

Using Commitment to Improve Environmental Quality

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Chapter 1

Using Commitment to Improve Environmental Quality: an Introduction



One of the biggest problems facing the world today is the degradation of our natural environment. This degradation is mainly due to human behavior (Stern, 2000). Because of this, there is ample pressure on social scientists to develop instruments that are effective in altering human behavior in a more pro-environmental direction. This thesis deals with that issue. More specifically, in this thesis I will investigate a specific instrument aimed at altering environmental behavior: the making of public commitments. I will show that commitment making is an effective instrument for improving actual conservation behavior, investigate the conditions under which people are willing to make commitments, and I will describe in detail the processes through which commitment making may alter behavior. The goal of this thesis is to provide a perspective on the entire process of commitment making. By doing so, I hope to contribute to the improvement of public commitment making as a tool to promote pro-environmental behavior.

This thesis consists of both field and laboratory studies. The research conducted was part of the NWO funded program “Feedback, social support and public commitment to improve environmental quality of farm lands”. Therefore, the field studies focus on nature conservation practiced by arable farmers. In this introductory chapter, I will first describe and explain these nature conservation practices. After that I will describe the background of this research project by reviewing the social psychological literature on interventions focussing on environmental behaviors. Then, I will formulate the research questions underlying this project. The chapter ends with an outline of the thesis and an overview of its chapters.

Farmers and nature conservation

By adopting nature conservation practices, farmers can increase the environmental quality of their farm lands. These conservation practices usually consist of reducing emissions of agrochemicals and fertilizer to the environment, as well as the management and maintenance of semi-natural habitats such as riparian zones, swamps and other small scale landscape elements. An example quite typical for the Netherlands is the creation of field margins: Strips of land lying between arable land and the field boundary which are deliberately managed to create conditions that benefit biodiversity. Such nature conservation practices have been officially acknowledged by the EU Common Agricultural policy (CAP) since the early 1990s (European Commission, Directorate-General for agriculture, 2003). Most European countries now offer farmers the possibility to partake in so-called agri-environmental schemes in which farmers are financially rewarded for their conservation efforts. These agri-environmental schemes are considered a key policy instrument for governments to enhance the quality of the natural environment (Burton, 2006). In addition, farmers can choose to perform nature conservation on a non-subsidized basis.

It has been recognized that these agri-environmental schemes are not always effective in changing farmers' attitudes and behavior concerning conservation (Burton, 2006). In the current thesis and especially in Chapters 2 and 3, I will describe studies that investigate the relevant aspects of farmers' motivation to engage in nature conservation practices and how these practices can be improved.

Environmental intervention research

Within the social psychological literature there is a vast amount of research dealing with interventions aimed at altering environmental behaviors (for reviews, see Abrahamse, Steg, Vlek, & Rothengatter, 2005; De Young, 1993; Dwyer et al., 1993). Interventions usually focus at household behaviors such as recycling and energy saving. One technique that seems particularly promising is the making of public commitments whereby an individual is asked to publicly commit to a certain behavior. It seems that people are likely to adhere to previously made commitments. Several studies have shown that commitment making is effective in, for instance, increasing recycling (Burn & Oskamp, 1986; DeLeon & Fuqua, 1995; Wang & Katzev, 1990), energy saving (Pallak & Cummings, 1976), and choosing public transport over car use (Matthies et al., 2006). The details of this process whereby commitment influences behavior will be discussed in greater detail in Chapter 5.

Another technique that has often been applied in intervention research is the presentation of information. This can be and is done in several different ways. Information can be given about general environmental issues or about specific problems and their solutions. Information can consist of feedback, whereby people are confronted with their current behavior, possibly compared to that of others. Feedback can be combined with advices on how to improve current behavior. These advices can vary in the extent to which they are tailored to the individual. In general, providing information serves to create awareness of the current behavior and to increase knowledge that is needed to change that behavior (Abrahamse et al., 2005). In respect to the latter function, it seems plausible to assume that the more tailored the information given is, the more it will result in change at the behavioral level. In Chapter 3, we will combine tailored information and public commitment making in an intervention aimed at improving farmers' nature conservation practices.

Overview of the current dissertation

The central question of this thesis is if and how commitment can be used to improve environmental behavior. Below I will describe the different chapters and how they contribute to answering the central research questions. While Chapters 2 and 3 focus specifically on Dutch farmers, Chapters 4 and 5 address commitment making in general.

Chapter 2: A Social-Cognitive Explanation Of Motivational Differences Between Farmers' Non-Subsidized And Subsidized Nature Conservation Practices

In this chapter I focus on the social psychological underpinnings of nature conservation performed by farmers. In a subsequent chapter I will argue that these underpinnings can be influenced by a commitment manipulation, but in this chapter the emphasis will be on the current motivation farmers experience when it comes to nature conservation. In order to successfully alter behavior and its motivation using a commitment manipulation it is essential to develop knowledge about this behavior. Therefore, this chapter is dedicated to investigating the motivation to perform nature conservation, using the Theory of Planned Behavior, to which the concepts of self-identity and personal norms were added. A distinction is made between nature conservation practices done on a non-subsidized basis and nature conservation practices for which farmers receive some form of remuneration from the Dutch government. 85 Arable farmers participated in this survey study. Results show that the model explains more variance in the intention to perform non-subsidized than subsidized nature conservation practices. Also, the concept of self-identity seems to affect intention to perform non-subsidized but not subsidized nature conservation practices. The results suggest that aside from a reward-based motivation, farmers can simultaneously have an identity-based motivation to engage in nature conservation practices. Increasing farmers' self-identity as conservationists therefore seems a promising way to improve their nature conservation efforts.

Chapter 3: Using Tailored Information and Public Commitment to Improve the Environmental Quality of Farm Lands

This chapter focuses on improving farmers' nature conservation efforts described in Chapter 3. An intervention is developed and tested that combined tailored information and public commitment. Participating farmers were divided in three groups: one group received tailored information only, one group received both tailored information and a public commitment manipulation, and one group served as a control. A questionnaire measuring relevant aspects of conservation was filled out before and after the intervention took place. Results show that especially tailored information combined with public commitment making resulted in a stronger desire to engage in conservation, an increase in surface area of non-subsidized natural habitat, and an increase in time farmers spent on conservation. The intervention affected both subsidized and non-subsidized conservation, but the effects were stronger for non-subsidized conservation. These results and their implications are discussed.

Reflections on the previous studies and a preview of the next chapters

As mentioned earlier, Chapters 2 and 3 were performed as part of the NWO funded program “Feedback, social support and public commitment to improve environmental quality of farm lands”. Two years were spent on conducting these studies and designing the tailored information and commitment intervention. While commitment making had been used previously as an intervention tool to stimulate pro-environmental behavior, the process whereby commitment making changes behavior was still for a large part unknown. Further investigation of this concept was clearly needed. Specifically, what needed clarification was a) what determines people’s willingness to make commitments, and b) how exactly these commitments affect subsequent behavior. I sought to answer these questions in the following chapters.

The conditions under which people are willing to make commitments had, to the best of my knowledge, not yet been addressed in social psychological research. This is surprising, since the success of any commitment intervention is highly dependent on people’s willingness to take part in it. In fact, the effectiveness of commitment making is rendered useless unless people make such commitments. Therefore, a new perspective on commitment making was needed, which I will further explain in Chapter 4.

To answer my second question, I reviewed the literature on commitment making. There are several studies that have tested the effect of commitment on environmental behavior (see, for instance, Burn & Oskamp, 1986; Pardini & Katzev, 1984; and Wang & Katzev, 1990). However, they had not yet been systematically documented (but see Katzev & Wang, 1994). Furthermore, what was lacking was a theoretical framework through which the effect of commitment making on behavior could be interpreted. Therefore, I performed a literature study that is described in Chapter 5. In this chapter, I turn to fundamental research on social influence to propose three ways through which commitment may alter behavior. I review studies that apply commitment making to increase environmental behaviors and investigate to what extent they offer evidence for these processes.

By following these two pathways I aim to provide the reader with a more complete picture of the ways commitment making can be used to change behavior.

Chapter 4: Public Commitment Making as a Structural Solution in Social Dilemmas

Environmental behaviors such as nature conservation described in this dissertation are, in essence, social dilemmas. Such dilemmas are characterized by a conflict of interests between the individual and the group: what is best for the individual leads to a negative outcome for the group, and vice versa. A specific dilemma is that of the provision of a public good, whereby group members are asked to contribute to a good that, upon realization, will

be enjoyed by all group members regardless of their contribution. In this situation it is highly attractive for individual group members not to contribute, since chances are the public good will be realized any way, and they will be able to enjoy it without having to bear the costs of contributing. Such behavior is called free riding. In these dilemmas, contributing for the public good is called *cooperation*, while behavior for the sake of the individual is called *defection* (for overviews, see Komorita & Parks, 1995; Weber, Kopelman, & Messick, 2004).

Seen from this perspective, trying to increase environmental behaviors is in fact trying to increase cooperation. Research has shown that the making of public commitments increases cooperation (Kerr & Kaufman-Gilliland, 1994). What remains unknown, however, is under which conditions people are willing to make such commitments. Based on the literature on structural solutions to social dilemmas, I expected dispositional trust and situational expectations to determine the willingness to install a system of public commitments. In this chapter I will present two studies which both show that group members who are low in dispositional trust are likely to invest in a system of commitments when their situational expectations concerning other group members' contributions are high. On the other hand, group members who are high in dispositional trust are likely to invest in a system of commitments when their situational expectations concerning other group members' contributions are low. It appears that both low trusters with high situational expectations and high trusters with low situational expectations choose for a system of public commitments in order to gain maximal joint outcomes.

Chapter 5: A Review of Commitment Making Strategies in Environmental Research

In this chapter I offer a critical review concerning commitment making as an intervention strategy in the environmental domain. Commitment making is commonly regarded as an effective way to promote several pro-environmental behaviors (Abrahamse et al., 2005; Katzev & Wang, 1994; De Young, 1993; Dwyer et al., 1993). The assumption is that when people make a commitment to engage in a certain behavior, they adhere to that commitment and this produces behavior change. While this idea seems promising, the results are mixed. Also, it remains unclear *why* people would be inclined to adhere to previously made commitments. In this chapter a structured review of environmental studies containing a commitment manipulation is presented. I also investigate the possible psychological constructs that underlie the commitment effect: self-concept, need for consistency and social and personal norms. By doing so I aim to clarify how commitment can be successful. I conclude that while commitment itself has been found to change behavior, it is more often effective in combination with other treatments. I notice a gap between fundamental and applied psychological research in that researchers in the applied domain do not always make use of the insights derived from fundamental social psychology. I see commitment

making as a potentially useful technique which could be improved by following up on findings from fundamental research.

Chapter 6: Summary and Conclusion

In this 6th and final chapter I will briefly summarize the major findings presented in this dissertation and I will elaborate on the general conclusions that can be drawn from these results. Also I will discuss the relevant practical implications of the current research, and offer some suggestions for future research on the making of commitments in the environmental domain.

To conclude, the central goal of this dissertation is to investigate if and how commitment making can be used to alter environmental behavior. More specifically, in the first chapters, I focus on conservation behavior as performed by Dutch farmers. I will study farmers' motivation for nature conservation practices, and test whether commitment making can improve these practices. These chapters are followed by two more general chapters on commitment making in which I will investigate the conditions under which people are willing to make commitments, and describe the processes through which commitment making can affect environmental behavior in general. By doing so, I aim to provide a perspective on the entire process of commitment making. Ultimately, I hope this will contribute to the effectiveness of commitment making as a tool to promote pro-environmental behavior.

An important ending note to the reader: All of the chapters in this dissertation are papers submitted for publication. Therefore, they have been written in the first-person plural and can be read independently of each other.

Chapter 2

A Social-Cognitive Explanation Of Motivational Differences Between Farmers' Subsidized And Non-Subsidized Nature Conservation Practices¹



¹ This chapter is based on Lokhorst, Van Dijk, Staats, Van Dijk, & De Snoo (2009a) and is therefore written in the first- person plural

Biodiversity is decreasing at an alarmingly high rate (World Resources Institute, 2005). It is generally recognized that in order to solve the environmental problems facing the world today, human behavior is key (Stern & Oskamp, 1987). Numerous psychological studies have investigated how to change peoples' behavior in more environmentally friendly ways (for reviews, see Abrahamse, Steg, Vlek, & Rothengatter, 2005; De Young, 1993; Dwyer et al., 1993). Those studies include for instance recycling (e.g. DeLeon & Fuqua, 1995), environmental household behaviors (e.g. Harland, Staats & Wilke, 1999), and choosing public transport over car use (e.g. Matthies, Klockner & Preissner, 2006). Typically, the behaviors studied are consumer behaviors: performed more or less by all members of society and relatively easy to execute. However, Gardner and Stern (2002) argue that psychologists studying interventions in the environmental domain should be very careful in selecting their target behaviors: The research focus should be on those behaviors that have the greatest effect on our environment.

Given the large areas of land in agricultural use, farmers' behavior and decision-making regarding sustainability and conservation issues have an extraordinary large influence on biodiversity. In this context, it is remarkable that this group has been somewhat overlooked in social psychological research.

There is only a small body of research on farmers' attitudes and behaviors regarding nature conservation, and this research rarely makes use of social psychological insights or theories. Often, research on agricultural decision-making is qualitative (e.g. Herzon & Mikk, 2007), which is problematic for comparative analysis. When quantitative instruments such as large scale questionnaires are applied, there is a tendency to measure only farmers' attitudes, and not other constructs that might very well influence behavior (Van der Meulen, De Snoo & Wossink, 1996; Burton, 2004). Researchers often ask about farmers' motivations directly, giving them a few options to choose from. These answers are then used for cluster analyses to form typologies of farmers (e.g. Morris & Potter, 1995; Wilson & Hart, 2000). While these results may look appealing to for instance policy makers, we believe there is a deeper insight to be gained when behavioral models that specify relations between relevant variables are applied. Grouping participants and their motivations into distinct types means that these motivations exclude each other, while behavioral models assume motivations are continua on which participants can score relatively low or high and that are not by definition incompatible with each other. To the best of our knowledge, only the work done by Fielding and colleagues (Fielding, Terry, Masser, & Hogg, 2008; Fielding, Terry, Masser, Bordia & Hogg, 2005) has applied such models. In concordance with Burton (2004), we therefore advocate a more systematic use of social psychological models such as the Theory of Planned Behavior in agricultural research, and the addition of normative influences and self-identity to those models. It is our goal in this research to study farmers' motivation to increase biodiversity using insights and methods derived from social

psychology and in this way contribute to a better understanding of the process that lead farmers to invest in nature conservation.

Farmers' conservation efforts usually consist of reducing emissions of pesticides and fertilizer to the environment, as well as the management and maintenance of semi-natural habitats such as field margins, riparian zones, hedges and other small scale landscape elements (for example Boatman et al., 1999). In recognition of the value of such efforts for biodiversity conservation in rural areas, many European countries have set up subsidy schemes to promote farmer conservation activities. These so-called agri-environmental schemes also stimulate farmers to set aside part of their productive area for the creation of semi-natural habitats for conservation purposes. The offered subsidies come with an extensive set of rules and regulations regarding size and management of these habitats; minimum standards farmers are required to comply with.

In addition, farmers have the possibility to perform nature conservation practices on a non-subsidized basis. The natural elements derived from such practices are not compensated for by any monetary rewards. It seems plausible that different underlying processes are at stake here. If a farmer can get compensated for one kind of natural element or practice, then why spend energy on other kinds? For subsidized nature conservation practices, it can be expected that the monetary reward is of prime interest; hence living up to the rules of the subsidy regulation to obtain the allowance can be identified as an important motivation for these conservation practices. Non-subsidized conservation however, is independent of a monetary goal and can therefore be expected to be related to more intrinsic conservation motives.

From a policy perspective it seems important to reward behavior that is believed to be desirable. From a social psychological perspective, however, monetary rewards can be detrimental and may actually backfire instead of producing the desired increase in behavior. As numerous studies have shown (for a meta-analysis, see Deci, Koestner & Ryan, 1999), behavior that is rewarded runs the risk of losing its intrinsic motivation. When people are rewarded for performing a behavior they attribute their motivation to this reward and thus come to think of themselves as extrinsically motivated. This attribution might then lead them to stop performing the behavior when the monetary reward is taken away. This possible reduce in effort caused by an external reward has been named the *crowding out effect* (Frey, 1997).

Previous research (Wilson & Hart, 2000) has shown that although financial rewards are an important reason for farmers to participate in nature conservation practices, there is a recent tendency for farmers to express more conservation-oriented motivations. Wilson and Hart call this "the new hypothesis" and argue that these concerns for conservation do not exclude the importance of the financial imperative. However, they argue that this "new hypothesis" deserves attention from researchers interested in environmental attitudes and behaviors among farmers.

In this study, we will take a closer look at farmers' motivation to participate in nature conservation practices. Our focus will be on the differences between subsidized and non-subsidized practices. We will examine these possible different underlying social psychological constructs using a social-cognitive model based on the Theory of Planned Behavior (Ajzen, 1991).

Theory of Planned Behavior

The Theory of Planned Behavior, or TPB, is perhaps the most influential and well-known social psychological model to predict human behavior. A plethora of research (for a review, see Armitage & Conner, 2001) has shown that it is capable of predicting a wide range of behaviors, for example donating to charity (Smith & McSweeney, 2007), recycling behavior (e.g. Terry, Hogg and White, 1999), environmental household behaviors (Harland, Staats and Wilke, 1999), and landholders' riparian zone management practices (Fielding, Terry, Masser, & Hogg, 2008; Fielding, Terry, Massar, Bordia & Hogg, 2005).

The TPB states that the most proximal predictor of any given behavior is the intention to perform that behavior. The intention to perform can be predicted by the three other components of the model: the attitude towards the behavior, the subjective norm and the perceived behavioral control (PBC). Attitude is described as an individual's evaluation of the specific behavior: it is a personal evaluation of whether the behavior is positive or negative (Ajzen & Fishbein, 1980). Subjective norm is the perceived social pressure to perform a certain behavior. It reflects the extent to which a person thinks relevant others believe the actor should perform the behavior. PBC reflects how easy or difficult the individual thinks it will be to perform the behavior.

Ajzen (1991) has stated that 'the theory of planned behavior is, in principle, open to the inclusion of additional predictors if it can be shown that they capture a significant proportion of the variance in intention or behavior' after the original TPB variables have been taken into account. In fact, several studies have been conducted in which new constructs have been successfully added to the model, thereby increasing its explanatory power (for an overview focusing on environmentally relevant behaviors, see Staats, 2003). In the current study, we have therefore added two constructs to the TPB model, for which we expected an increase of explanatory power for the behavior under study. These constructs are discussed in detail below.

Additional constructs

Personal Norm. According to the norm-activation theory (Schwartz, 1968, 1977) personal norms are self-expectations based on internalised values. They are feelings of personal obligation to perform a certain behavior, and in that way prescribe what one "ought to do". These personal norms do not influence behavior automatically: They need to be activated

first. Activation occurs when people are aware of the negative consequences of their behavior and feel that they are responsible for these consequences. Also, norms are activated when people identify actions that can counter these negative consequences, and feel that they can perform these actions (Harland, Staats, & Wilke, 2007). This activation results in a feeling of having to perform a certain behavior.

Several studies have shown that personal norms can significantly predict behavioral intention. Harland, Staats and Wilke (1999) studied environmentally relevant behavior in a household setting. They found that personal norms significantly explained intentions and behaviors such as using unbleached paper and using energy-saving light bulbs after the TPB constructs were accounted for. Moan and Rise (2005) examined if an extended version of the TPB could predict intentions to stop smoking and the subsequent behavior 6 months later. They found that personal norms predicted both intentions to stop smoking and actual quitting behavior. Bamberg, Hunecke and Blöbaum (2007) reported two studies in which they found that personal norm was a significant predictor of intention to use public transport and this effect was independent of attitude and perceived behavioral control.

