studies have focused solely on the norm-activating power of awareness of need and (or) of situational responsibility. Whether the other situational activators, that is, efficacy and ability, are related to personal norms or pro-environmental behavior, has not been studied yet. Second, as far as I am aware, none of the personality trait activators (awareness of consequences and denial of responsibility) has ever been studied in the environmental domain. There is, however, some evidence that factors related to the awareness of consequences and denial of responsibility personality traits affect pro-environmental behavior (e.g., Joireman, Lasane, Bennet, Richards, & Solaimani, 2001; Webster, 1975). Third, whereas personal norms can and, according to the NAT, should intervene between activators and pro-environmental behavior, some studies report that activators are directly related to behavior and that this relationship holds after the influence of personal norms has been taken into account (Schwartz & Tessler, 1972; Vining & Ebreo, 1992). These findings suggest that, in contrast to the conspicuous role that was assigned to personal norms in the norm-activation model, personal norms do not always have a central, mediating role. The latter findings (Schwartz & Tessler, 1972; Vining & Ebreo, 1992) are more in line with the process described in the predecessor of the TPB and related, earlier models (Boyd & Wandersman, 1991; Fishbein, 1967; Triandis, 1977; Wallston & Wallston, 1984). In those models, personal norms were assigned a role among other determinants of behavior, instead of a central, dominating role. This different view of personal norms raises the question of whether the central position that is allocated to personal norms in NAT is justified in all cases, and suggests that personal norms may play a less conspicuous role, as in the other models (e.g., Triandis, 1977).

In sum, whereas the norm-activation model seems a useful comprehensive model to study pro-environmental behavior, several aspects need further investigation. A more

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[2]It should be noted that all environmental studies published so far label situational activators with names that were originally reserved for personality trait variables (Schwartz, 1977). Thus, in environmental studies, situational awareness of need is termed 'awareness of consequences', a label that had originally been reserved in the norm-activation theory for people's tendency to be receptive for negative consequences of their behavior for the welfare of others (Schwartz, 1977). Likewise, environmental studies use the personality trait label 'ascription of responsibility' to refer to situational responsibility (e.g., Vining & Ebreo, 1992). Following this practice would cause a labeling problem if the personality trait activators were to be included (Chapter 3). Therefore, we stick with Schwartz' original labels in this chapter. To enhance conformity, we will *also* use Schwartz's original labels when we refer to activators used in environmental studies, and thus re-label the activators when necessary.

profound investigation of this model's components might more clearly uncover its potential with regard to understanding but also with regard to attempts to change pro-environmental behavior.

## ATTEMPTS TO ENCOURAGE PRO-ENVIRONMENTAL BEHAVIOR

Several review articles give a description of what has been accomplished in the domain of environmental psychology with regard to the effectiveness of behavior change intervention techniques (De Young, 1993; Dwyer, Leeming, Cobern, Porter, & Jackson, 1993; Schultz, Oskamp, & Mainieri, 1995). While progress has been made, it is emphasized in these reviews that two relevant issues need to be addressed more firmly in order to enhance the effectiveness of behavior change interventions. The first issue is that persistence of behavior change is rare, although short-lived behavior change will not lead to much environmental progress. The second issue addressed in these reviews is that interventions generally target only one or a few behaviors, but it is, at the same time, very questionable whether generalization of behavior change occurs from one specific behavior to other behaviors (e.g., Siegfried, Tedeschi, & Cann, 1982). In some studies (e.g., Thøgersen, 1999) negative "spill over" effects have even been found. In sum, the above mentioned issues have contributed to the fact that the practical value of many intervention techniques is disputed (e.g., Stern & Oskamp, 1987).

Considering the many behaviors that need to change if we are to move in the direction of a sustainable society, the issues of durability and behavioral scope of interventions are of the utmost importance. De Young (1996) argued that durable pro-environmental changes can be promoted by means of intervention techniques that combine the instruments of detailed procedural information, feedback, and social support (see also Geller et al., 1990). Whereas the first two methods have been used repeatedly in past research, use of a social supportive environment has rarely been implemented in the environmental domain. This lack of attention is particularly striking given that one of the first social psychological intervention studies focuses on the effects of social interactions in a group setting (Lewin, 1947). By means of field experiments, Lewin found that group discussions led to behavior change. More specifically, he found that being able to discuss pros and cons of behavioral alternatives freely was the factor responsible for changes in consumption patterns. There are a few studies that used the characteristics of Lewin's field experiments to try to improve pro-environmental behavior. Weenig and Midden (1991) found that decisions to adopt energy saving appliances at home could be stimulated by information that was spread through social interaction in neighborhoods. With respect to the explicit decision procedure involved, more information has become available. This procedure strongly resembles what is currently called a commitment technique. This technique has been applied as an intervention to encourage pro-environmental behavior (e.g., Wang & Katzev, 1990) and was found to produce behavior changes that are relatively long-lasting (De Young, 1993).

In sum, intervention packages that combine information, feedback, and social support may be successful in accomplishing long-lasting pro-environmental behavior change. Consequently, an initiative taken by a group of environmental scientists and organizational consultants who founded an organization, Global Action Plan for the Earth, was considered an interesting one. This group devised an intervention program called the EcoTeam Program (ETP). This program combines information, feedback, and social support and targets many household behaviors. EcoTeams are groups of 6 to 10 people who meet once a month for eight months in a row to exchange experiences, ideas, and achievements related to environmental household behavior. Following the EcoTeam Workbook, the EcoTeams subsequently focus on each of the following six themes for four consecutive weeks: garbage, gas, electricity, water, transport and consumer behavior. Worldwide, some 20,000 households have participated in the ETP (Harland & Staats, 2001). Although the program's possible success has been discussed and deemed to be positive (Staats & Weenig, 1994), a quantitative investigation of its effects has not yet been performed. Such an investigation may reveal the extent to which the program yields short-term and long-term behavioral and environmental effects. Furthermore, an in-depth investigation of how participation in the ETP affects behavioral backgrounds may reveal important information about the process that participants follow. Given the habitual character of many environmental household behaviors (Verplanken, Aarts, Van Knippenberg, & Moonen, 1998), possible effects of the ETP on habits is an interesting issue for further exploration. More specifically, an investigation of the effects of the elements of the ETP, that is, feedback, information, and social support, on the pattern of habit and intention as predictors of behavior change may provide insights into the program's effects.

## THIS THESIS

The analyses in the foregoing two sections lead to the formulation of four research questions that will be described in this section. The first two questions are related to the explanation of pro-environmental behavior by means of determinants described in attitude-behavior models, the second two questions are related to attempts to encourage pro-environmental behavior. The general aim of this thesis is to provide answers to these questions by means of four empirical studies. The following three chapters report on these studies. Chapter 2 deals with the first question. Because of the close theoretical relationship between the second and the third question, these questions are both addressed in Chapter 3. Chapter 4 addresses the fourth question. There are clear relations among these empirical chapters, yet each chapter is introduced separately. Therefore, each empirical chapter can be read independently from the others, whereas a reader who reads the whole book might encounter minor overlap among the introductions of the chapters. In Chapter 5 some general conclusions concerning the reported findings will be drawn. First, the four research questions will be summarized.

*Explaining Pro-environmental Behavior With Social Psychological Attitude-Behavior Models*

1. Is it worthwhile adding personal norms to the Theory of Planned Behavior to explain pro-environmental intention and behavior?
To the best of my knowledge, within the domain of pro-environmental behavior, personal norms have never been studied directly in addition to the TPB. However, some studies do address this issue or include concepts related to personal norms (e.g., Boldero 1995; Kantola et al., 1982). Adding personal norms to the TPB might reveal whether this construct can improve our understanding of pro-environmental behavior over and above the explanation acquired by means of the TPB constructs.
2. To what extent do situational activators from the Norm-Activation Theory improve our understanding of pro-environmental personal norms and intentions, and to what extent are behavioral effects of activators mediated by personal norms?
The state of the art with respect to applications of the NAT (Schwartz, 1977) in the environmental domain gives rise to several questions that are addressed in this thesis. Whereas two situational activators, awareness of need and situational responsibility, have been related to personal norms and to behavioral tendencies quite often (e.g., Black et al., 1985), the explanatory worth of the remaining two situational activators, that is, efficacy and ability, for personal norms and for behavioral tendencies is unknown. It would be valuable to determine whether an explanation of personal norms and behavioral tendencies by all four situational activators (i.e., awareness of need, situational responsibility, efficacy, and ability) differs from an explanation that is based on awareness of need and situational responsibility. Also, the centrality of personal norm as a mediating factor between activators and behavior can be studied more comprehensively if all four situational activators are included.

*Attempts to Encourage Pro-environmental Behavior*

3. To what extent do situational activators and personality trait activators from the Norm-Activation Theory affect pro-environmental personal norms and behavior, and to what extent are behavioral effects of activators mediated by personal norms?
Studies on the norm-activation model have never tested the value of personality traits in the environmental domain. In addition, it is unknown to what extent pro-environmental personal norms and behavior are enhanced by experimentally manipulated activators. Insights into the viability of the norm-activation model in relation to the pro-environmental behavior may be further improved if the joint effects of personality trait activators in addition to (experimentally manipulated) situational activators are determined. In line with the preceding question, the potentially mediating role of personal norms could be tested with regard to experimentally manipulated situational activators and with regard to personality trait activators.

4. What are the short-term and long-term effects of the EcoTeam Program on environmental household behavior and environmental resources, and how do program elements affect the pattern of habit and intention as predictors of behavior change?

Whether the ETP is effective in encouraging pro-environmental household behavior has not yet been studied. It therefore seems valuable to determine whether participation in the ETP leads to pro-environmental changes in household behavior and savings in environmental resources. Although short-term effects may give an indication of effectiveness, insights into the long-term effects of the program are of utmost interest (Dwyer et al., 1993). In addition, it seems interesting to reveal how potential changes in behavior can be explained. Many behaviors that take place in the household are habitual (i.e., less intentional). Given the ETP's duration of approximately eight months, a possible strength of the ETP might be that it helps to install more environmentally friendly habits by changing the pattern of habitual and intentional influence on behavior change.

# 2 Study 1: Explaining Pro-environmental Intention and Behavior by Personal Norms and the Theory of Planned Behavior

# Study 1: Explaining Pro-environmental Intention and Behavior by Personal Norms and the Theory of Planned Behavior[3]

People who make no behavioral changes to prevent further aggravation of environmental problems and who rely on the Earth's recuperative power seem to be indifferent or irresponsible. The persistence of environmental problems may be blamed on this presumed lack of concern. However, characteristics of the choice situation suggest that these people may have good reasons for their reservedness.

Environmental behaviors may be considered to be opposed to immediate, clearly perceptible individual benefits, whereas the benefits for the environment are shared by the total population, are uncertain, and are distant in time and place (Vlek & Keren, 1992). For example, when people choose to go to work by car instead of by public transportation, they enjoy directly the extra comfort and the feeling of being in control. In the long run, their choice might endanger the natural resources and clean air available to future generations and contribute to global warming. This choice situation can be seen as a social dilemma: a choice situation in which short-term rationality impels people to act for their own benefit at the expense of the collective (e.g., Dawes, 1980; see also, Mosler, 1993; Van Vugt, Meertens, & Van Lange, 1995). However, daily life shows that a considerable number of people do sacrifice their own short-term benefits and voluntarily perform pro-environmental behaviors. Examples found in empirical studies, such as recycling (e.g., Hopper & Nielsen, 1991; Thøgersen, 1996; Vining & Ebreo, 1992) and the consumption of organically produced food (Sparks & Shepherd, 1992), suggest that at least some people do sacrifice short-term benefits.

What motives determine the performance of pro-environmental behaviors? A model that has often been used to analyze people's motives and that seems to be of relevance when addressing this question is the Theory of Planned Behavior (TPB; Ajzen & Madden, 1986). In the TPB (Ajzen, 1985, 1991; Ajzen & Madden, 1986), it is assumed that behavioral intention is the best predictor of future behavior and that this intention is determined by three components: (a) a person's global evaluation of performing the behavior (attitude toward the behavior), (b) the perceived social pressure to perform the behavior (subjective norm), and (c) the person's conviction about whether the required skills and resources to perform the behavior are at one's disposal (perceived behavioral control; for a more extensive presentation of the theory, see Ajzen, 1985).

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[3]This chapter is adapted from Harland, Staats, and Wilke (1999). We would like to thank Tony Manstead and Bas Verplanken for their useful comments on an earlier draft of this chapter.

The TPB has been applied successfully in a wide variety of behavioral domains (for an overview, see Ajzen, 1991). For example, McCaul, Sandgren, O'Neill and Hinsz (1993) used the TPB to predict the intention of college students to perform two cancer self-examination behaviors and two dental-care behaviors. The model accounted for 36% to 82% of the variance in the intention to perform the four health-protective behaviors. In all but one case, attitude appeared to be a stronger predictor of intention than subjective norm. The reported superiority of the attitudinal component over the normative component in determining behavioral intention is not unique. In his overview of research on the TPB, Ajzen (1991) presents regression coefficients for attitudes and subjective norms (and perceived behavioral control) in predicting intentions in 16 studies and states that "the personal considerations tended to overshadow the influence of perceived social pressure" (p. 189). The empirical basis for this statement is clearly shown by Ajzen's overview. The superiority of the attitudinal component in Ajzen's overview was *not* caused by an absence of behaviors with a strong social connotation that presumably could be influenced by normative considerations.

What, then, could explain the preponderance of the attitudinal component? This may be due to the normative component of the TPB. It should be noted that the normative component of the model occupied a more conspicuous position in the predecessors of the TPB. Fishbein's (1967) first formulation of the theory was inspired by Dulany's (1961) theory of propositional control. Fishbein's theory consisted of one attitudinal component and *two* normative components, one personal and one social. The influence of both the personal and the social normative component on behavioral intention was assumed to depend on the person's motivation to comply with each of these norms. In an empirical sense, the personal norm concept did not seem strong enough to stand the test. In the first empirical study published on the model, Ajzen and Fishbein (1969) considered the motivation to comply with personal normative beliefs to be unnecessary because it did not improve the prediction of intention, and it was consequently deleted from the analyses. Shortly after, the personal norm concept itself was removed from the model because it correlated highly with intention, and as a result, the authors judged that it served mainly as an alternative measure for behavioral intention (Ajzen & Fishbein, 1970). From then on, the normative component of the model consisted only of the subjective norm and thus lost its personal normative aspect. The current research is inspired by our conviction that inclusion of personal norms might increase our understanding of pro-environmental behaviors.

## Personal Norms

In his Norm-Activation Theory (NAT), Schwartz (1968a; 1977) defines *personal norms* as self-expectations that are based on internalized values. Personal norms[4] reflect commitment to internalized values and are experienced as feelings of personal obligation to engage in a certain behavior (Schwartz, 1977). Personal norms will be most influential when they are activated. According to the NAT, activation occurs under the influence of (a) the extent to which someone is aware of need that is suffered by a person or by some non-human entity such as the environment (Schwartz, 1975), and (b) the extent to which one feels responsible in the situation at hand for that need. When these conditions are met, the personal norm is considered to be activated[5], bringing about a feeling of personal obligation that guides behavior (see Schwartz & Howard, 1984, for a more extensive treatment of the NAT).

One of the merits of Schwartz's (1977) work is that it clearly distinguishes personal norms from three other behavioral determinants. Firstly, it seems that Schwartz's operationalization of personal norms overcomes the problem of distinguishing the construct from behavioral intentions that Ajzen and Fishbein (1970) encountered. Feelings of personal obligation brought about by norm-activation can be neutralized before behavioral intentions are formulated; for example, by denying the seriousness of the need that is suffered. In contrast, someone who is intending to perform a certain behavior is beyond this point and has decided to engage in that behavior. Acknowledging the value of Schwartz's work, Fishbein and Ajzen (1975, p. 306) remark that Schwartz had indeed found a way to define personal norms such that they are distinguishable from intentions. Second, personal norms are distinct from behavioral attitudes, and what distinguishes the two is the dimension that is evaluated. Schwartz and Howard (1982; 1984) describe the difference as follows: "Whereas other attitudinal concepts refer to evaluations based on material, social, and/or psychological payoffs, personal norms focus exclusively on the evaluation of acts in terms of their moral worth to the self" (p. 245). Third, although personal norms are influenced by social expectations during socialization, in Schwartz's view personal norms are considered as qualitatively different from social norms. The expectations, sanctions, and obligations that are tied to personal norms are anchored in the self, whereas those tied to social norms are anchored in a social group (Schwartz, 1977; Schwartz & Howard, 1984). A distinction between Schwartz's (1977) concept of personal norm and other constructs is potentially useful, but what makes one think that a role of personal norms in the domain of pro-environmental behavior might be plausible in the first place?

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[4]The labels *moral* and *personal* are both used in the literature. Schwartz (1977, p. 240) argues that it is unclear which is best. In this study, the term *personal* is used, but it can also be read as *moral*.

[5]Additional factors that contribute to the activation of personal norms will be treated in the next chapter.

## Personal Norms and Pro-environmental Behavior

Schwartz's (1977) concept of personal norm has been developed and successfully tested in the domain of prosocial behavior, where other people are directly affected by the consequences of one's behavioral choice. The crucial question, then, is whether personal norms also play a role in the domain of pro-environmental behavior, where possible beneficial consequences of one's behavior for others are less obvious. The work of Stern and colleagues (Stern & Dietz, 1994; Stern, Dietz, & Guagnano, 1995; Stern, Dietz, & Kalof, 1993), Thøgersen's (1996) overview of research on recycling, and empirical studies that have tested Schwartz's model in the domain of pro-environmental behavior (e.g., Vining & Ebreo, 1992) suggest that personal norms can indeed affect pro-environmental behavior.

Stern et al. (1993, 1994, 1995) suggest that pro-environmental behavior is based on three value orientations. In addition to an egoistic (i.e., self-centered) value orientation and a biospheric (i.e., environmental) value orientation, the authors propose a social-altruistic value orientation that concerns the welfare of other people. This value orientation seems to be closely related to Schwartz's (1977) conceptualization of personal normative influence. Stern et al. found relationships between pro-environmental action and all three value orientations.

Additional support for the importance of the influence of personal norms on pro-environmental behavior comes from a review of literature on recycling behavior. Thøgersen (1996) argued that pro-environmental behaviors should be classified as belonging to the domain of moral, rather than economic, behaviors. As a consequence, instead of balancing personal costs and benefits, people evaluate pro-environmental behaviors in terms of right and wrong.

Direct support for the influence of personal norms stems from empirical research based on Schwartz's (1977) NAT in which researchers tried to predict pro-environmental behaviors. Various behaviors were studied, such as purchasing unleaded gasoline (Heberlein & Black, 1981), energy saving behavior (Black, Stern, & Elworth, 1985), participation in a recycling program (Hopper & Nielsen, 1991), household recycling behavior (Vining & Ebreo, 1992), and burning of yard and garden waste (Van Liere & Dunlap, 1978). Vining and Ebreo (1992), for instance, supported the plausibility of Schwartz's model in a study on recycling of glass, newspapers, and aluminum cans in households.

In sum, the environmental studies indicate that studying the influence of personal norms can increase our understanding of pro-environmental behavior. However, results from previous studies indicate that personal norms overlap with some concepts of the TPB (e.g., Budd & Spencer, 1985; Raats, Shepherd, & Sparks, 1995), which makes it questionable whether personal norms have an additional explanatory value. A combined study of personal norms and other determinants of behavior (i.e., the constructs of the TPB) seems justified to reveal whether or not personal norms can make an independent contribution to the explanation of pro-environmental behavior.

## Combining the Theory of Planned Behavior with Personal Norms

The TPB (Ajzen & Madden, 1986) and its predecessor, the Theory of Reasoned Action (Fishbein & Ajzen, 1975), have, in previous research, been expanded to include the personal norm concept[6] in investigating behavior for which moral considerations are likely to exist (for an overview, see Manstead, 2000). For example, in order to predict the intention to commit three driving violations, Parker, Manstead, and Stradling (1995) studied the performance of the TPB that was expanded with a measure of personal normative influences. Personal norms in that study consisted of a *moral norm*, reflecting internalized moral rules, and *anticipated regret*, a construct intended to reflect expected feelings on breaking those rules. After the TPB variables had been entered into the regression analysis, the personal-norm measure increased the explained variance in the intention to commit any of the three driving violations by 10% to 15% (see also Manstead & Parker, 1995).

In other domains too, personal norms appear to have an influence on behavior or behavioral intention, in addition to the TPB (or the Theory of Reasoned Action). Examples are blood or bone-marrow donation (Pomazal & Jaccard, 1976; Schwartz & Tessler, 1972; Zuckerman & Reis, 1978), skipping church attendance (Gorsuch & Ortberg, 1983), drinking in university halls and pubs (Budd & Spencer, 1985), dishonest behavior (Beck & Ajzen, 1991), contraceptive behavior (Boyd & Wandersman, 1991; Pagel & Davidson, 1984), salespersons' provision of adequate product information about financial services (Kurland, 1995), and using skimmed milk (Raats et al., 1995).

Although these studies support the expectation that adding a measure of personal norms to the TPB can enlarge our understanding of the determinants of intentions or behaviors, the range of behaviors for which this applies is not clear. Gorsuch and Ortberg (1983) provide an objective basis for determining those behaviors whereby an additional influence of personal norms should be expected. However, they only partly succeeded in distinguishing between moral and non-moral situations, using three of Hart's (1961) cardinal features of morality. Since an objective criterion is not available, the question of whether or not the addition of personal norms to the TPB constructs increases understanding of pro-environmental behavior is an empirical one.

To the best of our knowledge, within the domain of pro-environmental behavior personal norms have never been studied directly in addition to the TPB. However, some studies do indirectly address this issue. Lynne, Casey, Hodges, and Rahmani (1995), for example, suggest that attempts to promote farmers' investments in water-saving devices may benefit from a mix of external (i.e., governmental) control, incentives and moral persuasion. However, the authors did not address moral considerations in the empirical part

[6]Although the studies mentioned do not consistently refer to the concept as *personal norm* (but rather *moral norm* or *moral obligation*), these studies did use measures that were closely related to Schwartz's (1977) concept of personal norm. To enhance clarity, the measures are referred to here as *personal norm*.

of their study. Boldero (1995) states that behavioral beliefs about the benefits of recycling in her study are comparable to the awareness-of-need[7] component of Schwartz's (1977) model, but she did not include a measure of personal norms. Finally, Kantola, Syme, and Campbell (1982) asked respondents whether they felt that it was the government's or the individual citizen's responsibility to conserve water. According to the authors, this personal-responsibility measure resembled the concept of moral norm. This measure appeared not to improve the performance of the Theory of Reasoned Action. It is open to question whether this test is convincing enough to infer conclusions about the role of personal norms. Their measure, which indicates whether some action is the individual citizen's or the government's responsibility, possibly does not tap personal feelings of obligation, but may instead have been interpreted as an indicator of agreement with a prevailing social norm.

In addition, specific forms of pro-environmental behaviors do not constitute a homogeneous set, but are only weakly correlated (e.g., Boldero, 1995; Oskamp, Harrington, Edwards, Sherwood, Okuda, & Swanson, 1991; Siegfried, Tedeschi, & Cann, 1982). Even a set of behaviors aimed at the common goal of energy conservation have been found to be heterogeneous (Midden & Ritsema, 1983). As a result, drawing a general conclusion on the basis of non-supportive results derived from the study of one specific behavior, such as in the study of Kantola et al. (1982), seems premature. Apart from this, it is the Theory of Reasoned Action (Fishbein & Ajzen, 1975) that was tested in Kantola et al.'s study, and it therefore did not include the potentially important concept of perceived behavioral control that is included in the TPB (Ajzen & Madden, 1986).

## Aims of the Present Study

First, the present study is designed to gain insight into the contribution made by personal norms to understand intentions beyond an explanation provided by the TPB in the environmental domain. Explanation of intention is relevant on its own, but also because intentions are predictive for future behavior (Ajzen & Madden, 1986). Our study, however, is not focused on future behavior. This prevents predictions of future behavior by the TPB. Instead of testing the TPB and its causal relations, however, we were able to use three of its constructs (attitude, subjective norm and perceived behavioral control) and to explore

[7]It should be noted that all environmental studies published so far label situational activators with names that were originally reserved for personality trait variables (Schwartz, 1977). Thus, in environmental studies, situational awareness of need is termed 'awareness of consequences', a label that had originally been reserved in the norm-activation theory for people's tendency to be receptive for negative consequences of their behavior for the welfare of others. Likewise, environmental studies use the personality trait label 'ascription of responsibility' to refer to situational responsibility (e.g., Vining & Ebreo, 1992). In this study, we stick with Schwartz' original labels. To enhance conformity, we will also use Schwartz's original labels when we refer to activators used in environmental studies, i.e., we re-label the activators when we refer to those studies.

whether personal norms can add to the understanding of past behavior. Although intending to perform a behavior and having performed that behavior may seem similar, there may be important differences (e.g., intending to stop smoking is easier and something quite different from actually having stopped). As a consequence, the background variables that explain an *intention* to perform an pro-environmental behavior might differ from the background variables that explain that same behavior when it has actually been performed. As the second aim of this study, it will therefore be explored whether personal norms are a useful contribution to the understanding of previously performed pro-environmental behavior, beyond an explanation by attitude, subjective norm, and perceived behavioral control.

## METHOD

### Procedure and Subjects

The study reported here is the first of a larger project that evaluated the effects of the EcoTeam Program (ETP), a behavioral change intervention program aimed at enhancement of pro-environmental behavior (Staats & Harland, 1995). Prior to their participation in the ETP, 445 people who commenced this program in the Netherlands were asked to participate in the current study by completing a mail questionnaire. This sample was expected to have a higher level of involvement with pro-environmental behavior than would the general public. The presumed involvement of this sample was considered important for our purposes. According to Schwartz (1977), only activated personal norms are related to behavior. This implies that only the personal norms of people who are aware of the need that is suffered by the environment and who feel responsible for that need, will guide behavior. It was reasoned that people who enlisted in a program to change their pro-environmental behavior would have an activated personal norm to perform environmentally friendly behavior. This issue will be addressed in greater detail in the Results section.

### Questionnaire

In view of the expected low correlations between different forms of pro-environmental behavior (e.g., Oskamp et al., 1991), it was decided to focus on five specific behaviors to see if possible effects may be generalized to the environmental domain. The following behaviors were selected: using unbleached, instead of bleached, paper in the household; reducing the consumption of meat;[8] using other forms of transportation, rather than the

[8]A decrease in the consumption of meat is seen here as a pro-environmental behavior, because meat consumption indirectly leads to water pollution and forest degradation, and also because meat is an energy-inefficient type of food.

car, for short distances; using energy-saving light bulbs; and turning off the faucet while brushing one's teeth.

The fact that we chose to focus on five behaviors in this domain where specific behaviors are usually weakly correlated had its price. Because of limited space in the questionnaire, we were not able to use multi-item scales for our measures of past behavior, intention, attitude, subjective norm, and perceived behavioral control. For all five behaviors, the questionnaire contained the TPB constructs, a measure of personal norms, and a self-report measure of past behavior. Since the behaviors are performed in private, self-report measures come as close as possible to actual behavior. All questionnaire items were formulated on a behavior-specific level. The questionnaire also contained an environmental involvement scale, demographic variables, and measures not relevant to our present purposes. An example of each of the items concerning one of the five behaviors will be given now.[9] The items were formulated as similarly as possible for each of the five behaviors and were listed in the questionnaire in the order in which they appear here.

In the *past behavior* measure a time reference was given in order to be certain that respondents would focus on the same period while answering the question. The formulation was: "How often did you ... (one of the five behaviors) during the last 6 months?" Behavior was rated on a 7-point scale ranging from 1 (*never*) to 7 (*always*). A behavioral measure concerning decreased meat consumption was considered potentially unreliable. The fact is that such a measure necessarily would have had to elicit a comparison of current with past consumption (given that a *reduction* in consumption of meat and not meat consumption per se was the target behavior). This measure was therefore not included in the questionnaire (whereas we did include measures for attitude, behavioral intention, perceived behavioral control, personal norm, and subjective norm concerning meat consumption).

The item that measured *attitude toward behavior* was based on Ajzen and Fishbein's (1980) operationalization of the construct, and was formulated as: "In general, I think ... (one of the five behaviors) is ...". Respondents rated their attitude on a 7-point scale ranging from 1 (*very negative*) to 7 (*very positive*).

*Behavioral intention* was measured by the item: "I intend to, always or in most instances, ... (one of the five behaviors) during the next 6 months." Answers were given on a 7-point scale ranging from 1 (*most certainly*) to 7 (*most certainly not*).

One of Ajzen and Madden's (1986) items to capture *perceived behavioral control* was formulated as "If I wanted, I could in most instances ... (one of the five behaviors) during the next 6 months." This item was rated on a 7-point scale ranging from 1 (*extremely likely*) to 7 (*extremely unlikely*).