Self-identity. The construct of self-identity stems from identity theory, which describes the self as a collection of identities derived from the various social roles someone occupies (Stryker, 1968). Although all these role identities have the potential to influence behavior, it depends on their relative salience which of these identities will have the strongest influence on behavior. Some roles are more salient than others: These roles have more self-relevance than other roles and they are more likely to be invoked in different situations (Hogg, Terry & White, 1995). Used in combination with the TPB, self-identity refers to the extent to which a certain behavior is seen as part of the self. Research shows that self-identity is an important predictor of behavioral intentions (see Armitage & Conner, 1999). Sparks and Sheperd (1992) found that self-identity explained intentions to consume organically grown food, even when accounting for the TPB constructs and past behavior. In a subsequent study, Sparks and Guthrie (1998) found that self-identity explained intentions to adopt a more healthy diet. This effect was independent of personal norm and the TPB constructs. Fielding et al. (2008) showed that self-identity was an independent predictor of the intention to engage in environmental activism.

In sum, both personal norm and self-identity have proven to be successful in predicting a wide range of behaviors. In the current study, we want to expand the previous research by applying this knowledge to a new population and a new set of behaviors: farmers and their nature conservation practices. In contrast to Fielding et al. (2005), who focused on riparian zone management specifically, we will focus on general nature conservation practices. Also, while the work of Fielding et al. studied only non-subsidized practices, we are interested in determining the differences in subsidized versus non-subsidized practices. Finally,

the work of Fielding et al. did not include the concept of self-identity: A concept that plays a central role in the current study.

The current study: aims and hypotheses

Based on the above, our first aim was to investigate the social-psychological underpinnings of nature conservation practices using the TPB, including self-identity and personal norm. Moreover, we were interested in the possible differences in subsidized and non-subsidized practices. The second aim of this study therefore is to investigate whether different processes underlie these two types of nature conservation practices.

We believe that farmers will be more extrinsically motivated to perform subsidized nature conservation practices, and more intrinsically motivated to perform non-subsidized nature conservation practices. Associated with intrinsic motivation are feelings of personal obligation to perform nature conservation practices and seeing these practices as something that is part of the self. Thus, we believe that feelings of self-identity and personal norm will be associated more with non-subsidized than with subsidized practices.

More specifically, we hypothesize that: The TPB constructs will significantly predict both the intention to perform non-subsidized nature conservation practices as well as the intention to perform subsidized nature conservation practices (*Hypothesis 1*) and that self-identity and personal norm will be more associated with the intention to perform non-subsidized nature conservation practices than subsidized nature conservation practices (*Hypothesis 2*). Furthermore, we were interested in the relation between our psychological model and self-reported behavior: We therefore included a measure on time spent on nature conservation practices, and we predict that the intention to perform both non-subsidized as well as subsidized practices will significantly predict the amount of time spent on these practices (*Hypothesis 3*).

Method

Pilot

Eight Dutch farmers were interviewed before making a first version of the questionnaire. This was done to ensure that all constructs in the questionnaire would be relevant and understandable for participants. Based on these interviews, a first version of the questionnaire was constructed and tested on four different farmers to ensure that the phrasing of the questions in the questionnaire was comprehensible and acceptable for participants. The questionnaire was adjusted where necessary.

Procedure and participants

Our sample consisted of 109 arable farmers from Zeeland, a province in the southwest of the Netherlands. These farmers were recruited through their local agricultural organizations. These agricultural organizations generally have three goals: to increase the ecological values of farms, to jointly apply for conservation subsidies, and to increase the general publics' goodwill towards farmers. We specifically chose to select farmers through agricultural organizations for a reason: these organizations are rapidly growing and their members already make up 10 % of all the farmers in the Netherlands, while the amount of farmland owned by their members is 50 % of the total Dutch farmland (Oerlemans, Guldmond, & Visser, 2007). Since this group of farmers is becoming more and more important it makes sense to focus on them specifically.

Participants were initially contacted by telephone. After having agreed on participating, they received the questionnaire at home, together with a return envelope. In total, 85 farmers (94.1 % male, mean age 46.9 years) filled out and returned the questionnaire, making the response rate 78 %.

Questionnaire

All questionnaire items were measured on 5-point scales. Because we were interested in the possible differences between non-subsidized and subsidized nature conservation practices, all items were measured for both types of practices.

Attitude was measured using the items "I think that subsidized/ non-subsidized nature conservation practices are: negative-positive", "I think that subsidized/ non-subsidized nature conservation practices are: useless – useful", and "I think that subsidized/ non-subsidized nature conservation practices are: unimportant– important" (Ajzen & Fishbein, 1980). This scale yielded a sufficiently high reliability for both subsidized ($\alpha = .77$) and non-subsidized practices ($\alpha = .87$).

Perceived Behavioral Control was measured using the item "I am capable of carrying out subsidized/ non-subsidized nature conservation practices: completely disagree – completely agree" (Ajzen & Fishbein, 1980).

Subjective Norm was measured using the item "Most people that are important for me think it is important that I carry out subsidized/ non-subsidized nature conservation practices: completely disagree – completely agree" (Ajzen & Fishbein, 1980).

To measure Personal Norm, we used 2 items, both on a scale ranging from completely disagree to completely agree (Vining & Ebreo, 1992): "I feel a strong personal obligation to carry out subsidized/ non-subsidized nature conservation practices" and "I would feel guilty if I would not carry out subsidized/ non-subsidized nature conservation practices".

Cronbach's α for this scale is 0.77 for subsidized nature conservation practices and 0.85 for non-subsidized nature conservation practices.

Self-identity was measured with 2 items, both on a scale ranging from completely disagree to completely agree (Terry, Hogg & White, 1999): "Subsidized/ non-subsidized nature conservation practices are part of who I am" and "Subsidized/ non-subsidized nature conservation practices are something for that is typical for me". Cronbach's α for this scale is 0.80 for subsidized nature conservation practices and 0.90 for non-subsidized nature conservation practices.

Intention was measured using 2 items (Perugini & Bagozzi, 2001), being: "In the future, under the same conditions I would perform these nature conservation practices again" and "Given the opportunity I would perform these nature conservation practices again": certainly not – certainly". Cronbach's α for this scale is 0.84 for the intention to perform subsidized nature conservation practices and 0.90 for the intention to perform non-subsidized nature conservation practices.

Results

The means, standard deviations, and correlations for both subsidized and non-subsidized practices are listed in Table 2.1. Inspection of this table shows that the mean scores on scales used in our model were above the scale means, and that the intention to perform subsidized practices was positively correlated with the intention to perform non-subsidized practices.

Subsidized practices

A regression analysis was performed with intention as the dependent variable and attitude, perceived behavioral control, subjective norm, self-identity and personal norm as the independent variables. In the first step, the TPB-concepts attitude, perceived behavioral control and subjective norm were entered into the equation. Only attitude was found to be a significant predictor of intention ($\beta = 0.31, p < .01$). The proportion of the variance in intention to perform subsidized nature conservation practices explained by the TPB concepts was 17.9 %.

Table 2.1 Means, Standard deviations, and Correlations

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Subsidized Attitude	3.99	0.56	1													
2. Subsidized Subjective Norm	3.24	1.10	.28*	1												
3. Subsidized PBC	4.43	0.72	.06	.26*	1											
4. Subsidized Intention	3.78	0.70	.36**	.27*	.19	1										
5. Subsidized Personal Norm	2.98	1.10	.39**	.36**	.12	.16	1									
6. Subsidized Self-identity	3.34	0.98	.25**	.42**	.18	.24*	.49**	1								
7. Non-subsidized Attitude	3.78	0.78	-.03	-.16	-.14	.21	.00	.08	1							
8. Non-subsidized Subjective Norm	2.79	1.12	.11	.25*	-.04	.40**	.14	.26*	.44**	1						
9. Non-subsidized PBC	3.83	1.10	-.14	-.16	.08	.04	-.21	-.02	.55**	.27*	1					
10. Non-subsidized Intention	2.70	1.03	.02	.03	.03	.35**	-.02	.20	.64**	.51**	.49**	1				
11. Non-subsidized Personal Norm	2.54	1.05	.10	-.12	-.14	.19	.27	.18	.48**	.32**	.26*	.40**	1			
12. Non-subsidized Self-identity	3.00	1.05	-.07	-.25*	-.08	.11	.00	.18	.56**	.33**	.49**	.60**	.70**	1		
13. Time spent on subsidized practices	35.44	38.46	-.20	-.07	-.03	.26*	.19	.23*	.28*	.25*	-.07	.25*	.26*	.22	1	
14. Time spent on non-subsidized practices	96.42	206.76	.09	-.11	-.07	-.01	.08	.01	.21	.08	.02	-.08	.16	.14	.20	1

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

In the second step, personal norm and self-identity were added to the analyses. In Table 2.2 it can be seen that neither of these concepts were significant predictors of intention, and that attitude remained the sole significant predictor. Adding personal norm and self-identity improved the proportion explained variance by 1.2 % and this step was not significant.

Table 2.2 Subsidized nature conservation practices. Regression analysis with intention as the dependent variable

Step	R ²	ΔR ²	β after TPB	Final β
1. Attitude	.179	.179**	.31**	.31*
PBC			.13	.12
Subjective Norm			.16	.13
2. Personal Norm	.191	.012		-.07
Self-identity				.13

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

Non-subsidized practices

As with subsidized nature conservation practices, a regression analysis was performed with intention as the dependent variable and attitude, perceived behavioral control, subjective norm, self-identity and personal norm as the independent variables. In the first step, the TPB-concepts attitude, perceived behavioral control and subjective norm were entered into the equation. Both attitude ($\beta = 0.52, p < .01$), subjective norm ($\beta = 0.27, p < .05$) and perceived behavioral control ($\beta = 0.20, p < .05$) were effective in predicting intention, see Table 2.3. The proportion of the variance in intention to perform non-subsidized nature conservation practices explained by the TPB concepts was 47.1 %.

In the second step, personal norm and self-identity were added to the analyses. Attitude and subjective norm remained significant predictors although their betas slightly decreased. Perceived behavioral control no longer had a significant effect on intention. Self-identity ($\beta = 0.36, p < .01$) had a significant effect on intention whereas personal norm did not. Adding personal norm and self-identity improved the proportion explained variance by 6.2 % and this step was significant, $p < .01$

Table 2.3 Non-subsidized nature conservation practices. Regression analysis with intention as the dependent variable

Step	R ²	ΔR ²	β after TPB	Final β
1. Attitude	.496	.496**	.40**	.31**
PBC			.20*	.10
Subjective Norm			.27*	.26*
2. Personal Norm	.558	.062**		-.11
Self-identity				.36**

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

Self-reported intentions and time spent on nature conservation practices

We were also interested in testing whether self-reported intentions to engage in nature conservation practices were significant predictors of how much time was spent on these practices. As a self-reported measure of spent time we asked participants how much time they spent on either non-subsidized or subsidized nature conservation practices per season, and then aggregated these scores over the year. On average, participants spent 35.44 hours per year on subsidized practices ($SD = 38.46$) and 96.42 hours on non-subsidized practices ($SD = 206.76$). We then regressed the amount of time spent on nature conservation practices on intention and found that this effect was significant for subsidized practices ($\beta = 0.26, p < .05$) but not for non-subsidized practices ($\beta = -0.8, n.s.$).

Summary and conclusion

We tested a model based on the Theory of Planned Behavior, to which personal norm and self-identity were added. This model was tested twice: Once for subsidized and once for non-subsidized practices. We hypothesized that the TPB would predict both non-subsidized and subsidized practices; and that personal norm and self-identity would better predict non-subsidized than subsidized practices.

The first hypothesis was supported: The intention to perform subsidized practices was predicted by attitude, while the intention to perform non-subsidized practices was predicted by both attitude and subjective norm. Perceived behavioral control had no effect on the intention to perform nature conservation practices.

Our second hypothesis was also partly supported. Contrary to our expectations, personal norm did not significantly predict intention to perform non-subsidized practices. Self-identity, however, did have a significant positive impact on intention.

Furthermore we saw that self-reported intentions to perform nature conservation practices were significant predictors for self-reported time spent on subsidized practices but not on non-subsidized practices. Finally, our model explained 19 % of the variance in intention to perform subsidized practices, versus 56 % of the variance in intention to perform non-subsidized practices.

General Discussion

Stimulating biodiversity is an issue that is high on the political agenda. More than individual consumers, farmers' behaviors have a direct impact on nature and biodiversity. Therefore it is generally acknowledged that we need a better understanding of farmers' decision-making processes concerning conservation nature conservation practices (Burton, 2004).

In the analysis presented here, a major finding was that these processes differ between subsidized and non-subsidized practices

A first distinction between subsidized and non-subsidized practices is the role played by self-identity. As we have seen self-identity significantly predicts intention to perform non-subsidized but not subsidized nature conservation practices. How can this difference be explained? We have mentioned before that self-identity is associated with intrinsic motivation. This relation can be explained in greater detail when we look at self-perception theory (Bem, 1972). This theory holds that people construe their self-image on the basis of their actions instead of the other way around. People who believe they are free to choose to perform a certain behavior attribute the performance of this behavior to their self-concept. As Cialdini (2001, p. 82) said: "We accept inner responsibility for a behavior when we think we have chosen to perform it in the absence of strong outside pressure". We believe a similar process explains our finding that self-identity is related to the intention to perform non-subsidized but not subsidized nature conservation practices. Farmers engage in these practices while not being rewarded for them. This leads them to reason that they must be "the kind of people who do these things" and that these nature conservation practices are part of who they are.

A second difference between subsidized and non-subsidized practices is the relation between self-reported intention and self-reported time spent on these practices. As we have seen this relation is significant for subsidized but not for non-subsidized practices. We believe this (lack of) effect mirrors the difference in perspectives on both types of nature management. Since subsidized management is basically a business agreement between a farmer and the government, it comes with an "economic rationalist" perspective. Within this perspective it is important to keep track of how many hours are spent on nature conservation practices in order to see whether the remuneration is sufficient. Non-subsidized practices, however, are usually not fully incorporated into the farm management and are often carried out in between other tasks. It is therefore difficult to keep track of the hours spent on these practices, which may cause for the lack of a significant relation between intention and behavior in this study. It is important to note that the average amount of time spent on non-subsidized practices exceeded the average amount of time spent on subsidized practices.

An unexpected finding in this study was that personal norm had no significant effect on intention to perform nature conservation practices. This is surprising since other research shows that personal norms play an important role in environmental behavior (Bamberg & Möser, 2007; Harland et al., 1999). The question thus arises why this is not the case in this study. Inspection of the mean scores on all of our model's constructs learns that participants scored the lowest on personal norm, indicating that this construct was less relevant to them than the other constructs measured in the current study. Combining this finding with the fact that personal norm did not have a significant impact on intention it could be

concluded that the behavior investigated in the current study does not seem to carry moral implications. That is, farmers do not engage in these practices because they feel a moral obligation to do so, but rather as a result of a positive attitude towards the behavior and the perception that these practices fit their identity as conservationists.

The goal of this study was to investigate farmers' motivation to engage in nature conservation practices and to find out whether there are fundamental differences in motivation for subsidized and non-subsidized practices. Our results clearly show that there are. We hope this study contributes to a better understanding of why farmers choose to engage in nature conservation practices.

Ideally this better understanding aids in the improvement of policy instruments aimed at agricultural nature conservation. Our conclusion is not that the current policy of subsidies is not effective. However, we do see that farmers engage in nature conservation practices aside from these subsidies and that their motivation for these non-subsidized practices is to an important degree based on their self-identity: They see themselves as conservation-oriented farmers. These two types of motivations, reward-based and identity-based, are mutually co-existent. Our results corroborate the findings of Wilson and Hart (2004) that farmers' decision-making processes are more and more influenced by conservation-oriented motivations and that these are not incompatible with financial considerations. This point is highlighted by our finding that intention to perform non-subsidized practices correlates significantly with intention to perform subsidized practices. Thus, in this study we have found no evidence for the crowding out effect (Frey, 1997). We believe the current challenge for policymakers is to find ways to address farmers' self-identity as conservationists and in that way improve nature conservation.

Chapter 3

Using Tailored Information and Public Commitment to Improve the Environmental Quality of Farm Lands¹



¹ This chapter is based on Lokhorst, Van Dijk, Staats, Van Dijk, & De Snoo (2009b) and is therefore written in the first-person plural.

Scientists, policy makers and the general public agree that action must be undertaken to stop the rapid degradation of our natural environment. While technical solutions and environmental policies are promising, they can only be successful when accompanied by changes in human behavior (Stern & Oskamp, 1987). Unfortunately, changing human behavior is not an easy task. A vast amount of research has focused on changing people's environmental attitudes and behaviors and has yielded mixed results (for reviews, see Abrahamse et al., 2005; De Young, 1993; Dwyer et al., 1993). While these studies typically focus on household behaviors such as recycling (e.g. DeLeon & Fuqua, 1995, Harland et al., 1999) and energy conservation (Pallak & Cummings, 1976; Katzev & Johnson, 1983), Gardner and Stern (2002) argue that research should target those behaviors that have the largest impact on our environment.

One approach is to distinguish environmental behaviors such as using energy-efficient lamps and lowering the thermostat in terms of their effect on the environment, and then target the behaviors that affect the environment the most. A complementary approach would be to distinguish between groups of people in these terms. Some people might have a stronger influence on the environment based on their societal or job position. If this is the case, then it makes sense to target these people and their environmental behaviors specifically.

Following this line of reasoning, in the current study we therefore focus on farmers, who have a tremendous influence on the environment due to the large areas of land in agricultural use. More specifically, by adopting nature conservation practices, farmers can strongly improve the environmental quality of their land. This study focuses on improving these conservation practices by developing and testing an intervention, for which we relied on the vast body of social psychological research on interventions in the environmental domain. A key aspect of the current study is that it combines social psychological measures with ecological ones, making it possible to test relations between aspects of motivation and outcomes on the level of environmental quality.

Intervention

Attempts to change people's attitudes and behaviors often rely on the presentation of information. One of such informational techniques that has often been used in social psychological research is the administration of feedback (see, for instance, Abrahamse et al., 2007; Staats et al., 2004). Administering feedback entails providing people with information about their current behavior. A distinction is made between feedback on the individual and feedback on the group level. The latter is also described as a type of comparative feedback as it provides the opportunity to compare one's behavior with that of others. This way feedback can be successful in changing behavior because it possibly makes salient a social norm in favor of the behavior at stake (Abrahamse et al., 2007). Another informational technique is

the provision of tailored information: information that is tailored specifically to a person's individual needs. This technique has been used for example to give garage managers advice on how to reduce oil pollution of wastewater in a study done by Daamen, Staats, Wilke, and Engelen (2001) and was found effective. An important aspect of this study is that it targeted professionals instead of the more usual and more general sample of consumers. The current study focuses on farmers, who are professionals as well; therefore, the work by Daamen et al. served as an important impetus for the current study to include tailored advices.

An important distinction between feedback and tailored advice giving is that feedback is a so-called *consequent* strategy (informing participants about the consequences of their behavior) where as tailored advice giving is an *antecedent* strategy (informing participants on how to alter their future behavior effectively; see Dwyer et al., 1993). In the current intervention we used both techniques in order to increase the effectiveness of the information provided.

The effects of feedback techniques are often limited to shorter periods of time (Staats et al., 2000). Also, it is assumed that interventions are more successful when they are multifaceted and consist of multiple strategies (Gardner & Stern, 2002; Werner et al., 1995). Therefore in the current research we decided to further enrich our intervention package with a technique called public commitment making, in which an individual is asked to make a commitment to perform a certain behavior with others present. Commitment making is generally seen as a promising intervention technique (Abrahamse et al., 2005; Katzev & Wang, 1994; De Young, 1993; Dwyer et al., 1993) and has been shown to influence for instance recycling (DeLeon & Fuqua, 1995; Wang & Katzev, 1990) and choosing public transport over car use (Matthies et al., 2006). Commitment can influence behavior in several ways (see Lokhorst et al., 2008). First, commitment can change people's self-concept such that the new behavior becomes a part of the self. Second, commitments can evoke either a social or personal norm to engage in the behavior at stake. Third, making a commitment can set in motion a process generally referred to as cognitive elaboration (Petty & Cacioppo, 1986): A process whereby the individual elaborates on the possible reasons to engage in the behavior and strategies to accurately perform the behavior, resulting in a strong and accessible attitude towards the behavior.

The current research: farmers and conservation

In this study we focus on farmers and their conservation practices. These practices consist of reducing emissions of agrochemicals and fertilizer to the environment, as well as the management and maintenance of semi-natural habitats such as riparian zones, hedges and other landscape elements. Farmers' conservation practices have been officially acknowledged by the EU Common Agricultural policy (CAP) since the early 1990s (European Com-

mission, Directorate-General for agriculture, 2003). As a result, many countries have set up subsidy schemes to promote farmer conservation practices. These schemes stimulate farmers to set aside part of their productive area for the creation of semi-natural habitats for conservation purposes. In addition, farmers have the possibility to perform conservation practices on a non-subsidized basis. The natural elements stemming from such practices are not compensated for by any monetary rewards.

Our intervention, combining both tailored information and public commitment, is aimed at improving farmers' conservation practices and is based on the assumption of voluntary behavior change. Both subsidized and non-subsidized are voluntary behaviors. Even though subsidized conservation is contingent on contracts and thus less flexible, farmers are still free to choose for this type of conservation or not. Also, they are free to exert as much effort as they choose for this type of conservation, as long as they meet the required standards. Therefore one could reason that both subsidized and non-subsidized conservation may be influenced by our intervention package. However, it could also be that the effect of our intervention is stronger in the absence of any monetary rewards. Research has shown that rewarding a behavior can cause a decline in intrinsic motivation for this behavior. This process is called the *crowding out effect* (Frey, 1997). Seen from this perspective it could be that farmers are more motivated to perform non-subsidized conservation, raising the possibility that our intervention will be more successful in affecting this type of conservation. To test the full effect of our intervention and to be able to compare possible changes in non-subsidized conservation with changes in subsidized conservation we did include measures for both types of conservation.

We expected that especially the combination of tailored information and commitment would result in a stronger motivation to perform conservation and more/better conservation. To test this, we created three experimental conditions: one tailored information plus commitment condition, one tailored information only condition, and one control condition. This way we could test whether tailored information alone is sufficient to elicit change, or whether it should be accompanied by a commitment manipulation. A questionnaire measuring relevant aspects of both subsidized and non-subsidized conservation was filled out by participants before and after this intervention. We expected that the combination of tailored information and commitment would have a positive effect on conservation. More specifically, we hypothesized that this would result in a more positive attitude towards conservation, a stronger desire to engage in conservation, more time spent on conservation, higher quality of conservation, an increase in the surface area of (semi-) natural habitat, and more habitat diversity, compared to the tailored information only and control conditions. In addition, we expected the tailored information only condition to show an increase in the aforementioned measures compared to the control condition.

Method

Participants

This study took place in Zeeland, a province in the southwest of the Netherlands. We restricted the research to arable farms in the marine clay district to minimize the influence of differences in soil or landscape. Farmers were recruited through their local agricultural organizations. These agricultural organizations generally have three goals: to increase the ecological values of farms, to do so by jointly apply for conservation subsidies, and to increase the general public's goodwill towards farmers. These organizations are rapidly growing: The amount of farmland owned by their members is 50 % of the total Dutch farmland (Oerlemans et al., 2007). Since this group of farmers is becoming more and more important we chose to focus on them specifically.

Participants were initially contacted by telephone. After having agreed on participating, they received the baseline questionnaire at home, together with a return envelope. The initial wave of data collection took place in March 2006. In total, the questionnaire was sent to 112 farmers, of which 84 farmers (94.1 % male, mean age 46.9 years) filled out and returned the questionnaire, making the response rate 78 % (see also Lokhorst et al., 2009a).

During the course of the study, 26 participants dropped out. Total attrition from pretest to posttest was 31 %. To examine the nature of attrition, a comparison was made between participants who had dropped out and those who remained in the study on average scores of time spent on nature conservation, attitude towards nature conservation, farm size, age and gender. None of these differences were statistically significant, suggesting that the dropout in this study was not selective.

Study design

The final sample of participants who filled out both questionnaires consisted of 58 participants (70.2 % male, mean age 49.7 years). We divided our pool of participants into three groups: one group received tailored information only, one group received tailored information plus a commitment manipulation, and one group served as a control. In the tailored information only condition (N = 18), participants were sent feedback reports by mail. Feedback reports were tailored around the themes habitat area, habitat diversity and quality of management. Especially habitat diversity and adequate habitat management are seen as key drivers of biodiversity in agricultural landscapes (Benton et al., 2003; Blomqvist et al., 2006; Duelli, 1997; Manhoudt et al., 2007; Weibull et al., 2003). As a source for adequate management options, we used a manual for agri-environmental management (Van Paassen, 1998), which was published by the Dutch national organization for landscape management and is a widely accepted source of advice about agri-environmental management options.

Feedback reports were tailor made for each farm, based on self reported data on habitat area and management. Based on this information, each farm was rated on 4 aspects of agri-environmental management by a team of ecologists with expertise in this area. These aspects were: 1) total area of semi-natural habitat on the farm; 2) habitat diversity; 3) management quality of semi-natural habitats on the farm; 4) the contribution of the habitats and specific measures (e.g. nesting boxes) on the farm to landscape quality and the occurrence of specific groups of organisms (e.g. farmland birds, raptors, amphibians, etc.). Participants' performance on each of these aspects was compared with the performance of others in their area. We created feedback reports in which this information was presented in a clear and understandable way. The feedback was combined with tailored advices on how to improve their score in each of the 4 aspects of nature conservation (see also De Snoo, 2006).

In the information plus commitment condition (N = 16), participants were invited to a meeting. We organized two of such meetings: One for each agricultural organization in the information plus commitment condition. So, all participants in this condition went to one meeting, together with their fellow agricultural organization members. During these meetings, the reports, similar to those in the information only condition, were handed out. Participants were given the opportunity to read their reports and discuss the contents among themselves. At the end of each meeting we asked participants to publicly state which of the advices given in the report they were going to follow up on. This way, a public commitment manipulation was administered. In order to enhance the manipulation, minutes of the meeting, including every participant's commitments, were sent to all participants in this condition. Of the 17 participants in the information plus commitment condition, 12 were able to attend the meetings. All the participants present at the meeting made a commitment. Participants who did not attend the study groups and thus received no treatment were excluded from further analysis.

The control condition (N = 24) received no treatment. A year later, in March 2007, all participants were sent the post-intervention questionnaire.

Questionnaire

All questionnaire items were measured on 5-point scales. Because we were interested in the possible differences between non-subsidized and subsidized conservation, all items were consequently phrased for both types of practices. All items were measured before and after the intervention.

Self-report measures. Attitude was measured using the items "I think that subsidized/ non-subsidized nature conservation practices are: negative-positive", "I think that subsidized/ non-subsidized nature conservation practices are: useless – useful", and "I think that sub-

sidized/ non-subsidized nature conservation practices are: unimportant– important” (Ajzen & Fishbein, 1980). This scale yielded a sufficiently high reliability for both subsidized ($\alpha = .77$) and non-subsidized practices ($\alpha = .87$) in the pre-test as well as in the post-test (subsidized $\alpha = .76$, non-subsidized $\alpha = .91$). The behavioral desire to perform nature conservation was measured with the item “I want to perform subsidized/non-subsidized nature conservation practices”. According to the Model of Goal-Directed Behavior, desires “represent the motivational state of mind wherein appraisals and reasons to act are transformed into a motivation to do so” (Perugini & Bagozzi, 2001, p. 84). Therefore, they can be seen as a determinant of behavior. For the current study we were particularly interested in using this variable as it reflects an individual’s motivation to perform a given behavior irrespective of possible practical barriers. Nature conservation is characterized by plenty of practical barriers such as subsidies, changing regulations and income. Using this measure provided us with the opportunity to measure the effect of our intervention at the personal motivation to perform conservation.

Surface area of (semi-) natural habitat was calculated from self reported data on specific semi-natural habitats present on the farm. Also, we asked participants if they were interested in expanding their current surface area of subsidized (semi-)natural habitat.

Finally, we asked participants how much time they had spent on both subsidized and non-subsidized nature conservation practices per season in the past year. We then aggregated these season scores to measures indicating how much time they had spent on both subsidized and non-subsidized conservation practices per year.

Ecological measures. Conservation quality was assessed by asking questions regarding the use of fertilizer and pesticides, mowing/cutting/vegetation removal regime and timing of conservation in relation to breeding and overwintering periods of fauna and seeding periods of flora. These were aggregated into the following 4 categories to enable comparison between differently managed habitats (Van Dijk et al., 2009): 1) protection of the habitat from regular farm practice (e.g. actively avoiding fertilizer or pesticide misplacement); 2) warranting spatial and/or temporal continuity of the habitat (e.g. phased mowing or replanting trees); 3) actively influencing vegetation structure (e.g. selective cutting of trees, removal of exuberant water plant growth); 4) active nutrient reduction (e.g. haymaking). If a farmer performed one or more management options within a specific category, one point for management quality was awarded. In total, a management quality score between 0 (no beneficial management) and 4 (high management quality) could be calculated for each habitat. Overall agri-environmental management quality was defined as the average of the management scores of all semi-natural habitats present at the farm.

Another ecological measure used was the diversity of habitats. A habitat is commonly defined as “a place where an organism or a biological population normally lives or occurs” (<http://www.biology-online.org>). Habitat diversity was defined as the total number of dif-

ferent habitats and was calculated from the self reported data by adding the number of habitats reported to be present on the farm.

Results

All means and standard deviations are listed in Table 3.1. We will first discuss self-report measures, after which we will turn to effects found on the ecological measures.

One important feature of the current study is that it involves a collaboration of social psychological and ecological scientists. Using ecological measures implies selecting a sample that is not affected by differences in soil or landscape. Because of these stringent criteria, our final sample was relatively small. Since this study is, to the best of our knowledge, the first to test the effects of a social psychological intervention on nature conservation practiced by farmers, it is exploratory in nature. Therefore, we believe the need to reveal possible effects to be greater than the risk of false positive decisions (Myers, 1972; see also Hartig et al., 1991). We will thus also report effects at the $p < .10$ level.

Self-report measures

Attitude. A repeated measures analysis of variance on attitude towards conservation was performed. Subsidy (subsidized versus non-subsidized) and time (before and after the intervention) were used as the within subjects factors and experimental condition as the between subjects factor. This analysis showed a significant main effect of subsidy, $F(1, 40) = 4.56$, $p = .04$. Attitude towards subsidized conservation was more positive ($M = 4.02$) than attitude towards non-subsidized conservation ($M = 3.81$). There were no effects of our intervention.

Behavioral desire to perform nature conservation. Repeated measures analysis of variance on behavioral desire to perform conservation with time and subsidy as the within subjects factors and experimental condition as the between subjects factor showed a significant main effect of subsidy, $F(1, 46) = 54.77$, $p = .00$. The desire to perform subsidized conservation was stronger ($M = 4.00$) than the desire to perform non-subsidized conservation ($M = 2.80$). This analysis also showed a significant interaction effect of time*experimental condition, $F(2, 46) = 3.491$, $p = .04$. The average score of behavioral desire did not change significantly in the control condition (from $M = 3.43$ to $M = 3.16$, $p = .16$) nor in the tailored information only condition (from $M = 3.34$ to $M = 3.38$, $p = .79$). It did, however, increase significantly in the tailored information plus commitment condition (from $M = 3.32$ to $M = 3.77$, $p = .05$, one-sided). These results are in line with our hypothesis that especially the combination of tailored information and commitment would result in a higher willingness to engage in conservation.

Surface area of (semi-)natural habitat. A repeated measures analysis of variance on the surface area of natural habitat with time and subsidy as the within subjects factors and experimental condition as the between subjects factor was performed. This analysis showed a significant main effect of subsidy, $F(1, 39) = 28.15, p = .00$. Our participants had more subsidized ($M = 2.60$ hectare) than non-subsidized ($M = .64$ hectare) surface area of natural habitat. This analysis also showed a significant main effect of time $F(1, 39) = 7.88, p = .01$, showing that the surface area of natural habitat increased across all conditions (from $M = 1.47$ hectare to $M = 1.77$ hectare).

The three-way interaction of time*subsidy*condition was not significant overall, $F(2,39) = 1.99, p = .15$. However, given our specific hypothesis that especially the combination of tailored information and commitment would affect surface area of natural habitat, we looked at subsidized and non-subsidized conservation separately. A repeated measures analysis of variance on the surface area of subsidized natural habitat with time as the within subjects factor and experimental condition as the between subjects factor showed no significant interaction of time*experimental condition, $F(2,42) = 0.95, ns$. However, a similar analysis on the surface area of non-subsidized natural habitat did show an interaction of time*experimental condition, $F(2,48) = 2.89, p = .07$. Repeated measures analysis per condition showed that the largest change occurred in the tailored information plus commitment condition, where participants increased their surface area of non-subsidized natural habitat from 0.47 to 0.90 hectare, $p = .06$, one-sided. This confirms our hypothesis that especially the combination of tailored information and public commitment would be successful in increasing conservation.

We also asked participants if they were interested in expanding their current surface area of subsidized (semi-) natural habitat. A repeated measures analysis of variance with time as the within subjects factor and experimental condition as the between subjects factor was performed. Results showed a significant main effect of time, $F(1,49) = 8.15, p = .01$. The wish to expand decreased across all conditions. We expected this decrease to be caused by participants who had already expanded their surface area of subsidized natural habitat. Therefore, we calculated the difference scores of surface area of subsidized natural habitat by subtracting the surface area of subsidized natural habitat in 2006 from the surface area of subsidized natural habitat in 2007. We then included this difference score in the analysis as a covariate and indeed the effect of time disappeared $F(1,40) = 2.26, n.s$. This suggests that our finding that the wish to expand decreased across all conditions was explained by the fact that farmers had meanwhile expanded their surface area of subsidized natural habitat.

Table 3.1 Means and standard deviations for all the dependent variables before and after the intervention, for every condition

		Control		Information		Information plus Commitment	
		M	SD	M	SD	M	SD
Attitude subsidized	Pretest	3.98	.10	4.19	.11	3.96	.15
	Posttest	4.00	.12	3.98	.12	4.07	.17
Attitude unsubsidized	Pretest	3.81	.17	3.84	.18	3.91	.22
	Posttest	3.70	.19	3.73	.20	4.03	.25
Desire subsidized	Pretest	3.91	.20	4.24	.23	3.73	.28
	Posttest	3.86	.18	4.19	.20	4.27	.25
Desire unsubsidized	Pretest	3.00	.22	2.53	.26	2.91	.32
	Posttest	2.57	.25	2.77	.29	3.27	.36
Time spent subsidized (hours)	Pretest	34.90	8.49	37.33	8.95	27.65	12.01
	Posttest	34.40	6.83	37.44	7.20	38.40	9.66
Time spent unsubsidized (hours)	Pretest	113.33	22.45	58.33	26.56	22.30	32.53
	Posttest	48.52	12.02	37.93	14.22	73.25	17.42
Wish to expand	Pretest	3.86	.21	3.72	.23	3.36	.30
	Posttest	3.46	.22	3.17	.25	3.27	.31
Surface area subsidized (ha)	Pretest	2.51	.50	2.21	.54	2.29	.79
	Posttest	2.71	.54	2.88	.58	2.47	.85
Surface area not subsidized (ha)	Pretest	.59	.17	.71	.19	.47	.24
	Posttest	.69	.18	.81	.20	.90	.25
Quality subsidized conservation	Pretest	1.71	.21	2.01	.23	1.89	.30
	Posttest	1.85	.19	2.29	.21	2.51	.27
Quality unsubsidized conservation	Pretest	1.97	.25	1.96	.27	2.20	.39
	Posttest	2.04	.26	1.94	.28	2.24	.41
Habitat diversity subsidized	Pretest	1.52	.27	2.41	.29	3.18	.41
	Posttest	1.64	.35	2.86	.37	3.36	.53
Habitat diversity not subsidized	Pretest	4.20	.54	4.32	.58	3.55	.82
	Posttest	5.08	.59	5.53	.63	4.73	.89

Time spent on conservation. A repeated measures analysis of variance on time spent on conservation with time and subsidy as the within subjects factors and experimental condition as the between subjects factor showed a significant main effect of subsidy, $F(1, 42) = 7.49$, $p = .01$). Participants reported to have spent less time on subsidized ($M = 34.64$ hours) than on non-subsidized conservation ($M = 55.26$ hours). This analysis also showed a significant interaction of time*experimental condition, $F(2,42) = 4.22$, $p = .02$. The amount of time spent on conservation decreased in the control condition (from $M = 67.95$ to $M = 34.83$, $p = .02$) as well as in the tailored information only condition (from $M = 49.37$ to $M = 36.77$, $p = .27$). It did, however, increase in the tailored information plus commitment condition (from $M = 24.98$ to $M = 55.83$, $p = .10$, one-sided). This analysis also showed a significant three-way interaction of time*subsidy*experimental condition, $F(2,42) = 4.97$, $p = .01$. To explore the nature of this interaction we looked at subsidized and non-subsidized conservation separately. A repeated measures analysis of variance on time spent on subsidized practices with time as the within

subjects factor and experimental condition as the between subjects factor showed no significant interaction of time*experimental condition, $F(2,45) = 0.57, p = .57$. However, a similar analysis on time spent on non-subsidized practices did show a significant interaction of time*experimental condition, $F(2,46) = 4.56, p = .02$. Repeated measures analysis per condition showed that the time spent on non-subsidized practices decreased in the control condition from $M = 111.59$ to $M = 46.32$ ($p = .01$). The time spent on non-subsidized practices in the tailored information only condition decreased as well (from $M = 58.33$ to $M = 37.93, p = .33$). It did, however, increase in the tailored information plus commitment condition (from $M = 22.30$ to $M = 73.25, p = .06$, one-sided). This analysis shows that during the course of our intervention, participants in the tailored information plus commitment condition had spend more time on conservation, and that this was especially true for non-subsidized conservation. Because of the large differences in time spent on conservation between conditions before our intervention, these results must be interpreted with caution. However, they are in line with our hypotheses.

Ecological measures

Conservation quality. Next, we looked at the quality of conservation. A repeated measures analysis of variance on quality of conservation practices and time and subsidy as the within subjects factors and experimental condition as the between subjects factor showed a significant main effect of time, $F(1,35) = 5.56, p = .03$. Quality of conservation practices increased across all conditions, from $M = 2.04$ to $M = 2.20$. The interaction of time*subsidy was also significant $F(1,35) = 3.29, p = .04$, one-sided. This means that the quality of subsidized conservation practices increased over time ($M = 1.89$ to $M = 2.22, p = .00$) whereas the quality of non-subsidized conservation practices did not. In other words, the main effect of time was qualified by the interaction effect of time*subsidy. This increase in quality of conservation was not due to our intervention.

Habitat diversity. We also looked at the diversity of habitats per farm. A repeated measures analysis of variance with habitat diversity before and after the intervention and subsidy as the within subjects factors and experimental condition as the between subjects factor showed a significant main effect of subsidy, $F(1,56) = 20.87, p = .00$. Habitat diversity was lower ($M = 2.58$) for subsidized conservation than for non-subsidized conservation ($M = 4.54$). This means that non-subsidized (semi-) natural habitat was more diverse than subsidized (semi-) natural habitat. The analysis also showed a significant main effect of time, $F(1,56) = 56.08, p = .00$. Habitat diversity increased across all conditions, from $M = 3.24$ to $M = 3.88$. The interaction of time*subsidy was also significant $F(1,56) = 25.52, p = .00$: non-subsidized habitat diversity increased stronger ($M = 4.02$ to $M = 5.05, p = .00$) over time than subsidized habitat diversity ($M = 2.45$ to $M = 2.70, p = .00$). Non-subsidized habitat diversity was not only

higher to begin with, but it also increased more than subsidized diversity during the course of our intervention. Since there were no significant differences between experimental conditions, this increase cannot be attributed to our intervention.

General Discussion

By adopting conservation practices, farmers can strongly affect environmental quality and biodiversity. In this study we have seen that an intervention strategy containing tailored information and commitment making can improve these conservation practices. We distinguished between subsidized and non-subsidized conservation practices. Participants were divided into three groups: One group received information only, one group received information plus a commitment manipulation, and one group served as a control. Our results show that especially the combination of tailored information and the making of commitments was effective in eliciting behavior change: participants in this condition showed a stronger behavioral desire to engage in conservation, increased their surface area of non-subsidized natural habitat, and reported to spend more time on non-subsidized conservation. Participants in the tailored information only condition also increased their surface area of non-subsidized natural habitat but did not show any change on our other measures. In addition, we found that while our intervention affected both types of conservation, the effects were stronger for non-subsidized conservation.