Following Schwartz (e.g., 1968a), the items concerning *personal norms* were preceded by a prompt that emphasized that the respondent should give a personal view, independent of the view of other people. The concept was measured using three of Vining and Ebreo's (1992) items assessing personal norm: "I feel a strong personal obligation to ... (one of the

[9]A copy of the full questionnaire is available on request from the author.

five behaviors)," "I am willing to put extra effort into ... (one of the five behaviors) on a regular basis," and "I would feel guilty if I didn't ... (one of the five behaviors)." Reliability of the scales was considered acceptable. Cronbach's alpha of the five scales ranged between .77 and .81. As in Vining and Ebreo's study, the items were rated on a 4-point scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). The mean of the scores on the three items is used to create the personal norm measure.

The item measuring *subjective norm* was based on Ajzen and Fishbein's (1980) measure and was formulated as follows: "People who are important to me expect me to ... (one of the five behaviors)." The item was preceded by a prompt emphasizing that it was the respondent's own perception of the expectation of important others that was intended here. Like the personal norm scale, this item was rated on a 4-point scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*).

*Environmental involvement* was measured using six items, of which two examples are: "The condition of the environment forms a threat to my health," and "I am worried about the condition of the environment." The items were rated on 5-point scales ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). The reliability of the six items was considered satisfactory (Cronbach's alpha = .79), so the scores on the items were averaged to create a score on environmental involvement. Scores on all preceding measures were recoded such that a higher score indicates a more positive stance on the construct.

## RESULTS

### Respondents

Of the 445 Dutch people who enlisted for the ETP, 69% responded to the request to participate in the research and returned completed questionnaires. The assumption that participants in this program were highly involved with the environment seems to be confirmed by the data. A study into pro-environmental behavior among a representative sample of the Dutch population (Couvret, 1994), showed that the Dutch population's involvement (as measured on the same 5-point involvement scale we used in our study) was moderately high ($M = 3.6$), while involvement of the sample in the current study was higher ($M = 4.15$, $SD = .63$).[10] The majority of the 305 respondents in our study were female (240; 78.7%),[11] and the average age of the respondents was 47 years.

[10]The difference could not be tested, because we do not possess the relevant data from a representative sample of the Dutch population.

[11]The unbalanced distribution of the genders is caused by the fact that, at the time of this study, participants for the EcoTeam Program were mainly recruited from women's organizations.

## Overview of Behavioral Intentions and Past Behaviors

Tables 2.1 and 2.2 show the intercorrelations among the five behavioral intentions and among the four past behaviors. Corroborating what has been observed before in the domain of pro-environmental behavior (Boldero, 1995; Oskamp et al., 1991; Siegfried et al., 1982), the four pro-environmental behaviors were weakly related (Table 2.1). The only significant correlation was that between using unbleached paper and using energy-saving light bulbs ($r$ =.16). This can be seen as an illustration of the fact that intercorrelations among pro-environmental behaviors are generally low. Moreover, the fact that there seem to be almost no associations between our past behavior measures might additionally be

Table 2.1
*Intercorrelations Among Four Performed pro-environmental behaviors*

| | Use Unbleached Paper | Use other transport forms than car | Use energy-saving light bulbs |
|---|---|---|---|
| Use unbleached paper | — | | |
| Other transport than car | -.01 | — | |
| Energy-saving light bulbs | .16* | .08 | — |
| Turning off faucet | .03 | .12 | .00 |

*Note.* $N$ = 195. Listwise deletion of missing data caused the overall $N$ to decrease to 195, mainly because of the fact that a number of respondents did not own a car.
* $p < .05$.

Table 2.2
*Intercorrelations (Pearson r) of Five Intentions to Perform pro-environmental behaviors*

| Intentions | Use unbleached paper | Reduce meat consumption | Use other transport forms than car | Use energy saving light bulbs |
|---|---|---|---|---|
| Use unbleached paper | — | | | |
| Meat consumption | .36*** | — | | |
| Other transport than car | .22** | .09 | — | |
| Energy-saving light bulbs | .33*** | .36*** | .14 | — |
| Turning off faucet while brushing teeth | .19** | .10 | .13 | .19** |

*Note.* Listwise deletion of missing data caused the overall $N$ to decrease to 191, mainly because of the fact that a number of respondents did not own a car.
** $p < .01$. *** $p < .001$.

ascribed to our choice of behaviors which, on face value, form a very heterogeneous set of behaviors that are aimed at distinct environmental goals. Table 2.2 shows that the five behavioral intentions had slightly higher intercorrelations than did the behaviors. Of the 10 intercorrelations, 6 were significant and vary from weak ($r = .19$) to moderate ($r = .36$).

Table 2.3 shows the means, standard deviations, and correlations between the constructs for each behavior separately. It appears that the respondents had positive attitudes toward the five behaviors and that they perceived performance of those behaviors to be, to a considerable extent, under their control (*M*s for perceived control were between 4.97 and 5.72 on a 7-point scale). Perceived social pressure, as measured by the subjective norm, was weak (means for subjective norms were between 1.70 and 2.21 on a 4-point scale). The personal norm toward the behaviors was stronger than was subjective norm (means for personal norms were between 2.36 and 3.26 on a 4-point scale). Respondents reported average to strong intentions to perform of the five behaviors (means for the five behavioral intentions were between 4.23 and 6.11 on a 7-point scale). With one exception (the use of energy-saving light bulbs; M = 3.56 on a 7-point scale), the respondents' mean scores on the behaviors were on the "environmentally friendly" side of the scale (means for the other three behaviors were between 4.33 and 5.48 on a 7-point scale).

It should be mentioned that, in the domain of pro-environmental behaviors, self-reported measures of behavior and intentions can differ from actual performance (e.g., Luyben, 1982; Stern & Oskamp, 1987, p. 1053; Tarrant & Cordell, 1997). This might have contributed to these relatively high means. Finally, Table 2.3 shows that all constructs within each behavior were significantly intercorrelated. A point worth mentioning is that the correlations between behavioral intention and personal norms were far from 1.0 (Pearson *r* between .57 and .66), suggesting that, in our study, these concepts may not be considered to be equivalent (cf. Ajzen & Fishbein, 1970).

Table 2.3
*Descriptive Statistics for Past Behavior and the Behavioral Determinants for Each of the Behaviors separately*

| | M | SD | Past Behavior | Intention | Attitude | Subjective Norm | PBC |
|---|---|---|---|---|---|---|---|
| Use unbleached paper (*N*=277) | | | | | | | |
| Past behavior | 4.33 | 1.51 | | | | | |
| Intention | 5.45 | 1.22 | .47*** | | | | |
| Attitude | 6.01 | .86 | .49*** | .55*** | | | |
| Subjective norm | 2.20 | .91 | .23*** | .33*** | .32*** | | |
| PBC | 5.58 | 1.10 | .41*** | .59*** | .46*** | .27*** | |
| Personal norm | 2.90 | .67 | .53*** | .61*** | .62*** | .47*** | .44*** |
| Reduce meat consumption (*N*=263) | | | | | | | |
| Past behavior | - | - | - | | | | |
| Intention | 4.23 | 1.44 | - | | | | |
| Attitude | 5.13 | 1.24 | - | .67*** | | | |
| Subjective norm | 1.70 | .74 | - | .27*** | .18** | | |
| PBC | 5.47 | 1.11 | - | .33*** | .41*** | .17** | |
| Personal norm | 2.36 | .64 | - | .66*** | .53*** | .47*** | .28*** |
| Use other transport forms than car (*N*=198) | | | | | | | |
| Past behavior | 4.47 | 1.54 | | | | | |
| Intention | 5.16 | 1.49 | .60*** | | | | |
| Attitude | 6.17 | .93 | .48*** | .54*** | | | |
| Subjective norm | 2.21 | .89 | .24*** | .34*** | .21** | | |
| PBC | 5.30 | 1.52 | .59*** | .68*** | .51*** | .26*** | |
| Personal norm | 2.98 | .73 | .62*** | .59*** | .52*** | .32*** | .62*** |
| Use energy-saving light bulbs (*N*=277) | | | | | | | |
| Past behavior | 3.56 | 2.08 | | | | | |
| Intention | 4.83 | 1.51 | .25*** | | | | |
| Attitude | 5.82 | 1.04 | .24*** | .52*** | | | |
| Subjective norm | 2.15 | .83 | .24*** | .26*** | .19** | | |
| PBC | 4.97 | 1.40 | .25*** | .47*** | .36*** | .19** | |
| Personal norm | 2.64 | .66 | .37*** | .58*** | .50*** | .53*** | .39*** |
| Turning off faucet while brushing teeth (*N*=275) | | | | | | | |
| Past behavior | 5.48 | 1.80 | | | | | |
| Intention | 6.11 | 1.10 | .64*** | | | | |
| Attitude | 6.33 | .82 | .50*** | .58*** | | | |
| Subjective norm | 2.43 | .98 | .24*** | .21*** | .19** | | |
| PBC | 5.72 | 1.34 | .55*** | .62*** | .49*** | .17** | |
| Personal norm | 3.26 | .68 | .53*** | .57*** | .60*** | .36*** | .48*** |

*Note.* PBC = perceived behavioral control. Measures range from 1 to 7, except measures for subjective norm and personal norm, which range from 1 to 4. A higher score indicates a more positive stance on a construct. A number of respondents did not own cars which caused the *N* for "Use other transport forms than car" to fall to 198. ** $p < .01$. *** $p < .001$.

### Personal Norms Added to the TPB to Explain Behavioral Intention

Does the concept of personal norm contribute to the explanation of the intention to perform the five pro-environmental behaviors, beyond that provided by the TPB constructs? Hierarchical regression analyses on each of the five specific behavioral intentions were performed in order to answer this question. The TPB constructs (i.e., attitude, subjective norm, and perceived behavioral control) were entered on the first step.

Table 2.4
*Five Hierarchical Regression Analyses with Intention as Dependent Variable*

| Step | Predictor Variables | $R^2$ | $\Delta R^2$ | ß after TPB | Final ß |
|---|---|---|---|---|---|
| | Use unbleached paper ($N$=281) | | | | |
| 1 | Attitude | | | .29*** | .14* |
| | Subjective norm | | | .13** | .05 |
| | PBC | .45 | .45*** | .43*** | .38*** |
| 2 | Personal norm | .51 | .05*** | | .32*** |
| | Reduce meat consumption ($N$=266) | | | | |
| 1 | Attitude | | | .62*** | .43*** |
| | Subjective norm | | | .14** | .02 |
| | PBC | .47 | .47*** | .06 | .05 |
| 2 | Personal norm | .58 | .10*** | | .43*** |
| | Use other transport forms than car ($N$=200) | | | | |
| 1 | Attitude | | | .24*** | .19** |
| | Subjective norm | | | .18*** | .15** |
| | PBC | .51 | .51*** | .49*** | .42*** |
| 2 | Personal norm | .52 | .01* | | .16* |
| | Use energy-saving light bulbs ($N$=282) | | | | |
| 1 | Attitude | | | .36*** | .22*** |
| | Subjective norm | | | .12* | .04 |
| | PBC | .37 | .37*** | .32*** | .26*** |
| 2 | Personal norm | .45 | .08*** | | .39*** |
| | Turn off faucet while brushing teeth ($N$=279) | | | | |
| 1 | Attitude | | | .35*** | .25*** |
| | Subjective norm | | | .07 | .01 |
| | PBC | .49 | .49*** | .44*** | .38*** |
| 2 | Personal norm | .52 | .03*** | | .23*** |

*Note.* $R^2$ = proportion of variance explained. TPB = Theory of Planned Behavior; PBC = perceived behavioral control. Final ß = beta after all constructs are entered in the analyses. A number of respondents did not own cars, which caused the $N$ for "Use other transport forms than car" to fall to 200.
* $p < .05$. ** $p < .01$. *** $p < .001$.

From the betas in Table 2.4 (column labeled "ß after TPB"), it can be concluded that attitude and perceived behavioral control contributed most strongly to behavioral intention (except in the case of consumption of meat) and that subjective norm was less influential and in one case did not reach significance. The proportion of variance in the intention to perform the five behaviors explained by the TPB constructs varied from 37% to 51%.

The addition of personal norms on the second step of the regression analyses changes the picture in several ways. First, it can be seen that personal norms had an independent contribution to the explanation of each of the five specific behavioral intentions. Second, as the farthest right column of Table 2.4 shows, the influence of attitude on behavioral intention decreased when personal norm was added as a predictor variable. The attitudinal influence concerning the use of unbleached paper, for instance, was considerable (ß = .29) before, but much weaker (ß = .14) after personal norm was added. The influence of personal norms on the five behavioral intentions, as indicated by the betas, is of comparable strength or stronger than the attitudinal influence. Third, the influence of subjective norm and perceived behavioral control decreased less strongly when personal norms were entered. However, the decrease in the influence of subjective norm has far-reaching consequences for its final contribution to the explanation of intention. This contribution becomes insignificant in another three of the five cases. The only remaining significant effect of subjective norm was that on intention with respect to transportation decisions. Finally, personal norms added between 1% (other forms of transport) and 10% (reduced consumption of meat), raising the explained variance of the five intentions from 45% (use of unbleached paper) to 58% (reduced consumption of meat).

### Personal Norms Added to Attitude, Subjective Norm, and Perceived Behavioral Control to Explain Past Behavior

As we stated in the introduction, the second aim of this study was based on our presumption that there might be differences between the determinants that explain behavioral intention and the factors that explain past behavior. This implies that an additional contribution of personal norms to the explanation of behavioral intention, as we have seen in our data, does not guarantee that personal norms will also contribute to the explanation of past behavior. Therefore, as the second aim of our study, we will now address the question of whether personal norms can contribute to the explanation of past behavior beyond an explanation provided by attitude, subjective norm, and perceived behavioral control. We should emphasize that no test of the causal structure of the TPB is intended here. We do not have the measures of future behavior needed for such analyses, and thus do not attempt to further test the TPB. Instead, from a more practical and exploratory point of view, we wondered whether personal norms might contribute to the explanation of past behavior over and above attitude, subjective norm, and perceived behavioral control.

Four hierarchical regression analyses were executed with past behavior as the dependent variable. Attitude, subjective norm, and perceived behavioral control were entered on the first step. Table 2.5 shows that, on the first step, subjective norm was the weakest

contributor to the explanation of past behavior, and in two cases did not reach significance (column labeled "ß after Step 1"). One exception is the subjective norm regarding the use of energy-saving light bulbs, for which the three independent variables were of approximately similar strength. Attitude, subjective norm, and perceived behavioral control together accounted for a percentage of explained variance in the four past behaviors that ranges between 13% and 39%. The explanation of the use of energy-saving light bulbs is poor, when compared to the other behaviors. This may have been caused by the fact that our behavioral measure (which used a 7-point *never* to *always* response scale) did not account for the lack of freedom that people have concerning this behavior. Once installed, an energy-saving light bulb will probably be used from then on because using a regular light bulb again would mean replacing the energy-saving one. It might have been better to measure the proportion of the total available power points for lights in the house suitable for energy-saving light bulbs (which is not always the case) that are equipped with energy-saving light bulbs. Although long-winded, such a measure might more adequately have dealt with the lack of behavioral freedom and, as a consequence, might not have led to low correlations.

Focusing on all four past behaviors again, the proportions of variance explained are considerably lower than those in the behavioral intentions. This may additionally be interpreted as the difference between behavioral intention and (past) behavior.

In the second step, personal norms were entered in the regression analyses. Personal norm added significantly to the explanation of all four past behaviors.[12] In three of the four behaviors, personal norm had the highest regression weight (Table 2.5, farthest right column). The addition of personal norms caused a considerable decrease in the contribution of attitude, subjective norm, and perceived behavioral control. After inclusion of personal norms, the independent contribution of subjective norm was not significant for all four specific behaviors. The influences of attitude and perceived behavioral control remain significant in three out of four behaviors. For all four past behaviors, the increment in the total variance explained, resulting from the introduction of personal norms was moderate

[12]An anonymous reviewer suggested that testing the additional explanatory worth of personal norms for behavior might require an alternative analysis. Behavior might be regressed on intentions (on the first step) and on personal norms (on the second step). Since our behavioral measure refers to behavior during the past 6 months, this analysis bears on the assumption that our measure of past behavior is a good approximation of future behavior. Additionally, according to the TPB, the only construct that might add to the explanation of behavior by intention is perceived behavioral control. We performed the suggested analysis, and it appears that personal norms contributed significantly (between 4% and 12%) to the total variance explained in our measure of behavior. Given the strong assumption considering the approximation of future behavior by our measure of past behavior and the largely unknown theoretical implications, any conclusions concerning this point warrant further investigation.

Table 2.5
*Four Hierarchical Regression Analyses With Past Behavior as Dependent Variable*

| Step | Predictor Variables | $R^2$ | $\Delta R^2$ | ß after Step 1 | Final ß |
|---|---|---|---|---|---|
| | Use unbleached paper (*N*=277) | | | | |
| 1 | Attitude | | | .37*** | .21** |
| | Subjective norm | | | .05 | -.05 |
| | PBC | .28 | .28*** | .22*** | .17** |
| 2 | Personal norm | .34 | .06*** | | .34*** |
| | Use other transport forms than car (*N*=198) | | | | |
| 1 | Attitude | | | .24*** | .14* |
| | Subjective norm | | | .08 | .02 |
| | PBC | .40 | .40*** | .44*** | .28*** |
| 2 | Personal norm | .47 | .07*** | | .37*** |
| | Use energy-saving light bulbs (*N*=279) | | | | |
| 1 | Attitude | | | .15** | .06 |
| | Subjective norm | | | .19** | .08 |
| | PBC | .13 | .13** | .16** | .12 |
| 2 | Personal norm | .16 | .03** | | .25** |
| | Turn off faucet while brushing teeth (*N*=277) | | | | |
| 1 | Attitude | | | .29*** | .19** |
| | Subjective norm | | | .12* | .07 |
| | PBC | .39 | .39*** | .39*** | .34*** |
| 2 | Personal norm | .42 | .03*** | | .22*** |

*Note.* $R^2$ = proportion of variance explained. PBC = perceived behavioral control. Final ß = beta after all constructs are entered in the analyses. A number of respondents did not own cars, which caused the *N* for "Use other transport forms than car" to fall to 198.
* $p < .05$. ** $p < .01$. *** $p < .001$.

but significant. It added 3% to 7% to the explanation and raised the total explained variance in the four pro-environmental behaviors to 16% to 47%.[13]

[13]Our multi-item measure for personal norms was based on previous research (Vining & Ebreo, 1992). Compared to the single-item measures that we used for the TPB constructs, this multi-item measure of personal norm might have led to a disproportionately large contribution to the explained variance. To check whether this would be the case, we performed additional regression analyses using a single-item measure of personal norms (the item that refers to feelings of personal obligation). The additional explanation obtained with this single-item measure of personal norm is comparable to the increment obtained with our multi-item measure. The increment in explained variance accounted for by personal norms decreased by 1% on average. The contribution of personal norms became non-significant in one out of nine cases (personal norms to use transportation forms other than the car. In that case its contribution was originally only 1%).

## DISCUSSION

Previous studies have shown that the addition of the personal norm construct to the TPB improves the explanation of intentions and behaviors in various behavioral domains (Manstead, 2000). Another line of research has established the influence of personal norms per se (i.e., irrespective of the TPB) on pro-environmental behavior (e.g., Black et al., 1985; Heberlein & Black, 1981; Hopper & Nielsen, 1991; Vining & Ebreo, 1992). However, no previous study has investigated the impact of personal norms in combination with the TPB constructs in the realm of pro-environmental behavior. In this study, to capture the influence of personal normative considerations on behavioral intentions in the domain of pro-environmental behavior, the TPB was extended with Schwartz's (1977) personal norm construct. Intending to perform pro-environmental behaviors may differ importantly from actually having performed them. We therefore additionally explored the importance of personal norms to understand previously performed pro-environmental behavior by adding personal norms to three constructs from the TPB (i.e., attitude, subjective norm, and perceived behavioral control).

The results of this study suggest that, in this domain, personal norms are of importance. While the usual constructs of the TPB explained five specific behavioral intentions to a considerable extent, personal norms improved their explanation significantly. In addition, personal norms increased the explanation of past performance of four self-reported behaviors beyond the explanation offered by attitude, subjective norm, and perceived behavioral control. The contribution of personal norms to the explanation of behavior might not have come as a surprise, given that intentions and past behavior in our data were significantly correlated. However, it should be noted that these correlations are far from perfect. When we compare the determinants of intentions with the factors related to past behaviors, no important differences appeared in the weights of the determinants. Intentions and past behaviors were to a considerable extent explained by attitudes and perceived behavioral control, and to a lesser extent by subjective norms. Additionally, our results imply that decisions to behave pro-environmentally are based partly on moral considerations. This holds for all behavioral intentions and past behaviors in this study, despite the fact that the correlations among the five intentions and the correlations among the four behaviors were at best weak. This suggests that what we found may be a fairly general relation between personal norms and pro-environmental behavior. Our results raise a number of issues that will now be discussed.

The sample used in this study consisted of people who were fairly high involved with the environment. We are not the first to investigate behavior using a sample that is highly involved with the behavioral domain under study. Sejwacz, Ajzen, and Fishbein (1980) studied dieting behaviors and weight loss using a sample of women suffering from overweight. More recently, Fishbein et al. (1992) investigated AIDS-related sexual behaviors among a sample with a higher risk for AIDS than the general public. Given their registration in an environmental program and their fairly high involvement, respondents in our study were presumably more aware of the need of the environment and feel themselves

more responsible for that need than would less involved samples. As a beneficial consequence, this may satisfy Schwartz's (1977) precondition that personal norms must be activated before they can guide behavior. On the other hand, the sample that we used limits the generalizability of the results. To see whether general involvement dominates our results to such a degree that it neutralizes the effects of personal norms on intentions and behavior, additional regression analyses were executed. When our measure of involvement was included on the first step and the TPB constructs were included on the second step, the contribution of personal norms at the third step hardly changed, and it stayed significant in all intentions and past behaviors. Further research should clarify whether the impact of personal norms is stronger for involved samples than for less involved samples.

Another issue concerns the significance of personal norms for the usual constructs in the TPB in the environmental domain. Our results raise two points. First, we saw that the addition of personal norms increased the explained variance in intentions and past behaviors. This suggests that none of the TPB constructs entirely captures the influence of moral considerations on intentions to perform pro-environmental behaviors. Second, we saw a decrease in the unique contributions of attitudes and subjective norms. This result suggests that the inclusion of personal norms may conceptually increase clarity in the TPB, at least when used in the domain of pro-environmental behavior. When attitude is adjusted, controlling for personal normative influence (which the attitude concept does not capture entirely), the residue might be interpreted as non-moral costs and benefits. When subjective norms are adjusted, controlling for personal normative influence, the residue might more clearly refer to non-internalized norms. The latter is consistent with Schwartz's (1977) definition of personal norms as internalized social norms (see also Hopper & Nielsen, 1991).

An issue mentioned in the introduction is the frequently found dominance of the attitudinal over the normative component of the planned behavior model, that is, the fact that the impact of attitudes on behavior is often found to be stronger than the impact of subjective norms (Ajzen, 1991). As stated before, unlike the TPB, its predecessor originally consisted of two normative constructs, that is, subjective norm and personal norm, but personal norm was removed from the model (Ajzen & Fishbein, 1970). In our view, the results of the current study suggest that one reason for the dominance of attitudes might be this removal of personal norm. Adding the personal norm construct to the TPB in the current study enables us to compare the attitudinal component with the original, broader normative component, at least in the domain of pro-environmental behavior. Comparison of the attitudinal component with the original normative component (that

consists of personal as well as subjective norms) in the current study reveals that these two components are of equal importance in explaining behavioral intention and past behavior.[14]

Lastly, one may wonder what our results can contribute to the management of environmental problems. Our data suggest that an appeal to feelings of personal obligation might be beneficial in encouraging environmentally conscious behavior. Two issues that in our view are relevant in this respect are the internalization and activation of norms. Firstly, it seems to us that designing communicative interventions such that they explicitly draw on personal norms is difficult. Such interventions might, at best, stimulate internalization rather than directly encouraging norm-consistent behavior. This rests on the fact that the stimulating force of personal norms comes from one's inner self, whereas communication of such norms by definition originates from an external source. As such, a message, for instance, that states that people should feel personally obliged to behave pro-environmentally makes no appeal to personal norms, but may rather be seen as communicating an external (i.e., social) norm. After all, *others* are telling people how they should feel and act. Nevertheless, these kinds of messages can be useful. Personal norms are internalized social norms (Schwartz, 1977), and communicating social norms might, in the long run, stimulate this internalization.

The second issue that we would like to note concerns the fact that there is no guarantee that people adhering to internalized norms will act according to those norms in subsequent behavioral decisions. This requires activation of the appropriate, pre-existing norm. Schwartz' (1977) NAT offers suggestions for designing interventions that strengthen norm-consistent behavior. Interventions that make use of the norm-activation process should, according to Schwartz, be aimed at the two aforementioned activating preconditions and thus lead to (a) increased awareness of need, and (b) increased experienced responsibility for that need.

Several studies in the realm of pro-environmental behavior have revealed that the activating preconditions can strengthen the personal-norms-behavior relationship (Black et al., 1985; Hopper & Nielsen, 1991; Vining & Ebreo, 1992). Direct implementation of these findings and the one reported in the current study would be premature. Future research that expands on these findings might make use of norm-activating preconditions, for instance by experimentally testing interventions leading to heightened awareness of need or

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[14]This comparison was demonstrated statistically. To this end, a series of nine regression analyses (five behavioral intentions and four behaviors) were performed in which, after perceived behavioral control, *first* the attitudinal component and *second* the normative component (i.e., subjective norm and personal norm) were entered. In all regression analyses the normative component caused a statistically significant increment in the total explained variance that averaged 6.7%. When the order was reversed (i.e., after perceived behavioral control, *first* the normative component and *thereafter* the attitudinal component), the attitudinal component caused a significant contribution (in eight of nine cases) to the total explained variance that averaged 3.3%. This suggests that the attitudinal dominance (Ajzen, 1991) does not hold here, because the contribution of the normative component is of comparable importance to that of the attitudinal component.

experienced responsibility. More generally, we readily concur with Kerr (1995), who makes a strong plea for additional research attention into the installment, activation, and maintenance of personal norms.

# 3 Schwartz's Norm-Activation Theory and Pro-environmental Behavior

# Schwartz's Norm-Activation Theory and Pro-environmental Behavior[15]

The Norm-Activation Theory (NAT; Schwartz, 1977) includes several situational factors although it also pays attention to personal norms and personality differences (Schwartz & Howard, 1980). In the pro-environmental behavior domain, there is an increased interest in applications of this theory (e.g., Guagnano, Stern, & Dietz, 1995; Hopper & Nielsen, 1991). Indeed, Lindsay and Strathman (1997) argued that the use of this theory in the environmental domain is an exception to their observation of a general lack of adequate theoretical underpinning in research on pro-environmental behavior (p. 1801; see also Thøgersen, 1996). It seems that the NAT meets demands emphasized in recent overviews of research. Schultz, Oskamp, and Mainieri (1995), for instance, concluded there is a need for insights into the combined effects of situational factors, but also into a combination of situational with personality factors (Schultz et al., 1995, p. 118; see also Dwyer, Leeming, Cobern, Porter, & Jackson, 1993). In addition, De Young (1993) stressed the need for expanding our knowledge of internally initiated pro-environmental behavior (see also Stern & Oskamp, 1987). Corroborating this point, a considerable number of empirical studies support the view that internal or personal norms exhibit a promotive influence on pro-environmental behaviors (e.g., Black, Stern, & Elworth, 1985; Bratt, 1999; Harland, Staats, & Wilke, 1999; Heberlein & Black, 1981; Hopper & Nielsen, 1991; Kaiser, Ranny, Hartig, & Bowler, 1999; Schultz, 1999; Schultz et al., 1995; Sparks, Shepherd, & Frewer, 1995; Van Liere & Dunlap, 1978; Vining & Ebreo, 1992).

In the current chapter, two studies will be reported in which Schwartz's norm-activation model (Schwartz, 1977) serves as a comprehensive theory that permits investigation of whether situational and personality activators affect pro-environmental behavior and whether personal norms mediate these effects.

## The Norm-Activation Theory

Schwartz's NAT (Schwartz, 1977; Schwartz & Howard, 1984) describes the relationship between activators, personal norms, and behavior. The theory postulates that personal norms are intrinsically motivated self-expectations regarding morally appropriate behaviors. According to the NAT, norm activation occurs under the influence of four situational activators and two personality trait activators. An activated norm generates a

[15]This chapter is adapted from Harland, Staats, and Wilke (2001). We are indebted to Peter de Heus for his helpful suggestions regarding statistical analyses.

feeling of personal obligation to perform a specific behavior. We will now describe the activators included in the norm-activation model (cf. Schwartz, 1975, 1977).