We found some more noteworthy differences between subsidized and non-subsidized conservation. Attitude towards subsidized conservation was more positive than attitude towards non-subsidized conservation. This difference can be explained in terms of Ajzen's (1991) Theory of Planned behavior, according to which the monetary reward for behavior increases the positive attitude towards that behavior. The fact that the desire to perform subsidized conservation was also stronger than the desire to perform non-subsidized conservation should be seen from the same perspective.

Also, we saw that the quality of subsidized conservation increased over time whereas the quality of non-subsidized conservation did not. However, non-subsidized conservation was characterized by higher habitat diversity than subsidized conservation. These findings are hard to explain from the current data. It could be that farmers have more knowledge of subsidized conservation and are therefore better able to improve the quality of this type of conservation. As for habitat diversity, it could be that since non-subsidized conservation is not contingent on contracts and thus more flexible, it gives farmers a higher extent of freedom in choosing how to set up this conservation. This might then result in higher habitat diversity.

We have found effects of our intervention on different aspects of nature conservation. With this setup we were able to show that especially the combination of tailored information and public commitment increases the desire to perform conservation, time spent on non-subsidized conservation and surface area of non-subsidized (semi-)natural habitat.

The results presented here are particularly impressive when it is taken into account that the commitment manipulation used in this study was not a very strong one: Participants were only asked to attend one meeting during the course of the intervention. Yet, our commitment manipulation resulted in a stronger desire to engage in nature conservation and an increase in the reported time spent on conservation. Participants who had committed to conservation showed more change in these aspects of conservation than participants who had only been given tailored information. Our commitment manipulation did not affect all the dependent measures in our study. Attitude, quality of conservation and habitat diversity did not change as a function of our experimental conditions. Apparently our commitment manipulation was not successful in eliciting a more favorable attitude. This might be due to the fact that participants committed themselves only once: It might be that in order to change an attitude, commitments must be made several times. As for quality of conservation and habitat diversity, these are ecological measures that might very well be too multi-determined to change within a year.

Another reason why we believe our results to be very promising is that research has shown that farmers' attitudes and involvement concerning biodiversity are very resistant to change. In fact, it has been shown in several studies that conservation practices themselves do not influence farmers' attitudes and behavior (Burton et al., 2008). Research by Herzon and Mikk (2007) showed that 12 years of agri-environmental measures did not increase farmers' understanding of biodiversity, nor how to improve it. Although our intervention was not successful in eliciting attitude change, it did prompt farmers to expand their surface area of non-subsidized (semi-)natural habitat, and to devote more time to conservation.

It is important to note that our intervention lasted only one year. Considering the often complex decision making and the fact that subsidized conservation is contingent on contracts of multiple years, it seems reasonable to assume that had we been able to stretch the intervention for a longer period of time, we would have been able to find more and or stronger effects.

The current study is, to the best of our knowledge, the first to test the effects of a social psychological intervention on nature conservation practiced by farmers, and is therefore exploratory in nature. Current knowledge about the social psychological underpinnings of farmers' conservation is limited (Burton, 2006; Lokhorst et al., 2009a). In fact, we do not know of any study involving farmers that has used a quasi-experimental design to test causal effects of interventions on conservation. Because of this exploratory nature and our relatively small sample size, we have chosen to include effects that were significant at the $p < .10$ level. Another issue to consider is that our conditions differed in initial mean scores on some variables. These differences are mainly due to measures of non-subsidized conservation that are characterized by a high variability (see also Table 1). We hope this first attempt at improving farmers' conservation practices can serve as an impetus for future research in this area.

In conclusion, this research has shown that a relatively straightforward intervention can significantly improve agri-cultural nature conservation. The intervention we tested can be used by policymakers: The administration of feedback and tailored advices is not hard to implement when there is data present to base the feedback on. Commitment making initiatives could be implemented by working together with farmers' local organizations to ensure commitments are made within a group of peers. Given the promising effects of the current study, such initiatives are likely to positively affect farmers' conservation practices and with that, environmental quality in general.

Chapter 4

Public Commitment Making as a Structural Solution in Social Dilemmas¹



¹ This chapter is based on Lokhorst, Van Dijk, & Staats (2009) and is therefore written in the first-person plural.

Public commitment making has been used as an intervention strategy to promote environmental friendly behavior in several studies (e.g., DeLeon & Fuqua, 1995; Matthies, Klöckner, & Preissner, 2006) and is seen as quite successful (for overviews see De Young, 1993; Dwyer et al., 1993). In these studies, participants are usually asked to make a formal and public commitment to engage in a particular type of environmental behavior. However, as DeLeon and Fuqua note, “an unknown number of the entire community might refuse to make a commitment.” (1995, p. 236). In their own study on the effects of public commitment and group feedback on curbside recycling, an average of 36 % of the participants in the commitment conditions did not make a commitment. Other studies on recycling behavior (Wang & Katzev, 1990) and the use of public transport (Matthies et al., 2006) have reported similar reluctance to make commitments.

Although studies on the effects of public commitments do acknowledge that some people may be unwilling to make public commitments, the willingness to make public commitments has not been addressed as a focal issue. Thus, to our knowledge, no research has yet been done that identifies the conditions under which people will be willing to make public commitments to change their environmental behavior. This paper aims to answer that question by identifying public commitment making as a structural solution to social dilemmas.

A social dilemma situation occurs when the individual and the collective welfare are at odds with each other. The course of action that is attractive for the individual leads to an undesirable outcome for the group. This type of situation is very common in everyday life. Think for example of the various kinds of environmentally responsible behaviors, such as recycling. On the individual level, they are often not attractive to perform, because they are costly in terms of resources such as time, attention or money. It is often more attractive for the individual not to recycle. On the collective level, however, not recycling leads to an undesirable outcome: the rapid decline of our environment. In social dilemmas, behavior for the sake of the collective is called cooperation, while behavior for the sake of the individual is called defection (for overviews, see Komorita & Parks, 1995; Weber, Kopelman, & Messick, 2004).

One specific type of dilemma is the public good dilemma, in which individual group members have to decide on whether or not to contribute to a certain public good. Not contributing may lead to the public good not being realized, whereas contributing may lead to exploitation when the rest of the group defects (see e.g. Dawes, Van de Kragt, & Orbell, 1990; Van Dijk & Wilke, 1999). Public goods typically are characterized by the property of non-exclusion: People cannot be excluded from consuming the public good. The benefits of a public good can therefore also be enjoyed by the group members who did not contribute. This causes the problem of free-riding: self-interest may lead group members to rely on the contributions of others while not contributing themselves. Eventually this may lead to underprovision of the public good. Therefore, it is important to investigate how group members can be induced to contribute to the public good.

There are several environmental issues that closely resemble a public good dilemma (Joireman et al., 2001; Van Lange, Van Vugt, Meertens, & Ruiters, 1998; Van Vugt & Samuelson, 1999). Think for instance of a community that decides to adopt an energy saving system such as solar panels, but relies on its members to contribute to such a system. If no one contributes, the system will not be realized. However, once the system is realized, all members will enjoy its benefits, even the ones not contributing. How can people be induced to cooperate under such conditions? A key aspect of decision making in environmental issues is the balance between self and collective interest. In order to understand such environmental issues, and to intervene in them, it is essential to understand the nature of social dilemmas (Gifford & Hine, 1997; Vlek, 2000).

Past research has shown that a period of communication between group members significantly increases cooperation (Dawes, 1980; Kerr & Kaufmann-Gilliland, 1994; Kollock, 1998; Komorita & Parks, 1995). This is explained by the finding that a period of communication gives group members the opportunity to make commitments to each other to cooperate (Kerr & Kaufman-Gilliland, 1994). Group members then experience a strong norm to keep their commitments (Kerr, Garst, Lewandowski, & Harris, 1997). This research strongly suggests that the making of commitments in the group has a positive influence on cooperation. The question that remains unanswered, however, is under which conditions people are willing to make such public commitments.

Commitment making as a structural solution

In his structural goal/expectation theory, Yamagishi (1986b) makes the distinction between the “first order” and the “second order” public good. The first order public good is the good the group members want to realize or maintain. People who are convinced of the importance of the original, first-order public good, want to invest in the realization or maintenance of the good. However, the other group members will have to invest as well, or the public good will not be realized. People who have a low level of general trust in others are not expected to rely on spontaneous cooperation: they do not trust their fellow group members to cooperate. Therefore, they are more interested in contributing to a second-order public good: a structural change to the dilemma situation which will ensure that the personal benefit of contributing to the original public good will exceed the personal cost of doing so. Such a second-order public good can for instance be a sanctioning system whereby defection is punished and thus made less attractive. Yamagishi (1986b) labels contributing to the second-order public good instrumental cooperation, as opposed to elementary cooperation, which is cooperation in the original, first-order public good.

In the Yamagishi studies, the structural change is a sanctioning system whereby the group member that contributes the least, gets sanctioned. Other possible structural changes are for instance a reward system or appointing a leader who decides how much every group member has to contribute (Messick et al., 1983). For the current purposes, it

is important to acknowledge that for the individual, these structural changes come with a cost. Most notably, these structural solutions all lead to a loss of personal freedom for the members of the group: they are no longer fully in control over how much they will contribute to the public good. Although a structural change might be beneficial for the provision of the public good, the experienced loss of freedom that accompanies structural change may produce reactance and induce group members to oppose such structural change (Brehm, 1966, 1972; see also Van Dijk, Wilke, & Wit, 2003 for an application of this idea to the installment of leadership in social dilemmas).

In the current article we suggest that a system of making public commitments possesses characteristics that resemble those of structural solutions described above. As Van Dijk and Wilke (1994, 1999) argued, the interdependence structure of public good settings fundamentally changes when people are offered the opportunity to make mutual commitments to contribute. In a context of public commitment making it may in fact become more attractive for individual group members to publicly commit themselves to contribute than to refrain from mutual commitments. This, of course, is one of the main reasons why mutual commitment making is so effective (see also Chen, 1996; Chen & Komorita, 1994; Van de Kragt, Orbell, & Dawes, 1983), because if one does not make such a commitment others may not be expected to commit. Given that people generally keep their promises and stick to their commitments (Chen, 1996; Chen & Komorita, 1994; Kerr & Kaufmann-Gilliland, 1994), situations offering a possibility to make public and mutual commitments can offer a structural solution to the public good dilemma. This brief description also highlights another aspect in which public commitments may mimic other types of structural changes. Similar to structural changes such as the installment of sanctioning systems and leadership, public commitment making may also lead to a loss of decisional freedom. In particular, people may be reluctant to commit themselves to contribute because it reduces their behavioral options. In this way public commitment making is similar to other structural solutions to social dilemmas, and contributing to it can thus be seen as a type of instrumental cooperation.

The current study

In this paper, we argue that the making of public commitments can be seen as a structural change in dilemma situations. Previous research (Van Dijk & Wilke, 1994, 1999) did suggest that this could be the case but has focused on the implications for contributions. In this paper, we approach this idea from a different angle: If commitment making is in fact a structural solution, then the same processes that determine people's choice for other structural solutions may also determine their willingness to invest in a system of public commitments. To the best of our knowledge, no previous research looked at commitment making this way. In the context of environmental issues, we view environmental behaviors as elementary cooperation. Investing in public commitment making may function as a way to ensure

elementary cooperation, and thus take the form of instrumental cooperation. Interpreting and characterizing public commitment making as a possible structural solution to a social dilemma offers a new perspective: It enables us to make use of the theories of structural solutions to predict when people will be interested in public commitment making.

As noted above, in its prediction of the willingness to support structural change, structural goal/expectation theory (Yamagishi, 1986b) assigns a crucial role to interpersonal trust. According to structural goal/expectation theory, people who have a high level of general trust in others (high trusters) will generally have a lower preference for structural change than people who have a low level of general trust in others (low trusters). Due to their lack of general trust, low trusters will be hesitant to cooperate in the first-order dilemma, but more willing to do so to provide the structural solution. Low and high trusters are usually distinguished from each other using a median split on a general trust scale (Yamagishi, 1986; Yamagishi, Cook, & Watabe, 1998). Based on these findings, one might expect that low trusters are generally more willing to opt for public commitments than high trusters. However, public commitment making differs from other structural solutions, such as appointing a leader. In this case, the dilemmatic structure of the situation is altered so that group members are no longer dependent on one another. This means trust between group members is no longer an issue, and that low trusters can cooperate without being afraid of exploitation. It is because of this that low trusters are inclined to contribute to a structural solution. But with public commitment making, group members are still highly dependent on each other. This means that low trusters still run the risk of being exploited when they cooperate. Therefore we believe low trusters will not necessarily be interested in investing in commitment making.

Although structural goal/expectation theory has paid special attention to the role of general trust, it should of course be acknowledged that people's decisions are not solely determined by their dispositions. Besides the general expectations that are derived from dispositional trust, people can also rely on information they have about the specific situation they are in. In particular, people may have situation-specific information about what to expect from others. One could argue that in this sense situation-specific expectations function in a way that is similar to dispositional trust: Like high dispositional trust, high situational expectations may lead to a low willingness to make public commitments. As a consequence, one might reason that studying situation-specific expectations may not provide new input to the question of when people are willing or reluctant to make public commitments.

In the current paper, however, we wish to draw special attention to the fact that these situational and general expectations can also be incongruent with each other. Imagine attending a charity fundraising event at which all guests are asked to make a donation for some kind of good cause. In general, you trust people's intentions and so you expect them to contribute. But just as you are about to leave your house to go to the fundraising event, you

read on the internet that the previous event raised a rather small amount of money: Just enough to cover expenses, but no significant sum for charity. Would you feel confident about making anonymous contributions? Or would you rather sit down with the other guests and make commitments to each other to contribute?

Receiving information that is incongruent with general expectations may induce people to choose differently from what they would do based on these general expectations. In general, high trusters are likely to trust others to contribute. Their general expectation is that others will cooperate, and as such structural goal/expectation theory would predict that they would not be interested in contributing to the secondary public good. This would imply that they would not contribute to a public commitment system, but would rather rely on elementary cooperation, because they believe this to be enough to reach their goal. But what if they are confronted with a situational expectation that is incongruent, i.e. the message that others might not contribute a lot? Such situation-specific information would signal to them that the group runs the risk of the public good not being realized. One way to prevent this from happening and ensure realization of the public good is to make public commitments. Thus, for high trusters, the willingness to support a system of public commitment making may be especially high when faced with low situation-specific expectations. Vice versa, high trusters who are faced with high situation-specific expectations may believe their goal will be reached anyway and may thus not be willing to make an extra effort to ensure this.

In contrast, for low trusters, the willingness to support a system of public commitment making may be especially high when faced with high situation-specific expectations. Low trusters do not believe their goal of realization of the public good will be reached with elementary cooperation. When they are confronted with a situational expectation that others will contribute a lot, this might signal to them that there is a chance that their goal can be reached. Their low level of dispositional trust will prevent them from elementary contribution, but they might be interested in contributing to a second order public good. Low trusters who are faced with low situation-specific expectations, will probably think there is no way their goal will be reached and will therefore not contribute to a second order public good.

Based on the previous reasoning, we expect an interaction effect of dispositional trust and situational expectations on the willingness to install a public commitment system. We expect that a) more low trusters will be in favor of a public commitment system under high situational expectations than under low situational expectations, and b) more high trusters will be in favor of a public commitment system under low situational expectations, than under high situational expectations. Two studies were carried out to test this hypothesis.

Study 1

As a first test of our ideas, we conducted a scenario study. The public good in this study was a park that was to be built. Participants were asked to imagine that they lived in a newly built

neighborhood that was in need of a park. Every neighbor would have to decide whether or not to contribute to the realization of this new park. We manipulated situational expectations by giving our participants bogus information on voluntary contributions made by others in a similar situation. These voluntary contributions were either high (24-25 euros) or low (1-2 euros). Dispositional trust was assessed using a questionnaire.

Method Study 1

Participants and design

For this study with a 2 (Dispositional trust: low vs. high) by 2 (Situational expectations: low vs. high) between-participants design, 78 (18 male, 60 female; mean age = 19.2 years) students at Leiden University participated.

Procedure

Assessment of dispositional trust. To distinguish high trusters from low trusters, participants were first asked to fill out the six-item dispositional trust scale by Yamagishi and Yamagishi (1994). This trust scale was presented as an unrelated study. The scale contains items such as "Most people are basically honest". Each item was scored on a 7 point scale ranging from "totally disagree" to "totally agree". The scale yielded a reliability just underneath the traditional threshold ($\alpha = .65$) and, consistent with Yamagishi, Cook, and Watabe (1998), a median split was performed (median = 4.67) to separate the low trusters ($n = 40$) from the high trusters ($n = 38$).

Scenario study. Next, participants were presented with a scenario that captured the main aspects of a public good dilemma. The following text was distributed among participants in the low situational expectations conditions. Information given in the high situational expectations conditions is put between parentheses.

"The neighborhood you live in is very new. Much needs to be done to improve the environment. The neighbors have formed a committee aimed at realizing a new park. All neighbors will be asked to make a voluntary contribution. You want your neighborhood to get a nice park. The more everyone contributes, the nicer the park will be. But all of the neighbors can decide for themselves how much to contribute. You will decide for yourself as well and will have no idea what the others will do. It could be that the others contribute much less than you. While you are contemplating on how much to contribute, someone points out a news paper article to you that is about a similar initiative in another neighborhood. The article says that people in this neighborhood voluntarily contributed 1-2 (24-25) euros to the realization of their park."

Next, we presented them with a choice: They could either keep the situation as it was, and let everyone decide for themselves how much to contribute; or they could invest two hours of their time to go to a meeting where they could make a commitment to the rest of the group. Participants could indicate their choice by checking one of the boxes. After doing so, the experiment was finished. Participants were debriefed and paid €1, 50.

Results Study 1

Manipulation check

To check our manipulation of situational expectations, we asked participants if they thought people in this kind of situation contribute a little (1) or a lot (7). A 2 (Dispositional trust) x 2 (Situational expectations) ANOVA showed only a main effect of situational expectations, $F(1,74) = 41.92$, $p < .001$. Participants in the high situational expectations condition scored higher on this item ($M = 4.40$, $SD = 1.06$) than participants in the low situational expectations condition ($M = 2.49$, $SD = 1.37$). These results suggest that our manipulation was successful.

Willingness to commit

In total, 34.6 % of the participants wanted to install a system of public commitments. A log-linear analysis showed a significant three-way-interaction of Dispositional trust by Expectations by Willingness to commit, $\chi^2(1) = 3.77$, $p = .05$.

To break down the interaction effect, separate chi square tests were conducted for both low and high trusters. For high trusters, the relationship between situational expectations and the willingness to commit was significant, $\chi^2(1) = 3.99$, $p = .05$, showing that under low situational expectations, 44.4 % of them wanted to install a system of public commitments, versus 15 % under high situational expectations, see Table 4.1.

For low trusters, however, the opposite pattern was found: they were more in favor of installing a public commitment system under high (46.7 %) than under low situational expectations (36 %), but this effect did not reach significance, $\chi^2(1) = .44$, $p = .51$.

Table 4.1 Willingness to Commit as a Function of Dispositional Trust and Situational Expectations (Experiment 1)

	Low situational expectations	High situational expectations
Low trust	36 %	46.7 %
High trust	44.4 %	15 %

Note: Scores indicate the percentage of participants that chose for a system of public commitments

Discussion

This study showed an interaction effect of dispositional trust and situational expectations on the willingness to install a system of public commitments. It appeared that high trusters were more in favor of a system of public commitments under low situational expectations than under high situational expectations. We also expected that low trusters would be more interested in a system of public commitments when their situational expectations would be high rather than low. Although this effect did not reach significance, the direction was as we expected: Low trusters were more in favor of installing a public commitment system under high than under low situational expectations. Overall, the results of Study 1 are in line with our hypothesis.

These findings suggest that people are interested in the installment of a public commitment system when they are confronted with a situational expectation that is incongruent with their dispositional expectation. The question that remains unanswered is of course why participants chose for the installment of a public commitment system. What motive did they have in mind while making their decision? As mentioned before, we reasoned that high trusters generally expect that others will cooperate and that this will lead to the provision of the public good. When they receive the message that others' contributions might be low, this signals to them that the public good might not be realized. For them, public commitment making serves as a way to ensure the provision of the public good, i.e., to further the collective interest.

Low trusters, on the other hand, are less likely to rely on spontaneous cooperation and expect others to defect. When they receive the message that others' contributions might be high, this creates a decisional conflict: Should they act in accordance with their general expectations and defect, or should they follow their situational expectations and contribute? As Yamagishi (1986b) states in his structural goal/expectation theory, low trusters will contribute to a structural solution of the dilemma when they have developed the goal of achieving mutual cooperation. We therefore expected that if low trusters choose for public commitment making, they do so to provide the public good, i.e., to further the collective interest. This means that, although the conditions under which they choose for a public commitment system may differ for low and high trusters, their underlying motive for choosing to invest in a public commitment system may essentially be the same: the motive to further the collective interest. We therefore conducted a second study in which we also assessed the importance of this underlying motive.

Study 2

This second study was performed to replicate and extend the findings of Study 1. Also we wanted to address a few possible limitations of the first study. First of all, Study 1 was a sce-

nario study in which participants were asked to imagine the importance of the public good. Second, because we used a scenario study, we were able to show effects on the preference for a system of public commitments, but not yet on the behavioral level. Third, in Study 1, we tried to stress the dilemmatic nature of the situation by telling participants that “it could be that the others contribute much less than you.” We wanted to make sure our results were not caused by this possible salience of defection. And finally, we tested our predictions in a situation where the structural solution was not that costly to install.

To address these limitations we designed a laboratory study in which participants could contribute to a valuable public good by making actual choices concerning their own money in a situation where the making of public commitments would be costly. Because we were interested in the underlying motive for choosing a system of public commitments, we assessed the importance of the motive of maximizing the collective outcomes. Our first hypothesis was the same as in Study 1, but we also hypothesized that the interaction effect of dispositional trust and situational expectations on the willingness to install a public commitment system would be mediated by the motive to maximize collective outcomes.

Method Study 2

Participants and design

For this experiment with a 2 (Dispositional trust: low vs. high) by 2 (Situational expectations: low vs. high) design, 122 students (30 male and 92 female, mean age 21.2 years) of Leiden University participated.

Procedure

Upon arrival in the lab, participants were immediately placed in separate booths. They were told that their computers were linked to those of four other participants with whom they formed a five person-group.

Assessment of dispositional trust. Participants were first presented with eight items measuring their general level of trust (Yamagishi, 1988). As in the first study, participants were told that this questionnaire belonged to a different, unrelated study. They could answer the items on a scale ranging from 1 (totally disagree) to 7 (totally agree). An example of an item is “You should not trust other people unless you know them very well”. Higher scores indicated lower levels of trust. Combining the items resulted in a reliable scale ($\alpha = .76$). A median split (median = 3.75) was used to divide participants in low ($n = 59$) and high trusters ($n = 63$).

Social dilemma. The participants were then told that within their five person-groups, each group member had 100 chips and that each chip was worth 5 eurocents. They could either keep the chips for themselves or contribute them to a common fund. Chips in this common fund would be doubled and distributed under all group members. Participants in the low situational expectations condition were told that in previous experiments, participants generally contributed between 22 and 28 chips to the common fund. In the high situational expectations condition, participants were told that participants in previous studies generally contributed between 72 and 78 chips.

Then, participants were told that a system of public commitments could be installed. This would mean that they would first have to make a commitment to the rest of the five person-group, and then they would see the other group members' commitments. Installing this public commitment system would cost each participant ten chips. Participants were asked if they were willing to invest ten of their chips in the installment of a system of public commitments. Participants could answer this question with a yes or a no. We then asked participants to what extent they agreed with the statement "I wanted maximum outcomes for us as group" with regard to their decision to invest in a system of public commitments. Participants could select an answer ranging from 1 (not at all) to 7 (very much). After answering this question, the experiment was over. All participants were thoroughly debriefed and paid €6.

Results Study 2

Willingness to commit

In total, 43.4 % of the participants agreed to change to a public commitment system. A loglinear analysis showed a significant three-way-interaction of Dispositional trust x Situational expectations x Willingness to commit, $\chi^2(1) = 7.06$, $p < .05$.

To break down the interaction effect, separate chi square tests were conducted for both low and high trusters. For high trusters, the relationship between situational expectations and the willingness to commit was marginally significant, $\chi^2(1) = 3.47$, $p = .06$, showing that under low situational expectations, 56.7 % of them wanted to install a system of public commitments, versus 33.3 % under high situational expectations, see Table 4.2.

Table 4.2 Willingness to Commit as a Function of Dispositional Trust and Situational Expectations (Experiment 2)

	Low situational expectations	High situational expectations
Low trust	31.3 %	55.6 %
High trust	56.7 %	33.3 %

Note: Scores indicate the percentage of participants that chose for a system of public commitment

For low trusters, the relationship between situational expectations and the willingness to commit was also marginally significant, $\chi^2(1) = 3.54$, $p = .06$, showing that under high situational expectations, 55.6 % of them wanted to install a system of public commitments, versus 31.3 % under low situational expectations. Again, the effect of situational expectations for low trusters is completely the opposite of that for high trusters; low trusters want to invest in a system of public commitments when situational expectations are high, while high trusters want to invest in a system of public commitments when situational expectations are low.

The motive of maximizing collective outcomes

On the item “I want maximum outcomes for us as a group”, a 2 (Dispositional trust) by 2 (Situational expectations) ANOVA showed an interaction effect, $F(1,118) = 5.46$, $p < .05$. Post hoc testing showed that high trusters scored marginally significantly higher on this item under low ($M = 6.57$) than under high situational expectations ($M = 5.91$, $p = .07$). The pattern is completely the opposite for low trusters, who scored higher under high situational expectations ($M = 6.30$) than under low situational expectations ($M = 5.78$, $p = .15$, see Table 4.3).

Table 4.3 The Importance of the Motive of Maximizing Collective Outcomes, as a Function of Dispositional Trust and Situational Expectations (Experiment 2)

	Low situational expectations	High situational expectations
Low trust	5.75	6.30
High trust	6.57	5.91

Note: Scores range from 1 (not all important) to 7 (very important).

Mediation

In our theoretical reasoning we assumed that the effects of our independent variables on the willingness to invest in a public commitment system would be mediated by the motivation to maximize collective outcomes. We tested for mediation using the steps described by Baron and Kenny (1986). First, we performed a logistic regression with dispositional trust and situational expectations predicting willingness to commit. Results showed that the interaction of dispositional trust x situational expectations was significant in predicting the choice for public commitment, $B = -.99$, $p = .01$. When the item “I want maximum gain for us as a group” was added to the regression analysis, however, the interaction dropped in significance, $B = -.86$, $p = .04$. The Sobel test was significant ($t = -2.08$, $p = .04$), showing that the maximum gain for the group motive partially mediated the interaction of dispositional trust and situational expectations on the willingness to commit.

Discussion

This second study replicated and extended our findings regarding the interaction effect of dispositional trust and situational expectations on the willingness to install a system of public commitments found in Study 1. Again it was found that high trusters are more in favor of a system of public commitments under low situational expectations than under high situational expectations, while low trusters are more in favor of a system of public commitments under high situational expectations than under low situational expectations. This clearly indicates that people choose for a public commitment system when they are confronted with situation-specific information that is incongruent with their personal expectation derived from dispositional trust.

In this second study we also looked at a possible motive for choosing a system of public commitments. We found a significant interaction effect of dispositional trust and situational expectations on the motive to gain the most for the group, showing that this motive was most important for low trusters under high situational expectations and for high trusters under low situational expectations. We performed a mediation analysis and found that the motive for maximum joint outcomes partially mediated the interaction effect of dispositional trust and situational expectations on the choice for a system of public commitments.

Several possible shortcomings of Study 1 were addressed in the development of Study 2. We moved from a scenario to the laboratory, omitted a sentence that could have made salient the possibility of defection, and we made sure the system of public commitments was indeed costly for participants to install. Yet we managed to replicate the interaction effect found in Study 1.

General Discussion

Public commitment making is often used as an intervention technique to promote environmental behaviors and is seen as very promising. Of course, the key to any intervention program's success is people's willingness to participate in it. This is especially true for commitment making as it relies heavily on the freedom of choice to make a commitment. The goal of the current research was to increase our insights in what determines whether people are willing to invest in public commitment making. Interestingly, this question has largely been ignored in previous research. Since environmental issues are, in essence, social dilemmas, we have tried to answer this question by looking at public commitment making as a structural solution to a social dilemma situation. The results from our two studies are in accordance with Yamagishi's (1986b) structural goal/expectation theory. It appears that the same processes that determine the choice for structural solutions such as the installment of sanctioning systems and leadership, also determine their willingness

to invest in a system of public commitments. In all these situations, trust seems to play an important role.

However, our results not only corroborate structural goal/expectation theory: They also provide us with new insights in the willingness to invest in structural solutions. Our studies clearly show that dispositional trust is not the only factor that determines if people are in favor of structural change. Situational expectations play a role as well, showing that these processes are more complex than previously assumed.

People low in dispositional trust who have situation-specific information that voluntary contributions will be low, probably see no chance for realization of the public good and are thus not interested in investing their own resources in a possible solution. High trusters who have situation-specific information that voluntary contribution will be high, probably expect the public good to be realized based on those voluntary contributions and for that reason see no need to invest in a possible solution to ensure cooperation.

It is different when situational expectations are incongruent with personal expectations. High trusters generally rely on their group members' spontaneous cooperation. Their general expectation is that others' contributions will be high. If they are confronted with situational expectation that is incongruent, i.e. the message that others are not likely to contribute a lot, this signals to them that the public good might not be realized. One way to ensure realization of the public good is to make commitments.

Low trusters, on the other hand, do not trust their fellow group members to contribute. Their general expectation is that others will defect. If they hear that the other group members' voluntary contributions are likely to be high, this may signal that there is a chance of realization of the public good. As Yamagishi (1986b) states in his structural goal/expectation theory, low trusters will contribute to a structural solution of the dilemma when they have developed the goal of achieving mutual cooperation. The same process seems to be happening here: Low trusters choose for a system of public commitments to ensure realization of the public good. This is shown by the fact that the motive to gain maximum joint outcomes mediates the choice for a public commitment system for both low and high trusters. However, this effect should be interpreted with caution, as the mediation is only partial.

An issue that is important to consider is the fact that in our studies, we manipulated situational expectations independently of dispositional trust. It may be that in real life dilemmas, situational expectations and dispositional trust are confounded. However, since these studies were performed in order to gain insight in these processes, we deemed it essential to manipulate the central variables systematically. By doing so, we have the possibility to study all four different combinations of dispositional trust and situational expectations. This way, when these two are in fact confounded in real life dilemmas, the current research sheds light on the relative impact of both variables. This is of particular importance when bearing in mind that this research is meant help increase the effectiveness of commitment interventions in the environmental domain.

Of course the story does not end here. The results from our studies leave us with interesting possibilities for future research. For instance, there are several other types of structural solutions to dilemma situations, such as implementing a reward system or appointing a leader who decides how much every group member has to contribute (Messick et al., 1983). Future research could determine whether situational and general expectations also interact to predict preference for these structural changes.

Another question would be what causes the effect that commitment has on behavior. As mentioned earlier, Kerr, Garst, Lewandowski, and Harris (1997) argued that people tend to adhere to previously made commitment because they experience an internal norm to do so. This is in line with Matthies et al. (2006) who find that commitment making is effective in changing travel behavior for those people in which a personal norm is activated. The making of a commitment can also be thought of as a kind of implementation intention (Bamberg, 2002; Gollwitzer, 1999), whereby explicitly stating an intention leads to heightened attention for situational cues that a behavior can be performed. Yet another explanation may be that when people perceive that they freely chose to engage in a behavior this changes how they think about themselves and the behavior. If they freely chose to perform a behavior, they must have wanted to: They must have believed in the cause or expected to enjoy the behavior. This is a standard principle of minimal justification techniques, on which much of the commitment literature is based (Cialdini, 2001; Katzev & Johnson, 1983). For an overview of these possible explanations for commitment making effects on environmental behavior, see Lokhorst, Werner, Staats, and Van Dijk (2009).

We conducted this research out of an interest in commitment making as a useful tool to enhance pro-environmental behaviors. Previous research on commitment has predominantly focused on the effect it has on environmental behavior and environmental behavior change. The current paper has paid less attention to the effectiveness of commitment making but has instead focused on the preceding question of when and why people will be willing to commit. As stated in the Introduction section of this paper, public commitment making is often used as an intervention strategy in environmental research. As we have seen, these studies usually show a positive effect of commitment making on behavior change, but at the same time are faced with participants who refuse to make a commitment. At this point it is not known what proportion of the population will not participate in commitment making, but it is clear that we cannot readily assume that an intervention consisting of public commitments will always be effective. We hope this paper helps to understand why participants sometimes refuse to invest in commitment making and can help to improve the design of such commitment interventions. It would be interesting to test our hypotheses in the context of field research and in that way contribute to the effectiveness of public commitment making as an intervention strategy for changing behavior in the environmental domain.

Chapter 5

A Review of Commitment Making Strategies in Environmental Research¹



¹ This chapter is based on Lokhorst, Werner, Staats, & Van Dijk (2009) and is therefore written in the first-person plural.

As threats of environmental degradation loom, there is increased interest determining how to induce people to engage in more environmentally friendly behaviors. In addition to legal regulations and financial incentives there is a clear interest among authorities and other organizations in stimulating people to voluntarily change their environmental behaviors. A number of intervention techniques are in use to accomplish this (see for example, Abrahamse et al., 2005). Interestingly, there appears to be a preference for one specific instrument, which is asking people to make a promise or pledge to do something for the environment². Examples abound: the City of Chicago asks its residents to do their part for the environment and promise to perform five simple pro-environmental actions (www.earthmonthchicago.com); the chair of Biological Sciences of Arkansas State University proposed to have students who want to contribute to save the environment wear a green ribbon during the graduation ceremony to show their commitment (<http://media.www.asuherald.com>); the European Commission asks high school students to cooperate in reducing their impact on the environment and invites them to sign a document, as a group, co-signed by their teacher, promising that they will reduce their CO₂ emissions, and send this document to the European Commission (http://ec.europa.eu/environment/climat/campaign/schools/schools_en.htm); and finally the Dutch Automobile Association declares that October 9, 2008, will become a day without traffic jams, asking drivers to endorse this initiative, in writing, on a website, by giving their name and address (<http://www.denhaag.com/default.asp?id=9579>).

Inherent in the idea of asking for a promise is, of course, the expectation that people will feel obliged to keep it and will therefore behave accordingly. Even a negative example may demonstrate the potential power of the mechanism: when Madonna did *not* keep her promise to make her “Sticky & Sweet” Tour very environmentally friendly, she received severe criticism (<http://www.ecorazzi.com>). So, there may be consequences for not keeping a promise. But what form do they take, and are they strong enough to motivate individuals to keep their commitments? In other words, are these authorities who issue pledges, letters, green ribbons and what not, correct in assuming that these promises will be kept?

This chapter is about the validity of the assumption that commitments are an effective behavior change technique. We will review the scientific evidence that is available of whether, why, when and for whom making a promise to change environmentally relevant behavior leads to the intended results. We focus exclusively on interventions in which people are induced to make commitments they otherwise would not have made. Research in which people spontaneously make commitments is valuable; however we could not find any examples in the environmental behavior change research literature. Similarly, although we think of commitment as just part of the total process by which behaviors are stimulated,

2 A Google search on September 17, 2008, with the term “environmental pledge” gave 17.200 hits.

sustained, and ultimately become habits (Verplanken & Wood, 2006), we found no studies in which commitment and habits were connected.

A substantial amount of research has been done using commitment-making strategies to promote environment-friendly behavior. This line of research goes back to the classic experiments by Lewin (1947), in which participants who had the opportunity to discuss and come to a decision about new behaviors were more likely to change than those who heard a lecture on the same topic. Lewin's group discussions contained several mechanisms that may account for the differential change in behavior. One mechanism is what we would now call a commitment technique, whereby group members make a commitment to change their behavior. Such commitment techniques have been applied in a number of environmental psychology studies over the past few years and seem to be effective compared to other techniques that rely on voluntary cooperation rather than incentives or sanctions. However, as outlined below, not all studies show a clear-cut positive effect. Also, the ways in which commitment is manipulated seem to vary greatly among the different studies.

In this chapter we identify possible underlying mechanisms that can explain the effects of commitment, and assess to what extent commitment manipulations currently used in environmental studies address these mechanisms. To do so, we will first look at fundamental social psychological research on commitment making. Then we review environmental studies that use a commitment manipulation, see to what extent they use these insights and how commitment making as an intervention can be improved.

Current views on commitment processes are strongly influenced by the social psychological insights of Cialdini (2001). In his seminal book on social influence he devotes a chapter to the explanation of general commitment processes. In the current chapter it is our goal to extend these explanations by focussing specifically on research that aims to bring about environmental behavior change.

The most recent review on commitment strategies in the environmental domain was done by Katzev and Wang in 1994. Consistent with Katzev and Wang's (1994) distinction between measured and manipulated commitment, we focus exclusively on commitment *manipulations* in which "a commitment is brought about by eliciting from individuals a pledge to perform a particular act" (p. 13). Whereas Katzev and Wang focused mainly on reporting the effects of commitment, we extend this work by analyzing the applied studies in view of recent literature on the psychological processes that underlie commitment, and in that way combine knowledge from both areas to improve our understanding of commitment making.

Theory

First, we will describe possible underlying psychological mechanisms that can account for the effect of commitment making on behavior change. We distinguish three of these mechanisms: changes in self-concept (moderated by one's need to be consistent with that self-

concept), attitudinal processes, and social and personal norms. It is important to note that, although the commitment literature tends to treat these three constructs separately, others are interested in how they work together to predict behavior (e.g., Conner & Armitage, 1998; Terry, Hogg, & White, 1999), issues that are outside the realm of the present review.

Self-concept and the need for consistency

One theme in Cialdini's (2001) explanations for commitment effects is that when people perceive that they freely chose to engage in a behavior this changes how they think about themselves and the behavior. If they freely chose to perform a behavior, they must have wanted to: They must have believed in the cause or expected to enjoy the behavior. This is a standard principle of minimal justification techniques, on which much of the commitment literature is based (Katzew & Johnson, 1983). The general idea is that when people view their behaviors as voluntary and not coerced, they conclude that they have come to these decisions by themselves and that their behaviors reflect their true motivation, their internal self or self-concept.

Self-concept, defined by Bem (1972) as "an individual's ability to respond differentially to his own behavior", has been well studied in the foot-in-the-door (FITD) effect in which agreeing with a small request makes people more likely to complying with a subsequent larger request. Burger's (1999) meta-analysis of FITD suggested that the related mechanisms of commitment, consistency needs, and consistency of self-perception were viable explanations for this effect (Burger identified additional mechanisms which are less relevant for the present review).

In the first FITD study, Freedman and Fraser (1966) showed that participants who agreed to a small request (putting a small sign in their windows promoting driving safety) were more likely to agree to the larger or "target" request (placing a large sign in their front lawn) than were participants who were only asked to perform the target request. In explaining this effect, Freedman and Fraser argued that compliance with an initial request informed participants about their personal character, that they were "the kind of person who does this sort of thing" (Freedman & Fraser, 1966, p 201). This interpretation was underscored by the high cooperation by a group of participants who had complied with an initial request about an unrelated topic. Their high cooperation to the target request suggested that their commitment transcended the particular issue and was related to a broader personal self-concept as someone who helps with social causes.

In FITD studies, commitment is always induced by performance of an initial simple behavior (e.g., signing a petition) and when freely chosen, performing this behavior seems to change how people think about themselves. For instance, people who sign a petition to save energy will start to see themselves as people who care about conservation and will change their behavior accordingly to be consistent with their new self-image. This idea of

a change in self-concept is in line with self-perception theory (Bem, 1972) which holds that people derive their self-concept from their actions. Bem distinguished between freely chosen (or “tacted”) and externally imposed behaviors (“manded”), and research consistently shows that cognitions and self-perceptions only change when people believe they had freely chosen to engage in the behavior. As Cialdini (2001, p 82) put it: “We accept inner responsibility for a behavior when we think we have chosen to perform it in the absence of strong outside pressure”. Threats or rewards may produce compliance but not a feeling of commitment, because people will not feel they are intrinsically motivated to perform the behavior at stake.