Four situational activating factors are proposed by the norm activation theory. The process of norm-activation starts with the perception of need. This *awareness of need* activator involves the extent to which a person's attention is focused on the existence of a person or a more abstract entity, such as a country, in need. Awareness of need is influenced by the prominence and clarity of negative consequences (Schwartz, 1977, p. 242). Apart from the awareness of need, the potential actors have to define the situation at hand as one in which they feel some *responsibility* for the consequences of the needy party's welfare. When it is for instance clear that others caused the need and thus are accountable for it, potential actors will probably not engage in any helping behavior (Schwartz, 1977, p. 246). Norm-activation is further enhanced by *efficacy*, referring to the extent to which persons recognize actions that might alleviate the need. The actions that are recognized as such determine which specific norms are activated. Finally, *ability* to perform the actions refers to potential actors' perception about whether they possess the resources or capabilities needed to perform the focal actions.

In addition to these situational activators, the NAT proposes that some people's personal norms are more likely to be activated than the personal norms of others (Schwartz, 1977). Two personality traits refer to this predispositional sensitivity: *awareness of consequences* and *denial of responsibility.* Awareness of consequences refers to a person' s receptivity to situational cues of need (Schwartz & Howard, 1981, p. 196). Denial of responsibility refers to people's inclination to deny responsibility for the consequences of their behavioral choices for the welfare of others. The four situational activators and the two personality traits, which will be labeled hereafter as "personality activators", determine whether or not a behaviorally specific norm becomes activated.

Personal norms are described as "... situation-specific reflections of the cognitive and affective implications of a person's values for specific actions" (Schwartz & Howard, 1981, p. 199). Personal norms differ from social norms. While expectations (and as a consequence sanctions) stemming from social norms are anchored in a specific social group, expectations and sanctions from personal norms stem from the individual's self as an "inner voice". These personal expectations are experienced as feelings of personal obligation to engage in a certain behavior. Adherence to these expectations, that is, to a personal norm, renders enhanced self-appreciation and pride, while acting against them results in feelings of guilt and self-depreciation (De Young, 1993; Schwartz, 1977; Schwartz & Fleishman, 1982).

In NAT (Schwartz, 1977) personal norms play a conspicuous or central role in the relationship between activators and behavior. More specifically, it is assumed that personal norms mediate the behavioral influence of activators (e.g., Schwartz & Tessler, 1972), although also a somewhat different, but equally central, moderating view has been occupied

(e.g., Schwartz, 1977; Schwartz & Fleishman, 1978).[16] However, other influential models ascribe personal norms a more modest position. The Triandis model of attitude-behavior relations (Triandis, 1977), for instance, treats personal norm as just another determinant of behavior, in addition to other determinants, such as self-efficacy or perceived control. A similar, ordinary role was granted to personal norms in Fishbein's (1967) predecessor to the Theory of Planned Behavior (TPB; Ajzen, 1991). This different view on personal norms raises the question of whether the central position of personal norms in NAT is justified in all cases or whether personal norms play a less conspicuous role in predicting pro-environmental behavior, as suggested by Fishbein (1967) and Triandis (1977; see also Wallston & Wallston, 1984).

The NAT has been developed and initially been tested in the domain of interpersonal prosocial or altruistic behavior (Schwartz, 1969; Schwartz & Ben David, 1976). Schwartz argued that the model may also be applicable in a domain where the needy party is for instance the environment (Schwartz, 1975, p.116). Meanwhile, several theorists have convincingly argued that pro-environmental behavior should be considered as moral behavior (Heberlein, 1972; Thøgersen, 1996) which seems to point to the potential applicability of Schwartz's model in this domain.

## The Norm-Activation Model in the Environmental Domain

Empirical efforts to explain pro-environmental behavior by means of the norm activation model provide some supportive evidence. The focus in that work is on the extent to which situational activators affect personal norms or behavior. Specific behaviors such as burning of garden waste (Van Liere & Dunlap, 1978), recycling (Bratt, 1999; Guagnano, Stern, & Dietz, 1995; Hopper & Nielsen, 1991; Lee, De Young, & Marans, 1995; Vining & Ebreo, 1992), buying lead-free gasoline (Heberlein & Black, 1976, 1981), off-road vehicle use in the environment (Noe, Hull, & Wellman, 1982), energy conservation (Black, 1978; Black et al., 1985; Tyler, Orwin, & Schurer, 1982), and littering (Heberlein, 1972) were studied by means of this model. Also less direct pro-environmental behaviors, such as political actions to protect the environment, have been studied using the norm activation model (e.g., Blamey, 1998; Gärling et al., 2000; Guagnano et al., 1995; Stern et al., 1986; Stern, Dietz, & Kalof, 1993; Stern, Dietz, Kalof, & Guagnano, 1995; Widegren, 1998). Different relationships between activators, personal norms and behavior were found. In a study into electricity conservation behavior, Black et al., (1985), for instance, showed

[16]Some environmental studies also take this moderational view stating that norm-activators enhance the personal norm-behavior relationship (e.g., Blamey, 1998). The majority of environmental studies, however, emphasize that the behavioral influences of activators are exerted via personal norms, i.e., take a mediational view (e.g., Black et al., 1985; Bratt, 1999; Stern, Dietz, & Black, 1986). Schwartz often studied moderation (1977), with partial support, but also performed mediational tests (Schwartz & Tessler, 1972).

that personal norm was predicted rather well by awareness of need and by responsibility,[17] and that personal norm was a significant predictor of several conservation behaviors (see also Black, 1978). Thus, in line with the norm-activation model, personal norms seemed to mediate the influence of situational activators on behavior. However, activators were also found to directly promote behaviors (e.g., Heberlein, 1972; Stern et al., 1986; Van Liere & Dunlap, 1978; Vining & Ebreo, 1992). Vining and Ebreo (1992), for instance, found that awareness of need influenced recycling even when the influence of personal norm was taken into account. This result suggests that activators might also directly promote behavior. However, these studies did not all include a personal norm measure so that empirical tests of the potentially mediating role of personal norms was not always possible.

## Aims of the Present Research

The current chapter aims to further theoretical insights into the importance of activators and the role of personal norms in the environmental domain in several respects. Firstly, it appears that environmental studies have focused solely on the norm-activating power of awareness of need and/or of situational responsibility. Stern et al. (1986), for instance, found that awareness of need and situational responsibility predicted personal norms and (political) pro-environmental behaviors (see also Hopper & Nielsen, 1991). However, no study has yet been made into whether efficacy and ability are related to personal norms and such a study may further these insights. Some studies did, however, test the behavioral effects of efficacy or ability independently, that is, without inclusion of the commonly studied activators awareness of need and situational responsibility, and without personal norms. In some of those studies behavioral effects of efficacy and ability were found (Ellen, Wiener, & Cobb-Walgren, 1991; Geller, 1995; Guagnano et al., 1995; Vining & Ebreo, 1992), whereas in others they were not (Axelrod & Lehman, 1993; Oskamp, Harrington, Edwards, Sherwood, Okuda, & Swanson, 1991). Additionally, the effects of efficacy and ability on personal norms have not previously been studied, since studies that focused on efficacy or ability did not test for effects of these activators on personal norms (Guagnano et al., 1995; Vining & Ebreo, 1992). The norm-activating

[17]It should be noted that all environmental studies published so far label situational activators with names that were originally reserved for personality trait variables (Schwartz, 1977). Thus, in environmental studies, situational awareness of need is termed 'awareness of consequences', a label that had originally been reserved in the norm-activation theory for people's tendency to be receptive for negative consequences of their behavior for the welfare of others. Likewise, environmental studies use the personality trait label 'ascription of responsibility' to refer to situational responsibility (e.g., Vining & Ebreo, 1992). Following this practice would cause a labeling problem if the personality trait activators were to be included. Therefore, we stick with Schwartz' original labels in this chapter. To enhance conformity, we will also use Schwartz's original labels when we refer to activators used in environmental studies, and thus re-label the activators when necessary.

potential of efficacy and ability and their effect when simultaneously studied with awareness of need and situational responsibility is open to question.

Related to this point, a second extension of existing knowledge refers to the impact of individual differences. In the interpersonal domain, some support was found for the promotive power of one of these personality trait activators, denial of responsibility, regarding interpersonal helping behavior (e.g., Ferrari & Leippe, 1992; Schwartz, 1968b; Schwartz & Tessler, 1972). The awareness of consequences personality trait activator has rarely been tested, and these rare tests have largely been non-supportive (e.g., Schwartz & Clausen, 1970). As far as we are aware, neither of these personality trait activators has ever been studied in the environmental domain. There is, however, some evidence that factors related to awareness of need and to denial of responsibility affect pro-environmental behavior. Joireman et al. (2001), for instance, reported effects of a personality trait factor 'consideration of future consequences' on pro-environmental intentions (see also Strathman, Gleicher, Bonninger, & Edwards, 1994). Likewise, Van Lange, Van Vugt, Meertens, and Ruiter (1998) found that people's tendency to view behavioral decisions in terms of private as compared to collective well-being, influenced their appraisal of public transportation (see also Gärling et al., 2000). Webster (1975) found an effect of a responsibility scale of the California Psychological Inventory (CPI), comparable to the denial of responsibility trait, on recycling. It thus seems worthwhile gaining additional insights into the effects of denial of responsibility and awareness of consequences factors in the environmental domain.

Finally, as stated above, personal norms can intervene between activators and pro-environmental behavior (e.g., Hopper & Nielsen, 199; Vining & Ebreo, 1992), although some studies found that activators are directly related to behavior and that this relationship holds after the influence of personal norms has been taken into account (Schwartz & Tessler, 1972; Vining & Ebreo, 1992). This questions the central, mediating role of personal norms and seems more in line with the process described in other attitude-behavior models (Fishbein, 1967; Triandis, 1977; Wallston & Wallston, 1984). As stated above, in those models, personal norms have been treated as being of equal importance as situational activators, that is, as just another determinant of behavioral intention. It thus seems that activators can affect behavior and that personal norms mediate their influence. However, support for the latter and central assertion of the NAT is weak, so an empirical test seems appropriate.

In the current chapter we report two studies in which we investigated the relationships that are described in the NAT (Schwartz, 1977). Based on the available evidence, we anticipated that awareness of need and situational responsibility are related to pro-environmental personal norms and to pro-environmental behavioral intentions. The extent to which such relationships also exist with regard to the other situational and personality trait activators is unknown. Therefore, the main endeavor of the present research was to investigate (a) the extent to which situational and personality trait activators are related to pro-environmental personal norms, (b) the extent to which situational and personality trait activators are related to pro-environmental behavioral tendencies, and (c) the extent to which personal norms mediate the influence of activators on behavioral tendencies. To this

aim, Study 2 will focus on four situational activators, while Study 3 includes three situational activators in combination with the two personality trait activators from Schwartz's model.

# Study 2: Explaining Pro-environmental Intentions by Situational Activators From the Norm-Activation Theory

## METHOD

### Procedure

Respondents of Study 2 were randomly sampled from the Dutch population. A postal service company selected a total of 700 addresses. These 700 citizens were sent a questionnaire that focused on two pro-environmental behaviors. After one week all participants received a postcard which thanked people who had returned the questionnaire and reminded the others. After another three weeks, non-responders received a new cover letter and a substitute questionnaire.

### Questionnaire

The questionnaire that was used focused on the two pro-environmental behaviors, "using forms of transportation other than the car for short distances" and (to save water) "turning off the faucet while brushing one's teeth." It consisted of measures of the four situational activators (awareness of need, responsibility, ability, and efficacy of the behavior in decreasing environmental burden), personal norms, and, as an indicator of behavioral performance (Ajzen, 1991), behavioral intention. Additionally, the questionnaire contained measures of demographic variables and measures not relevant to our present purposes. An example of items measuring each of the concepts is given below.[18]

*Awareness of need* measured the respondent's view about whether the environment would suffer if the behavior that is performed is not pro-environmental (i.e., choosing the car instead of other transportation for short distances and *not* closing the faucet while brushing teeth). This construct was measured with two items for each behavior. One item was formulated as "The environmental consequences of *not* closing the faucet (using the car for short distances) are negligible." The other item was formulated as "No matter what circumstances, *not* closing the faucet (using the car for short distances) is detrimental for the environment." The items were rated on a 7-point *strongly agree* to *strongly disagree* scales. Reliability as measured with Cronbach's alpha for the awareness of need scales was low (0.40 concerning car use and 0.54 for closing the faucet).[19]

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[18]A copy of the full questionnaire is available on request from the author.

[19]Separate analyses for these awareness of need items were performed in order to test whether these modest scale reliabilities influenced our results. Minor differences were observed that did not influence the final results or lead to different conclusions. Therefore, analyses that are based on the 2-item measures of awareness of need will be presented.

*Responsibility* was also measured by two items. One was "Someone who ... (one of the two behaviors) ... cannot be held responsible for the environmental consequences of that behavior." The other item was formulated as "Someone who ... (one of the two behaviors) ... is personally responsible for the environmental consequences." Both items were rated on a 7-point *strongly agree* to *strongly disagree* scale. Cronbach's alpha for the situational responsibility scales was low. Cronbach's alpha relating to other transport forms was 0.48 and for the scale involving closing the faucet it was 0.36.[20]

*Efficacy* of pro-environmental performance of the behavior in decreasing environmental damage was measured by two items. One was formulated as "My ... (use of other forms of transportation/ closing the faucet) contributes to a clean environment." This item was rated on a 7-point scale with endpoints *strongly agree* (1) and *strongly disagree* (7). The other item was formulated as the statement "Compared to other actions I could take, the use of other forms of transportation (closing the faucet) is, in striving to a clean environment...". This item was rated on a 7-point scale with endpoints *the most useless one* (1) and *the most useful one* (7). Cronbach's alpha for the efficacy scale concerning car use was 0.54, and for the scale concerning closing the faucet it was 0.68.

One of the two items to capture *ability* is formulated in a similar fashion to the way this concept has been measured in studies in the domain of the TPB (Ajzen, 1991): "If I wanted, I could in most instances ... (one of the two behaviors) during the next six months". This item was rated on an *extremely likely* to *extremely unlikely* 7-point scale. The other item was "To what extent can you determine yourself whether or not to ... (one of the two behaviors) during the next six months?" This item was rated on a 7-point scale with endpoints *totally by myself* (7) and *not at all by myself* (1). Cronbach's alpha for the ability scale concerning car use was 0.68 and for the scale concerning closing the faucet Cronbach's alpha was 0.75.

The three items concerning *personal norms* were preceded by a prompt emphasizing that respondents should give their personal view, independent of the view of other people. The concept was measured using three of Vining and Ebreo's (1992) items assessing personal norm: "I feel a strong personal obligation to ... (one of the two behaviors)", "I am willing to put extra effort into ... (one of the two behaviors) on a regular basis", and "I would feel guilty if I didn't ... (one of the two behaviors)". As in Vining and Ebreo's and our previous study (Harland et al., 1999), the items were rated on a 4-point *strongly agree* to *strongly disagree* scale. Cronbach's alpha of the scales for the two behaviors were .84 (transport means) and .86 (closing the faucet). The mean of the scores on the three items was used to create the personal norms measure.

[20]Separate analyses for these situational responsibility items were performed in order to test whether these modest scale reliabilities influenced our results. Minor differences were observed that did not influence the final results or lead to different conclusions. Therefore, analyses that are based on the 2-item measures of situational responsibility will be presented.

*Behavioral intention* was assessed by two items. One was formulated as "I intend to always or in most instances... (one of the two behaviors), during the next six months". Answers were given on a 7-point *most certainly* to *most certainly not* scale. The other items was formulated as "How often will you ... (one of the two behaviors), during the next six months?". Answers were given on 7-point *never* to *always* scale. Cronbach's alpha for the behavioral intention scale concerning car use was 0.82, and for the scale concerning closing the faucet it was 0.92.

If necessary, scores on the preceding measures were recoded such that a higher score reflected a more positive stance on the construct.

## RESULTS

### Respondents

The response rate was 49% ($N = 345$). The sample consisted of 188 (55%) female and 152 (45%) male respondents. Mean age of the respondents was 48.64 years ($SD = 15.77$).

### Overview

Table 3.1 provides an overview of the relevant descriptive statistics with regard to the two studied behaviors: the use of other transport forms than the car (in short: "other transport forms") and closing the faucet while brushing teeth (in short: "closing the faucet"). The mean behavioral intention with respect to the use of other transport forms than the car was just above the midpoint ($M = 4.18$, $SD = 1.44$), indicating that people exhibited a modestly positive intention to use other transport forms. The means of the activators concerning other transport forms were all on the positive side of the scales. Efficacy regarding other transport forms was rated highest ($M = 5.24$, $SD = 0.95$). The mean of personal norm was around the midpoint of the scale ($M = 2.44$, $SD = 0.78$). Behavioral intention to close the faucet was quite high ($M = 5.65$, $SD = 1.44$). Also the mean scores of the activators and for personal norms regarding closing the faucet were on the positive side of the scales. For both behaviors, all constructs were positively correlated.

Table 3.1
*Descriptives and Correlations Among Behavioral Intention, Activators and Personal Norm*

| | *M* | *SD* | Inten-tion | Awareness of need | Ascr. respon-sibility | Efficacy | Ability |
|---|---|---|---|---|---|---|---|
| Using other transport forms (*N*=252) | | | | | | | |
| Intention | 4.17 | 1.44 | | | | | |
| Awareness of need | 5.15 | 1.26 | .26*** | | | | |
| Responsibility | 4.32 | 1.39 | .32*** | .41*** | | | |
| Efficacy | 5.24 | .97 | .38*** | .48*** | .37*** | | |
| Ability | 5.10 | 1.51 | .61*** | .19** | .31*** | .28*** | |
| Personal norm | 2.46 | .77 | .68*** | .21*** | .35*** | .34*** | .46*** |
| Closing the faucet (*N*=289) | | | | | | | |
| Intention | 5.65 | 1.44 | | | | | |
| Awareness of Need | 4.52 | 1.37 | .44*** | | | | |
| Responsibility | 4.26 | 1.35 | .35*** | .56*** | | | |
| Efficacy | 4.88 | 1.18 | .51*** | .63*** | .49*** | | |
| Ability | 5.60 | 1.12 | .74*** | .46*** | .39*** | .47*** | |
| Personal norm | 2.90 | .78 | .64*** | .40*** | .37*** | .48*** | .55*** |

*Note*: All measures range from 1 to 7, except the personal norm measures, which range from 1 to 4. A higher score indicates a more positive stance on the construct. A number of respondents did not own cars, therefore the *N* for "Other transport forms" is lower.
** $p < .01$. *** $p < .001$ (two tailed).

### Situational Activators as Determinants of Personal Norms

The usefulness of the inclusion of the additional activators (i.e., efficacy and ability) to the usually studied activators (awareness of need and situational responsibility) in explaining personal norms can be investigated by hierarchical regression analyses. To test whether the explanation of personal norms regarding the two pro-environmental behaviors improved when the activators efficacy and ability were included, hierarchical regression analyses were performed (Table 3.2). The partial norm-activation model (Model 1) includes awareness of need and situational responsibility and was entered first. In the second step the activators efficacy and ability were entered in order to investigate the full norm-activation model (Table 3.2, Model 2).

Table 3.2
*Explaining Personal Norms by two Activators and by the Full Norm-Activation Model*

| | ß's | $R^2$ |
|---|---|---|
| Using other Transport Forms (*N*=253) | | |
| *Model 1: Partial norm-activation model* | | |
| Awareness of Need | .08 | |
| Situational Responsibility | .32*** | 13% |
| *Model 2: Full norm-activation model* | | |
| Awareness of Need | -.02 | |
| Situational Responsibility | .18** | |
| Efficacy | .19** | |
| Ability | .35*** | 28% |
| Closing the Faucet (*N*=289) | | |
| *Model 1: Partial norm-activation model* | | |
| Awareness of Need | .29*** | |
| Situational Responsibility | .21** | 19% |
| *Model 2: Full norm-activation model* | | |
| Awareness of Need | .02 | |
| Situational Responsibility | .09 | |
| Efficacy | .24*** | |
| Ability | .39*** | 37% |

*Note:* $R^2$ = proportion of variance explained. Entries are beta weights.
** $p < .01$. *** $p < .001$ (two tailed)

The results concerning personal norm to use other transport forms, obtained with the partial norm-activation model (Model 1, Table 3.2), indicate that situational responsibility does, but awareness of need does not contribute to the explanation of personal norm. Results of Model 2, the full norm-activation model, suggest that efficacy and ability both contribute significantly to the explanation, which increases relative to Model 1 from 13% to 28%. Personal norm regarding closing the faucet (Model 1, Table 3.2) is explained by significant contributions of both activators from the partial norm-activation model, that is, by awareness of need and situational responsibility. The full norm-activation model (Model

2, Table 3.2) improves the explanation of personal norm from 19% to 37%. In the full norm-activation model, efficacy and ability are the only two activators making a significant contribution to the explanation of personal norm.

### Situational Activators as Determinants of Behavioral Intention

A similar hierarchical procedure to that used for the explanation of personal norms was executed to explain behavioral intentions. We first regressed behavioral intentions on the partial norm-activation model (Model 1) that includes the two usually studied activators awareness of need and situational responsibility, while in the full norm-activation model (Model 2) all situational activators were included (i.e., awareness of need, situational responsibility, efficacy, and ability). Table 3.3 (Model 1, column "activators without PN") shows that awareness of need and situational responsibility significantly contribute to the explanation of both behavioral intentions when they are the only two predictors. The partial norm-activation model (Model 1) explains behavioral intention of other transport forms by 12% and behavioral intention to close the faucet by 21%. Second, efficacy and ability were entered into the regression analyses in order to test the full norm-activation model (Table 3.3 Model 2). The explanation of awareness of need and situational responsibility becomes statistically non-significant when the full norm-activation model is observed (Model 2, column "activators without PN"). Only efficacy and ability contributed significantly to the explanation of both intentions. The full norm-activation model explained 43% of the variance in the intention to use other transport forms and 58% of the variance in the intention to close the faucet.

### Mediation by Personal Norm

The final aim of Study 2 was to explore the role of personal norm. More specifically, we wanted to investigate to what extent personal norms mediate the influence the activators have on behavioral intention. Following standard methodological procedures (Baron & Kenny, 1986; Kenny, Kashy, & Bolger, 1998) it was (a) established that personal norm, that is, the potential mediator, was related to behavioral intention and (b) determined which activators were significantly related to personal norms and to behavioral intention. Mediation is involved when it can be established that the behavioral influence of the activators that meet the latter preconditions are exerted via personal norms and thus, stated otherwise, when the influence of activators decreases after inclusion of personal norm.

Similar to the analyses with regard to personal norms and behavioral intention, the mediational analyses were executed with regard to two models that were introduced above. Model 1, the partial norm-activation model, includes the usually studied activators awareness of need and situational responsibility, and Model 2, the full norm-activation model, also includes the activators efficacy and ability. Comparison of the two models provided an opportunity to investigate the effects of inclusion of additional activators by determining what differences between the two models in the establishment of mediation

occur. Mediation of personal norms was tested for the activators that meet the aforementioned preconditions (i.e., the activators that were related to personal norms and behavioral intention). With regard to the partial norm-activation model, these preconditions were met for situational responsibility regarding both behaviors and for awareness of need regarding closing the faucet (awareness of need regarding other transport forms was not related to personal norm, as was shown in Table 3.2). A comparison of the betas in the column "Activators Without PN" with the betas in the column "Activators With PN" shows decreases in betas of the activators in the partial norm-activation model (Table 3.3, Model 1) when personal norms are included. These decreases are significant,[21] suggesting mediation of personal norms. However, after inclusion of personal norms only the behavioral relationships of the situational responsibility activators became non-significant, whereas the behavioral relationship of awareness of need remained significant. This indicates that mediation of personal norms with regard to situational responsibility was complete and that mediation with regard to awareness of need was partial, but also significant.

With regard to the full norm-activation model (Table 3.3, Model 2) only efficacy and ability with regard to both behaviors meet the aforementioned preconditions for establishing mediation (i.e., were related to personal norms and behavioral intention). Thus, efficacy and ability were the only candidates of mediation by personal norms. A comparison of the betas in the Models 2 of the column "Activators Without PN" with the betas in the column "Activators With PN" (Table 3.3), shows modest decreases in the betas of efficacy and ability. Again it appears that, although mediation was significant (column "Mediation test z-score"), these activators remain significantly related to both intentions. This pattern of results suggests that personal norms only partially mediate the influence of efficacy and ability on behavioral intention.

[21]This was determined by means of a test of the null hypothesis that the route from an activator via personal norms to behavioral intention differs from zero (Kenny et al., 1998, p. 260).

Table 3.3
*Explaining Behavioral Intention by the Partial Norm-Activation Model and by the Full Norm-Activation Model, Without and With Inclusion of Personal Norm*

| | Activators Without PN | | Activators With PN | | Mediation Test |
|---|---|---|---|---|---|
| | *β's* | $R^2$ | *β's* | $R^2$ | (z-score) |
| Using Other Transport Forms (*N*=251) | | | | | |
| *Model 1: Partial norm-activation model* | | | | | |
| Awareness of Need | .16* | | .11* | | ‡ |
| Situational Responsibility | .25*** | | .05 | | 4.47* |
| Personal norm | — | | .64*** | | |
| | | 12% | | 48% | |
| *Model 2: Full norm-activation model* | | | | | |
| Awareness of Need | .05 | | .05 | | |
| Situational Responsibility | .06 | | -.02 | | |
| Efficacy | .19** | | .10* | | 2.89* |
| Ability | .53*** | | .36*** | | 5.32* |
| Personal norm | — | | .47*** | | |
| | | 43% | | 59% | |
| Closing the Faucet (*N*=288) | | | | | |
| *Model 1: Partial norm-activation model* | | | | | |
| Awareness of Need | .35*** | | .20*** | | 4.25* |
| Situational Responsibility | .16* | | .04 | | 3.15* |
| Personal norm | — | | .55*** | | |
| | | 21% | | 45% | |
| *Model 2: Full norm-activation model* | | | | | |
| Awareness of Need | .03 | | .02 | | |
| Situational Responsibility | .00 | | -.03 | | |
| Efficacy | .19*** | | .12* | | 3.08* |
| Ability | .64*** | | .52*** | | 5.09* |
| Personal norm | — | | .30*** | | |
| | | 58% | | 63% | |

*Note*: Entries are beta weights. PN = personal norm. "Mediation test z-score" was calculated for activators that met preconditions for establishing mediation (Kenny et al., 1998), meaning that they were related to personal norms and to behavioral intention.
‡ = preconditions for mediation-calculation were not met.
* $p < .05$. ** $p < .01$. *** $p < .001$.

## DISCUSSION

In Study 2, the NAT (Schwartz, 1977) is supported in some, but not in all respects. The two commonly studied activators, awareness of need and situational responsibility, are significantly related to one or both personal norms. Thus, the need that is perceived as well as the perception of being responsible for that need are both related to feelings of personal obligation to behave in a pro-environmental fashion. This supports similar findings with regard to political behaviors by Stern et al. (1986). However, inclusion of the other two activators, efficacy and ability, adds new insights. They both contribute significantly to the explanation of personal norm; as a result, the contribution of awareness of need to the explanation of both personal norms dropped to non-significance. Likewise, the contribution of situational responsibility to the explanation of personal norm to close the faucet also dropped to non-significance when all four activators were included simultaneously. With regard to the analyses of behavioral intention, the two commonly included activators have explanatory value. However, similar to what was observed with regard to the explanation of personal norms, when efficacy and ability were included, and thus the full norm-activation model could be tested, awareness of need and situational responsibility no longer contributed to the explanation of behavioral intentions. These results suggest that proportions of explained variance in pro-environmental personal norms and intentions increase when the full norm-activation model, other than the partial norm-activation model, is tested. More specifically, this suggests that the influences of 'basic' activators, awareness of need and situational responsibility, overlap with the influences 'instrumental' activators, efficacy and ability, have upon pro-environmental norms and intentions.

Finally, although it was established that personal norms were to an important extent related to both behavioral intentions, they only partially mediated the influence of situational activators. The only complete mediation that was observed concerned the situational responsibility activators when the partial norm-activation model (that included only awareness of need and situational responsibility) was investigated (Model 1, Table 3.3). When the full norm-activation model (Model 2, Table 3.3) was tested, only partial mediation was observed. These findings suggest that personal norms mainly fulfil a role similar to that of other behavioral determinants, that is, as a direct behavioral determinant, and only partially accomplish the decisive, mediating role that is assigned to them in the NAT (Schwartz, 1977). This concurs with earlier findings in which personal norms did not intervene strongly between activators and behavior (Vining & Ebreo, 1992; Schwartz & Howard, 1980; Zakrzewski, 1983) and seems more in line with the role ascribed to personal norms in other behavioral decision models (e.g., Triandis, 1977).