A great deal of evidence has been found for self-perception as a mediator for the FITD phenomenon (Burger, 1999). As self-perception theory would predict, studies show that the more salient the initial request, the greater the compliance to the target request. Self-perception theory would also predict that whether participants actually perform the initial request affects compliance to the target request. If people look at their own behavior to determine their self-concept then the self-perception process should not occur when the initial request is not performed, and this should in turn not lead to increased compliance. Indeed, the studies that Burger (1999) described clearly show that performance of the initial request leads to greater compliance to the target request. For example, when people do not comply with the original request because it is too big, compliance to the target request drops significantly (Burger, 1999).

Direct evidence for FITD leading to changed self-concept comes from a study done by Burger and Caldwell (2003). In this study, participants complied with a small request by signing a petition and writing a statement about problems of homelessness. Immediately after this, they completed personality questionnaires designed to tap differences in self-concept related to feeling compassion and helping with worthy causes. These participants described themselves as more willing to provide support and as more compassionate than a control group. They were also more likely to comply with the target request to volunteer with a food drive than the control group. Mediation analysis showed that the change in self-concept mediated the FITD effect. Similar changes in self-concept were obtained in another study (Burger & Guadagno, 2003).

Summarizing, self-perception processes are often seen as the driving force behind commitment and its corollary, the FITD effect. The suggested self-perception process works because people derive information about the self from previous behavior and then act accordingly in order to be consistent with that self-concept. However, as Cialdini, Trost and Newsom (1995) showed, people differ in their need for consistency. They designed and validated the Preference for Consistency Scale (PFC) which identifies the extent to which people describe themselves as favoring consistency. People who are high in PFC value personal consistency whereas those who are low in PFC prefer to be spontaneous and even avoid being congruent with previously made statements or behaviors. Using the PFC scale,

Cialdini et al. were able to replicate three consistency-based phenomena, but only for those high in PFC. Those high in a preference for consistency replicated a standard “balance” effect (they gave higher ratings to a person with whom they anticipated interacting), a standard dissonance effect (high choice to write a counter-attitudinal essay resulted in more attitude change), and at a marginally significant level, a standard FITD effect (more agreement to a large target request after conceding to a small request). These effects did not appear for those low in preference for consistency.

To underscore the importance of PFC, Guadagno, Asher, Demaine, and Cialdini (2001) carried out a study on the FITD effect combining both the PFC and the self-concept explanation. In their second study the authors were able to show that when participants low in PFC were made aware of the trait implications of their previous behavior (“you are a helpful person”) they actually produced a reverse FITD effect. That is, compliance rates dropped significantly in this condition. The authors concluded that when people with a low preference for consistency are confronted with their prior behavior, they are motivated to behave differently in order to confirm their preference for spontaneity and even anti-consistency. That is, when prior cooperative behavior was made salient, low PFC participants were actually less likely to cooperate than when prior cooperative behavior had not been made salient. This means that although the process of self-perception is active in both low and high PFC’s, it leads to the FITD effect only in high PFC’s because they are motivated to act in accordance with their prior behavior. As Guadagno et al. (2001) noted, “If there is no predilection for consistency within oneself, there is unlikely to be any tendency for consistency with the self-relevant implications of earlier compliance” (p. 866).

Although there seems to be evidence for the self-perception explanation of the FITD effect, it is not entirely clear how this process operates (Burger, 1999). More precisely, it is not exactly clear what it is that changes when people agree to the initial request. Do they change their self-concepts about a specific behavior or to a more general cause? This is important for researchers whose goal is to change people’s environmental behaviors. Should they get people to commit to a specific behavior or to environmentalism in general? This issue will be examined further in the Discussion.

Attitudinal approach

A related approach to understanding the effect of commitment making on behavior change is offered by a cognitive attitudinal approach. If people commit themselves to engaging in a behavior, they need to develop ways of remembering to perform the behavior and they need to maintain their motivation to actually perform the behavior once reminded. External features might be used to remind and motivate people (e.g. notes, signs, recycling bins). However, it is also possible for people to develop internal motivators and reminders such as strong and accessible attitudes that guide behavior (Fazio, 1990, 1995; Holland, Verplanken,

& Van Knippenberg, 2002; Petty, Haugtvedt, & Smith, 1995). "Attitude strength" is a multifaceted construct (Krosnick, Boninger, & Chuang, 1993; Petty, Haugtvedt, & Smith, 1995) that has interested researchers because strong attitudes are more predictive of behavioral intentions and behaviors. If making a commitment keeps the issue salient and activates cognitive processes such as "cognitive elaboration", this could account for why commitment leads to long-term attitude and behavior change (e.g., Chaiken's, 1987, Heuristic Systematic Model, or HSM; Petty & Cacioppo's, 1986, Elaboration Likelihood Model or ELM). Favorable cognitive elaboration means that the individual thinks about reasons for engaging in the behavior and strategies for effectively performing the behavior; in the process of this elaboration, the individual develops a strong and accessible attitude that serves both to remind and motivate the individual to engage in the behavior. As Pardini and Katzev (1983-1984, p. 253) argue, the making of commitments leads participants to "find their own reasons for recycling, to begin to even like doing so, and, as a result, to continue to perform these behaviors on their own."

The making of commitments resembles the making of "implementation intentions" (Gollwitzer, 1999), where an anticipated opportunity is linked to a certain goal-directed behavior. These implementation intentions take the format of "I intend to do *y* when situation *z* is encountered" and are hypothesized to activate the mental representation of the situation to perform a certain behavior in. This activation subsequently leads to a heightened attention for situational cues.

A study of recycling provides some support for the idea that commitment and follow-through can increase cognitive elaboration and lead to more favorable attitudes about the behavior (Werner et al., 1995). First, commitment was more effective at increasing recycling than other forms of contact (flyer only; telephone and flyer; face to face and flyer). However, by the end of the 4 month study, all recyclers had more favorable attitudes than nonrecyclers, regardless of their initial recycling behavior or how they had been informed of the program (the attitude measure contained a variety of questions; attitudes, self-concept as a recycler, and behavioral intentions were rated most positively, whereas perceived normative pressures were rated lowest). This pattern was interpreted to indicate that commitment had not led to mindless consistency, but instead participants had reflected on their recycling behavior and developed attitudes that supported and maintained their recycling.

Norms

Another explanation that could account for commitment making effects is based on a normative approach. It seems plausible to think that when a commitment is made in public, people will adhere to this commitment because of the possible negative social sanctions that will follow for breaking it (Abrahamse et al., 2005). This means that it is a *social norm* that mediates the effect of commitment on behavior. This explanation directly reflects Cial-

dini's (2001) recommendation that commitments should be made in public in order to be effective. It would mean that a commitment would not be effective when there is nobody around to witness it, because no social norm would be activated.

Another implication of the social norm explanation is that a commitment or initial request activates a particularly strong social norm when that commitment is made within a strong reference group. It is here that the level of group identification may also play a role. Terry, Hogg and White (1999) showed that group norms influence behavior primarily for people who strongly identify with that particular group. These ideas are consistent with the recommendation given by Werner (2003) that group discussions aimed at behavior change should be held within significant social groups.

Although the impact of public surveillance on adherence seems plausible, this has been complemented by more recent research on internalized norms. Kerr, Garst, Lewandowski, and Harris (1997) developed a more nuanced explanation of the idea that commitments made in the public eye would be more effective. In their research, Kerr et al. specifically pitted the social norm explanation against the alternative explanation of a personal or internalized norm. In contrast to a social norm which depends on concerns about others, an internalized norm influences behavior even when there is no public surveillance. In two experiments, Kerr and his colleagues showed that anonymity did not reduce the effect of commitments on behavior: that is, participants kept their commitments whether their behavior was monitored by others or not. Kerr et al. (1997) conclude that instead of a social norm, a *personal norm* must be at work. Thus, although the commitments were made in a public discussion with other involved participants, and none of them (not even the experimenter) would know whether the individual kept that commitment, the personal norm or responsibility for one's commitments overruled any inclination for violating that commitment.

In this context it is relevant to note that when people perceive some kind of need for action, this can elicit considerations concerning the implications of behavior for one's moral values. These considerations, in turn, produce feelings of moral obligation to perform or refrain from certain behaviors (Schwartz & Howard, 1984). These feelings of moral obligation are, in essence, personal norms. It could very well be that the making of a commitment serves as a situational cue indicating a need for action and in this way activates a personal norm.

When a personal norm becomes truly internalized it closely resembles the self-concept: the way people think about themselves. In fact, as Conner and Armitage (1998) argue, the way people think about themselves may be associated with having a set of values linked to a particular kind of behavior, and these values can lead to personal norms. This closely resembles what Thøgersen (2006) calls integrated norms: Deeply internalized norms that are based on conscious reflection on and evaluation of behavior and its consequences.

Comparison of self-concept and normative explanations for commitment

Do self-concept and norms work together in changing people's behavior? In his review of the FITD effect, Burger (1999) noted that receiving normative information can significantly change participants' reactions to target requests. Interestingly, the self-perception and the norm explanation yield completely opposite predictions concerning performance of target requests. That is, when a person who complied with a first request receives the (social normative) message that few people actually go along with this first request, the norm explanation would predict that this decreases the FITD effect. After all, people have a tendency to comply with social norms and this should subsequently inhibit compliance. However, the self-perception explanation predicts an increase of the FITD effect because the very fact that someone does something that very few others do, makes the behavior more idiosyncratic, more self-relevant and thus something to act in accordance with on the second request.

DeJong (1981) tested these predictions and found that people who heard that they were the only one so far to have performed the initial request were slightly less likely to comply with the target request than the control group. However, participants who received the message that virtually everyone had agreed to the initial request were significantly more likely to comply with the target request than the control group. These results are consistent with the social norm information interpretation and show that people do base their behavior on normative information. Most FITD or commitment studies do not confront participants with counter normative messages. These results clearly show that people's tendency to conform to a norm has a significant impact on their behavior and may even overrule self-perception effects (see also Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007, for how injunctive messages can counter the undermining effect of normative information).

Now that we have discussed possible psychological mechanisms that can account for commitment making effects, we will turn to studies of environmental behaviors that included commitment strategies. Special attention will be paid to how the commitment was administered and how effective it was in both the short and the long term. We will then return to the possible psychological bases of commitment effects and see to what extent there is empirical evidence to support them.

Environmental studies that use a commitment manipulation

In the next section we will review environmental research containing a commitment manipulation. We include all environmental commitment studies we found³. First, we will look at main effects of commitment: Was commitment successful compared to the control group?

3 The study done by Bachman and Katzev (1982) on the effects of commitment on bus ridership was omitted since the method section did not provide enough information to evaluate the study.

After that, we will review studies that combined commitment with another type of intervention and report whether the combination was more effective than commitment alone. We will organize that section according to the second intervention's potential to lead to internalization; we start with more external interventions (e.g., feedback) and move to internal ones (e.g., labelling). The short-term and long-term results of all studies, as well as the characteristics of the commitment manipulations and the dependent variables, are summarized in Table 5.1.

Commitment only effects

Several studies have shown a positive effect of commitment making on behavior change. For instance, Burn and Oskamp (1986) carried out a commitment intervention that was aimed at household recycling. Participants in the commitment conditions were approached by a Boy Scout who asked them to sign a pledge card. If they signed the pledge, the scout handed them a sticker to post in their home to remind them to recycle. It is not clear how many participants actually signed the card. Results of this study showed a significant difference between the commitment condition and the control group in frequency of recycling during the pledge period; no long-term follow-up data were collected. No additional constructs were measured in this study and it is thus not clear which underlying psychological process was influenced by this manipulation of commitment.

In another neighbourhood recycling study, participants were randomly assigned to one of four conditions for introducing a new curb side pickup program (flyer only; telephone and flyer; face to face and flyer; and written commitment and flyer; Werner et al., 1995). Four parallel streets were included in the study, and all residents on a street were assigned to the same condition (total $n=309$). Results indicated that a signature commitment was significantly more effective at inducing regular recycling than the other three conditions. This difference was most pronounced during the first 3 months of the 4-month program.

Table 5.1 Summary of environmental studies using a commitment manipulation

Author, date	Dependent variables	Commitment manipulation	Commitment Effective: Short Term (Treatment in Place)	
			Commitment only	Commitment Plus
Burns & Oskamp (1986)	Household recycling (all materials; city program)	Boy Scout project; asked resident to sign pledge card; provided reminder sticker in both Commitment conditions	C-only vs. ctrl, $p < .05$	a) C+persuasive message vs. ctrl, $p < .05$ b) C+persuasive message vs. C-only, n.s. c) C+persuasive message vs. persuasive message only, n.s.
Werner et al., 1995	Household recycling	Signed commitment versus information via flyer, telephone, or face to face	Signed commitment most effective for repeated recycling, $p < .05$	
Pardini & Katzev (1983-84)	Newspaper recycling	Weak commitment: Face to face verbal commitment; Strong commitment: Face to face signed commitment	Both weak and strong commitment more successful than information only	
Wang & Katzev (1990) Experiment 1	Paper recycling	Retirement home ABA design; Group meeting; signed group commitment	Commitment vs. baseline, $p < .003$	
Katzev & Pardini (1987-88)	Newspaper recycling	Undergraduate experimenter; resident signed form making a 5-week recycling commitment; both experimenter and resident kept copy of form	<i>Frequency</i> C-only vs. ctrl, $p < .01$ <i>Weight</i> C-only vs. ctrl, $p < .001$	<i>Frequency</i> a) C+token vs. ctrl, $p < .01$ b) C+token vs. C-Only, n.s. c) C+token vs. token only, n.s. <i>Weight</i> a) C+token vs. ctrl, $p < .02$ b) C+token vs. C-Only, n.s. c) C+token vs. token only, n.s.
DeLeon & Fuqua (1995)	Recycling	Mailed request. P signed form and mailed back; names to be published in newsletter; 55 % (C only) and 75 % (C+) committed; data presented for all.	C-only vs. ctrl, n.s.	a) C + group feedback, $p < .02$; increase due only to those who committed)
Matthies et al. (2006)	Use of alternative transportation (bus, metro, bike, etc.)	Personal request; Written; public to research team; all committed, but only 38/191 participants chose to commit to transit	No ME for C-only predicting DV (phase 2 or 3, $p > .10$)	a) C + free ticket (phase 2 or 3, $p > .10$) b) C by personal norm interaction (phase 3, $p < .03$)
Cobern et al. (1995)	Grass cycling	Personal request. Signed card to grass cycle for 4 weeks; public to research team. 70 % in C-only agreed; 80 % in C+ agreed; data presented for all.	C-only vs. ctrl, n.s.	a) C + agent (block leader) vs. ctrl, $p < .05$ b) C + agent (block leader) vs. C-only, $p < .05$

Commitment Effective: Longer Term (Treatment Ended)

Commitment only

Commitment Plus

Signed commitment most effective for 3 of 4 months

Weeks 3 & 4: Strong commitment group maintained recycling; weak commitment group did not.

4-wk follow-up C-group vs. baseline, $p < .004$

3-week follow-up:

Frequency C-only vs. ctrl, n.s.*Weight* C-only vs. ctrl, n.s.

3-week follow-up:

*Frequency*a) C+token vs. ctrl, $p < .05$

b) C+token vs. C-Only, n.s.

c) C+token vs. token only, $p < .01$ *Weight*

a) C+token vs. ctrl, n.s.

b) C+token vs. C-Only, n.s.

c) C+token vs. token only, n.s.

Week 25 Follow-up: No ME for C-only predicting DV

Week 25 Follow-up: C by personal norm interaction, $p < .08$

Immediate Follow-up: C-only v. ctrl, n.s.

1-year Follow-up: Returned to baseline

Immediate Follow-up:

a) C+ Block Leader v. ctrl, $p < .05$ b) C+ Block Leader v. C-only, $p < .05$

1-year Follow-up: Returned to baseline

		Commitment Effective: Short Term (Treatment in Place)	
Pallak & Cummings (1976)	Energy conservation (meter reading)	Signed consent form, "C-public" understood names would be in paper as "public spirited fuel-conserving citizens." Both public and private commitment groups heard 20 mins. information about effective ways to save energy.	<p>Natural gas</p> <p>a) C-public vs. ctrl, $p < .05$</p> <p>Electricity</p> <p>a) C-public vs. ctrl, $p < .05$</p> <p>Natural gas</p> <p>a) C-public vs. C-private, $p < .05$</p> <p>Electricity</p> <p>a) C-public vs. C-private, $p < .05$</p>
Shippee & Gregory (1982)	Energy conservation (meter reading)	<p>Mild commitment: Newspaper ad thanking for conserving, listing names of firms in program.</p> <p>Strong commitment: Newspaper ad thanking for conserving and listing amount conserved by each firm.</p>	<p>a) C-mild vs. ctrl, $p < .03$</p> <p>b) C-strong vs. ctrl, $p < .03$</p> <p>c) C-strong vs. C-mild, $p < .03$, C-mild conserved more</p>
Wang & Katzev (1990) Experiment 2	Paper recycling	<p>College dorms</p> <p>Group commitment: Two group meetings, then signed group form (1 refused).</p> <p>Individual commit: One contact, signed individual form (1 refused).</p>	<p><i>DV = Frequency</i></p> <p>a) C-group vs. ctrl, $p < .001$</p> <p>b) C-individual vs. ctrl, $p < .001$</p> <p>c) C-individual vs. C-group, $p < .05$, C-individual higher.</p> <p><i>DV = Weight</i></p> <p>a) C-group vs. ctrl, n.s.</p> <p>b) C-individual vs. ctrl, $p < .001$</p> <p>c) C-individual vs. C-group (not reported).</p>

Note: Articles are listed in the order discussed in the manuscript.

Commitment Effective: Longer Term (Treatment Ended)

12 month follow-up Natural gas

- a) C-public vs. ctrl, $p < .01$ for use period, winter months only

Electricity (central air conditioning)

- a) C-public vs. ctrl, $p < .03$, all year

Electricity (window air conditioning)

- a) C-public vs. ctrl, $p < .01$, summer only

12 month follow-up

- a) C-public vs. C-private, $p < .01$ for use period, winter months only

Electricity (central air conditioning)

- a) C-public vs. C-private, $p < .03$, all year

Electricity (window air conditioning)

- a) C-public vs. C-private, $p < .01$, summer only

4-wk follow-up *DV = Frequency*

- a) C-group vs. ctrl, n.s.
 b) C-individual vs. ctrl, $p < .01$
 c) C-individual vs. C-group, (not reported)

DV = Weight

No differences

As described in a previous section, people who recycled had the most favourable attitudes at the end of the project, regardless of treatment condition. Werner et al. interpreted this to indicate that attitudes had become more favourable and more accessible because of participation in the program, and discounted the idea that a mindless need for consistency had driven the commitment group to recycle.

Pardini and Katzev (1983-84) studied the effect of strength of commitment on newspaper recycling. Their experiment consisted of three conditions. The first was *information*, in which participants were informed about the recycling project by means of a leaflet. Second was the *minimal commitment* condition, in which participants were given the same information and were asked by the experimenter to verbally commit to recycling in the next two weeks. Finally, in the *strong commitment* condition, the same procedure was carried out but participants were asked to sign a commitment form.

During the intervention phase, both commitment groups recycled more frequently than the information group; the commitment groups did not differ from each other. During the 2-week follow-up phase, however, recycling frequency in the minimal commitment condition dropped, while recycling frequency in the strong commitment condition remained high. This difference supports Cialdini's (2001) recommendation that a commitment should be active in order to have long-term effects. Since no additional constructs were measured, it is not possible to identify which psychological process mediated the effect of commitment on recycling.