The fact that we found a modest mediating role was somewhat unexpected, given what has been advocated by proponents of the NAT (e.g., Black et al., 1985; Schwartz, 1977). A replication would provide further insights into the issue of whether personal norm should be seen as the central intervening factor or alternatively as a less central, direct behavioral determinant that does not mediate other determinants (cf. Fishbein, 1967; Wallston &

Wallston, 1984). Moreover, robustness would be gained if comparable results were to appear under a replication with a methodologically different approach. This would enhance control over the extent to which activators are experienced. This is not unimportant, because the measured activators in our first survey had sub-optimal reliabilities. Although reliabilities of these constructs were comparable in size to those found elsewhere (e.g., Gärling et al., 2000), the low reliabilities would be seen as an alternative, methodological explanation for the weak relations that were obtained between activators and personal norms and between activators and behavioral intention. Enhanced control by means of a laboratory experiment will rule out this alternative explanation. In addition it circumvents potential problems such as influences of external circumstances on activators regarding daily behaviors.

# Study 3: Encouraging Pro-environmental Volunteering by the Norm-Activation Theory

In this study, the value of the NAT for understanding pro-environmental behavior was investigated by means of a laboratory experiment. In this experiment, participants were systematically exposed to an appeal to volunteer for an unknown environmental agency, Green Aid, with which participants could not have had prior experience. We experimentally induced three situational activators, awareness of need, efficacy and ability.[22] In addition, we included the two personality trait activators (awareness of consequences and denial of responsibility), which have not been incorporated before in environmental studies.

In this second study, we revisited the aims formulated in the introduction concerning relationships between activators, personal norms and pro-environmental behavior. More specifically, the aims of Study 3 were (a) to determine the extent to which situational and personality activators are related to personal norm regarding volunteering for Green Aid, and (b) to volunteering itself, and (c) to assess the extent to which personal norm mediates the influence of activators on volunteering for Green Aid.

As suggested in the introduction, until now only some of the relationships specified in the NAT have been investigated. In Study 3 we were able to investigate these relationships in an almost complete way. Our expectations concerning relations in the model are based on the NAT, on previous environmental studies, and on the results of Study 2. The NAT would predict promotive effects of the three situational activators that are included in Study 3 on personal norm and behavior (Schwartz, 1977). What should be expected in the environmental realm? Effects of the awareness of need activator on personal norms and behavioral intention have been found in some studies (e.g., Black et al., 1985), but not in others (e.g., Bratt, 1999), and only partial evidence of such effects were found in Study 2. However, the experimental design in Study 3 was deemed adequate to raise the salience of the existence of need which would offer a better occasion to test whether, in line with NAT, need affects personal norm and volunteering. With regard to efficacy and ability, we would expect positive effects on personal norm and on volunteering decisions, given positive results in environmental studies (e.g., Ellen et al., 1991; Geller, 1995) and given the results of Study 2.

Results of the personality trait activators, awareness of consequences and denial of responsibility, have only been obtained in the interpersonal domain (Schwartz & Howard,

[22]Situational ascription of responsibility was not included in this study. Together with the two personality trait activators, there were already five activators included in this study. Excluding the situational ascription of responsibility activator seemed least detrimental for our purposes, because a responsibility measure (i.e., the personality trait activator denial of responsibility) was included.

1984). Behavioral effects of awareness of consequences were rarely found, whereas effects of the denial of responsibility personality trait activator have quite consistently been found (e.g., Schwartz & Ben David, 1976; Schwartz & Clausen, 1970; Schwartz & Tessler, 1972). Although tests of the effects of these activators in the environmental realm are not available, the norm-activation model would predict that both personality trait activators have a positive effect on the personal norm to volunteer, as well as on volunteering itself.

As for the interactions of the activators on personal norm and behavior, NAT is somewhat unclear about what the exact relation should be. One proposition is that the relation is additive (Schwartz, 1968b). In that case, personal norm and the tendency to show pro-environmental behavior should be strongest when all situational activators are high. However, it has been shown more than once in the interpersonal domain that activators influence each other in a negative way (Schwartz, 1970, 1974, 1977). In these situations the highest rates of helping behavior were found when one activator was high and the other low, whereas helping *boomeranged* to its lowest level when both activators were high. In those instances actors were deemed to interpret the situation as coercive or suspicious which apparently led to reactance (Schwartz, 1977, pp. 263-268). However, in the pro-environmental realm activators may be experienced as more distant and therefore less intrusive than interpersonal activators and may not easily lead to suspicion or reactance. Thus, in addition to tests of main effects of activators, interaction effects among the included activators will be explored.

With regard to the role of personal norms, the third goal of Study 3, we will test whether this construct mediates potential behavioral effects of the situational and personality trait activators. As explained above, we do not rule out the possibility that activators have a direct influence on behavior instead of a central mediating role, which would be in agreement with models such as Triandis' model of the attitude-behavior relationship (Triandis, 1977; Wallston & Wallston, 1984).

## METHOD

### Design and Participants

In addition to measurement of the two personality traits, we manipulated Awareness of Need (low vs. high), Efficacy (low vs. high), and Ability (low vs. high) in a 2 x 2 x 2 factorial design. The participants, 166 non-psychology freshmen of Leiden University with a mean age of 20 years old ($M$ = 19.96; $SD$ = 2.96), participated voluntarily in this study. They received 7.5 Dutch guilders (approximately four US Dollars at that time) for their participation that lasted 45 minutes.

## Procedure

The participants were invited to our laboratory for what was called a multiple-study investigating behavioral decision making. Participants were seated in separate cubicles that contained a computer terminal which presented information and questions, and which registered their responses. The experiment started with questions about the personality traits Denial of Responsibility and Awareness of Consequences. These questions were presented as a study into opinions about societal issues and interpersonal behavior. After this, participants moved on to an ostensibly independent second study containing two assignments, which actually functioned as filler tasks. The first assignment was a proof-reading task in which participants were asked to find and correct errors in a newspaper article. The second assignment involved a cognitive mapping task in which participants were requested to draw a map of the city center of their hometown. After these two filler tasks, which each took five minutes, the participants had to answer a short questionnaire with questions concerning language matters and the way they visualized the city center. Together, these tasks took approximately 15 minutes. The third part involved the experiment. Participants received general information about an environmental organization Green Aid that had planned an intervention action against the substance SCN. Except for a remark that SCN was used by farmers to make their crops grow more rapidly, this substance was not further described at that stage. In fact, the Green Aid organization and the substance SCN were fictitious. It was suggested that Green Aid's actions are usually executed by volunteers. For this particular action against SCN, volunteers were needed to assist in the diffusion of information. Volunteers had to prepare letters. The letters informed consumers about SCN and how to recognize vegetables and fruits that are treated with SCN. After this general information the experimental manipulation was presented in a 2 (high versus low awareness of need) by 2 (high versus low efficacy) by 2 (high versus low ability) between subjects factorial design. After the manipulations were presented, questions were administered to obtain a general impression of the efficacy of our manipulations. Subsequently, the main dependent variables were presented, that is, measures of the willingness to volunteer for Green Aid and personal norm to volunteer. Finally, specific manipulation checks were presented, after which participants were thoroughly debriefed, paid and thanked for their participation.

## Manipulations

*Awareness of Need.* The Awareness of Need manipulations were packaged in a summary of fictitious research results about the substance SCN. The *low need* condition stated that SCN is harmless for plants, trees, birds and humans, and that it is used very rarely in the Netherlands so that very few consumers can buy vegetables and fruit treated with SCN. It was concluded that SCN is not an environmental problem in the Netherlands. The *high need* condition stated that SCN is very harmful for plants, trees, birds, and also for humans, and that SCN is used excessively in the Netherlands, so that many consumers

are buying vegetables and fruit treated with SCN. It was concluded that SCN is a very serious environmental problem in the Netherlands.

*Efficacy.* The efficacy manipulations were packaged in a summary of results of, again fictitious, communication research into the efficacy of sending letters to change consumer behavior. The *low efficacy* condition asserted that the communication research results were disappointing because a mail campaign rarely leads to a decrease in consumers' purchase of products treated with SCN. It was stated that an identical campaign, executed some years ago, had been a failure. It was concluded that the purchase of vegetables and fruit that had been treated with SCN would decrease by only 2%. The *high efficacy* condition stated that the research results were encouraging because a mail campaign leads to a strong decrease in consumers' purchase of products treated with SCN. It was stated that an identical campaign aimed at an other hazardous substance, executed some years ago, had been very successful. It was concluded that the purchase of vegetables and fruit that had been treated with SCN would decrease by at least 85%.

*Ability.* The requirements to become a volunteer contained the ability manipulations. The *low ability* manipulation stated that there were numerous special requirements and that by no means everybody would be able to perform the tasks a volunteer has to fulfil. It was explained that volunteers had to be very meticulous, that the work involved time pressure, and that, in order to fulfil the tasks, volunteers also needed to have available a room that was large and quiet. The *high ability* manipulation stated that there were no special requirements and that almost everybody would be able to perform the tasks a volunteer has to do. It was explained that volunteers did not have to be very meticulous, that the work did not involve any time pressure, and finally, that any room would be suitable for performing the tasks of a volunteer.

After the information that contained the manipulations was presented, three dichotomous questions about the essence of each of the manipulations were presented. In case a wrong answer was given, the information containing the manipulation was presented for a second time and the participant was requested to answer the question once more. These three questions were used as general manipulation checks, as will be explained later.

## Measures

As explained, data concerning the personality traits were assessed in what was ostensibly a first study, that is, before the filler tasks and the main experiment. *Denial of Responsibility* was assessed by means of the 28-item scale developed by Schwartz (1977) and used in previous studies by Schwartz and others (e.g., Ferrari & Leippe, 1992; Schwartz, 1977; Zakrzewski, 1983).[23] Examples of denial of responsibility items are: "If I hurt someone unintentionally, I would feel almost as guilty as I would if I had done the

[23]We would like to thank Shalom Schwartz and John Ferrari for providing us with the measures for the personality traits. A copy of the full measures is available on request from the author.

same thing intentionally" and "Even if something you borrow is defective, you should still replace it if it gets broken". Responses were measured on 7-point *strongly agree* to *strongly disagree* scales. The 28 responses were averaged to create a denial of responsibility scale. Cronbach's alpha of the scale was .72. The mean score on denial of responsibility scale was 3.59 ($SD$ = 0.58). To facilitate further analyses, the participants were identified as low or high deniers, by means of a median split on their denial of responsibility scores. The cut-off score of the median-split was 3.61 and yielded a low *denial of responsibility* group (representing participants with a tendency to accept responsibility) with 51% of the participants, and a high *denial of responsibility* group (representing participants with a tendency to reject responsibility) with 49% of the participants.

The *awareness of consequences* personality trait was measured using a method developed by Schwartz (Schwartz, 1968a, 1977). By means of three of the six available open-ended stories we measured to what extent people include the consequences for the welfare of others in their decision making process (Schwartz, 1977). The three stories we presented to the participants dealt with consequences for strangers and not, as in the other three stories, for peers. Since environmental consequences seem more related to consequences for unknown people than to consequences for peers, these three stories were, at face value, considered to be suitable for use in the present study. An additional argument to make a selection from the total set of six stories was to save time and effort on the part of the participants.

The first story tells about a main character who drove home by car a little faster than usual, which would help him to visit someone in a hospital. The car in front of him accidentally ran off the road and landed in a ditch. The story ends at the point where the main character wonders what to do. The second story deals with a person at an airport who luckily acquires the last available flight ticket. At that moment someone else arrives who is apparently very worried and upset because he misses that last available ticket. Again, the story ends at the point where the main character wonders how to act. In the third and last story, participants read about a safety engineer who is promised a promotion if a deadline is met. The only way to meet the deadline is to cut corners with his security work. The main character wonders whether to cut corners or to do his work in the usual, careful way at the expense of the promotion. Respondents read each of these open-ended stories of approximately ten lines that all end at the point were the main character in the story has to decide how to respond to the moral dilemma at hand. Respondents were asked to give a description of how they thought the main character would reach a decision about what to do. It was stressed that respondents were not supposed to write down what the main character should or should not do, but instead what the main character's feelings and thoughts would have been while reaching a decision.

Respondents' written responses were coded according to Schwartz's (1977) instructions. According to these instructions, the score of the single response to a story that demonstrates the strongest awareness of consequences is assigned to represent the total response to that story. For each story, the total response was rated on a 5-point scale with endpoints *no awareness* (0) and *strong awareness of consequences* (4). One hundred and

fifty-seven participants provided valid responses on all three stories. The stories were coded by the author and by a student.[24] The raters assigned a score to each of the three stories. Initial agreement about scores within one scale point was 97.24%, which is comparable with earlier findings (Schwartz, 1968a, p. 360). Differences were discussed after which agreement for all responses was obtained. Cronbach's alpha for the Awareness of Consequences scale was 0.43.[25] The scores on the three stories were averaged to obtain an overall score (ranging from 0 to 4) for the extent to which participants were aware of the potential consequences of their behavior on the welfare of others. The mean score on the awareness of consequences measure was 1.09 (SD = 0.63). To facilitate further analyses, a median split was performed and thereby we obtained a *low awareness of consequences* group and a *high awareness of consequences* group. It was impossible to divide the participants into two equally sized groups. A cut-off score of 1.00 yielded two groups with the least difference in size. The low awareness of consequences group contained 58% and the high awareness of consequences group 42% of the participants.

*Volunteering to participate* in the preparation of the mailing to inform consumers about the substance (SCN) was the main dependent variable. It was measured using seven items. An example is: "If asked, I intend to participate as a volunteer with the Green Aid campaign at the end of 1999". Responses were given on 7-point *strongly agree* to *strongly disagree* scales or on 7-point *certainly* to *certainly not* scales. Cronbach's alpha of this 7-item scale is .97.

*Personal norm* was measured using four items that had been used in former studies (e.g., Manstead & Parker, 1995; Schwartz, 1977). One item was "To what extent do you feel a personal obligation to participate in this action as a volunteer?" Responses were measured on a 7-point *totally no personal obligation* (1) to *very strong personal obligation* (7) scale. Another item was formulated as "If I didn't participate in this action as a volunteer, I would feel ...", with responses on a 7-point *not guilty at all* (1) to *very much guilty* (7) response scale. Cronbach's alpha for the scale that was constructed with these four items is .88.

Further questions were used as *general manipulation checks*. The general manipulation checks involved dichotomous "yes-no" questions. Each question referred to the core of each of the three manipulations. After a question was answered, the participant was informed whether or not his or her answer was correct while the main characteristics of the manipulation were presented once more. For instance, if a participant in the high need condition disconfirmed the existence of need, the main characteristics were presented again, after which the question was presented for a second time. The number of errors was

[24]We thank Maarten Cramers for his assistance with the coding of the awareness of consequences responses.

[25]Whether this low alpha was usually obtained with the awareness of consequences scale could not be determined because scale reliabilities are not reported elsewhere. Dropping one of the stories did not produce a higher alpha. Acknowledging that a higher alpha would be preferable, we decided to use this less optimal one.

registered to provide a general indication of the extent to which people understood the manipulations in the way they were intended.

For each of the manipulations a *specific manipulation check* was also performed. The specific Awareness of Need manipulation check was "to what extent is the use of SCN in the Netherlands an environmental problem?" Responses were given on a 7-point scale with endpoints *not an environmental problem at all* (1) and *a very serious environmental problem* (7). The Efficacy manipulation was "To what extent does the participation of each volunteer contribute to the fight against the consequences of SCN in the Netherlands?" Responses were given on a 7-point scale with endpoints *does not contribute* (1) and *contributes very strongly* (7). Finally, the Ability manipulation was "To what extent is it difficult to meet the requirements for participation?" Responses were given on a 7-point *very easy* (1) to *very difficult* (7) scale.

## RESULTS

### Testing Strategy

Participants were randomly assigned to the eight conditions of the three manipulated variables Need, Efficacy, and Ability. Given that we performed a single-measurement experiment, participants could not be assigned to conditions based on their scores on the personality traits. This yielded a somewhat unequal distribution of participants over the 32 cells in the full 2 (Need) x 2 (Efficacy) x 2(Ability) x 2 (Awareness of Consequences) x 2 (Denial of Responsibility) design. This imbalance was exaggerated because nine of the 166 participants did not provide a response on the Awareness of Consequences scale. Despite the reduced power, we deemed testing of five factors of the model to be theoretically and empirically important. We therefore decided to include both personality trait activators. Thus, the opportunity to test the full 2 x 2 x 2 x 2 x 2 design was preferred at the expense of being limited to tests of main effects and second-order interactions.[26] This, however, was also the central focus of our theoretical interest (see Stevens, 1990, p. 134, for additional reasons for being reluctant to test higher-order interactions).

### Manipulation Checks

With respect to the general manipulation checks, each of the 166 participants answered three yes-no dichotomous questions. Ninety-four percent of these 498 (166 x 3) questions were initially answered correctly, and the remaining 6 percent were corrected after initial

[26]To see whether relevant higher-order effects would appear, we performed a 2 x 2 x 2 analysis of variance in which only the three situational activators were included. The same and no additional (e.g., three-way interaction) effects were observed for these three situational activators.

errors. This result indicates that, in general, the manipulations were understood as intended. Effects on the specific manipulation checks were tested by means of three separate 2 (Awareness of Need) x 2 (Efficacy) x 2 (Ability) analyses of variance (ANOVAS) with each of the three specific manipulation check questions serving as the dependent variable. As intended, participants in the low need condition estimated the extent to which SCN generated an environmental problem as significantly lower ($M$ = 1.90) than participants in the high need condition ($M$ = 5.07), $F$ (1,158) = 298.92, $p < .001$. Similarly, participants in the low efficacy condition estimated the effectiveness of the action to restrict the consequences of SCN products as significantly lower ($M$ = 2.53) than participants in the high efficacy condition ($M$ = 4.88), $F$ (1,158) = 120.00, $p < .001$. Finally, participants in the low ability condition estimated the difficulty of fulfilling the requirements necessary to participate as lower ($M$ = 3.55) than participants in the high ability condition ($M$ = 6.26), $F$ (1, 158) = 151.44, $p < .001$. No other main effects or interactions were found on the manipulation check variables. These results suggest that the manipulations were perceived as intended.

### Activators as Determinants of Personal Norms Toward Volunteering

The first goal of Study 3 was to investigate whether people's personal norm to become a volunteer for Green Aid was affected by the five activators. A 2 (Need) x 2 (Efficacy) x 2 (Ability) x 2 (Denial) x 2 (Awareness of Consequences) ANOVA was performed with personal norm as the dependent variable. The experienced personal norm for the whole sample was weak ($M$ = 2.48 on the 7-point scale; $SD$ = 1.28). Main effects were found for Awareness of Need and for the personality trait Denial of Responsibility. In the low Need condition, participants experienced a weaker personal norm ($M_{\text{low Need}}$ = 2.19) than people in the high Need condition ($M_{\text{high Need}}$ = 2.75; $F(1,125) = 8.63$, $p < .01$). The effect of the Denial of Responsibility trait on personal norm was similar. Participants with a strong tendency to deny responsibility felt a weaker personal norm to volunteer than participants with a weak tendency to deny responsibility ($M_{\text{high Denial}}$ = 2.24 vs. $M_{\text{low Denial}}$ = 2.71; $F(1,125) = 5.88$, $p < .05$). No main effects of the other three activators on personal norm were found. However, there was a significant Efficacy x Denial of Responsibility interaction, $F(1,125) = 4.78$, $p < .05$ (Table 3.4). In the low Efficacy condition, no difference in the personal norm scores was observed between participants who were weak and those who were strong in their tendency to deny responsibility. In the high Efficacy condition, however, low denial of responsibility participants reported a stronger personal norm ($M$ = 2.96) than high denial of responsibility participants ($M$ = 2.09).

Table 3.4
*Interaction Effect Denial of Responsibility by Efficacy on Personal Norms Toward Volunteering for Green Aid*

| | Efficacy | |
|---|---|---|
| | Low | High |
| High Denial of Responsibility | 2.38[a,b] | 2.09[a] |
| Low Denial of Responsibility | 2.48[a,b] | 2.96[b] |

*Note*: Means are based on a 7-item personal norms scale ranging from very weak personal norm (1) to very strong personal norm (7). Means with different superscripts differ significantly by Tukey comparisons ($p$ <.05).

### Activators as Motivators to Become a Volunteer

The second aim of Study 3 was to investigate whether the five activators from the norm-activation model affected participants' willingness to become a volunteer for Green Aid. For this aim, we performed a 2 (Need; present vs. absent) x 2 (Effect; high vs. low) x 2 (Ability; high vs. low) x 2 (Denial; low vs. high) x 2 (Awareness of consequences; high vs. low) ANOVA with willingness to volunteer as the dependent variable. The mean willingness to volunteer for Green Aid appeared to be moderate ($M$ = 3.04; $SD$ = 1.51). The ANOVA yielded main effects for all five activators. The main effect with regard to the Awareness of Need, $F(1,125) = 11.62$, $p < .01$, shows that participants in the high Awareness of Need condition (M = 3.38) were more likely to volunteer than participants in the low Awareness of Need condition (M = 2.67). The Efficacy main effect $F(1,125) = 4.16$, $p < .05$, shows that participants in the high Efficacy condition (M = 3.26) displayed a higher level of volunteering than participants in the low Efficacy condition (M = 2.83). Likewise, the Ability main effect, $F(1,125) = 5.35$, $p < .05$, indicates that participants in the high Ability condition (M = 3.28) showed stronger volunteering intentions than participants in the low Ability condition (M = 2.79). The main effect concerning Denial of Responsibility, $F(1,125) = 15.02$, $p < .001$, indicates that low Denial of Responsibility participants showed stronger volunteering (M = 3.43) than high Denial of Responsibility participants (M = 2.63). Finally, the Awareness of Consequences main effect, $F(1,125) = 3.99$, $p < .05$, shows that participants in the high Awareness of Consequences condition (M = 3.26) were more likely to volunteer than participants in the low Awareness of Consequences condition (M = 2.87). These main effects were qualified by two significant two-way interaction effects. First, an Efficacy x Denial of Responsibility interaction, $F(1, 125) = 11.60$, $p < .01$, was observed. Additional tests revealed that volunteering was higher in the Low Denial of Responsibility/ High Efficacy condition than in the other conditions (Table 3.5).

Table 3.5
*Interaction Effect Denial of Responsibility by Efficacy on Willingness to Volunteer for Green Aid*

| | Efficacy | |
|---|---|---|
| | Low | High |
| High Denial of Responsibility | 2.77[a] | 2.48[a] |
| Low Denial of Responsibility | 2.90[a] | 3.99[b] |

*Note*: Means are based on a 7-item volunteering scale with responses running from very weak volunteering (1) to very strong volunteering (7). Means with different superscripts differ significantly by Tukey comparisons ($p$ <.05).

In addition, an Efficacy x Ability interaction, $F(1, 125) = 6.57$, $p < .05$, was found. Further tests indicated that in the Low Efficacy / Low Ability condition a lower level of volunteering was observed than in the other conditions. The effects of Efficacy and Ability do not seem to summate (Table 3.6).

Table 3.6
*Interaction Effect Efficacy by Ability on Willingness to Volunteer for Green Aid*

| | Efficacy | |
|---|---|---|
| | Low | High |
| Low Ability | 2.27[a] | 3.36[b] |
| High Ability | 3.41[b] | 3.15[b] |

*Note*: Means are based on a 7-item volunteering scale with responses running from very weak volunteering (1) to very strong volunteering (7). Means with different superscripts differ significantly by Tukey comparisons ($p$ <.05).

**Personal norm as Mediator of the Effects on Volunteering for Green Aid**

Our final aim concerns the mediational function of personal norm. The question is whether the presented significant effects of activators in volunteering behavior were mediated by personal norm. To test mediation, a 2 (Need) x 2 (Efficacy) x 2(Ability) x 2 (Denial of Responsibility) x 2 (Awareness of Consequences) analysis of covariance (ANCOVA) was performed with volunteering as the dependent variable and personal norm as the covariate. To establish mediation, we followed the steps outlined by Kenny et al.

(1998; see also Baron & Kenny, 1986). First, it has to be determined whether the potential mediator, that is, personal norm, is related to volunteering. A highly significant effect of personal norm on volunteering, $F$ (1, 125)= 170.46, $p < .001$, indicates that this prerequisite was met. Then, only those independent variables, that is, activators, that are significantly related to personal norm and to volunteering can be subjected to a mediational analysis. As reported above, this leaves three factors, that is, Awareness of Need, Denial of Responsibility, and the Efficacy by Denial of Responsibility interaction. Finally, the crucial part of a mediational analysis is to determine the extent to which the distinct influence of each of these three remaining activators on willingness to volunteer reduces when the personal norm is included as a mediator. As in Study 2, we tested these reductions.[27] These three reductions were significant, that is, the associated z-scores were all greater than the critical value of |1.96| ($z$ = 3.02 for Awareness of Need, $z$ = -2.35 for Denial of Responsibility, and $z$ = -2.27 for the Efficacy x Denial of Responsibility interaction). However, the ANCOVA with personal norm as a covariate revealed that the main effect of Denial of Responsibility remained significant, $F(1, 125) = 8.14, p < .01$, as did the Efficacy by Denial of Responsibility interaction, $F$ (1, 125) = 6.55, $p < .05$. This indicates that these factors were partially mediated by personal norm. The effect of Awareness of Need on volunteering appeared to be mediated completely as it decreased to insignificance when personal norm was included, $F$ (1, 125) = 2.64, n.s.[28]

## GENERAL DISCUSSION

The NAT (Schwartz, 1977) includes situational and personality trait activators, as well as personal norms, and was therefore deemed to be an adequate, comprehensive theory for studying the determinants of pro-environmental behaviors. Our two studies, a field study and a laboratory experiment, were performed to enhance insights provided by a rather substantial, though somewhat selective use of the NAT in environmental studies. Specifically, our studies aimed to determine whether activators are related to personal norm and to behavior. In addition, we determined whether personal norms fulfil the central mediational role as proposed in NAT (Schwartz, 1977), or, alternatively, function merely

[27]Similar to the previous study, this was determined by means of a test of the null hypothesis that the route from an activator via personal norms to behavior differs from zero (Kenny et al., 1998, p. 260).

[28]No treatment by covariate interactions were observed in the analysis of covariance.

as a determinant among other behavioral determinants as proposed in other models (e.g., Wallston & Wallston, 1984).

*Activators and Personal Norms*

Corroborating earlier findings (e.g., Bratt, 1999; Widegren, 1998), it was shown in Study 2 that all activators were significantly related to personal norms. When the commonly studied activators, awareness of need and situational responsibility, were used to explain personal norms, responsibility appeared to be the strongest contributor. However, when the full norm-activation model, including all situational activators, was examined, the situational activators efficacy, ability, and to a somewhat lesser extent situational responsibility, contributed to the explanation of personal norms. This suggests that there is some overlap between the basic activators, awareness of need and situational responsibility, and the instrumental activators, efficacy and ability. Apparently the situational activators are not related to personal norms independently of each other. Study 3 supports this notion in a somewhat different way. It was shown that personal norm regarding the less common behavior of volunteering for an environmental organization is influenced by awareness of need and by the personality trait activator denial of responsibility. The latter finding, however, was qualified by a denial of responsibility x efficacy interaction, suggesting that personal norm was only enhanced by denial of responsibility when efficacy was favorable. No effect was found for the awareness of consequences personality trait. In combination, the two studies indicate that almost all activators are able to strengthen personal norms toward pro-environmental behavior. The results agree with past findings that awareness of need and responsibility can affect personal norms (e.g., Stern et al., 1986). However, inclusion of additional activators suggest that the activators do not exert their influence on personal norms independently of other activators.

*Activators and Behavioral Tendencies*

With regard to the relationship between situational activators and behavioral tendencies, it was found in Study 2 that the activators commonly included in past research, awareness of need and situational responsibility, contribute to our understanding of pro-environmental behavioral intention (cf. VanLiere & Dunlap, 1978; Stern et al., 1986). However, these two activators provide only partial insight into behavioral tendencies. The findings suggest to a somewhat stronger extent, as compared to what was found with regard to personal norms, that there is some overlap among the activators in their relation to behavioral intention. That is, once efficacy and ability are included in the analysis, awareness of need and situational responsibility no longer contribute to the explanation of behavioral intention. In Study 3 all situational activators that were included, that is, awareness of need, efficacy, and ability affected volunteering. The latter two activators appear to interact such that when either efficacy *or* ability is high, volunteering is at its highest level (i.e., volunteering does not increase any further when both of these activators are high), whereas in the case where both efficacy and ability are low, weakest volunteering

rates are observed. In general, efficacy and ability consistently enhanced the explanation of pro-environmental behavior. Especially the finding that efficacy is an important behavioral determinant is interesting, and possibly relevant with regard to environmental management. It is a factor of considerable uncertainty, caused by the fact that the efficacy of most presumable pro-environmental behaviors can often only be determined in the long-run or when executed on a large scale (Staats, Wit, & Midden, 1996; Vlek & Keren, 1992).

Corroborating expectations outlined in the NAT regarding the personality trait activators (Schwartz, 1977), volunteering is, apart from situational activators, also enhanced by awareness of consequences and by denial of responsibility. Whereas mainly non-supportive effects of awareness of consequences have been found in the interpersonal domain (e.g., Schwartz, 1974), our data suggest that this activator is of value in the environmental field. Denial of responsibility appears to be important to understand the promotive influence of the efficacy activator. Table 3.5 shows that high efficacy has a promotive influence on volunteering only for people who tend to accept responsibility for their behavior. This result agrees with the idea in the NAT that one has to feel responsibility for the presence of a certain need before one focuses on the efficacy of potential helping actions. Generally, these effects confirm earlier findings of personality traits on pro-environmental behavior (e.g., Strathman et al., 1994) and stress the importance of personality differences to the understanding of pro-environmental behavior.

### *The Role of Personal Norms*

The exploration of the role of personal norms with regard to pro-environmental behavior provided mixed findings. Corroborating earlier findings (e.g., Widegren, 1998), behaviors in both studies are strongly related to personal norms. However, tests of the mediating role of personal norms yield only partial support. Contrary to what the norm-activation model would predict, personal norm seems to mediate some, but certainly not a large proportion of the behavioral effects of most activators that were investigated in our studies. Both studies demonstrate that the behavioral influences of activators were only partially mediated by personal norm. Whereas it is true that personal norms mediated situational responsibility in Study 2, this was only the case when efficacy and ability were not included (i.e., in the partial norm-activation model, Model 1, Table 3.3). The only exception concerns awareness of need in Study 3, which was completely mediated by personal norm. Given that awareness of need is supposed to be the starting-point of the norm-activation process, and given the attention paid to this factor in environmental research in which the NAT has been studied (e.g., Stern et al., 1995), mediation of this activator by personal norms is a notable finding. It suggests that people's feelings of moral obligation or guilt are triggered by the conviction that the natural environment suffers (cf. Black et al., 1985). This finding is the more remarkable because the effect of awareness of need on personal norm to volunteer did not interact with other activators. That is, even if circumstances provided excuses to disqualify personal normative feelings, for instance, because of limited opportunities to volunteer (i.e., in the low ability condition) or when

volunteering seems ineffective (in the low efficacy condition), personal normative feelings to volunteer were enhanced by awareness of need.

However, the general claim of NAT concerning the mediation role of personal norm was not completely supported. To a considerable extent, our data are more in line with the view maintained in other models that consider personal norm to be one of the determinants of behavior, no more central or important than other determinants (Fishbein, 1967; Triandis, 1977; Wallston & Wallston, 1984).

A point related to the presumed central role of personal norms is that in the current research a mediational view on personal norms was taken (cf. Black et al., 1985; Stern et al., 1986). In some other studies the construct is investigated from a somewhat different, that is, moderational perspective (e.g., Hopper & Nielsen, 1991; Vining & Ebreo, 1992). Vining and Ebreo (1992), for instance, tested whether the personal norm-behavior relationship was moderated under the influence of two situational activators. These authors found that the personal norm-behavior relationship was positively moderated, that is, strengthened, by the awareness of need activator, but not influenced by the situational responsibility activator. The partial support for mediation and direct behavioral effects of personal norms that we found, in combination with the partial support for moderation found by Vining and Ebreo (1992), suggests that, although personal norm is an important construct, clarity about its role has not yet been found in empirical research. One reason for unclearness might be that personal norms with regard to the environmental issues we studied were not particularly salient to the persons' self-concept. It has been found that central attitudes are more strongly related to behavior (Kraus, 1995; Lindeman, 1993). A study in which the centrality of personal norms is controlled might provide insights into whether a mediational, moderational, or yet another role of personal norms prevails. However, it seems difficult to exert direct experimental control over personal norms that people adhere to. This calls for an elaboration on methods suitable to circumvent this problem. The use of scenarios or vignettes might be helpful. By means of a scenario or a vignette a participant is stimulated to imagine a situation in which he or she adopts a certain role, for instance a situation in which he or she adheres to a certain personal norm. Another way to circumvent the problem of experimental control is to select participants on the basis of the centrality of their personal norms. Despite a possibly limited external generalization of such studies, they can be helpful in obtaining clarity about the role of personal norms.

### *Combination Rules*

In a more general vein, the effects of activators on behavior in our experiment illustrate different combination rules. Remember that in the norm-activation model (Schwartz, 1977) there is no detailed specification of how situational and personality trait activators are combined. Schwartz suggested that one (situational) activator may empower one or more others. In Study 3, besides main effects of each of the five activators on behavior, we found two significant interaction effects, that is, an ability x efficacy interaction and a denial of responsibility x efficacy interaction. Thus, the effects of three of

our five activators were qualified. The interaction effect of efficacy by ability suggests that low levels of ability and efficacy lead to less volunteering than when either the level of ability or the level of efficacy is high, or when both are high. By contrast, the efficacy by denial of responsibility interaction suggests that when both factors are favorable (high efficacy, low denial of responsibility), a higher level of volunteering is obtained than when only one of these factors is high and when both are low. It should be noted that these interaction effects suggest quite different combination rules. A disjunctive rule (see Van der Pligt, De Vries, Manstead, & Van Harreveld, 2000) is involved for the relation between efficacy and ability, since the highest level of volunteering is reached when only one of the two variables is high. In contrast, a conjunctive combination rule is involved for the relation between denial of responsibility and efficacy. That is, unless both variables are induced at a favorable level, volunteering is sub-optimal. For the other activators (awareness of need and awareness of consequences) only main effects were observed, suggesting that these activators are related in an additive way to behavior: High levels of awareness of consequences and awareness of need seem to enhance volunteering for Green Aid more than low levels of these two activators. In sum, although tentative, our analyses of the effects of the five activators on behavior suggest that several combination rules were employed: Additive, conjunctive, and disjunctive relations are observed.

### *Conclusions*

Two methodologically different studies have shown that a combination of personality trait factors and situational factors enhances our insights into decision-making in the environmental domain. It was found that activators described in NAT (Schwartz, 1977) can influence pro-environmental behavior in different ways. Activators influence each others' effect on personal norms and behavior, and several interactions among activators were also found. Additionally, it became clear that De Young's (1993) call for more research on intrinsic factors appears to be justified by the results showing the influence of personal norms on behavioral tendencies. The mediational role of personal norms was fully supported only with regard to the awareness of need activator. With respect to other activators only partial mediation was found indicating that, in view of the present data, the claim of the NAT that personal norms fulfil a decisive, mediational role between activators and behavior seems not to be justified. However, more generally, support has been found in both our studies for the usefulness of the NAT in the environmental domain in that it distinguishes important factors that affect personal norms as well as behavioral decisions.

# 4 Study 4: Real-life Encouragement of Pro-environmental Behavior: Short-term and Long-term Effects of Participation in the EcoTeam Program

# Study 4: Real-life Encouragement of Pro-environmental Behavior: Short-term and Long-term Effects of Participation in the EcoTeam Program[29]

In the last 25 years a considerable body of research has investigated the effectiveness of intervention techniques in encouraging pro-environmental behavior. Three review articles (De Young, 1993; Dwyer, Leeming, Cobern, Porter, & Jackson, 1993; Schultz, Oskamp, & Mainieri, 1995) give an account of what has been accomplished in this field. In all three articles similar conclusions are presented: (a) There is agreement that persistence of pro-environmental behavior change is rare in the relatively few cases that persistence has been investigated at all. For example, Dwyer et al. (1993) concluded that, out of 54 studies that they analyzed, only two studies reported that interventions appear to retain their effectiveness for a period of up to 12 weeks after the treatment phase has expired. (b) Intervention studies generally target only one or a few behaviors and thus have a very limited scope. Earlier studies (see for example Luyben, 1980, p.616) reflect the hope that the conditions that affect some pro-environmental behaviors will make other behaviors also susceptible to change, because of the shared elements of their respective supporting conditions. Nowadays, a less optimistic view prevails. The authors of the three review articles (De Young, 1993; Dwyer et al., 1993; Schultz et al., 1995) stated that it is largely unknown, and probably very questionable, whether generalization occurs from the specific behavior that is targeted by an intervention technique to other behaviors that affect the environment. Such a lack of communality across pro-environmental behaviors has been reported by Siegfried, Tedeschi, and Cann (1982), who found that four different pro-environmental behaviors (lowering thermostats, using less hot water, purchasing environmentally safe products, and avoiding the use of unnecessary lights) are explained by different predictor variables. Similar findings are reported by McKenzie-Mohr, Nemiroff, Beers, and Desmarais (1995; see also Stern & Oskamp, 1987). This lack of communality seems to exist even among behaviors that imply a similar act, such as recycling aluminum cans when paper recycling is the target (Schultz et al., 1995).

[29]This chapter is adapted from Harland and Staats (1995, 1997, 2001), and from Staats, Harland, and Wilke (2001). We would like to thank Peter van Luttervelt, manager of GAP-The Netherlands, and his staff for their inexhaustible enthusiasm and for their practical support throughout the years. We thank Peter de Heus for his suggestions regarding the statistical analysis of our data and Henk Aarts for sharing his enthusiasm and knowledge regarding the concept of habit with us. This study has been carried out with financial support from the Dutch Ministry of the Environment.

Considering the many behaviors that need to change if we are to move in the direction of a sustainable society, the issues of durability and the behavioral scope of interventions are of utmost importance. Intervention techniques that only change one specific type of behavior, and then only for the duration of the intervention, have limited practical value (cf. Geller, 1987; Stern & Oskamp, 1987). De Young (1993) argued that, now that a number of intervention techniques have proven their short-term effectiveness, researchers should focus on developing intervention techniques that create self-sustaining change in order to be practically relevant. Three years later, the same author (De Young, 1996) argued that durable pro-environmental changes can be promoted by devising techniques that combine (a) detailed procedural information, (b) feedback about one's performance, and (c) a supportive social environment. Similar conditions are proposed by Geller et al. (1990) to increase intervention effectiveness.

*Information* is one of the most widely used means to promote pro-environmental behavior change. Information may serve to give practical advice (e.g., Austin, Hatfield, Grindle, & Bailey, 1993). Apart from that, it may also be used to increase problem awareness, which in turn can affect behavior (e.g., Vining & Ebreo, 1992), or to inform about other people's efforts, which may increase cooperation (Messick & Brewer, 1983). *Feedback* may increase the sense of individual and collective efficacy (Bandura, 1977). In general, feedback has proven to be helpful in changing behavior (see Samuelson, 1990). However, information and feedback are rarely sufficient to establish maintenance of change. For example, Van Houwelingen and Van Raay (1989) provided weekly feedback during a year, and even after this long period beneficial effects disappeared quickly.

The third condition that might encourage pro-environmental behavior that was mentioned by De Young (1996) and Geller et al. (1990) is a *supportive social environment.* This condition has rarely been implemented when promoting pro-environmental behavior (Dwyer et al., 1993). This lack of attention to interventions that employ social support is particularly striking given that one of the first social psychological studies that documents the effects of an intervention technique focuses on the effects of social interactions in a group setting (Lewin, 1947). Lewin described the strong effects of participation in discussion groups, as compared to the minor effects of lectures, in promoting the preparation and consumption of types of food considered unattractive. In addition, the effects of group discussions did not decrease with time, whereas those of lectures disappeared. In both the lecture and the discussion groups identical information was given on the importance of diet change, as well as detailed procedural information regarding the preparation of the food. The difference between conditions was mainly due to the possibility to discuss freely the advantages and disadvantages of the new food, prior to making an explicit decision. Lewin concluded that being able to experience group standards before the explicit decision was made was the factor responsible for the success of changing behavior in a small group setting, as compared to that of lectures. Strong additional proof for this hypothesis was derived from the finding that the effects of group discussions also compared favorably to the effects of individual instruction, ruling out the possibility that it was the amount of attention given to each person individually that was responsible for the

change in behavior. This joint effect of group interaction and the explicit decision that was made in public by the group members to prepare and consume the new food was apparently quite successful in changing behavior.

There are a few studies that used each of those characteristics of Lewin's experiments to try to encourage pro-environmental behavior. Social interaction that focused on changing of group standards, or social norms, to effect pro-environmental behavior change has been investigated by Hopper and Nielsen (1991). In an experiment on recycling behavior they investigated the effects of a "block leader approach", that is, a person living in the neighborhood who personally informed people in the neighborhood about the program and actively encouraged them to recycle. Compared with two other conditions, that is, a monthly reminder and an information brochure that was distributed twice during the seven-month program, the block leader condition was more effective. In the Hopper and Nielsen study recycling appeared to increase partly by increasing social and personal norms toward recycling. Weenig and Midden (1991) studied whether decisions to adopt energy-saving appliances in the home could be stimulated by information that was spread through social interaction in neighborhoods. It appeared that adoption decisions were markedly influenced by the informal advice of neighbors who were friends or kin, that is, persons whose opinion the adopters considered relevant and reliable. So some evidence is available that points to the positive influence of face-to-face interaction regarding pro-environmental behavior.

With respect to the other factor in Lewin's experiments, the explicit decision procedure, more information is available. This procedure strongly resembles what is currently called a commitment technique, a pledge or promise regarding performance of future behavior. This technique has been applied as an intervention to promote pro-environmental behavior in several ways, e.g., commitment expressed in public or in private (McCaul & Kopp, 1982; Pallack, Cook, & Sullivan, 1980; De Leon & Fuqua, 1995), in oral or written form (Pardini & Katzev, 1983-1984; Cobern, Porter, Leeming, & Dwyer, 1995), and as an individual or as member of a group (e.g., Pallack et al., 1980; McCaul & Copp, 1982; Burn & Oskamp, 1986; Wang & Katzev, 1990). Compared to other techniques that rely on voluntary cooperation, commitment techniques are known to produce behavior changes that are relatively long-lasting, beyond the period in which the intervention takes place (De Young, 1993). In addition, two studies have reported favorable effects of commitment manipulations combined with feedback (Pallack et al., 1980; De Leon & Fuqua, 1995). The study by Pallack et al. (1980) reported effects lasting for one year, thus being a notable exception to the lack of maintenance of behavior change that is generally found.

The studies that are cited above suggest that intervention packages that combine information, feedback, and social support (including social interaction and commitment) may be successful in accomplishing pro-environmental behavior change that remains in effect after the period in which the intervention package is implemented. It is with these expectations that we looked with great interest at an initiative of a group of environmental scientists and organizational consultants, involved with the organization of the second

national Earth Day that was held in 1990 in the United States (Geller, 1990). This group founded an organization, Global Action Plan for the Earth, and devised an intervention program for the realization of an environmental life-style whose design combines information, feedback, and social support. The program aims to realize substantial and durable pro-environmental changes in the way a household is run. By targeting very many of the behaviors (approximately one hundred) that together determine most of the ecological effects of the way a household is run, it constitutes a tremendous expansion from the narrow behavioral scope of most interventions. The program is called the EcoTeam Program (ETP). Apparently its introduction was timely, and fulfilled a need of governmental organizations on different levels, because it has already diffused to 16 countries and it is internationally supported by the United Nations and the European Commission. In the Netherlands it is supported by the Ministry of the Environment, the Ministry of Economic Affairs, several environmental organizations, and some 15 local communities. World-wide, some 20,000 households have participated in the ETP.

This chapter describes what happened with the Dutch people who responded favorably to the invitation to become an EcoTeam participant. Their developments in behavior, relevant psychological characteristics and household environmental burden have been studied in a longitudinal design with measurements taken before they entered the ETP, directly after, and again two years after they concluded the ETP.

## The EcoTeam Program: Description of the Intervention Package

Suppose you were asked to join a group of people in your neighborhood to discuss your own household pro-environmental behavior in monthly meetings, for a period of approximately eight months. In addition you would have to do some reading in preparation for these meetings, weigh your garbage, calculate your consumption of electricity, gas and water, and try to reduce each of these. How would you respond to such an invitation?

Essentially this is the request made by Global Action Plan for the Earth when they invite people to join the ETP. The design of the ETP, the formula, is threefold: in a *group*, the EcoTeam, environmental household behavior is discussed and possibly changed, based on the *information* that is contained in a workbook. *Feedback* is then given periodically about the savings that have been accomplished by these changes.

EcoTeams are groups of 6 to 10 people who usually know each other already as neighbors, friends, club members, church members, etc.. EcoTeams meet once a month. During these meetings experiences, ideas and achievements related to environmental household behavior are discussed. Following the EcoTeam Workbook, the EcoTeams subsequently focus on the following six themes, each for four consecutive weeks: garbage, gas, electricity, water, transport and consumer behavior. Usually garbage is the first theme to be addressed. First of all the current situation in the household is analyzed. Garbage is weighed for a period of approximately one month, and, by doing so, a database is established that expresses the outcomes of the current way of living with respect to this theme. During this month the information in the workbook about the theme is studied.

The workbook gives background information about the environmental problems associated with garbage, makes clear what consequences specific behavioral changes will have, and gives detailed practical information to help execute these changes. After this month, participants meet again, report on the weight of garbage they produce, exchange and discuss ideas for diminishing their garbage, helped by the list of actions that are suggested in the workbook. The participants explicitly indicate whether they intend to perform the suggested actions. Subsequently they try to implement the methods they find acceptable. After one month the EcoTeam meets again to discuss the experiences they had while trying to reduce the weight of garbage, to report how much the weight of garbage had actually decreased, and to prepare the next theme. This procedure is followed for all six themes, while the actions related to previously treated themes, including registration of the output/consumption, continue. The program lasts approximately eight months.

The EcoTeam results in terms of reductions of garbage and savings of gas, electricity and water, are recorded in the EcoTeam logbook. In this way the team members gain insight into their own behavior with regard to the six mentioned themes, and track their progress individually, as well as at the team level. In each EcoTeam the group-results that are recorded are sent to a central database at the national Global Action Plan office. At this office, the results of all active EcoTeams are compiled and used to give individual teams feedback about the amount of realized savings. During and after their active period EcoTeam members also receive feedback about the accumulated results of all EcoTeams in the Netherlands and in other countries by means of the EcoTeam-Newsletter, which is distributed every three months.

The major aim of the present study is to see whether participation in the ETP is successful in terms of changing behavior in a pro-environmental direction. As explained, the ETP consists of a package of information, by means of the EcoTeam Workbook, feedback of results obtained so far, and social support, as experienced in an EcoTeam. If successful, this success can only be ascribed to some combination of these elements, since we had no opportunity to investigate EcoTeams in which one or more elements of the intervention were absent. However, in an attempt to explain the possible success of the ETP, we collected measures of behavioral intention, perceived behavioral control and habit with regard to one behavior, and also responses to measures assessing participants' evaluation of the elements of the ETP.

### Tracing the Effects of the EcoTeam Program to Habits and Intentions

Many behaviors that take place in the household are displayed frequently, and in the stable context of the home. According to Ouellette and Wood (1998), these are major conditions for behavior to become habitual, that is, displayed automatically, without the need to consult intentions (Mittal, 1988). It could be hypothesized that many of the behaviors that are targeted in the ETP have a fairly strong habitual character, and that one potential explanation for effects of the program might be its success in making behavior more reasoned, at least for long enough to install more environmentally friendly habits.

Reasoned behavior is more sensitive to new information and more liable to be changed on the basis of this information (Fishbein & Ajzen, 1975). According to the Theory of Planned Behavior (TPB; Ajzen, 1991), deliberately formed intentions, resulting from an active reasoning process about the consequences of performing the behavior, represent the counterpart of habits. Effects of participation, thus, should operate on the intentional component of behavior. An example of this process is found in a study by Verplanken, Aarts, Van Knippenberg, and Moonen (1998). They report an experiment on daily travel behavior where the experimental group kept a diary in which they described the circumstances (distance, weather conditions, and amount of luggage) and travel mode (private car or other) for each trip they made. The control group only used the diary to register the travel mode for each trip. The manipulation in the experimental group, the description of the circumstances, was intended to make travel mode choice more deliberate, and, for that reason, more in line with previously expressed intentions. Verplanken et al. (1998) found that deliberation increased the capacity of intention to predict travel mode during the one-week experimental period. No behavior change was expected and found in their study, because the intervention was not aimed at behavior change. In the present study, reason-based components are expected to play a role in the prediction of behavior change, because, generally, the people who signed up for the ETP did so with the intention of having a closer look at the environmental aspects of their household behavior and of changing for the better whatever they considered appropriate and acceptable. This leads us to expect that the perceived quality of the ETP's main elements, (a) information, (b) feedback, and (c) social support experienced in the EcoTeam, will strengthen the effects of prior intentions, independently of previously held habits, in the prediction of behavior change after participation.

## Research Objectives

In this study we looked at the effects of participation in the ETP on changes in household behavior and on changes in environmental resources. Given the characteristics of the ETP, especially the great number of behaviors addressed and the package of intervention techniques that are combined, we were interested not only in short-term effects, directly after participation, but also and especially in long-term effects. We investigated the effects of participation both on the level of behavior and on the level of outcomes of behavior, i.e., the weight of garbage disposed of, and the consumption of natural gas, electricity and water. Finally, we investigated the expectation that pro-environmental changes in behavior were more strongly related to intentions to act in a pro-environmental way, as expressed before participation, relative to the degree that participants experienced the qualities of the three elements of the ETP (i.e., information, feedback, and social support).

## METHOD

### Participants

*EcoTeam members.* A group of 445 people who were ready to start the ETP in January or February 1994 received a request to participate in the research. Of this group 289 (65%) cooperated prior to participation in the ETP, by completing the first set of mail questionnaires (T0). In October 1994, these people were approached for a second time to complete the mail questionnaires that assessed their pro-environmental behavior, psychological backgrounds and quantitative environmental household savings after participation (T1). Of the original sample of 289 respondents, 205 (71%) completed the post-ETP questionnaires. In December 1996 this group was approached again with the request to complete a third set of mail questionnaires, to obtain a similar set of data two years after participation (T2). The sample of respondents that also completed the second post-ETP questionnaires was reduced to 150, due to a non-response of 27% compared to T1. Non-response was related neither to socio-demographic characteristics nor to general environmental concern at T0 and T1. The sample of ETP participants had an average age of 52 years, had a higher income and higher education level than the Dutch population, and consisted of 85% women. The high proportion of female participants is most probably due to the fact that participants were recruited for the ETP mainly through a number of women's organizations in that period.

*Comparison group.* The volume of information requested from EcoTeam participants far exceeded what is considered feasible for mail surveys (Dillman, 2000). No attempt was made to collect the same amount of data from a control group. Instead, in the questionnaires administered at T0, T1, and T2, eight specific behaviors were phrased identically to those asked in a longitudinal study on environmental household behavior that is administered each year among a panel that is a representative sample of the Dutch population (De Kruijk & Couvret, 1995; Couvret, 1995; Couvret & Reuling, 1997). Data collection for this annual survey was done each time within one month of T0, T1, and T2. Comparison of the changes in these eight specific behaviors was deemed adequate to assess whether behavioral changes assessed among the ETP participants could be attributed to the ETP or to influences external to the ETP.[30] A direct comparison indicated that EcoTeam participants at T0 behaved more pro-environmentally than the general Dutch population. Therefore, a sub-sample ($N = 332$) was selected from this sample of the Dutch population, matched on identical performance (Mean and Standard Deviation) of pro-environmental behavior at T0 on a Pro-environmental Behavior Index (PBI) that was created from the set of eight pro-environmental behaviors. Scores of the EcoTeam participants on the PBI were compared with the scores of this matched sub-sample of the Dutch population at T0, T1,

[30]We thank Ellen Couvret and Albert Reuling of the marketing research institute NIPO for their help in providing the data of the Dutch population that was necessary for this comparison.

and T2. This sub-sample of the Dutch population had an average age of 47 years, a higher income and education level than the general population, and consisted of 60% women.

## Behavioral Measures

The main body of the questionnaires that were administered at T0, T1, and T2 was identical. All three questionnaires contained questions about the performance of a series of 38 specific environmental household behaviors, measures of intention, perceived behavioral control, and habit for one of these behaviors, and registration forms for the weight of solid waste disposed of, and the amount of gas, electricity and water consumed during a two-week period. Further, at T1 participants evaluated the quality of the workbook, the feedback that was provided by the national Global Action Plan office, and the social support from their EcoTeam. Other measures were included that are not relevant for our present purposes (but see Harland & Staats, 2001).

*Behavior.* Thirty-eight specific behaviors were measured by self-report to investigate developments of pro-environmental behavior of the EcoTeam participants at T0, T1, and T2. Eight of these 38 behaviors comprised the PBI on which we compared EcoTeam participants with the sub-sample from the Dutch population at T0, T1, and T2. The PBI consisted of the following eight behaviors: separation of organic waste from solid waste, saving dirty laundry until the washing machine can be fully loaded, leaving the faucet running while doing the dishes, bringing a shopping bag from home when going shopping, using unbleached coffee filter bags, using detergents in refill packaging, using unbleached toilet paper, refusing plastic bags or wrappings offered by shopkeepers. Scores on these eight items, all on 7-point scales ranging from 1 (*never*) to 7 (*always*), were averaged. (The scores of the eight behaviors comprising the PBI across the period of the study are included in Table 4.2, labeled 'PBI', following the description of each of these eight behaviors).

The complete sample of 38 household behaviors consisted of three types. First, frequently performed behaviors, e.g., closing the faucet while brushing teeth, scored on a 7-point scale ranging from 1 (*never)* to 7 (*always*). For these behaviors a time referent was given, the period from six months prior to administration of the questionnaire, in order to have respondents focus on the same period while answering the question. All the behaviors that comprise the PBI are of this type. Second, making small alterations to the house which need to be performed only once to make an improvement, e.g., insulating the pipes of the central heating system in places where the heat is not functional, scored on a 4-point scale ranging from 1 (*nowhere*) to 4 (*everywhere).* Third, large investments, e.g., install double glazing, scored on a 4-point scale ranging from 1 (*nowhere)* to (4) (*everywhere*). All the 38 behaviors are described in Table 4.2.

### *Intention, Perceived Behavioral Control, and Habit*

Intention, perceived behavioral control and habit were measured for one specific behavior: Using forms of transportation other than the car for distances below 5

kilometers. Given our interest in the degree to which reason-based and habitual components of behavior are able to explain behavioral change, this behavior, for which habit could be expected to exist to some degree, was deemed a good choice (see Ouellette & Wood, 1998; Verplanken, Aarts, Van Knippenberg, & Van Knippenberg, 1994). The amount of data to be collected in this study prohibited the collection of a larger sample of behaviors that could be studied in detail. The items measuring each of these concepts are given below.[31]

*Behavioral intention* was phrased as: "During the next six months I intend to use forms of transportation other than the car for distances below 5 kilometers". Answers were given on a 7-point scale ranging from 1 (*most certainly not*) to 7 (*most certainly*).

*Perceived behavioral control* was measured by the item: "If I wanted, I could in most instances use forms of transportation other than the car for distances below 5 kilometers during the next six months". Answers were given on a scale ranging from 1 (*extremely likely*) to 7 (*extremely unlikely*).

*Habit* was measured with two items: "To me, using forms of transportation other than the car for distances below 5 km, is a matter of course", and "I automatically use forms of transportation other than the car for distances below 5 km". Answers were given on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Pearson correlation between these two items was .83. The two items were averaged to create the habit measure.

For correspondence among all measures, scores were recoded before analyses such that a higher score always reflected a more pro-environmental stance on an item.

*Use of Environmental Resources*

Ultimately, the intended changes in the set of pro-environmental behaviors that were assessed by self-report should result in a reduction in the use of environmental resources. In the household the environmental resources that are used as a consequence of the behaviors that are subject to the ETP are the production of solid waste, the consumption of natural gas, of electricity, and of water. Collection of these data was considered important. Since the collection of these data by the participants comprised part of the ETP, we were in a position to ask participants also to collect these data for us, during periods that we specified, without this being an overly demanding task. All respondents were asked at T0, T1, and T2, to register the weight of solid waste disposed of, and the amount of gas, electricity and water their household used, each time for a period of two weeks. Their scores were corrected for special circumstances, such as the stay of guests or, conversely, the absence of household members for days during these two-week periods. The data on gas consumption were corrected for variation in weather conditions (temperature, sunlight, and wind) and for weather-independent use of gas (cooking and hot water) during these periods, using the weighted degree-day method (EnergieNed, 1995; Zwetsloot, 1983). This correction method is considered quite reliable for natural gas consumption. Data for analysis were scores per person of kilograms of solid waste per day, $m^3$ natural gas per degree-day, $m^3$ of water per week, and kWh electricity per week. Registration of these data

[31]Copies of the full questionnaires are available on request from the author.

appeared to be a difficult job, as many errors and missing data appeared on the score sheets. To be sure that the remaining data were of good quality, two decisions were made concerning outliers. The first was that respondents whose score at T0, T1, or T2 was outside the interval of the average score plus or minus two standard deviations *and* whose change score (the scores of two registration periods subtracted) was outside an interval defined by the average change score plus or minus two standard deviations, were excluded from the analyses. This accounted for five participants. The second decision rule was that respondents' scores indicating an increase of more than 500%, compared with earlier registrations, were considered errors and excluded from the analyses. This also accounted for five participants. Comparable decisions are made by institutions that calculate the total use of environmental resources in Dutch households (Weegink, 1996a, 1996b).