Wang and Katzev (1990, Experiment 1) showed that group commitment is effective in increasing recycling. In their study, residents of a retirement home were first given general information about paper recycling. At a later time, the participants met with the experimenter for a discussion about the importance of recycling which ended with elicitation of a group commitment to recycle. Participants were told that, if the recycling program were to continue, the experimenter needed to know that there were enough interested participants. They were asked to sign a group commitment form that stated "We, the residents of the 2nd floor, are willing to participate in the paper recycling project sponsored by the Reed College Environmental Group. It is understood that any recyclable paper can be placed in the "recycle" garbage can. We commit ourselves to participating in this recycling project for the next 4 weeks." Of the 22 participants present, 17 signed the consent form. Results showed that after the group commitment manipulation, recycling increased by 47 % compared to baseline. During a 4-week follow-up (when participants were no longer bound by their commitment) recycling rates remained high, making this commitment manipulation a successful one. This study differs from other studies reviewed here because of the emphasis on group commitment instead of an individual commitment. It might be that participants in this study experienced a group norm to follow up on their commitments. Unfortunately, no measures of attitudes, self-concepts or group norms were measured, but the nature and success of the manipulation indicates that a group norm might have mediated the effect of commitment.

Katzev and Pardini (1987-88) compared the single and combined effects of token reinforcers (coupons) and commitment making on increasing recycling. Participants in the commitment conditions were asked to sign a commitment form. It is not reported whether or not everyone complied with this request. Results of this study showed that during the 5-week intervention phase, all three experimental conditions (commitment, token, and combined commitment and token) yielded increased recycling, without one being more effective than the other. However, during the 3-week follow-up period, recycling remained high in the commitment and combined conditions but decreased significantly in the token condition. The combined intervention was most successful in terms of frequency and weight measures of recycling. The commitment condition was most effective in terms of number of households that recycled at least once. These results are clearly promising since they show that relatively long term effects can be achieved with interventions containing commitments. Again, no additional constructs were measured in this study and it is thus not clear which underlying psychological process was operating in this study.

Summarizing, we have found four studies that show a main effect of a commitment manipulation on pro-environmental behavior. None of these studies include additional psychological constructs that could explain this effect and it is thus not possible to draw strong conclusions concerning possible mediators. However, the study done by Wang and Katzev (1990, Experiment 1) suggests that a group norm might have been active, causing the effect of commitment making on behavior.

Commitment combined with other treatments

The previous studies showed a simple main effect for commitment; we will now look at studies that combine commitment with other interventions.

Commitment and group feedback

DeLeon and Fuqua (1995) examined the single and joint effects of public commitment and performance feedback on curbside recycling. In their paper they identified public commitment making as an intervention strategy that would activate social pressure from peer group members to perform a certain behavior; they promised publicity for participants to underscore this aspect. An additional purpose of this study was to evaluate the effectiveness of mailing commitment forms so as to make commitment manipulations more practical and cost effective for widespread use. Residents of a student housing complex were first invited to participate in a recycling program. Of those who returned an informed consent form, half were assigned to commitment conditions. After a 6-week no treatment baseline period, those in the commitment groups were asked to sign and return a consent form that committed them to recycling. Those who signed would have their names printed in a

monthly newsletter under a caption describing them as people who are “concerned about the future of our environment”. In the commitment-only condition, 11 out of 20 households signed and returned the form, and 14 of 19 did so in the commitment combined with group feedback condition. However, to control for the possibility of self-selection, all 39 participants who received the request were included in analyses. Feedback was provided weekly by taping a note to participants’ doors describing how their group had done and promising to print the feedback in the weekly student newspaper.

The commitment-only condition showed a modest increase in recycling over baseline, but this effect did not reach significance. The commitment plus feedback condition significantly increased their recycling, however, this effect was primarily due to recycling by participants who had signed and returned the consent form, leaving self-selection as a plausible rival explanation for the results. Students in a control condition (initial consent only) and a feedback only condition did not change their recycling over time. It is important to note that participants in all four conditions were residents of the same apartment building and that their recycling was visible to others. This may have activated competition and/or normative pressure among some participants which might have led to an increase in recycling that cannot be attributed to the intervention itself.

The fact that participants who received both the commitment and the feedback manipulation significantly increased their recycling is particularly interesting because it provides support for the attitudinal approach described in the previous section of this chapter. Feedback might serve as a reminder of the commitment, making this commitment more salient and there by setting in motion more cognitive elaboration, which in turn leads to behavior change. However, the nature of the feedback manipulation might also have activated a norm to recycle. That is, the feedback given in this study was on the group level, which might have elicited a group norm. Unfortunately, constructs such as norms or salience were not measured in this study.

This study shows that [group] feedback can significantly enhance a commitment manipulation. Although the results are very promising, it is not clear at this point if the effect of combining feedback with commitments on behavior is mediated by increased salience, a group norm, or another process.

Commitment and personal norms

Mathhies, Klockner and Preissner (2006) combined commitment and normative pressures in a study designed to increase use of alternative modes of transportation (i.e., transit, bike riding, walking, etc. at least once in a two-week period). The study involved a 2-week baseline, then three 2-week intervention periods, and a 2-week follow-up 18 weeks later. Using Schwartz and Howard’s (1981) “norm activation” model, Matthies et al. reasoned that a commitment could activate and stabilize participants’ pre-existing personal norms. In essence,

they hypothesized that commitment would have its strongest effect on people who had a pre-existing personal norm to reduce automobile use (e.g., would agree with items such as “feel obliged to use a car as seldom as possible” p. 98). Their analyses provide support for these ideas. In tests of moderation, they found that the commitment by personal norm interaction significantly predicted using transportation alternatives when measured 4 weeks and 21 weeks (marginally) after the commitment had been made. Furthermore the interaction effects eliminated the simple effects of commitment, showing only moderation.

The results are particularly impressive because the commitment manipulation itself was fairly weak and automobile use was a strong, habitual preference. Participants were not asked to commit to the target behavior. Instead, in order to provide a sense of behavioral choice, participants were given a list of 10 ways of reducing global warming, only two of which were directly related to the target behavior (indeed, only 38 of 191 participants chose the transit options). On the whole, the study provides an important new way to construe the role of commitment in behavior change and provides intriguing support that pre-existing personal norms can be activated with a commitment manipulation.

Commitment and consonant acts

Cobern, Porter, Leeming and Dwyer (1995) conducted a study in which they examined the effects of two types of commitment on residential grass recycling. Participants were asked to commit to grass recycling and, in a second condition, were also asked to talk to their neighbours about recycling. The commitment to the target behavior was written, but the commitment to talk to their neighbours was done verbally. Both types of commitment were made with the experimenters present. Results showed that only participants who made both types of commitment significantly changed their behavior.

In this study, the same process might operate as in Kiesler's (1971) study on strength of commitment as a function of the number of consonant acts performed. In his study, Kiesler found that participants who had performed three consonant acts were less influenced by a counter-attack than participants who had performed one act or no acts at all. He concluded that increasing the number of consonant acts increased the degree of commitment to the attitudinal position. In the Cobern et al. (1995) study, the verbal and written commitments could be considered as consonant acts. Possibly, the two combine to make the commitment itself more salient, thereby increasing its effectiveness. An additional possibility is that the act of persuading others can serve as a way of persuading the self. This study seems to provide support for the attitudinal approach: The increased salience of the commitment might lead to more cognitive elaboration, which would account for the change in behavior. Unfortunately, neither cognitive elaboration nor attitudes were measured in this study, so a possible mediator could not be empirically tested.

Commitment and labelling

Another way of improving a commitment manipulation is to label participants according to their commitment. Pallak and Cummings (1976) conducted a study with a commitment manipulation aimed at energy conservation. They approached participants with the request to start saving energy. One half of the participants were told that their names would appear in the local newspaper as energy conserving citizens. After a month the homeowners in this sample saved significantly more energy than the control group. Then, the participants were told that it would not be possible to publicize their names in the paper after all. For a period of 12 months the researchers measured the energy usage of these families. It appeared that during these months they had actually conserved more fuel than during the time they believed their names would be printed in the newspaper (Pallak & Cummings, 1976).

Especially noteworthy in this study is that participants in the public commitment condition were told that their names would be listed as “public-spirited, fuel-conserving citizens”. Labelling them as such seems to refer directly to their self-concepts as “the kind of people who do such things”. Although the researchers did not measure any changes in self-concept it might very well be that this is exactly what happened in this condition. Given the fact that this study shows a significant effect of commitment, it offers indirect support for the self-concept explanations for commitment making.

Recall that DeLeon and Fuqua (1995) had also told participants in their public commitment condition that their names would be publicized. In their study, names would appear in a monthly newsletter as people who are “concerned about the future of our environment”. However, in their study the commitment manipulation in itself did not have a significant effect on behavior. We believe this might be due at least in part to the wording that they used, which did not refer to the particular target behavior and therefore to a particular aspect of the self-concept. In contrast, Pallak and Cummings (1976) labelled their participants as “public-spirited, fuel-conserving citizens” which both addresses the self-concept and is specific to the target behavior under study.

More evidence for the effect of labelling comes from research by Cialdini et al. (1998) on “undermining the undermining effect”, in which the authors show that behavior that is rewarded and thus runs the risk of losing intrinsic motivation can be perceived as intrinsically motivating if people are told that the behavior stems from an internal trait. Taken together, these studies strongly suggest that combining a commitment manipulation with a labelling technique results in strong effect on behavior.

However, caution is advised, since labelling participants may backfire. Shippee and Gregory (1982) studied the effect of public commitment on energy conservation. They recruited 23 firms in Jackson, Michigan, to participate in an energy conservation program and divided them into three conditions: control, mild commitment and strong commitment. Participants in the mild commitment condition were told that their names would appear in the local news

paper with the words “Jackson thanks you”. In the strong commitment condition, participants’ names were also published, but their actual energy savings would be included in the advertisements. Results showed no significant differences in electricity usage across conditions. However, an analysis on natural gas consumption revealed that the mild commitment condition used less natural gas than did the strong commitment condition, and that the firms in the strong commitment condition used less than those in the control condition. Contrary to the experimenters’ hypotheses, the mild commitment manipulation yielded the greatest effect. Apparently, as became clear from survey responses, participants in the strong commitment condition experienced reactance to the manipulation. The authors suggested that the firms in this condition were not able to show significant energy reduction, which made them simply “quit trying”. This is a very important aspect of this study. Although other studies (e.g. DeLeon & Fuqua, 1995) have shown that commitment and feedback combined can have a significant positive effect on behavior, this study clearly shows the detrimental effect of making that feedback public before participants learn how to change their behavior. Failure to improve behavior can then cause public embarrassment, reactance and withdrawal.

Summarizing, this set of studies shows that labelling participants can be a very useful tool for enhancing the effect of commitment making. These findings are corroborated by findings from fundamental research: Cialdini et al. (1998) have shown that labelling can elicit internal motivation that is so strong it is able to undermine the undermining effect of external rewards. However, labelling must be used with caution, as we have seen in the Shippee and Gregory (1982) study, where combining labelling with public feedback elicited reactance and had a detrimental effect on behavior.

Commitment and group norms

Wang and Katzev (1990, Experiment 2) compared the group commitment technique with an individual commitment and an incentive-based procedure. In this experiment, participants were 87 college students. The intervention period lasted 4 weeks after which there was 2-week spring break followed by a 3-week follow-up period. The experimental conditions were randomly assigned to four wings in two dormitories. Participants in the control condition were given a flyer explaining the start of a paper recycling project; each room received a recycling bag. In the group commitment condition, students heard a 5-minute informational speech on the recycling project, after which they were instructed to discuss the issue amongst themselves. Participants were then asked to sign a commitment form stating: “We, the residents of [name of hall], are willing to participate in the paper recycling project. We understand that the recyclable paper needs to be placed outside our room on Friday mornings by 11 A.M. for the paper to be picked up. We commit ourselves to participating in this recycling project for the next 4 weeks.” 18 Out of the 19 students in this condition signed the form. Each room was given a plastic bag for their recycling. In the individual commit-

ment condition, students were approached individually and asked to sign a slightly modified version of the group commitment form. Twenty-four of the 25 participants in this condition signed the form. After signing, each participant received a flyer and a plastic bag.

As dependent measures the experimenters looked at both the frequency of recycling and the weight of the recycled paper. For recycling frequency, during the intervention phase all three experimental groups recycled more than the control condition, and the individual commitment condition recycled more than the group commitment condition. Looking at the weight of the recycled paper, participants in the individual commitment condition recycled the most. During follow-up, recycling frequency dropped significantly for all three experimental conditions. Only the individual commitment condition still recycled more frequently than the control condition. There were no significant differences across conditions in terms of amount of paper recycled during follow-up.

The commitments made in the study were basically the same both in the group and the individual commitment condition. Yet it was the individual commitment manipulation that had the stronger effect in this study. Why? One possibility is that in the group commitment condition, participants did not make a personal pledge to change their behavior. As discussed previously, there is evidence that commitments are effective when they change people's self-concept and that people come to think of themselves as "the kind of people who do this". It might have been that the group commitment manipulations did not appeal to self-concept and therefore was not successful. Another possibility was suggested by the authors in comparing this pattern with the results of a previous experiment (Wang & Katzev, 1990, Experiment 1). It might be that the group in which the commitment was made was not a very cohesive one. As we have suggested before, group dynamics such as cohesiveness and identification might be important variables to take into account when studying group commitment. It might very well be that within a cohesive group with which its members strongly identify, a group commitment would be very effective since it activates a group norm that people are sensitive to and concerns behaviors that others in the group can monitor. A related interpretation is that the group was cohesive and talked about the commitment meeting after the experimenters had gone. If they agreed among themselves that they had only signed to be polite, that would undermine their commitment to their pledge. All of these possibilities should be considered in future research or behavior change programs.

Summarizing, this study shows a significant effect of commitment making on recycling behavior. It leaves interesting clues concerning possible mediators of this effect. Results show that the appeal made to the self-concept by manipulating a personal commitment was effective; whereas the appeal to the group norm (by manipulating a group commitment) was not. The failure of the group commitment to produce behavior change might be due to group variables such as cohesiveness, identification and visibility that either were absent and could not support the new behavior, or that were present but were turned against the request to recycle. Unfortunately, concepts such as self-concept, norms and group variables were not measured in this experiment.

Comparing environmental studies to theory

In the introduction section of this chapter we described possible underlying processes responsible for the commitment effect: self-concept and preference for consistency, attitudes and cognitive elaboration, and personal and social norms. After reviewing the environmental studies it is important to reflect on the evidence they show for the different possible mediators. Most of the studies we reviewed (with the exception of Matthies et al., 2006, and Werner et al., 1995) do not include measures of psychological constructs that might mediate the effect of commitment. As a consequence it is not possible to say whether different strategies for manipulating commitment activate different psychological processes, or which of the possible mediators has the greatest effect on behavior. We believe that future commitment research can be significantly improved by first investigating more specifically which of the possible mediators is most important, designing manipulations so that they effectively activate that construct, and including measures of all the constructs to see which are operating.

Attitudes and cognitions can be important for motivating and maintaining behaviors. Several of the studies reviewed in this chapter appear to indicate that the effect of commitment can be enhanced by increasing its salience. Feedback, for instance, as applied in de DeLeon and Fuqua (1995), can help remind people of their commitment. In the Cobern et al. (1995) study, participants who committed to both grass recycling and talking to their neighbours about grass recycling showed the greatest behavior change. In this case, persuading others might have helped persuading the self and by doing so increasing the salience of the commitment. Results of both these studies clearly support the cognitive approach that holds that making a commitment keeps the issue salient and sets in motion cognitive processes like cognitive elaboration, which accounts for long-term attitude and behavior change. Werner et al. (1995) suggested that active recycling had led to more favourable recycling attitudes, behavioral intentions, and self-concepts (contrary to a hypothesis that commitment led to recycling based only on a drive for consistency). A follow-up two years later showed that people with strong attitudes at time 1 were more likely to have maintained recycling over the years (Werner & Makela, 1998). Werner and Makela focused on the importance of intrinsic motivation, and showed that people with strong time 1 attitudes had maintained their behavior by creating intrinsic interest in recycling.

Personal or social *norms* were evident in two studies reviewed in this chapter. The Matthies et al. (2006) study showed that commitment is effective in increasing use of alternative modes of transportation for people who have a pre-existing personal norm to do so. In this study, the effect of commitment on behavior was not mediated by a personal norm, but moderated: Commitment was successful for those with a pre-existing norm.

The two experiments performed by Wang and Katzev (1992) seemed to be aimed at activating a *group norm*. It appeared that this activation was successful in Experiment 1, where participants who made a group commitment recycled more than participants in the control group. However, in Experiment 2, the group commitment was less successful than the individual commitment. As pointed out earlier, we believe this might have been due to the dynamics of this particular group. Aiming at activating a group norm could very well be successful in a more cohesive group or one in which the cohesiveness was turned towards supporting the requested behavior.

The *self-concept* explanation of commitment was supported by another set of studies. The Pallak and Cummings (1976) study showed a strong effect of commitment combined with labelling, which, as we have argued before, can enhance the shift in self-concept needed for behavior change. The study by Shippee and Gregory (1982) showed the same positive effect in the mild commitment condition, although due to the public feedback this effect backfired in the strong commitment condition. Research by Cialdini et al. (1998) showed that labelling can counter the undermining effect of external justifications for behavior. This research showed that by giving children a trait label, the damage of a reward on their motivation to write well could be reversed. By implication, commitment manipulations that include a behavior-specific label should be more effective than those that do not provide the label. Although this comparison has not been made within a single experiment, the studies by Pallak and Cummings (1976) and Shippee and Gregory (1982) are very promising and support the need for additional research on this strategy.

The work done by Cialdini et al. (1995) and others (Guadagno et al., 2001) suggests that we should not look at self-perception without taking personal need for consistency into account since activation of the self-concept will have differential effects for those low and high in their need for consistency. Unfortunately we do not know how Preference for Consistency is distributed across the population. It might very well be that the mixed results of commitment studies are (partly) due to a large number of participants who have a low level of preference for consistency and thus actively try and behave inconsistently. To the best of our knowledge no research has examined the distribution of PFC scores in our society. Most studies use extreme scores or median splits to classify participants as low or high in PFC, which do not provide a real estimate of the distribution of PFC in the population. Cialdini et al. (1995) state that in each of their three studies, more than half of the participants scored at or below the midpoint of the scale, which indicates that a large number of the population might have a low preference to be consistent. As the authors point out, this might account for error variance in a wide range of studies, not just the ones based on consistency-based phenomena.

Although the studies shared the use of a commitment manipulation, they often differed in whether they emphasized personal norms, group norms, attitudes, or self-concepts, or other possible motivators of behavior. At this point it is not possible to say which of the

possible mediators has the greatest effect on behavior. However, only by identifying possible mediators can we understand and improve commitment manipulations. A commitment intervention aimed at increasing cognitive elaboration about the behavior might be combined with a reminder such as feedback, offers of additional information, and so on, to optimize positive elaboration. As another example, when researchers want to activate a group norm, they should take into consideration the dynamics of the groups and should make sure the commitment is made within a significant reference group, with which the participants identify, and that the commitment does not reflect superficial compliance with the request. To reduce superficial compliance, researchers might use in their meetings a technique called “guided group discussion” (Werner, Sansone, & Brown, 2008) to assure that members hear group support for the commitment and new behavior. Researchers could also encourage group members to hold regular discussions that might support the new behavior, help solve problems with the behavior, keep it salient, and so on (Staats, Harland, & Wilke, 2004). Finally, when the goal is to address the self-concept, it appears to wise to combine the commitment with labelling the participants as “the kind of people who perform this behavior” rather than more general traits such as “good people.”

Summary and suggestions for future research

As becomes clear from the overview of studies, commitment manipulations in field studies yield mixed effects. Of the studies we reviewed, a small number report a clear-cut significant main effect of commitment on behavior. The majority of the studies show that commitment is effective only when combined with other interventions, see also Table 5.1.

We have seen that the manipulations itself and the way they are administered vary greatly across studies. For instance, in some studies participants are asked to sign a commitment form whereas in other studies the commitment is verbal. Most studies have participants make a commitment with only the experimenter present, while some explicitly manipulate a group commitment. We suggest when researchers design their commitment manipulation they take into account Cialdini's (2001) recommendations; namely that commitments will be most effective when they are (1) active, (2) public, (3) effortful and (4) freely chosen. *Active* means that people have to do something to make the commitment, for instance signing a form. A written commitment is preferred over a verbal one (Pardini & Katzev, 1983-84). *Public* means that in order for the commitment to be effective, other people must be present when the commitment is made or the individual must believe that others will become aware of the commitment. According to Cialdini, commitments have to also be *effortful*, meaning that participants must exert some kind of effort in making the commitment. Finally, commitments should be *freely chosen*, that is, participants should be under the impression that the commitment was not forced upon them but that it was their own choice to make the commitment.