*Evaluation of the EcoTeam Program components.*

The workbook, the feedback about effects of behavior, and the functioning of the EcoTeam were each evaluated separately.

*The workbook* was evaluated by means of two items: "I found the workbook ..." *very informative* (1) to *not informative* (5), and *very pleasant to read* (1) to *very unpleasant to read* (5). Pearson correlation between the two items was .63 ($p < .001$). The items were averaged to form the Workbook Quality scale.

*The feedback* was evaluated for each environmental domain separately. For transportation, the items were: "Keeping informed of the scores of kilometers traveled by car is...". Responses were provided on scales ranging from *very useful* (1) to *not useful* (5), *very easy* (1) to *very difficult* (5), and *very pleasant* (1) to *very unpleasant* (5). Cronbach's alpha for the 3 items was .73. The items were averaged to form the Feedback Quality scale.

The functioning of the EcoTeam was measured with 3 items, intended to *measure social influence*. The items were, "Were you stimulated by your team members to take pro-environmental action in your household?" "Did you feel obliged by your team to take pro-environmental action?" and "In your EcoTeam, did you experience a competitive attitude to achieve better than other team members?" Answers were given on scales ranging from *not at all* (1) to *very strongly* (5). Cronbach's alpha for the 3 items was .71. The items were averaged to form the *Social Influence scale.*

## RESULTS

### Behavior Changes of EcoTeam Participants Compared with Non-Participants

We investigated whether pro-environmental behavior was affected by participation in the ETP, using the PBI. A comparison was made between EcoTeam participants and the non-participating sub-sample of the Dutch population that had an identical score on the PBI at T0. Table 1 displays the scores on the PBI of both groups at T0, T1, and T2. Repeated

measures analysis of variance (ANOVA) with Participants (EcoTeam participants, Non-participants) and Time (T0, T1, T2) as factors show a significant main effect of Participants, $F$ (1, 428) = 20.03, $p < .001$, a significant main effect of Time, $F$ (2, 427) = 59,57, $p < .001$, and a significant interaction between Participants and Time, $F$ (2, 427) = 26.28, $p < .001$. The interaction effect testifies to the effect of the ETP as the cause for the differences on the PBI between EcoTeam participants and non-participants that emerge after T0.

Table 4.1
*Means (and Standard Deviations) on the Pro-environmental Behavior Index (PBI) of EcoTeam Participants and Non-participants at T0, T1, and T2*

| | T0 | T1 | T2 |
|---|---|---|---|
| EcoTeam Participants | $5.54\ (.77)_a$ | $5.92\ (.74)_b$ | $6.16\ (.58)_c$ |
| Non-participants | $5.54\ (.73)_a$ | $5.62\ (.69)_d$ | $5.67\ (.65)_d$ |

*Note.* PBI scores range from 1 (least pro-environmental) to 7 (most pro-environmental). Means with different subscripts differ at $p < .05$ in the t-test comparisons.

Separate t-tests show that EcoTeam participants improved their pro-environmental behavior during the course of the program (from T0 to T1), and again in the two years following participation (from T1 to T2). The sub-sample of the Dutch population slightly improved between T0 and T1, but not to the same extent as the EcoTeam participants. No change is found for the sub-sample of the Dutch population between T1 and T2.

## Change and Maintenance of Change of 38 Pro-environmental Behaviors Among EcoTeam Participants

In Table 4.2 the scores of the EcoTeam participants are displayed for 38 pro-environmental behaviors (including the eight earlier described PBI-behaviors), as performed before (T0), directly after (T1), and two years after participation (T2).[32] Differences in performance were initially tested by repeated measures analysis of variance with Time (T0, T1, T2) as factor. Due to missing values on many of the behavioral items it was impossible to execute one multivariate test including the 38 behaviors simultaneously.

[32]Because participants in the ETP work in groups, differences between groups might lead to differences in the magnitude of behavioral effects. An impression of the extent to which behavioral effects are attributable to differences between groups was obtained by a calculation of the intra-class correlation (Kreft & De Leeuw, 1998). It appeared that the intra-class correlation was zero or close to zero for the PBI at T0 (.09), at T1 (.00) and at T2 (.00). For this reason, we did not execute multilevel analyses in this study.

Table 4.2
*Environmental Behaviors in the Household. Performance at T0, T1 and T2*

| | T0 | T1 | T2 |
|---|---|---|---|
| • Separation of organic waste from solid waste (PBI) | $5.96_a$ | $6.68_b$ | $6.74_b$ |
| • Separation of textile waste from solid waste | $6.17_a$ | $6.77_b$ | $6.68_b$ |
| • Composting your organic waste | 3.77 | 3.78 | $4.07_‡$ |
| • Did you put aluminum foil behind central heating radiators where possible? (1-4) | 1.59 | 1.63 | $1.74_‡$ |
| • Did you put isolation material around the pipes of your central heating system, apart from the rooms, in the corridors)? (1-4) | 2.87 | 2.94 | $2.87_‡$ |
| • Do you have double glazed windows in your house? (1-4) | 2.93 | 2.96 | $3.07_‡$ |
| • Are the outer walls of your house isolated?(1-3) | 2.27 | 2.23 | $2.26_‡$ |
| • To what temperature do you set your central heating? (degrees Celsius) | $18.69_a$ | $18.27_b$ | $18.19_b$ |
| • Do you have lights burning in non-occupied rooms? | $2.79_a$ | $2.39_b$ | $2.37_b$ |
| • Is your television set on 'off' instead of on 'stand by'? | $5.10_a$ | $5.55_b$ | $5.85_c$ |
| • Do you save your dirty laundry until you can load your washing machine fully? (PBI) | $6.11_a$ | $6.34_b$ | $6.54_c$ |
| • To what temperature do you set your water heater? (degrees Celsius) | 70.83 | 69.66 | $66.83_‡$ |
| • How many energy saving light bulbs do you use? | $2.83_a$ | $3.72_b$ | $4.32_c$ |
| • Do you close the faucet while washing hands? | $2.82_a$ | $4.26_b$ | $4.77_c$ |
| • Do you close the faucet while doing the dishes? (PBI) | $5.83_a$ | $6.15_b$ | $6.38_c$ |
| • Do you close the faucet while brushing your teeth? | $5.36_a$ | $5.95_b$ | $5.91_b$ |
| • How often do you take a bath? (1-6) | 5.20 | 5.32 | $5.35_‡$ |
| • On average, how often do you take a hot shower? (1-4) | 2.17 | 2.19 | $2.32_‡$ |
| • On average, how long are you showering? (1-5) | $3.66_a$ | $2.97_b$ | $2.98_b$ |
| • Is there a low-flow shower head installed in your shower? (1-2) | $1.37_a$ | $1.56_b$ | $1.64_c$ |
| • How many toilets in your house have a toilet dam installed? | $.56_a$ | $.76_b$ | $.88_c$ |

*(table 4.2 continues)*

Table 4.2 (continued)
*Environmental Behaviors in the Household. Performance at T0, T1 and T2*

| | T0 | T1 | T2 |
|---|---|---|---|
| • Did you reduce the volume of the toilet flusher? (1-2) | 1.06 | 1.13 | $1.14_{‡}$ |
| • Do you engage in car-pooling? | 1.73 | 2.05 | $2.03_{‡}$ |
| • What is your regular speed on roads where 120 km. per hour is the speed limit? | 112.41 | 111.37 | $110.49_{‡}$ |
| • On average, how much fuel does your car use? | 13.71 | 13.99 | $13.62_{‡}$ |
| • Do you use forms of transportation other than the car for distances below 5 km? | $4.63_{a}$ | $5.14_{b}$ | $4.90_{b}$ |
| • How many times a week do you eat a dinner without meat? | $2.70_{a}$ | $3.12_{b}$ | $3.32_{b}$ |
| • How much meat (in grams) do you eat for dinner? | $97.02_{a}$ | $87.36_{b}$ | $94.88_{a,b}$ |
| • How often do you eat organically grown food? | 3.81 | 4.03 | $4.06_{‡}$ |
| • How often do you eat deep-frozen vegetables? | $2.79_{a}$ | $2.41_{b}$ | $2.42_{b}$ |
| • How often do you eat canned vegetables? | 2.06 | 1.85 | $1.90_{‡}$ |
| • When you go shopping do you bring a shopping bag from home? (PBI) | 6.55 | 6.73 | $6.71_{‡}$ |
| How often do you use ... | | | |
| • ...detergents in refill packaging? (PBI) | $4.31_{a}$ | $5.16_{b}$ | $6.02_{c}$ |
| • ...unbleached or non-chlorously bleached toilet paper? (PBI) | 4.99 | 5.23 | $4.89_{‡}$ |
| • ...unbleached or non-chlorously bleached writing paper? | 3.75 | 4.34 | $4.00_{‡}$ |
| • ...unbleached or non-chlorously bleached coffee filter bags? (PBI) | $5.76_{a}$ | $5.83_{a}$ | $6.70_{b}$ |
| • Do you refuse plastic bags or wrappings of shopkeepers for environmental reasons? (PBI) | $4.93_{a}$ | $5.40_{b}$ | $5.45_{b}$ |
| • Are you inclined to repair products or have them repaired instead of buying them new? | 5.47 | 5.68 | $5.75_{‡}$ |

*Note.* Measures range from 1 (never) to 7 (always) unless specified otherwise (see Method section for details). Means in the same row with different subscripts differ at $p < .05$ in the t-test comparisons. ‡ = Overall F-test non-significant at $p < .001$. Behaviors followed by (PBI) are part of the Pro-environmental Behavior Index.

Therefore, significance levels for the 38 overall F tests were set to $p < .001$ (.05 divided by 38), the conventional Bonferroni correction to protect against Type 1 error. Only for behavior for which the Overall F-test was significant at $p < .001$, t-tests ($p < .05$) were performed between T0 and T1, T0 and T2, and T1 and T2,

It appears that, overall, for 20 of the 38 behaviors significant changes were observed between T0 and T2. Of these 20 behaviors, 17 were frequently performed behaviors, 3 were one-time behaviors. Between T0 and T1, 19 behaviors changed in a pro-environmental direction. No behavior changed in an anti-environmental direction. Between T1 and T2, 11 earlier pro-environmental changes were maintained while eight further pro-environmental changes were observed for behaviors that already improved between T0 and T1. One behavior that was unaltered between T0 and T1 changed in the pro-environmental direction between T1 and T2.

## Use of Environmental Resources

The use of four environmental resources that are potentially influenced by the behaviors that are targeted in the ETP was assessed by the participants before, directly after, and two years after participation in the ETP, during three two-week periods. The means based on the valid observations across these periods are displayed in Table 4.3. It appears

Table 4.3
*Use of Four Environmental Resources at T0, T1, and T2. Mean, Standard Deviation (Upper row), and Percentage (Lower row) of Change as Compared to T0*

| | T0<br>*M* (*std*) | T1<br>*M* (*std*) | T2<br>*M* (*std*) |
|---|---|---|---|
| Solid Waste Deposition | .216 (.15)$_a$ | .153 (.12)$_b$ | .145 (.12)$_b$ |
| (KG per person per day) | 100% | -28.5% | -32.1% |
| Natural Gas Consumption | .299 (.21)$_a$ | .237 (.18)$_b$ | .248 (.18)$_b$ |
| ($M^3$ per person per degree day) | 100% | -20.5% | -16.9% |
| Electricity Consumption | 27.2 (15.4)$_a$ | 25.9 (15.6)$_{ab}$ | 25.1 (14.3)$_b$ |
| (kWh per person per week) | 100% | -4.6% | -7.6% |
| Water Consumption | .854 (.38)$_a$ | .830 (.38)$_{ab}$ | .796(.33)$_b$ |
| ($M^3$ per person per week) | 100% | -2.8% | -6.7% |

*Note.* Means in the same row with different subscripts differ at $p < .05$ in the t-test comparisons.

that between T0 and T1, significant savings were achieved for the deposition of solid waste and the consumption of natural gas, while at T2, as compared to T0, significant savings were obtained for all four environmental resources. None of the changes between T1 and T2 were significant.

## Explaining the Change in a Specific Behavior by its Reason-based and Habitual Components: Using Other Forms of Transportation than the Car for Distances Below 5 kilometers

Understanding of what happened to EcoTeam participants is explored by means of detailed analyses regarding one behavior, using forms of transportation other than the car for distances below 5 kilometers. Relevant measures were behavioral intention, perceived behavioral control, and habit at T0 and T1. Transportation choice changed in a pro-environmental direction across the measurements at T0, T1, and T2 ($F$ (2, 95) = 12.49, $p$ < .001) which was only due to the significant change from T0 ($M$ = 4.63, $SD$ = 1.45) to T1 ($M$ = 5.13, $SD$ = 1.51; $t$ (98) = 5.01, $p$ < .001). Because our aim concerns the explanation of behavior *change*, we focused on the period between T0 and T1.

Our objective was to investigate whether the elements of the ETP altered the pattern of habit and intention as predictors of behavior change. Behavior change scores were calculated by subtracting participants' score at T0 from their score at T1. More specifically, we wanted to test our expectation that EcoTeam participants' behavior change was better predicted by intentions to the extent that they were affected more strongly by the ETP's three components. The scales measuring Workbook Quality, Feedback Quality, and Social Influence were used as indicators of the ETP's impact. Pearson correlations among the three scales were insignificant (.13, n.s., .15, n.s.) or weak (.35, $p$ < .01, between Social Influence and Workbook Quality). We therefore decided not to construct one global ETP-measure but to analyze each of the three indicators separately. In order not to exceed the number of interpretable interactions, we performed regression analyses for each indicator separately.[33] Thus, behavior change during participation (i.e., between T0 and T1) was regressed on habit and intention at T0, on one of the indicators of the ETP's impact, all the two-way interactions, and the three-way interaction.[34] No direct or interaction effects on behavior change were found for two indicators of the ETP's impact, Workbook Quality and Feedback Quality, suggesting that the value of these elements of the ETP did not alter the pattern of habit and intention as predictors of behavior change. However, Social Influence

[33]All variables were standardized before cross-products were computed to reduce a possible bias due to multicollinearity (cf. Cohen & Cohen, 1983, p. 325).

[34]According to the TPB (Ajzen, 1991), perceived behavioral control can influence behavior independent of intention. To investigate this possibility, perceived behavioral control was added as a predictor, including all interactions with other predictor variables. The analyses demonstrated that perceived behavioral control was not a predictor of behavior change, either directly, or in interaction with the other predictors. Consequently, perceived behavioral control was omitted from the analyses reported here.

was found to affect this pattern. Table 4.4a displays the relevant descriptives and intercorrelations with regard to this analysis. It shows that behavior change is weakly correlated with the intention by habit and with the intention by Social Influence interactions, and that habit and intention show the highest correlation ($r = .58$).

Table 4.4a.
*Using Forms of Transportation Other Than the Car. Means, Standard Deviation and Correlations Between Behavior Change, Intention, Habit, Social Influence, and Their Interactions (N=95)*

| | M | SD | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Behavior change | .46 | .98 | .07 | -.12 | -.08 | -.23* | .22* | -.18 | .11 |
| 2. Intention | 5.24 | 1.37 | - | .58*** | .09 | -.13 | -.03 | -.00 | -.11 |
| 3. Habit | 5.21 | 1.58 | | - | .02 | -.36*** | .00 | .02 | .08 |
| 4. Social Influence | 2.49 | .74 | | | - | -.05 | -.03 | .09 | .32** |
| 5. Intention x Habit | | | | | | - | -.17 | .08 | .06 |
| 6. Intention x Social Influence | | | | | | | - | .36***.16 | |
| 7. Habit x Social Influence | | | | | | | | - | -.06 |
| 8. Intention x Habit x Social Influence | | | | | | | | | - |

*Note.* Measures of Intention and Habit range from 1 to 7. The measure of Social Influence ranges from 1 to 5. Means and standard deviations of interaction variables are not presented. Behavior change was calculated by subtracting the score on T0 from the score on T1.
* $p < .05$. ** $p < .01$. *** $p < .001$ (two-tailed).

Table 4.4b displays the summarized results of the regression analysis. The insignificant $F$-Change value ($F = 1.72$, n.s.) indicates that intention, habit, and Social Influence do not significantly predict behavior change (step 1). Introduction of the two-way interactions does significantly improve the prediction (step 2), as indicated by the significant $F$-Change. In addition, the three-way interaction between intention, habit, and Social Influence significantly improves the prediction of behavior change, suggesting that Social Influence moderates the intention-habit interaction (step 3).

To investigate our expectation that more intense Social Influence increases the effect of intentions, a median split was performed on the Social Influence ratings, creating a Low Social Influence group ($M = 1.89$, $SD = .35$, $N = 48$), and a High Social Influence Group ($M = 3.07$, $SD = .47$, $N = 47$). Mean scores for intention, habit, and behavior change were not significantly different across the two groups (all $ps > .30$; see also Table 4.5a). Note that the change scores of the two groups are based on changes in similar values on the original variables, measured at T0 and T1: Mean scores of behavior at T0 were 4.58 and 4.68, for Low and High Social Influence, respectively.

Table 4.4b
*Using Forms of Transportation Other Than the Car. Regression of Behavior Change During Participation on Behavioral Intention and Habit before Participation, Social Influence, and all Interactions*

| Step | Predictor | Multiple R | $F_{change}$ | ß in final equation |
|---|---|---|---|---|
| 1 | Intention | | | .33*** |
| | Habit | | | -.43*** |
| | Social Influence | .23 | 1.72 | -.17 |
| 2 | Intention x Habit | | | -.32*** |
| | Intention x Social Influence | | | .20 |
| | Habit x Social Influence | .48 | 6.74*** | -.18 |
| 3 | Intention x Habit x Social Influence | .51 | 4.00* | .21* |

*Note.* * $p < .05$. *** $p < .001$ (two-tailed).

Table 4.5a
*Using Forms of Transportation Other Than the Car. Means(Standard Deviations), and Correlations Between Behavior Change, Intention, and Habit for Two Levels of Social Influence*

| | Low Social Influence ($N = 48$) | | | | High Social Influence ($N = 47$) | | | |
|---|---|---|---|---|---|---|---|---|
| | M(SD) | 2 | 3 | 4 | M(SD) | 2 | 3 | 4 |
| 1. Behavior change | .46( .80) | -.09 | -.03 | -.32* | .47(1.14) | .19 | -.18 | -.18 |
| 2. Intention | 5.12(1.36) | - | .57*** | .08 | 5.36(1.37) | - | .61*** | -.34* |
| 3. Habit | 5.29(1.62) | | - | -.47*** | 5.13(1.55) | | - | -.24 |
| 4. Intention x Habit | | | | - | | | | - |

*Note.* Measures of Intention and Habit range from 1 to 7. Behavior change was calculated by subtracting the score on T0 from the score on T1.
* $p < .05$. *** $p < .001$ (two-tailed).

Behavior change was regressed on intention, habit, and the intention x habit interaction for the Low Social Influence group and for the High Social Influence group. Results are displayed in Table 4.5b. In the group that reports Low Social Influence (Table 4.5b, upper panel), only the intention x habit interaction predicts behavior change. Simple slope

analyses were conducted in order to explore the nature of the intention x habit interaction following the procedure described by Aiken and West (1991). The regression weights of intention were computed for three levels of habit, that is, one standard deviation below the mean, the mean, and one standard deviation above the mean. These are .79 ($p < .05$), .20 (n.s.), and -.38 (n.s.) respectively, for low, medium, and high values of habit. This suggests that, under Low Social Influence, the intention to choose an environmentally friendly travel mode for short distances is only a positive predictor of pro-environmental behavior change when the pro-environmental habit is weak. When this habit is moderate or strong, intentions are no longer predictive of pro-environmental change. In the group that reports High Social Influence (Table 4.5b, lower panel), this interaction effect between intention and habit is absent. This suggests that, irrespective of previously established habits, intention predicts behavior change when Social Influence is high. This differential effect of habit and intentions depending on Low versus High Social Influence was in agreement with our expectations.

Table 4.5b

*Using Forms of Transportation Other Than the Car. Regression of Behavior Change During Participation on Behavioral Intention, Habit, and the Intention x Habit Interaction Before Participation, Separated for Low and High Social Influence Groups*

| Step | Predictor | Multiple R | $F_{change}$ | ß in final equation |
|---|---|---|---|---|
| a. Low Social Influence ($N = 48$) | | | | |
| 1 | Intention | | | .15 |
| | Habit | .10 | .21 | -.35 |
| 2 | Intention x Habit | .40 | 7.81** | -.50** |
| b. High Social Influence ($N = 47$) | | | | |
| 1 | Intention | | | .49** |
| | Habit | .43 | 4.91* | -.48** |
| 2 | Intention x Habit | .45 | .98 | -.14 |

*Note.* * $p < .05$. ** $p < .01$.

## DISCUSSION

Research in the last three decades has shown that intervention techniques that aim to change pro-environmental behavior generally face two problems that severely limit their effectiveness: A lack of generalization of behavior change from targeted to non-targeted behaviors, and a very limited duration of pro-environmental change. With these limitations in mind, we studied the effectiveness of the ETP, an intervention program whose approach

deviates substantially from other intervention techniques in two ways. First of all, approximately 100 behaviors are targeted in the ETP, together comprising the way a household is run. This very large number contrasts sharply with other techniques that target a very select group of behaviors and strongly reduces the generalization problem. Second, the combination of information, feedback, and social support in the coherent package of the ETP that is executed over a relatively long period gave rise to expectations of behavior change beyond the intervention period. These expectations were confirmed in the study reported in this chapter. Out of the 38 behaviors that we studied on a longitudinal basis, 20 changed in a pro-environmental direction directly after finishing the ETP, and retained or further improved this pro-environmental change during the subsequent two years. These changes and the duration of these changes were assessed in comparison with those of a group non-participants whose behavior was just as pro-environmental as EcoTeam participants at the time they started the program. This comparison group also improved during the period that EcoTeam participants were engaged in the program, but only very slightly, and they did not improve behavior during the two-year period after participants were engaged in the program. This allows the conclusion that it was the ETP, and not a pro-environmental change in the society at large, that was responsible for the behavior changes of EcoTeam participants. The self-reported behavioral changes were validated by changes in objective measures that register the environmental burden of household behaviors: The weight of solid waste disposed of, and the amount of natural gas, electricity, and water that was consumed. The deposition of solid waste and use of natural gas changed substantially in a pro-environmental direction during participation in the ETP. By that time use of water and electricity by EcoTeam participants had only marginally decreased. It should be noted that in the same period the general household use of electricity and natural gas in the Netherlands increased by 1% (Weegink, 1996a, 1996b). Two years after participation in the ETP all four physical indicators had changed significantly in a pro-environmental direction. In the 2-year period after participants had finished the ETP, the general use of natural gas and electricity in the Netherlands increased by 2% (Weegink, 1997a, 1997b).

Our conclusion is that this particular package of techniques managed to create pro-environmental behavior change that is self-sustaining. A closer look at the type of changes makes clear that the effects mainly consist of a large number of relatively small changes in household behaviors that are displayed quite frequently. So, participants managed to make lasting adjustments to behaviors that were already fairly favorable, from an environmental perspective.

The behavior that we studied in detail (the use of alternatives to the car for short distances) provided information about what appears to have affected these changes. Apparently, the intentions of participants to try to establish pro-environmental changes in behavior, the main reason for enlistment in the ETP, were operating on this specific behavior. Our results suggest that participants changed their travel mode for short distances from the automobile to a more environmentally friendly mode of transportation. Intentions as expressed before participation explained this change. However, the pattern of results that

we obtained qualified this result in an interesting way, one that appears to shed light on the functioning of the EcoTeam. Similar to results of other, recent studies (Verplanken et al., 1998; see also Ouellette & Wood, 1998), the effect of intention on behavior change was qualified by the level of habit for the participants who reported having experienced low social influence from their EcoTeam. For this group, the habit of travelling short distances in an environmentally friendly way interacted with intentions such that only for those with weak habits were intentions positively related to behavior change to a substantial degree. For this group, pro-environmental improvement was thus confined to the participants who were not impeded by relatively strong, albeit positive habits. For the other group, the participants who reported having experienced a rather high degree of social influence from their EcoTeam members, results were different. For this group, the more intense social interaction with EcoTeam members appeared to have resulted in intentions that were predictive of behavior, irrespective of the degree to which habits were consolidated. Although the results suggest that habit impeded behavior change, this occurred for all participants who experienced more intense social influence, the outcome being that those with a strong pro-environmental habit of travel mode also managed to improve their behavior somewhat.

Given that we obtained data about the indicators of the ETP's impact based on self-reported measures and not on experimental manipulation, we have to be cautious in drawing conclusions about the exact nature of behavior change. Nevertheless, the process suggested by the combination of these results is plausible, given the character of the ETP, and given recent work on the way attitudes and intentions interact with habit in the formation of behavior (Aarts, Verplanken, & Van Knippenberg, 1998). Concerning the ETP, it is probably not surprising that its most distinguishing feature, the EcoTeam, influenced the results of our analyses, while the more traditional features, the information contained in the workbook, and the feedback, apparently did not have such a substantial effect. This appears to be in line with results of Hopper and Nielsen (1991), and those of Weenig and Midden (1991), in that both studies report positive effects of direct social interaction on pro-environmental behavior.

Another reason for caution is the fact that only one behavior could be studied in detail and so the results may not be representative of the majority of the behaviors targeted in the ETP. The category of pro-environmental behavior is a very heterogeneous set (see, e.g. McKenzie-Mohr et al., 1995), which makes generalization of the findings hazardous. On the other hand, this argument works both ways: Our findings are plausible despite the narrowness of the behavioral example. Other behaviors might have given even stronger support for our expectations. The same argument applies to the limitation that we had to work with three self-reported process measures, Workbook and Feedback Quality, and the strength of Social Influence, that are not only less powerful than experimental manipulations, but are also lacking correspondence with our other variables. That is, these process measures refer to all behaviors targeted in the Program. Being much more general, they are bound to exhibit weaker relations with our behavioral measures than would measures on the same level of specificity (Fishbein & Ajzen, 1975).

A general conclusion can be that the ETP succeeds in accomplishing pro-environmental changes across a large number of specific behaviors that are performed in the household, and in maintaining these behavioral changes. Both features are extremely rare in the literature on pro-environmental interventions, as noted in the introduction. Apart from the direct environmental effects that originate from participation, the value of the program obviously resides in its demonstration of what an intervention package is able to accomplish. For that reason it is certainly a prime example of an intervention package that merits the research attention that is recommended by Geller (1987). He argues that complex intervention packages that have proven to be effective in real-life settings should be decomposed in experimental studies, in order to find out what elements cause the package to be effective. The ETP is rather demanding, both for participants and for the organization that distributes and runs the program. A leaner instrument that attracts larger numbers of participants and retains its original effectiveness would be a precious instrument in the struggle for pro-environmental change.

# 5 Main Findings and Conclusions

# Main Findings and Conclusions

In response to a call made to psychology to provide insights into the background of pro-environmental behavior (e.g., McKenzie-Mohr, 2000), this thesis was aimed to enhance understanding on the issues of explaining and encouraging pro-environmental behavior. The first aim concerns the identification of the background or determinants of pro-environmental behavior in order to improve the explanation of behavioral decisions in this domain. The second aim concerns insights into attempts to enhance pro-environmental behavior. Apart from its possible societal relevance, addressing both issues was deemed interesting because of the distinguishing characteristics of pro-environmental behavior.

Behavioral choices in the environmental domain can be characterized as decisional conflicts or dilemmas. That is, behavioral choices with detrimental side-effects on the environment often coincides with short-term, individual benefits whereas a more pro-environmental course of action is often less profitable from an individual perspective. In Chapter 1, I suggested that pro-environmental behavior may even, from an individual, short-term perspective, be considered irrational. Still, people *do* sometimes behave pro-environmentally. I argued that choices to behave pro-environmentally at the expense of personal benefits might be based on concerns that go beyond a pure rational weighing of immediate personal advantages and disadvantages. In this thesis two social-psychological attitude-behavior models, the theory of planned behavior (TPB; Ajzen, 1991) and the Norm-Activation Theory (NAT; Schwartz, 1977) were used to study pro-environmental behavior. Both models include factors that go beyond a consideration of short-term rational pros and cons. Given the characteristic decisional structure of pro-environmental behavior, this was considered a relevant feature of these models in investigations of pro-environmental behavior. In addition, this thesis reports on the effects of a behavior change intervention that is called the EcoTeam Program (ETP).

The first aim, the explanation of pro-environmental behavior by means of determinants described in social psychological attitude-behavior models, was addressed in Studies 1 and 2 (Chapters 2 and 3). In *Study 1* it was determined whether personal norms could improve the understanding of five pro-environmental behavioral intentions and four pro-environmental behaviors as was obtained by the TPB. In *Study 2* it was determined to what extent four situational activators from the NAT could be used to understand pro-environmental personal norms and pro-environmental behavior. The second aim, insights into the effectiveness of behavior change attempts, was addressed in the Studies 3 and 4 (Chapters 3 and 4). Again, the NAT and the TPB were the theoretical points of departure. In *Study 3* the effects of experimentally manipulated variables derived from the NAT on pro-environmental personal norms and behavior were investigated. In addition the influence of personality trait activators was studied. In *Study 4* effects of the ETP on pro-

environmental behavior and environmental resources were investigated. The short-term as well as the long-term effects were investigated. In addition, the effects of the program's main elements (information, feedback, and social support) on the pattern of habit and behavioral intention as predictors of behavior change were studied.

Although understanding behavioral decisions and testing behavior change attempts have much in common, in this concluding chapter it is considered useful to discuss these two aims separately. I will summarize the main findings with regard to the two general aims of this thesis and elaborate on the conclusions concerning the findings with regard to a central construct of this thesis: personal norms. In the last section some design choices and limitations associated with those choices will be discussed and issues related to possible applications of the results that were obtained will be addressed.

## MAIN FINDINGS CONCERNING THE EXPLANATION OF PRO-ENVIRONMENTAL BEHAVIOR WITH SOCIAL PSYCHOLOGICAL ATTITUDE-BEHAVIOR MODELS

### Adding Personal Norms to the Theory of Planned Behavior

The specific questions addressed in Study 1 were based on the suggestion that behavioral decisions in the environmental realm might in part be influenced by moral or personal normative considerations (e.g., De Young, 1993). The concept of personal norm represents this influence. Personal norms are described as intrinsically motivated self-expectations regarding the moral correctness of behavior, which are experienced as feelings of personal obligation to engage in a certain behavior (Schwartz, 1977). The personal norm concept was included in the predecessor of the TPB (Fishbein, 1967), but was dropped from the later versions of the model. In Study 1, personal norms were added to the TPB to determine whether inclusion of this construct could enhance the model's value in an attempt to understand pro-environmental behaviors. The results suggest that personal norms are of importance with regard to the explanation of pro-environmental behavior. A reasonably strong explanation of five weakly related specific pro-environmental behavioral intentions (using unbleached, instead of bleached paper in the household; reducing the consumption of meat; using other forms of transportation, rather than the car, for short distances; using energy-saving light bulbs; and turning off the faucet while brushing one's teeth) was obtained by the usual constructs of the TPB, that is, by attitude, perceived behavioral control, and subjective norm. However, personal norms improved the explanation of pro-environmental behavior significantly. In the same vein, personal norms increased the explanation of four measures of past behavior, beyond the explanation offered by the TPB constructs.

These results imply that behavioral decisions in the environmental domain are not solely based on a rational weighing process of personal advantages and disadvantages but also, in part, co-vary with moral considerations. One theoretical conclusion that may be

drawn is that the personal norm construct makes a valuable contribution to the TPB because none of the TPB constructs entirely captures its influence. Moreover, the inclusion of the personal norm construct increases conceptual clarity in the TPB, for it adjusts the TPB constructs attitude and subjective norm for personal normative influences. When attitude is adjusted for personal normative influences, the residue might more clearly tap those non-moral advantages and disadvantages of behavior. The residue of subjective norm more obviously refers to non-internalized norms. It is not possible to determine from the results of Study 1 whether personal norms could be valuable when shaping interventions to encourage pro-environmental behavior. However, the positive results obtained do raise the issue of how personal norms could be used in an applied sense. To directly communicate the appropriateness of a pro-environmental behavior in an attempt to use the promotive influence of personal norms seems to contradict the core of this concept, that is, its internalized character. An identification of the backgrounds of personal norms might be of value here, for it might offer indirect ways to use the influence of personal norms. The NAT (Schwartz, 1977) seems a relevant theory to study personal norm and to identify its backgrounds or activators.

### The Value of Situational Activators for the Explanation of Personal Norms and Pro-environmental Behaviors

In Study 2 the NAT (Schwartz, 1977) was introduced to study the determinants of two pro-environmental personal norms and environmental intentions. The theory postulates four situational activators (awareness of need, situational responsibility, efficacy, and ability) and two personality trait activators (awareness of consequences and denial of responsibility) as behavioral determinants. One similarity between the TPB (Ajzen, 1991) and the NAT is that they both include a factor, labeled perceived behavioral control in the TPB and ability in the NAT, that covers behavioral opportunities. More salient, however, is a prominent difference between the NAT and the TPB, in that the NAT assigns a central role to personal norms. More specifically, it suggests that personal norms fulfil an intervening or mediating role between activators and behavior. A review of studies that apply the NAT in the environmental domain showed that only two of the four situational activators have been studied. Generally, awareness of need and situational responsibility have been included, whereas efficacy and ability have been largely neglected (e.g., Bratt, 1999). Study 2 focused on two pro-environmental behaviors, these were (a) using forms of transportation other than the car for short distances, and (b) closing the faucet while brushing teeth. With regard to these two behaviors, it was determined whether the explanation of personal norms and behavioral intention as obtained through the commonly studied two situational activators of the norm-activation model, that is, awareness of need and situational responsibility, could be enhanced if the remaining two situational activators, that is, efficacy and ability, are included. In addition, the central proposition of the NAT regarding the mediational role of personal norms was tested.

The results of Study 2 demonstrated that awareness of need and situational responsibility explained two pro-environmental personal norms and pro-environmental behaviors to some degree. However, efficacy and ability improve the explanations to an important extent. This accounts for personal norms as well as for behavioral intentions. In fact, efficacy and ability neutralize much of the explanation of personal norms and behavioral intentions offered by awareness of need and situational responsibility. It seems that the influence of the "basic" activators, awareness of need and situational responsibility, overlaps to some degree with the influences of the activators, efficacy and ability. In addition this study revealed that, although personal norms was strongly related to behavioral intention, the mediational role of personal norms was limited. That is, only when a part of the norm-activation model was tested (i.e., when the only activators included were awareness of need and situational responsibility), was full mediation by personal norm of the effect of situational responsibility found with regard to both behaviors. The effect of awareness of need was only partially mediated by personal norm, and only with regard to one behavior (closing the faucet). However, when the full norm-activation model was tested, that is, when all four situational activators (awareness of need, situational responsibility, efficacy, and ability) were included, full mediation by personal norms was not found. Personal norms only partially mediated the relationships between efficacy and ability, on the one hand and behavioral intention, on the other. Thus, although it was found that the relationships of the activators efficacy and ability with behavioral intention declined significantly after personal norms were entered, efficacy and ability maintained significantly related to behavioral intention when personal norms were included.

This study gives rise to the conclusion that it is valuable to include more than two activators from the NAT (Schwartz, 1977) in order to obtain a better view of the determinants of personal norms and pro-environmental behaviors. In particular, the activators efficacy and ability seem to be important contributors to the understanding of personal norms and behavioral intention. With regard to the central, mediating role of personal norms as advocated in the NAT, only limited evidence was found in Study 2. The findings suggest that personal norms only partially mediate the behavioral influences of situational activators. These results are in contrast to expectations derived from the NAT, in which a central, mediating role is assigned to personal norms. To a considerable extent, these findings are more in line with the view maintained in models that treat personal norms as similar to, that is, not more central or important than, other behavioral determinants (Fishbein, 1967; Triandis, 1977; Wallston & Wallston, 1984).

Whether activators from the NAT are also valuable in *enhancing* pro-environmental personal norms and behavior in an experimentally controlled situation was the topic of investigation in Study 3. The increased experimental control obtained in Study 3 allowed for the testing of the robustness of the results obtained with regard to the role of personal norms.

## MAIN FINDINGS CONCERNING ATTEMPTS TO ENCOURAGE PRO-ENVIRONMENTAL BEHAVIOR

### The Value of the Norm-Activation Theory in Enhancing Pro-environmental Personal norms and Behavior

In Study 3 the value of the NAT for encouraging pro-environmental behavior was investigated in a laboratory experiment. Three situational activators (awareness of need, efficacy, and ability) were experimentally manipulated, and, for the first time in an environmental study, the model's two personality trait activators, that is, awareness of consequences and denial of responsibility were incorporated. With the objective of enhancement of pro-environmental behavior (volunteering for a fictitious environmental organization), the specific research questions of Study 2 were revisited. The influence of activators on personal norms and on volunteering was tested, and the extent to which personal norms mediate the influence of activators on volunteering was assessed.

The results showed that personal norm regarding the less common behavior of volunteering for an environmental organization is enhanced by awareness of need and by the personality trait activator denial of responsibility. Efficacy qualified the latter effect such that personal norm was only enhanced by denial of responsibility when efficacy was favorable. Volunteering was promoted by all situational activators that were included in this study, that is, by awareness of need, efficacy, and by ability. The latter two activators interacted such that when either efficacy *or* ability was high, volunteering was at its highest level. Volunteering was also enhanced by the awareness of consequences and denial of responsibility personality traits. The denial of responsibility trait interacted with efficacy such that efficacy only enhanced volunteering if people tended to accept responsibility. With regard to the role of personal norm, similar to what was found in Study 2, only limited support was found. That is, the behavioral effects of denial of responsibility and of the denial of responsibility by efficacy interaction remained significant when personal norm was included as a covariate. Full mediation was found for awareness of need. In general, these results support the findings of Study 2 in that they suggest that the claim of the NAT that personal norms fulfil a decisive, mediational role between activators and behavior is not justified by the current findings. This indicates that the personal norm construct should be interpreted as one of several behavioral determinants, rather than a central factor that dominates the influence of other determinants (cf. Fishbein, 1967; Wallston & Wallston, 1984). In a more general way, Study 3 did support the value of the NAT in that it is a comprehensive theory that embodies important activators that seem adequate to enhance pro-environmental personal norms and behavior.

## Real-life Encouragement of Pro-environmental Behavior: Short-term and Long-term Effects of Participation in the EcoTeam Program

The practical value of behavior change interventions in the environmental domain has been disputed on several occasions (e.g., Dwyer et al., 1993; Stern & Oskamp, 1987). The skepticism concentrates on the facts (a) that interventions have rarely been found to yield durable behavior changes, and (b) that it is very questionable whether interventions that target only one or a few behaviors affect other behaviors. It may thus be argued that the issues of duration of effects obtained by interventions and of behavioral scope are important issues for further investigation. In Study 4 the effectiveness of an intervention package, called the ETP, that combines information, feedback, and social support, was tested. EcoTeams are groups of 6 to 10 people who meet once a month to discuss environmental household behavior, and who consider pro-environmental behavior changes in their households. Feedback about the savings that have been accomplished by these changes is given periodically by the EcoTeam organization. Short-term and long-term effects on environmental household behaviors and environmental resources were studied. In addition, behavior change in one behavior (using forms of transportation other than the car) was investigated in some detail to explore the effects of the ETP. More specifically, it was determined whether program elements (information, feedback, and social support) affected the pattern of habit and behavioral intention as predictors of change in transportation choice.

Results indicate that more than half of the investigated behaviors changed in a pro-environmental direction directly after finishing the program, and these changes were maintained or further improved in the subsequent two years. A comparison of these changes with behavior change in an environmentally conscious but non-participating sample of the Dutch population was made. It appeared that, in the same period of time, the behavior of ETP participants improved significantly more than the behavior of non-participants. The self-reported behavioral changes of ETP participants were validated by substantial long-term decreases in the use of environmental resources, whereas energy-use in the Dutch population in the same period increased (e.g., Weegink, 1997a). The investigation of transportation choice showed that the ETP is helpful in making habitual behavior more intentional or reason-based. That is, although habits explained behavior change to some extent, the social influence that was experienced in the ETP resulted in a persisting influence of intentions on behavior change in addition to the influence of habitual forces on behavior change. In view of the scarcity of lasting effects and the narrow scope of influence of most interventions, the support that was found in Study 4 for the success of the ETP is surprising. Its success leads to the question of how to enhance participation in the program in an attempt to make use of its effectiveness.

## GENERAL CONCLUSIONS

### Factors Contributing to the Explanation and Enhancement of Pro-environmental Behaviors

Testing the viability of attitude-behavior models to identify determinants of pro-environmental behavior and providing insights into attempts to encourage pro-environmental behavior, were the two aims of this thesis. They were addressed in four methodologically different studies that lead to the following general conclusions. With regard to the identification of determinants of pro-environmental behavior, it can be concluded that several factors contribute importantly to our understanding of behavioral decisions in the environmental domain. The most influential determinants identified in Study 1 were attitudes, perceived behavioral control, and personal norms. In Study 2 it was found that efficacy, ability, and personal norms contributed most strongly to explanations of behavior. Ability (labeled perceived behavioral control in Study 1) and personal norms were found important behavioral determinants in both studies. With regard to insights into the encouragement of pro-environmental behavior, it can be concluded that awareness of need, efficacy, and ability, as well as the personality traits awareness of consequences and denial of responsibility, stimulate pro-environmental behavior, either separately or in combination with each other. Additionally, in Study 4 the intervention mix of the ETP was found to enhance pro-environmental behavior and to decrease the use of environmental resources. In contrast to many other behavior change interventions (e.g., Dwyer et al., 1993), the effects of the ETP were found to persist in the long-term.

### A Retrospective View on Personal Norms and the Value of the Theory of Planned Behavior and the Norm-Activation Theory in the Investigation of Pro-environmental Behavior

In this thesis, an extended version of the TPB (Ajzen, 1991) as well as the NAT (Schwartz, 1977) appeared to be useful instruments for explaining behavioral decisions in the environmental domain. Further, it appeared possible to enhance a pro-environmental personal norm and behavioral intention by manipulating activators from the NAT. Finally, lasting improvements in pro-environmental behaviors were obtained by means of the ETP intervention package. The significance of these results has been discussed in the separate chapters and will not be repeated here. However, from a more general perspective, I would like to elaborate on the overall findings with regard to the personal norm construct.

At several points in this thesis, the data showed that personal norms contribute to the explanation of pro-environmental behavioral decisions. In general, this finding supports suggestions that decisions in the environmental domain are, to some extent, based on moral considerations (e.g., Thøgersen, 1996; De Young, 1993). It also is in line with the reasoning, summarized in Chapter 1, that behavioral decisions in the environmental domain may be viewed from a social dilemma perspective. It was argued in that chapter that pro-

environmental behaviors are often opposed to attempts to optimize rational short-term benefits, and could therefore be deemed irrational. As a consequence, it was suggested that pro-environmental behaviors might, at least in part, be motivated by concerns that go beyond a simple weighing of costs and benefits, for instance by personal norms. The success with which the two models that were used in this thesis managed to enhance our understanding of pro-environmental behavior and behavior change will be discussed here, especially with regard to the way they take account of personal normative considerations.

In the moral domain, behaviors are evaluated by a responsible actor in terms of how or good or bad they are with respect to the consequences they have for the welfare of other people or on the condition of a non-human entity such as the environment (Schwartz, 1970, p. 116). Schwartz developed his NAT based on this definition. The data presented in this thesis regarding that model support its applicability to the environmental domain in several respects and support the value of personal norms in this domain. This was especially clear in Study 1, in which personal norms improved the explanation of all included behaviors and intentions in addition to attitude, subjective norms, and perceived behavioral control. This is surprising given that, as discussed in Chapter 1, salient individual, short-term costs and benefits usually dominate environmental consequences of pro-environmental behaviors. However, the presented data indicate that this is not necessarily so. That is, whilst attitudes, representing behavioral costs and benefits, were favorable and were found to be important determinants of pro-environmental behavior (Study 1), they did not dominate the influence of personal norms.

Both the TPB (Ajzen, 1991) and the NAT (Schwartz, 1977) explained substantial proportions of variance in the pro-environmental behaviors that were studied. However, the presented data also give rise to less favorable points with regard to these models. Based on the presented data, it might be argued that the TPB does not sufficiently account for moral concerns, whereas the centrality of personal norms as advocated in the NAT gains only partial support. These two points will now be discussed.

First, it appears necessary, in order to provide a better explanation of pro-environmental behavior, to add the construct of personal norm to the TPB. This has been done now in quite a few behavioral domains (see for an overview Manstead, 2000). However, as a central construct in the TPB, attitude toward behavior is defined as a comprehensive evaluation of behavioral consequences (Ajzen, 1991) and thus, one may argue, it should also cover moral considerations. Why, then, do we need to add another attitudinal construct, that is personal norm, to the TPB in order to capture influences of personal normative consequences? Manstead (2000) mentioned two operational problems that might answer this question. He argued that both the method used to identify behavioral consequences as well as the semantic differential scales used to measure attitudes more readily capture instrumental rather than moral considerations (Manstead, 2000, p. 13-14). Thøgersen (1996) took a more radical position and expressed fundamental doubts about the subjective expected utility models such as the TPB. More specifically, he questioned the existence of a weighing process of pros and cons that these models apply to understand pro-environmental behavior. In his view, pro-

environmental behavioral decisions are *not* based on a thorough calculation of pros and cons but, instead, on their moral implications, that is, on personal norms.
Although the existence of a weighing process was not investigated in the presented studies, the contributions of personal norms to the performance of the TPB regarding five behaviors in Study 1 may be interpreted as indirect support for the doubts aired by Thøgersen. It suggests that, even if a weighing process of pros and cons did occur, it did not optimally explain the pro-environmental decisions investigated. Thøgersen concluded that pro-environmental behaviors might be studied more satisfactorily by means of Schwartz's NAT.

The use of the NAT in this thesis to investigate pro-environmental behavior could be seen as a straightforward compliance with Thøgersen's (1996) suggestion. The presented data support the value of situational as well as personality trait activators from the NAT (Schwartz, 1977) as important determinants of pro-environmental behavior. However, only partial support was obtained with regard to the central, mediating position assigned to personal norms in that theory. That is, in the presented tests of the full norm activation model, complete mediation was only found with regard to the awareness of need activator in Study 3, whereas the influence of some other activators was only partly mediated by personal norm. Although awareness of need might be considered as a basic activator that commences the activation process, this result seriously questions whether the central position of personal norms is the best way to fully understand its influence. I would argue that it is not. Rather, the reported findings seem more in line with the role of personal norms that is assigned in other attitude-behavior models. In the predecessor of the TPB and related models (Fishbein, 1967; Triandis, 1977; Wallston & Wallston, 1984) personal norms were regarded as a behavioral determinant among other determinants, and not as any more or less important or central than other determinants.

The presented data provide qualified support for Thøgersen's (1996) plea to consider pro-environmental behaviors as belonging to the moral domain. Although, in line with Thøgersen's plea, personal norm appears to be an important construct, it certainly does not dominate other influences. In addition, the attitudinal influence that was found (Study 1) suggests that a certain weighing of pros and cons may occur. Thus, to totally abandon subjective expected utility models to study pro-environmental behavior because these models suggest a weighing process, as Thøgersen seems to suggest, would in my view go too far. One reason is that the presented data (Study 1) show the value of one of those models, the TPB, in the environmental domain. Another reason is that the alternative model that Thøgersen suggests, the norm-activation model, also implies a process that, in my opinion, is comparable to the weighing of pros and cons. According to the norm-activation model an actor whose activated personal norms support some course of action may act otherwise if the (psychological, social, material) costs weigh heavily against his intention to adhere to his personal norms.

In sum, I would like to draw two conclusions with regard to this general retrospection on personal norms and the value of the TPB and the NAT. First, my conclusion with regard to the TPB would be that it would be useful, in cases in which moral influences are expected, to extend the TPB with the personal norm concept. In my opinion, this is

necessary at least as long as the limited capability of the models' usual constructs to capture moral considerations remains unsolved. In view of the presented data, I would argue that such influences might be expected with respect to behavioral decisions in the environmental domain. Second, with regard to the NAT I would conclude that this is also a viable theory to study pro-environmental behavior. In addition to the personal norm construct that appeared to be a valuable determinant of pro-environmental behavior, the NAT includes other valuable factors, that is, situational activators and personality trait activators. With respect to the role of personal norm, the partial mediational effects are in line with findings in some other studies (e.g., Black et al., 1985), although some studies found partial support for a somewhat different, that is, *moderational* role of personal norms (e.g., Vining & Ebreo, 1992). As was discussed more fully in Chapter 3, I would like to plea for additional research that, with more experimental control, might provide explanations for the different roles that have been found for personal norms.

## DESIGN CHOICES AND APPLICATIONS

### Design Choices

As a rule, in all empirical research choices have to be made with regard to the study design that is be used. These decisions will, in one way or another, most probably result in limitations with regard to the generalizability or with regard to the conclusions that can be drawn from the obtained findings. The studies presented in this thesis are no exception to this rule. I do not want to bother the reader with a detailed discussion about what might have been gained (or lost) if these choices had been made differently. However, without attempting to be exhaustive, some of the design choices that were made will be discussed now.

An important choice that was made in Study 1 was to study the relevance of pro-environmental personal norms among an environmentally involved sample. This limits straightforward generalization of the obtained support for personal norms as behavioral determinants. Involved people might have somewhat more positive and more influential personal norms to behave pro-environmentally than the general population. In my view it is for at least two reasons unlikely that this involvement explains the additional worth of personal norms that was found. Firstly, the behaviors of involved people might also be influenced by TPB constructs that are somewhat more positive and more influential. That is, there is no reason to believe that involved people will *only* have stronger personal norms and, for instance, have attitudes that are no stronger than members of the general population. As a result I think that personal norms had to 'compete' with determinants that presumably were of comparable strength. In addition, additional analyses in Study 1 showed that environmental involvement was not strongly related to personal norms, because involvement did not change the presented results very much. Of course, curiosity about the strength of personal norms among a sample of the general population remains an

interesting question for future research. In my view, hints at a positive answer to this question are found in Study 2.

A general choice that was made in the presented studies concerns the decision to measure behavioral intention or behavior self-reports as substitutes of actual behavioral performance. Several authors have contributed to an ongoing discussion on limitations that are related to this choice (see e.g., Bagozzi, 1992; Radecki, & Jaccard, 1999; Sutton, 1998). Studying determinants of actually performed behavior is valuable (e.g., Cialdini, 1991), especially in the environmental domain, because demand characteristics such as social desirability might influence responses to research stimuli. However, the main interest in the presented studies did not concern the absolute scores on measures that were used, but relationships among these measures. In my view the limitations that are related to the use of intention and behavioral self-reports as proxies for actual behavioral performance did not hamper the achievement of the purposes.

The last design choice concerns the decision to study the ETP, an extensive real-life intervention technique. The main elements of this intervention mix, information, feedback and (to a lesser extent) social support, were to a substantial extent validated in past research and might have been a reason for experimental investigation. However it does not need much deliberation to conclude that building a research design similar to this intervention mix would dramatically exceed the usually available resources. One of the reasons that this mix could be investigated was simply the fortunate opportunity to contact the ETP organization. Deciding to investigate an initiative that is undertaken by members of society, that is, in real-life, almost by definition narrows the possibility of exerting experimental control. As a result, the program has been studied the way it was distributed, i.e., without opportunities to investigate the effects of its separate elements or to influence the selection of its participants. In my view, the possible limitations related to these circumstances did not outweigh the scientifically interesting characteristics of the ETP or my curiosity about its effects.

## Applications

This thesis provided answers to the research questions that were formulated in the introduction, which was the main objective of this work. The studies presented here may in the longer term contribute to attempts to limit environmental degradation, for instance, because they found support for several constructs that may be valuable ingredients for such attempts. However, it should be noted that, although it may be considered a honorable objective, the provision of straightforward contributions to attempts that limit environmental degradation was not a direct goal of this thesis. Nevertheless, from a broader perspective two directions regarding future applications of the insights provided in the presented studies can be sketched.

*Encouraging Pro-environmental Behavior by Personal Norms and Activators?*

On several occasions in this thesis, strong, positive relationships between personal norms and pro-environmental behavioral tendencies were found. In addition, several determinants of pro-environmental personal norms and behaviors were identified. Attempts to use these findings in, for instance, informational campaigns, may appear difficult. Direct enhancement of pro-environmental personal norms seems problematic because a communication designed to influence a personal norm, such as "you should feel personally obliged to buy organic food" contradicts the underlying idea of a personal norm. Such messages are by definition sent by an external agent, that is, a social force, whilst the stimulating force of personal norms comes from an internal, that is, a personal force. The NAT however offers ways to indirectly enhance pro-environmental personal norms. For instance, effects of awareness of need on personal norms were found. It might be interesting to investigate whether real-life use of awareness of need to enhance pro-environmental personal norms is beneficial. Again, however, this may not turn out to be as easy as it seems, because it has potential drawbacks. This can be illustrated by means of two related findings in the presented studies. Remember that consistent effects on personal norms and behavioral intentions were found of the factors that were related to opportunities to engage in pro-environmental behaviors, that is, efficacy and ability (or perceived behavioral control). In addition, it was found in Study 3 that the effects of the awareness of need activator on personal norms were to a quite substantial degree independent from the effects of efficacy or ability (i.e., no statistical interactions were found). Thus, awareness of need was also found to enhance pro-environmental personal norms when people had limited opportunity to act in accordance to their personal norms. Translated to an applied example this means that an informational campaign might succeed in enhancing personal normative feelings in people to perform a focal pro-environmental behavior by heightening people's awareness of need, even if the campaign totally ignores people's abilities to perform the focal behavior. This may lead to aversive side-effects if people are unable to perform the behavior. For instance, a public service announcement on television showing devastating environmental effects of private car use might strengthen the awareness of the environmental need caused by private car use and might eventually succeed in enhancing people's personal norm to use alternative forms of transportation. However, if reasonable alternatives are not available, what will become of the personal normative feelings to perform the behavior? In my opinion these feelings remain in people's minds, because awareness of need and factors with regard to behavioral opportunities can have separate, that is, independent behavioral effects. That is, lack of ability or efficacy do not totally dissolve personal normative feelings to engage in the focal behavior that are brought about by awareness of need (Study 3). Thus, whereas the positive effects of awareness of need on personal norms that were found may imply that awareness of need is a good starting point for behavior change interventions, the above reasoning suggests that a straightforward application of this finding might not always be appropriate. These findings imply, at least, that other factors in addition to awareness of need have also to be taken into account before such interventions can be implemented (cf. Van Meegeren, 2000).

*A Lean EcoTeam*

Given the effectiveness of the ETP as reported in Chapter 4, it seems valuable to find ways of enhancing the program's impact. This might be achieved by boosting participation rates. In the six years that the ETP has been fully operational, nearly 20,000 households have participated. Given the demanding character of the ETP, it may especially be interesting to expand the "pool" of potential participants, which might be achieved by developing a lean version of the ETP. Field experiments that compare combinations of some of its elements (information, feedback, and social support) could reveal an optimal program that would produce the same positive effects and also attract greater numbers of participants (cf. Geller, 1987, p.367).

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# Summary

Human behavior often has detrimental effects on the environment. This has contributed to effects such as climate changes and the extinction of many plants and animals. Decisions regarding environmentally relevant behavior have similarities with decisions in a social dilemma (Mosler, 1993). In a social dilemma one is inclined to favor behavioral choices that maximize personal gains, irrespective of collective consequences (Messick & Brewer, 1983). Indeed, it seems that personal choices concerning environmentally relevant behaviors are not influenced very much by their detrimental (collective) environmental consequences. An explanation suggested in environmental psychology is that, because of a combination of social and other dilemmas, the negative environmental consequences of our behavior easily elude our attention (Vlek & Keren, 1992). The personal advantages of environmentally unfriendly behavior are usually highly salient, whereas the harmful environmental consequences (a) often are somewhat uncertain, (b) arise in the long-term, (c) have the most serious effects in distant areas, and (d) are often only detrimental if many people act in an environmentally unfriendly manner. It seems that, from a short-term, personal and rational viewpoint, environmentally unfriendly behavior is the optimal behavioral choice. Nevertheless, many people choose to behave pro-environmentally from time to time. In this thesis, the backgrounds or determinants of these choices were studied from a social psychological perspective. The aim of this thesis was twofold. First, it examined to what extent pro-environmental behavior could be explained by determinants described in social-psychological attitude-behavior models. Second, it provided insights into attempts to encourage pro-environmental behavior.

## Explaining Pro-environmental Behavior With Social Psychological Attitude-Behavior Models

**Study 1** was based on the notion that pro-environmental behavior might in part be motivated by other considerations than those that are personal, rational and short-term. Specifically, it determined whether an explanation of pro-environmental behavior as obtained by the Theory of Planned Behavior (Ajzen, 1991) would improve if the concept of *personal norms* was included. In the Theory of Planned Behavior it is assumed that

behavioral intention is the best predictor of future behavior. Summarizing, the theory states that three factors determine the strength of a behavioral intention. These factors are (a) the attitude or a person's global evaluation of performing the behavior, (b) the subjective norm, or a person's estimation about the expectations of significant others concerning performance of the behavior, and (c) the perceived behavioral control, or the person's conviction about how easy or difficult performance of the behavior would be.

Personal norms are defined as internalized self-expectations that are based on internalized values. Personal norms are experienced as feelings of personal obligation to engage in a certain behavior (Schwartz, 1977). The results of Study 1 support the hypothesis that personal norms contribute to the explanation of pro-environmental behavior. The explanation of each of five pro-environmental behavioral intentions, and their corresponding previously performed behaviors, improved when personal norms were added to the three determinants from the Theory of Planned Behavior (attitude, subjective norm, and perceived behavioral control). These findings support the notion that in addition to short-term rational motives, pro-environmental behavior is also based on personal normative considerations that are not completely covered by the Theory of Planned Behavior. The fact that the five investigated behaviors were at best weakly correlated suggests the existence of a fairly general relation between personal norms and pro-environmental behavior.

**Study 2** enlarges on the support for the importance of personal norms in the domain of pro-environmental behavior that was found in the previous study. The aim of Study 2 was to unravel the backgrounds of pro-environmental behavior by means of the Norm-Activation Theory (Schwartz, 1977) that allocates a central role to personal norms. Translated to the subject at hand, this theory states that six activators, that is, four situational activators and two personality trait activators, motivate pro-environmental behavior via the activation of personal norms. Earlier environmental studies in which the Norm-Activation Theory was used to explain behavior, included only one or two situational activators. In Study 2, the extent to which four situational activators can explain pro-environmental personal norms and intentions regarding two pro-environmental behaviors (using forms of transportation other than the car and turning off the faucet while brushing one's teeth) was investigated. In addition, the central proposition of the Norm-Activation Theory was tested. According to this assumption behavioral influences of activators are exerted via personal norms, i.e., it suggests that personal norms mediate those influences. The four situational activators that are described in the Norm-Activation Theory are (a) awareness of the existence of need (interpret in this study as environmental harm), (b) acceptance of responsibility for that need, (c) perceived efficacy of behaviors to alleviate that need, (d) perceived ability to perform those behaviors. The results from Study 2 showed that mainly perceived efficacy and perceived ability were strongly associated with personal norms and intention regarding the two pro-environmental behaviors under study. Only partial mediation by personal norms was found. That is, a direct relationship between situational activators and behavioral intention was found which was only partially exerted via personal norms.

**Attempts to Encourage Pro-environmental Behavior**

In **Study 3**, the influence of activators on pro-environmental personal norms and behavior was again studied by means of the Norm-Activation Theory. Study 3 contributed to the existing literature by studying the influence of the two personality trait activators from the Norm-Activation Theory, in addition to three situational activators. This was the first occasion that these personality trait activators - the tendency to be aware of the consequences of one's behavior for the welfare of others and the tendency to deny responsibility for those consequences - were studied in environmental research. By means of experimental manipulation of three situational activators from the Norm-Activation Theory (awareness of need, perceived efficacy, and perceived ability) this study explored whether a pro-environmental personal norm and a pro-environmental behavioral intention could be stimulated. The focal behavior in this study was to participate as a volunteer in a campaign planned by an environmental organization. The results of this study show that two activators - the activator that refers to awareness of need and the activator that refers to the tendency *not* to deny responsibility - enhanced the personal norms to volunteer. The behavioral intention to volunteer was enhanced by the three situational activators included and by both personality trait activators. Some of the activators interacted with each other. Similar to results in Study 2, partial support regarding the mediational role of personal norms was found. The activators enhanced pro-environmental behavioral intention via personal norms but in contrast to expectations based on the Norm-Activation Theory, they continued to have a direct effect on behavioral intention. Only the influence of the situational activator awareness of need on volunteering was entirely exerted via personal norms. The role of personal norms in this and the previous study seems more in line with the role that was allocated to personal norms in older attitude-behavior models (Fishbein, 1967; Triandis, 1977). In those models, personal norms were treated as one behavioral determinant in addition to other determinants and not as one that dominates the influences of other determinants.

Through a field study, **Study 4,** it was investigated how pro-environmental behavior could be enhanced. In this study, the effectiveness of an existing behavior change intervention, the EcoTeam Program for households, was tested. The aim of the EcoTeam Program is to enhance pro-environmental household behavior. The program has been distributed since 1990 in the Netherlands by the organization Global Action Plan for the Earth. Approximately 10,000 people have participated in the Netherlands. The program has three main elements. In a *group*, the EcoTeam, environmental household behavior is discussed, based on the *information* that is contained in the EcoTeam Workbook. The program encompasses eight monthly meetings. Besides an introduction and a closing meeting, each meeting focuses on one of the following themes: Garbage, gas, electricity, water, transport and consumer behavior. After each meeting participants determine which actions they want and can take in their household. These actions may range from simple actions such as turning off the television set rather than keeping it on 'stand-by' to

complex actions such as insulating the house. The third main element of the EcoTeam Program, *feedback*, means that during their participation, people receive information about their (potential) savings of garbage, gas, electricity, water, and private car use. The aim of Study 4 was to test the short-term and long-term effects of participation in the EcoTeam Program and to trace the effects of the three elements of the program. The results showed that by means of the EcoTeam Program a large number of behaviors have changed in a pro-environmental direction and that, in contrast to many other behavior change interventions, these changes were maintained in the long-term (two years after participation). Substantial savings in the use of gas, electricity, water, and reductions in the amount of household garbage were obtained, effects that run counter to the rising use of natural resources among the Dutch population. Finally it was found that the behavioral intention of participants who experienced high social influence in their EcoTeam predicted behavior change irrespective of habits.

The conclusion from Study 4 was that the EcoTeam Program is successful in achieving durable enhancement of pro-environmental household behavior.

In **Chapter 5** the main findings with regard to the two aims in this thesis were summarized. With regard to the first goal, testing the viability of attitude-behavior models to identify determinants of pro-environmental behavior, it is concluded that the explanation of pro-environmental behavior improves if personal normative - or moral - considerations were included. In the environmental domain, personal norms would be a valuable extension to the usual constructs from Ajzen's (1991) Theory of Planned Behavior (attitude, subjective norms, and perceived behavioral control). Next, it was concluded that the Norm-Activation Theory (Schwartz, 1977) can be a viable tool to explain pro-environmental behavior. This theory not only provides a theoretical background for personal norms, it also describes situational activators which contribute to the explanation of pro-environmental behavior. With regard to the second goal of this thesis, providing insights into attempts to enhance pro-environmental behavior, the conclusion was that, in addition to the situational activators, the personality trait activators from the Norm-Activation Theory also provide clues for the enhancement of pro-environmental behavior. Another conclusion with regard to enhancement of pro-environmental behavior that was drawn in Chapter 5 was that, in contrast to many other behavior change interventions, participation in the EcoTeam Program yields lasting decreases of the negative impact that household behavior has on the environment. The program seems to help participants to break through behavioral habits.

With regard to a central concept of this thesis, personal norms, in Chapter 5 one of the conclusions drawn was that this is an important concept, but that also other concepts from the Theory of Planned Behavior (Ajzen, 1991) and the Norm-Activation Theory (Schwartz, 1977) can contribute to enhance our understanding of pro-environmental behavior. Only partial support was found in this thesis for the central or mediational role that is allocated to personal norms in the Norm-Activation Theory. Other environmental studies (e.g., Vining & Ebreo, 1992) found partial support for a moderational role of personal norms. The conclusion drawn was that the role of personal norms needs additional research attention.

In addition to the main findings and conclusions, choices concerning the research designs and the corresponding limitations with these choices were discussed in Chapter 5. Finally, perspectives for applications of the presented findings and suggestions for future research were considered briefly. First, a study could be undertaken of how the concepts from the Norm-Activation Theory could be used in real-life attempts to encourage pro-environmental behavior. In addition, those attempts could benefit from insights into ways to make fuller use of the effectiveness of the EcoTeam Program. Such insights may arise from research into ways to enhance the attractiveness of participation in the EcoTeam Program when at the same time its original effectiveness is retained.

# Samenvatting (Summary in Dutch)

Menselijke gedragingen hebben meestal negatieve effecten op het milieu. Dit heeft onder andere bijgedragen aan klimaatveranderingen en geleid tot het uitsterven van vele dier- en plantensoorten. Beslissingen ten aanzien van milieurelevant gedrag hebben overeenkomsten met beslissingen binnen een sociaal dilemma (Mosler, 1993). Binnen een sociaal dilemma is men geneigd om gedragskeuzen te maken die persoonlijke opbrengsten maximaliseren, ongeacht de collectieve gevolgen. Inderdaad lijkt het erop dat persoonlijke keuzen ten aanzien van milieurelevante gedragingen niet erg sterk worden beïnvloed door hun schadelijke (collectieve) gevolgen voor het milieu. Een vanuit de milieupsychologie geopperde verklaring hiervoor is dat de negatieve milieugevolgen van ons handelen, door een samenspel van sociale en andere dilemma's, gemakkelijk aan onze aandacht onttrokken blijven (Vlek & Keren, 1992). De persoonlijke voordelen van milieu*on*vriendelijk gedrag springen sterk in het oog terwijl de schadelijke gevolgen voor het milieu (a) vaak met enige onzekerheid gepaard gaan, (b) pas op lange termijn optreden, (c) in afgelegen gebieden de meest ernstige effecten hebben, en (d) vaak pas schadelijk zijn als vele mensen zich milieuonvriendelijk gedragen. Het lijkt er op dat, vanuit korte termijn, individuele en rationele argumenten bezien, milieuonvriendelijk gedrag de beste keuze is. Echter, veel mensen kiezen ervoor zich zo nu en dan milieuvriendelijk te gedragen. Wat de achtergronden van dergelijke keuzen is, werd in dit proefschrift vanuit een sociaal-psychologische invalshoek bestudeerd. Het doel van dit proefschrift was tweeledig. Ten eerste werd onderzocht in hoeverre milieuvriendelijk gedrag verklaard kan worden met behulp van gedragsdeterminanten die in sociaal-psychologische attitude-gedrag modellen worden beschreven. Ten tweede werd inzicht verkregen in manieren om milieuvriendelijk gedrag te stimuleren.

## Het Verklaren van Milieuvriendelijk Gedrag met Sociaal-Psychologische Attitude-Gedrag Modellen

**Studie 1** heeft zijn oorsprong in het idee dat milieuvriendelijk gedrag wellicht deels door andere dan persoonlijke, puur rationele korte termijn overwegingen wordt gestuurd. Meer specifiek werd nagegaan of de verklaring van gedrag zoals wordt verkregen met de Theory of Planned Behavior (Ajzen, 1991) zou verbeteren wanneer deze theorie werd uitgebreid met het concept *persoonlijke normen*. De Theory of Planned Behavior gaat ervan

uit dat een gedragsvoornemen ofwel intentie de beste voorspeller van gedrag is. Globaal samengevat houdt de theorie in dat drie factoren bepalend zijn voor de sterkte van iemands intentie. Deze drie factoren zijn (a) de attitude ofwel de algemene beoordeling van een actor over het uit te voeren gedrag, (b) de subjectieve norm, ofwel de inschatting van een actor over wat voor hem belangrijke anderen van hem verwachten ten aanzien van het uit te voeren gedrag, en (c) de waargenomen gedragscontrole, ofwel de inschatting van een actor over hoe moeilijk of gemakkelijk de uitvoering van het gedrag zal zijn.

Persoonlijke normen worden omschreven als op geïnternaliseerde waarden gebaseerde verwachtingen die iemand ten aanzien van zijn eigen gedrag heeft (Schwartz, 1977). Persoonlijke normen worden ervaren als een gevoel van persoonlijke verplichting om een bepaalde gedraging uit te voeren. De resultaten van Studie 1 geven steun voor de hypothese dat persoonlijke normen bijdragen aan de verklaring van milieuvriendelijk gedrag. De verklaring van elk van vijf milieuvriendelijke gedragsintenties, alsmede de daarmee corresponderende in het verleden vertoonde gedragingen, verbeterde wanneer het concept persoonlijke norm aan de drie determinanten uit de Theory of Planned Behavior (attitude, sociale norm en waargenomen gedragscontrole) werd toegevoegd. Deze bevindingen bevestigen het idee dat er naast korte termijn rationele argumenten ook, door de Theory of Planned Behavior niet geheel gedekte, persoonlijk normatieve overwegingen ten grondslag liggen aan beslissingen omtrent milieuvriendelijk gedrag. Het feit dat de vijf onderzochte gedragingen onderling niet tot zwak samenhangen, suggereert het bestaan van een vrij algemene relatie tussen persoonlijke normen en milieuvriendelijk gedrag.

**Studie 2** bouwt verder op de steun die in de voorgaande studie werd gevonden voor het belang van persoonlijke normen binnen het domein van milieuvriendelijk gedrag. Het doel van Studie 2 was om de achtergrond van milieuvriendelijk gedrag te ontrafelen aan de hand van een theorie waarin persoonlijke normen centraal staan: de Norm-Activation Theory (Schwartz, 1977). Vertaald naar ons onderwerp stelt deze theorie dat zes *activatoren*, te weten vier situationele kenmerken en twee persoonlijkheidskenmerken, milieuvriendelijk gedrag sturen via het activeren van milieuvriendelijke persoonlijke normen. Eerdere milieustudies die de Norm-Activation Theory gebruikten om gedrag te verklaren, gebruikten slechts één of twee situationele activatoren bij het verklaren van gedrag. In Studie 2 werd voor twee gedragingen (het gebruiken van alternatieven voor de auto en het dicht draaien van de kraan tijdens het tanden poetsen) onderzocht in welke mate de vier situationele activatoren de milieuvriendelijke persoonlijke normen en intenties konden verklaren. Daarnaast werd de centrale aanname uit de Norm-Activation Theory getoetst. Deze aanname veronderstelt dat de invloed van activatoren op gedrag via persoonlijke normen verloopt, met andere woorden, dat persoonlijke normen die invloed mediëren. De vier situationele activatoren die in de Norm-Activation Theory beschreven worden, zijn (a) bewustzijn van het bestaan van nood (in dit onderzoek opgevat als schade aan het milieu), (b) het accepteren van verantwoordelijkheid voor die nood, (c) de waargenomen effectiviteit van gedragingen om de nood te lenigen, en (d) de waargenomen mogelijkheden om die gedragingen uit te voeren. Uit de resultaten van Studie 2 bleek dat vooral de waargenomen effectiviteit en waargenomen mogelijkheden een sterke relatie hadden met persoonlijke

normen en met de intentie ten aanzien van de twee onderzochte milieuvriendelijke gedragingen. Mediatie door persoonlijke normen werd slechts zeer ten dele aangetoond. Dat wil zeggen, er werd een directe relatie tussen situationele activatoren en gedragsintentie gevonden die slechts gedeeltelijk via persoonlijke norm verliep.

### Pogingen om Milieuvriendelijk Gedrag te Stimuleren

In **Studie 3** werd, wederom aan de hand van de Norm-Activation Theory, de invloed van activatoren op persoonlijke normen en milieuvriendelijk gedrag onderzocht. Een aanvulling van Studie 3 op bestaand onderzoek was dat, naast drie situationele activatoren, ook de invloed van de twee persoonlijkheidsactivatoren uit de Norm-Activation Theory werden bestudeerd. Het was voor het eerst dat deze persoonlijkheidsactivatoren - de neiging om zich bewust te zijn van de consequenties van het eigen handelen voor het welzijn van anderen en de neiging om verantwoordelijkheid voor die consequenties te ontkennen - in een milieustudie werden onderzocht. Via experimentele manipulatie van drie situationele activatoren uit het norm-activatie model (bewustzijn van het bestaan van nood, waargenomen effectiviteit en waargenomen mogelijkheden om helpende acties uit te voeren) werd onderzocht of een milieuvriendelijke persoonlijke norm en een milieuvriendelijke gedragsintentie gestimuleerd konden worden. Het gedrag dat in deze studie centraal stond was het als vrijwilliger meewerken aan een actie van een milieu-organisatie. De resultaten lieten zien dat twee activatoren – een die verwijst naar bewustzijn van nood en een die verwijst naar de neiging om verantwoordelijkheid *niet* te ontkennen - de persoonlijke norm om als vrijwilliger mee te werken versterkten. De gedragsintentie om als vrijwilliger deel te nemen aan de actie werd versterkt door de drie in deze studie opgenomen situationele activatoren en door beide persoonlijkheidsactivatoren. Sommige activatoren interacteerden met elkaar. Evenals in Studie 2 werd gedeeltelijk steun gevonden voor de mediërende rol van persoonlijke normen. De activatoren stimuleren milieuvriendelijk gedrag via de persoonlijke norm maar hadden, in tegenstelling tot wat vanuit de Norm-Activation Theory verwacht zou worden, ook een direct effect op gedragsintentie. Alleen de invloed van de situationele activator bewustzijn van nood op het voornemen om als vrijwilliger mee te werken verliep geheel via de persoonlijke norm. De rol die de persoonlijke norm vervulde in deze en de vorige studie komt sterker overeen met de rol die aan persoonlijke normen wordt toebedeeld in klassieke attitude-gedrag modellen (b.v. Fishbein, 1967; Triandis, 1977). In die modellen wordt een persoonlijke norm beschouwd als een determinant *naast* andere determinanten en niet als een overheersende determinant die de invloed van andere determinanten volledig medieert.

In **Studie 4** werd in een veldsituatie bestudeerd hoe milieuvriendelijk gedrag gestimuleerd kan worden. In deze studie werd de effectiviteit van een bestaande gedragveranderingsinterventie, het EcoTeam Programma voor huishoudens, onderzocht. Het EcoTeam Programma heeft als doel huishoudelijk milieuvriendelijk gedrag te stimuleren. Het programma, waaraan in Nederland ongeveer 10.000 mensen hebben deelgenomen, wordt sinds begin jaren 90 in Nederland verspreid door de stichting Global Action Plan for

the Earth. Het programma heeft drie hoofdkenmerken. In een groep, een *EcoTeam*, wordt aan de hand van *informatie* uit het EcoTeam Werkboek het huishoudelijk gedrag onder de loep genomen. In acht maandelijkse bijeenkomsten komen (behalve een introductie- en een slotbijeenkomst) opeenvolgend de thema's afval, gas, elektriciteit, water, vervoer, en consumptie aan bod. Na elke bijeenkomst bepalen deelnemers welke acties zij in hun huishouden willen en kunnen nemen. Deze kunnen variëren van eenvoudig uit te voeren gedragingen zoals het uitzetten van de stand-by functie van de televisie tot ingrijpende acties zoals het isoleren van het huis. Het derde hoofdkenmerk van het EcoTeam Programma, *feedback*, houdt in dat deelnemers gedurende de looptijd van het programma informatie krijgen teruggekoppeld over hun (eventuele) besparingen op het gebied van afval, gas, elektriciteit, water en autogebruik. De doelstelling van Studie 4 was het in kaart brengen van de korte termijn en lange termijn effecten van deelname aan het EcoTeam Programma en het verklaren van de werking van het programma. De resultaten lieten zien dat het EcoTeam Programma tot een groot aantal milieuvriendelijke gedragsveranderingen leidt die, in tegenstelling tot veel andere gedragveranderingsinterventies, op lange termijn (twee jaar na deelname) gehandhaafd bleven. Deze gedragsveranderingen waren sterker dan die van een vergelijkbare groep mensen die niet deelnam aan het EcoTeam Programma. Daarnaast werden aanzienlijke besparingen vastgesteld in het verbruik van gas, elektriciteit, en water, en verminderde de hoeveelheid huishoudelijk afval, hetgeen tegen de algemene trend van een stijgend beroep op natuurlijke bronnen in de Nederlandse bevolking in gaat. Tenslotte werd gevonden dat de voorspelling van gedragsverandering door de gedragsintentie van deelnemers die een sterke sociale invloed in hun EcoTeam ervoeren onafhankelijk was van gewoonten.

De conclusie die uit Studie 4 getrokken werd is dat het EcoTeam Programma succesvol is in het stimuleren van blijvende milieuvriendelijke gedragsveranderingen in het huishouden.

In **Hoofdstuk 5** werden de belangrijkste bevindingen met betrekking tot de twee doelen van dit proefschrift samengevat. Met betrekking tot het eerste doel, het verklaren van milieuvriendelijk gedrag met behulp van determinanten uit attitude-gedrag modellen, wordt geconcludeerd dat deze verklaring verbetert wanneer daarbij persoonlijk normatieve ofwel morele overwegingen worden betrokken. In het domein van milieuvriendelijk gedrag zouden persoonlijke normen een waardevolle toevoeging zijn aan de gangbare componenten uit Ajzen's (1991) Theory of Planned Behavior (attitude, subjectieve norm en waargenomen gedragscontrole). Vervolgens werd geconcludeerd dat voor het verklaren van milieuvriendelijk gedrag de Norm-Activation Theory (Schwartz, 1977) een bruikbaar uitgangspunt kan zijn. Naast het feit dat deze theorie het concept persoonlijke norm een theoretisch kader geeft, blijken de situationele activatoren uit de theorie bij te kunnen dragen aan het verklaren van milieuvriendelijk gedrag. Met betrekking tot het tweede doel van dit proefschrift, het verkrijgen van inzicht in manieren om milieuvriendelijk gedrag te stimuleren, wordt geconcludeerd dat hierbij, behalve situationele activatoren ook persoonlijkheidsactivatoren uit de Norm-Activation Theory in acht genomen dienen te

worden. Een andere conclusie die in Hoofdstuk 5 met betrekking tot het stimuleren van milieuvriendelijk gedrag werd getrokken is dat, in tegenstelling tot veel andere gedragveranderingsinterventies, deelname aan het EcoTeam Programma leidt tot blijvende vermindering van de negatieve invloed van huishoudelijke gedragingen op het milieu. Het programma lijkt deelnemers te helpen hun gewoontes te doorbreken.

Met betrekking tot een centraal concept uit dit proefschrift, persoonlijke normen, wordt in Hoofdstuk 5 geconcludeerd dat dit een belangrijk concept is, maar dat ook andere factoren uit de Theory of Planned Behavior en de Norm-Activation Theory kunnen bijdragen aan een beter begrip van milieuvriendelijk gedrag. Voor de centrale, mediërende rol die aan het construct persoonlijke norm wordt toegeschreven in de Norm-Activation Theory werd slechts ten dele steun gevonden. In ander onderzoek is gedeeltelijk steun gevonden voor een modererende rol van persoonlijke normen (b.v. Vining & Ebreo, 1992). Geconcludeerd wordt dat deze rol nader onderzocht dient te worden.

Naast de belangrijkste bevindingen en conclusies behandelt Hoofdstuk 5 keuzen met betrekking tot de gehanteerde onderzoeksontwerpen en de daarmee samenhangende beperkingen. Tenslotte werd kort ingegaan op de praktische toepasbaarheid van de gepresenteerde bevindingen en werden suggesties voor toekomstig onderzoek gedaan. Ten eerste zou onderzocht kunnen worden hoe componenten uit de Norm-Activation Theory ingezet kunnen worden bij het in de praktijk stimuleren van milieuvriendelijk gedrag. Daarnaast zou die praktijk gebaat zijn bij inzichten in manieren om de effectiviteit van het EcoTeam Programma beter te benutten. Dergelijke inzichten kunnen verkregen worden uit onderzoek naar factoren die de aantrekkingskracht van het EcoTeam Programma vergroten terwijl de aanvankelijke effectiviteit ervan behouden blijft.

# Curriculum Vitae

Paul Harland werd samen met zijn broer geboren op 24 april 1964 te Den Haag. Na het behalen van zijn MAVO-diploma (Dr. Ph. J. Hoedemakerschool te Rijswijk) in 1980 en via een omweg ook zijn HAVO-diploma (Scholengemeenschap Overvoorde te Den Haag) in 1984, heeft hij aan de Leidse Hogeschool voor Beroepsonderwijs de Hogere Beroepsopleiding tot Verpleegkundige (HBO-V) gevolgd. In 1988 kreeg hij zijn speldje na de HBO-V te hebben afgerond met een onderzoek naar burnout onder verpleegkundigen. Van 1988 tot en met 1990 heeft hij als verpleegkundige in verschillende psychiatrische en algemene ziekenhuizen gewerkt, deels als vervulling van zijn militaire dienstplicht.
In 1990 begon hij aan de studie psychologie aan de Universiteit Leiden en in 1993 werd hij daar als student-assistent aangesteld bij de Werkgroep Energie- en Milieuonderzoek (sectie Sociale en Organisatiepsychologie). In 1995 studeerde hij af (met genoegen) met een vrije afstudeerrichting binnen de Sociale Psychologie op onderzoek naar milieuvriendelijk gedrag. Vanaf december 1995 tot en met december 2000 heeft hij aan dezelfde universiteit - aanvankelijk als beursaal promovendus, later als heuse Assistent in Opleiding (AiO) - onderzoek gedaan naar sociaal-psychologische achtergronden van milieuvriendelijk gedrag. Dit proefschrift is het resultaat van dat onderzoek.
Sinds januari 2001 werkt hij als onderzoeker bij TNO - Preventie en Gezondheid te Leiden.

De Kurt Lewin Instituut Dissertatiereeks bestaat sinds 1997. Sinds 1999 zijn de volgende proefschriften verschenen:

1999-1 Barbara van Knippenberg: Determinants of the use of hard and soft influence tactics.

1999-2 Manon Hoekstra: Gedragsbeïnvloeding door cursussen. Een studie naar de effecten van persoons-, cursus- en omgevingskenmerken.

1999-3 Marga de Weerd: Sociaal-Psychologische determinanten van boerenprotest: collectieve actie frames, onvrede, identiteit en effectiviteit.

1999-4 Agnes van den Berg: Individual differences in the aesthetic evaluation of natural landscapes.

1999-5 Wilco van Dijk: Dashed hopes and shattered dreams: On the psychology of disappointment.

1999-6 Frans Oldersma: Downward comparison in close relationships: A blessing in disguise?

1999-7 Dörte Heimbeck: Training and motivation: The function of implementation intentions, goal orientation, and errors for performance.

1999-8 Patricia Rodriguez Mosquera: Honor and emotion. The cultural shaping of pride, shame and anger.

1999-9 Tjarda van Sliedregt: Het beoordelen van functies nader beoordeeld.

1999-10 Marco Yzer: Mass media campaigns to promote safe sex. An evaluation of public campaigns in the Netherlands.

1999-11 Ellen de Bruin: Good for you or good for me? Interpersonal consequences of personality characteristics.

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2000-3 Cathy van Dyck: Putting errors to good use: On error management culture in organizations.

2000-4 Manuela Barreto: Identity and strategy in pro-group behaviour.

2000-5 Arieneke Groenenboom: Efficiency and fairness in collective task performance.

2000-6 Birgitta Gatersleben: Sustainable household metabolism and quality of life: Examining the perceived social sustainability of environmentally sustainable household consumption patterns.

2000-7 Wander Jager: Modelling consumer behaviour.

2000-8 Claudia Hoeksema-van Orden: Fatigue and performance in groups.

2000-9 Jaap Ouwerkerk: Comparison-based reactions to group performance outcomes.

2000-10 Carien Görts: The Significance of Personal Relationships in Cultural Perspective: A Comparison of Individualistic and Collectivistic Cultures.

2000-11 Monique Timmers: Sex differences in emotion expression.

2000-12 Ana Christina Costa: A matter of trust: Effects on the performance and effectiveness of teams in organizations.

2000-13 Sander Koole: Positivity in self-evaluation.

2000-14 Andreas Rauch: Success Factors of Small and Medium Sized Enterprises.

2001-1 Laura Sweeney: Abstraction, Representation and Social Cognition.

2001-2 Arjan Bos: HIV stigma and social interaction: Examining strategies to influence receivers' emotional and behavioral reactions in initial encounters.

2001-3 Esther van Leeuwen: Preserving identity when groups combine: A study of group-based reactions to mergers.

2001-4 Mark Dechesne: Flexible and rigid reactions to reminders of mortality. Some further explorations of terror management theory.

2001-5 Wendy van Rijswijk: Contextual and perceiver factors in the stereotyping of multiple category groups.

2001-6 Nanja Kolk: Assessment Centers. Understanding and improving construct-related validity.

2001-7 Paul Harland: Pro-environmental Behavior.