Related to the Cialdini (2001) criteria is the question of specificity: how specific must commitment be in order to change behavior? Should researchers try and get participants to commit to a specific course of action or to a more general environmentalism? Although to the best of our knowledge no study has pitted these options against each other, research indicates that committing to a specific behavior yields best results. The studies reviewed that showed a positive effect on behavior change (Pallak and Cummings, 1976; Wang & Katzev, 1990) used wording specifically describing a certain behavior.

In general, written commitments seem more effective than verbal ones (Pardini & Katzev, 1983-84). This might be because of the permanence: A written commitment serves as a (semi-)permanent reminder of that commitment. This aspect could be enhanced by leaving participants a copy of their signed form or leaving a reminder, such as a "thank you for your commitment" sticker or magnet.

This review revealed additional features that may have contributed to making the commitment manipulation particularly successful. First, most of the researchers were careful to enhance the legitimacy of their program. In their spoken or written materials, they invoked local governments, particular service providers, environmental groups, the local college or university, and so on as the impetus for the program. Such legitimacy would make it difficult for people to reject the appeal without some consideration. Second, most of the programs provided a supportive physical environment for the new behavior (e.g., recycling bins with convenient pick-up; available public transit) or provided detailed written instructions and advice for being successful with the new behavior (e.g., ideas for conserving energy). Creating a supportive environment would be important for removing barriers that might undermine participants' efforts to change their behaviors (McKenzie-Mohr, 2000). Third, most researchers were careful to ask participants to commit to a specific behavior. Participants were not asked to commit to being a better person or to supporting environmental causes, but were asked to commit to recycling on particular days using a particular bin and location, using transit for their commute to work, and so on. We suspect that all of these features are essential for optimum program effectiveness, but of course, systematic research is needed to see which – if any – features are more effective and under what conditions.

In contrast, some aspects of manipulations may have undermined their effectiveness. For example, as noted previously, in the Shippee and Gregory (1982) study, combining commitment with publicity appeared to have backfired in the strong commitment condition (i.e., publication of each firm's failure to conserve energy appeared to undermine their efforts to conserve). A similar problem may have occurred in the DeLeon and Fuqua (1995) study, where weekly publication of each group's recycling performance may have been discouraging instead of encouraging.

Unfortunately, none of the studies we reviewed included manipulation checks on commitment. This means we do not know the degree to which participants felt committed, if at all, to change their behavior. Future studies on commitment making should incorporate such manipulation checks so more insight can be gained in how effective these manipula-

tions are and how they relate to behavioral change. Another weakness in the research is the lack of attention to real or perceived consequences for following through or failing to follow through on a commitment. Our opening remarks suggested that there are negative consequences for failing to follow through on a commitment; however that has not been specifically addressed in any of this research.

Conclusion

The existing literature in the domain of environmental psychology is generally highly positive about commitment making (e.g. De Young, 1993; Dwyer et al., 1993). Often it is presented as one of the most promising techniques to promote behavior change for both short- and long-term programs. In light of this positive and optimistic view, the current review may offer a more nuanced perspective. This chapter shows that out of the studies reviewed only 4 showed a main effect of commitment. In all the other studies, commitment needed to be combined with another type of intervention in order to have an impact. As can be seen from Table 5.1, the majority of the studies did not measure long term behavior change. Most studies include a follow up measurement only a couple of weeks after the intervention. Of the studies that do include a long-term follow up, only one study (Pallak and Cummings, 1976; 12 months) report a lasting significant change in behavior, while one (Matthies et al., 2006; 25 weeks) reports a marginally significant long term effect.

The popularity of commitment manipulations resides in part in the idea that commitment leads to long-term, internalized changes. The psychological processes of attitude change and self-concept/personal norms are of interest because they reflect ways in which the new behavior can be maintained and eventually become a habit (e.g., Holland, Aarts, & Langendam, 2006; Ouellette & Wood, 1998; Verplanken & Wood, 2006). Studies that yielded long-term, sustained change include Matthies et al. (2006), and Pallak and Cummings (1976), and both of these utilized self-concept/personal norm-related interventions that contributed to this increased internalization. Internalized norms are also of interest, as they reflect not mindless responding, but deliberate intentions to adhere to one's values. In the environmental literature, we found two studies that tap into a pre-existing willingness to commit to sustainability. Heberlein and Warriner (1983) measured family members' personal norms about energy conservation (willingness to commit to conserving energy), and Montada, Kals and Becker (2007) measured the relationship between "willingness for continued commitment" and behavioral intentions. Both of these studies are tapping into commitment at a later point in the development of permanent psychological and behavior change, and they both show that commitment is related to a number of different pro-environmental behaviors.

We began this literature review with describing the current popularity of commitment making initiatives. After reviewing the empirical support for this type of intervention, we have to conclude that the results are mixed. Few studies provided insights about the particular psychological mechanisms activated by commitment; however, these mechanisms

can be studied, and have been addressed in non-environmental research. From the present group of studies, interventions that play on norms and self-concepts seem to yield the most robust findings.

The most important lesson to be learned here is that the different insights derived from fundamental research are not very well integrated in the environmental field. Commitment manipulations used in field studies seem to address different constructs; while at the same time do not seem to be designed to aim at specific constructs. We suggest that future research into commitment should include measures of different possible mediators and tests which is/are most effective in producing behavior change. Then, with the knowledge from fundamental research, commitment manipulations can be improved to aim at specific constructs. At the same time, applied studies can then serve as important input to deepen our understanding of the underlying processes of commitment. A better understanding of the way commitment works will result in more successful tools that will help both researchers and professionals to stimulate pro-environmental behaviors.

Chapter 6

General Discussion



The main objective of the research described in this dissertation was to investigate whether and how commitment making can improve environmental behaviors. I have done so by performing both field and laboratory research, and by reviewing the commitment literature. The field research focused on nature conservation as performed by Dutch farmers. In the previous chapters I have described a social-cognitive explanation for farmers' motivation to perform nature conservation, showed that commitment making is effective in changing important aspects of nature conservation, investigated the conditions under which people are willing to make commitments, and described the processes through which commitment making can change environmental behavior. In this final chapter I will briefly summarize the most important findings in the studies described. I will then elaborate on the general implications of these findings, and finally I will end with suggestions for further research.

Summary of the main findings

In this thesis I have sought to investigate the process of commitment making as broadly as possible. To do so, I have used a multi-method approach: I have performed cross-sectional and quasi-experimental studies in the field, experimental studies in the laboratory, and a literature study.

Chapters 2 and 3 focused on nature conservation performed by Dutch farmers. In Chapter 2, a social-cognitive explanation of farmers' motivation to perform conservation practices was offered. A distinction was made between conservation that is subsidized by the Dutch government, and conservation that is performed in the absence of monetary rewards. I used a model based on the Theory of Planned Behavior (Ajzen, 1991) to which the concept of self-identity and personal norm were added. Results showed that this model explained more variance in the intention to perform non-subsidized than subsidized nature conservation practices. Also, self-identity seemed to impact intention to perform non-subsidized but not subsidized nature conservation practices. It was shown that next to a reward-based motivation, farmers can simultaneously have an identity-based motivation to engage in nature conservation practices.

Chapter 3 dealt with an intervention package containing both public commitment making and the administration of tailored information, aimed at improving farmers' nature conservation. The participating farmers were divided in three groups: one group received tailored information only, one group received both tailored information and a public commitment manipulation, and one group received no treatment at all and thus served as a control. Relevant aspects of both subsidized and non-subsidized nature conservation were measured before and after the intervention took place. Tailored information was administered by creating feedback reports that were tailor made for each farm, based on self reported data on habitat area and management. The feedback was combined with tailored advices on how to improve performance on four important aspects of nature conservation. In the tailored

information plus commitment condition, participants were asked in a group of peers which of these advices they were going to follow up on in the next year. This way, a public commitment manipulation was administered. Results showed that especially tailored information combined with public commitment making resulted in a stronger desire to engage in conservation, an increase in surface area of non-subsidized natural habitat, and an increase in time farmers spent on conservation. Participants who received only tailored information showed an increase in their surface area of non-subsidized natural habitat but did not show any change on our other measures. The intervention affected both subsidized and non-subsidized conservation; however the effects were stronger for non-subsidized conservation.

In Chapter 4, I investigated the conditions under which people are willing to make commitments. This is an important question, since the goal of this thesis was to investigate if and how commitment making can successfully promote environmental behavior. In order for commitment making to be successful, people first have to be willing to make commitments. In this chapter we looked at commitment making as a structural solution to a social dilemma. Environmental issues such as nature conservation are, in essence, social dilemmas in which the individual needs are at odds with the group needs (see for example Joireman et al., 2001). In two experiments it was shown that people low in dispositional trust were in favor of contributing to a system of public commitment making when they had situation-specific information that others would contribute a lot to the realization of the public good. People high in dispositional trust showed the opposite pattern: They were in favor of contributing to a system of public commitment making when they had situation-specific information that others would not contribute a lot to the realization of the public good. This chapter showed that two types of trust, dispositional and situation-specific, are essential in predicting if people are willing to invest in public commitment making.

Chapter 5 of this dissertation consisted of a critical review of commitment making as an intervention in environmental research. Commitment making is generally seen as a very promising intervention technique (De Young, 1993; Dwyer et al., 1993). In this chapter, I reviewed the literature on the effectiveness of commitment, and found that while there are indeed studies that confirm the effect of commitment on behavior change, the overall results are mixed. Also, I noticed that the ways in which commitment manipulations are administered vary greatly among different studies. Most research does not pay attention to the processes through which commitment operates. Based on more fundamental research, I proposed three different but not necessarily mutually exclusive routes through which commitment might change behavior. First, committing to a particular behavior might make people see this behavior as part of the self. People are generally motivated to behave in congruence with their self-concept and may thus alter their behavior accordingly (Bem, 1972). Second, the making of commitments might evoke a norm to adhere to this commitment. Such a norm can be either personal or social. Researchers often assume that commitment making should be done in public so that a social norm is evoked. However, research by Kerr,

Garst, Lewandowski, and Harris (1997) shows that people tend to adhere to previously made commitments even when there is no public surveillance. It might therefore very well be that personal norms underlie the process through which people change their behavior upon making a commitment to do so. Yet a third possible route lies in the attitudinal approach, whereby the making of a commitment keeps the behavior at hand salient and activates cognitive processes such as “cognitive elaboration”, resulting in a strong en central attitude towards the behavior (Werner et al., 1995). From the empirical studies investigated in this chapter it is not possible to draw any firm conclusions concerning the validity of any of these routes, although it looks as though commitment interventions that tap into norms or the self-concept are most successful.

General implications

The most important finding in this dissertation is that commitment making can be effective in promoting pro-environmental behavior. This is shown in different ways: By the quasi-experimental field study on farmers’ nature conservation in Chapter 3, and by the literature review in Chapter 5. However, it also becomes clear that commitment making is no “quick fix”: Using commitment making as an intervention strategy requires careful consideration on the part of the researcher. As I argued in Chapter 5, there is great variation in the ways commitment manipulations are administered, and as such it should come as no surprise that effects of commitment making are mixed. I have attempted to shed some light on this issue by clarifying possible underlying mediators of the effect of commitment on behavior: self-concept, attitudes, and a normative process. As a general recommendation I believe researchers who are designing an intervention that contains commitment making should consider in great detail the environment they are working in. By environment, I mean the research setting, the target sample and the behavior at stake. Only by carefully examining these aspects and deciding which mediator a commitment manipulation should activate can a successful commitment manipulation be designed and administered.

Another implication from the current line of research is that giving tailored information (including feedback) as an intervention strategy by itself may be not strong enough to produce actual behavior change. This follows from the results presented in Chapter 3, that show the greatest change occurred in the condition wherein people were given both tailored information and commitment. While tailored information alone was successful in producing an increase in surface area of non-subsidized natural habitat, the combination of tailored information and public commitment making yielded stronger effects on multiple dependent measures. The finding that especially the combination of these two intervention strategies was most successful corroborates findings in the literature that interventions packages that combine several manipulations are generally most prone to yield results (Stern, 2000; DeLeon & Fuqua, 1995). Although it is good to know that combining multiple

strategies works, it would also be interesting to know how the separate strategies work and why they sometimes fail to produce results. Therefore it is important that we measure not only outcome variables on the behavioral level, but also possible social psychological underpinnings of those behaviors.

An important aspect of the current dissertation is that the field research described in Chapters 2 and 3 focused on nature conservation performed by farmers. This group is not usually targeted by social scientists (but see Fielding, Terry, Masser & Hogg, 2008, and Fielding et al., 2005). As I argued in Chapter 3, when designing an intervention it is important to select a target behavior that has a significant impact on the environment. Farmers' nature conservation practices have this significant impact and therefore I consider it highly relevant to study this behavior (see also Fish, Seymour, & Watkins, 2003). This research thus contributes to the environmental psychology literature by introducing a fairly new target group as well as a new target behavior. Most published studies in this area of research deal with household behavior such as energy saving or recycling. These are behaviors that are relatively easy to perform. Nature conservation, however, is more complex than that. It covers a wide range of different behaviors such as mowing and planting. Not only do these behaviors vary greatly in difficulty, they are also to a varying extent contingent on more practical matters such as climate, subsidies, soil type, et cetera. This makes it harder to study and to intervene in these behaviors. Also, farmers as a target group are hard to reach: Very few studies have assessed farmers' motivation towards biodiversity and conservation, and even fewer are successful in increasing it (Herzon & Mikk, 2007). This might be due to the fact that nature conservation practices can conflict with the economic goals that come with farming. In fact research has shown that goodness of fit between current farm management and conservation prescriptions are a key factor in farmers' decisions (not) to participate in conservation (Wilson & Hart, 2000). By distinguishing subsidized from non-subsidized conservation practices the current research was able to show that economic factors are not solely responsible for decisions concerning conservation. For all these reasons I consider the results I present in Chapter 3 very promising.

An assumption of the current research lies in the idea that environmental issues such as nature conservation are, in essence, social dilemmas. This implies that within these environmental issues individuals are continuously faced with the decision to either pursue their own personal (short-term) interest, or the group's (long-term) interest. Examples abound: Recycling, for instance, is unattractive for individuals since it is costly in terms of effort. Yet it is in the interest of the collective that many individuals recycle. In the case of farmers, they have to decide whether to invest in nature conservation or not. The advantages of nature conservation, such as an increase in biodiversity, are enjoyed not solely by them personally, but by the collective as well. In order to understand such environmental issues, and to promote pro-environmental behavior, it is essential to understand the nature of social dilemmas (Vlek, 2000; Gifford & Hine, 1997).

In the experimental social dilemma literature, it has been shown that commitment making increases cooperation (Dawes, 1980; Kerr & Kaufmann-Gilliland, 1994; Kollock, 1998; Komorita & Parks, 1995). In more applied environmental psychology studies, it has been found that commitment making increases pro-environmental behavior (De Young, 1993; Dwyer et al., 1993). This is no coincidence when bearing in mind that, as I just argued, pro-environmental behaviors are instances of cooperative behavior.

In this dissertation I have empirically shown that commitment is effective in promoting nature conservation. However, in order for any intervention program to be effective, people have to be willing to participate in it. This willingness to engage in public commitment making has until now not been systematically investigated. In my research, specifically in Chapter 4, I identify the conditions under which people will be willing to make public commitments. I do so by looking at commitment making as structural solution to social dilemmas. This approach enables me to make use of the literature on other structural solutions when identifying the conditions under which people are willing to put effort in commitment making and when they are not. The studies reported in Chapter 4 are a first attempt to shed light on this issue. With this knowledge the effectiveness of intervention programs in the environmental domain can hopefully be increased.

Suggestions for future research

After considering the general implications that result from the studies described in this dissertation, it is now time to translate these implications into more tangible suggestions for future research. As argued above, my findings concerning the conditions under which people are willing to make commitments can help increase the effectiveness of commitment interventions in the environmental domain. We now know that this willingness is dependent on the interplay of dispositional trust and situational expectations. Specifically, we know that people are willing to invest in public commitment making when their dispositional trust and situational expectations are incongruent. Researchers can use this information in the process of designing a commitment intervention, by carefully considering people's situational expectations and the level of trust within the group, or by manipulating these by giving people information about what to expect from others.

Another interesting pathway for future research would be to empirically test the routes through which commitment making alters environmental behavior. In Chapter 5, I propose three possible routes: self-concept, attitudes, and normative processes. Based on the literature, I conclude that there seems to be the greatest amount of evidence for self-concept and norms to mediate the effect of commitment on behavior. However, in order to truly disentangle the three, it would be interesting to pit them against each other in an empirical commitment study. An example for such a study is offered by Burger and Caldwell (2003), who showed that a change in self-concept underlies the foot-in-the-door effect.

In this study, participants complied with a small request by signing a petition and writing a statement about problems of homelessness. After this, they completed a questionnaire measuring differences in self-concept related to feeling compassion and helping with worthy causes. These participants described themselves as more willing to provide support and as more compassionate than a control group. Also, they were more likely to comply with the target request to volunteer with a food drive than the control group. Mediation analysis showed that the change in self-concept mediated the FITD effect. Such a study could be performed on commitment, in which case participants would first be asked to commit to a certain behavior, after which changes in self-concept would be measured as well as willingness to actually perform the behavior.

Furthermore, in Chapter 2 it was shown that self-identity predicts farmers' intentions to perform non-subsidized nature conservation. Self identity refers to a collection of identities derived from the various social roles someone occupies (Stryker, 1968) and thus closely resembles the notion of self-concept (Bem, 1972), which refers to the idea that people infer their attitudes from their own behavior. Seen as how I argue that commitment can alter behavior through this self-concept, it seems plausible to hypothesize that in the case of farmers' nature conservation, commitment manipulations can be improved by addressing the self-concept. Research by Cialdini et al. (1998) indicates that this can be done by combining the commitment manipulation with a trait label. Labelling the participants as "the kind of people who perform this behavior" can counter the undermining effect of external justifications for behavior and make the self-concept salient. Therefore, for possible further interventions concerning farmers' nature conservation, I recommend that commitment manipulations be combined with such trait labels.

Conclusion

The current line of research has shown that the making of public commitments is successful in improving farmer's nature conservation practices. This success is of course dependent on people's willingness to make such commitments. It appears people are willing to invest in commitment making when their general trust and situation-specific expectations are incongruent. The current research has also highlighted that there are three possible routes through which commitment may alter behavior: self-concept, attitudes, and normative processes.

What I have presented in this dissertation is a perspective on the entire process of commitment making: under which conditions people engage in it, if it is successful in altering behavior, and how it is successful. By doing so, I hope to have contributed to the improvement of public commitment making as a tool to promote pro-environmental behavior.

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Nederlandse samenvatting

Dutch summary

Dit proefschrift gaat over het effect van het maken van publieke beloftes (*public commitments*) op gedrag. Meer specifiek onderzoek ik in dit proefschrift of het maken van zulke beloftes effect heeft op agrarisch natuurbeheer. Daarnaast onderzoek en beschrijf ik het proces waarin publieke beloftes gedrag veranderen, en onderzoek ik onder welke omstandigheden mensen geneigd zijn om zulke beloftes te maken.

Publieke beloftes worden vaak ingezet als middel om milieuvriendelijk gedrag van mensen te stimuleren. Het maken van publieke beloftes houdt in dat mensen in het bijzijn van anderen beloven hun gedrag te veranderen. Deze techniek is al veel gebruikt in milieupsychologisch onderzoek. Aangevoerd is dat mensen die publieke beloftes maakten, meer gingen recyclen (Burn & Oskamp, 1986; DeLeon & Fuqua, 1995; Wang & Katzev, 1990), minder energie gingen gebruiken (Pallak & Cummings, 1976), en vaker de auto lieten staan (Matthies et al., 2006).

In het eerste empirische hoofdstuk van dit proefschrift (Hoofdstuk 2) onderzoek ik de motivatie van boeren voor agrarisch natuurbeheer. Er wordt hierbij een onderscheid gemaakt tussen natuurbeheer dat door de Nederlandse overheid wordt gesubsidieerd, en natuurbeheer waarvoor de boer geen compensatie ontvangt. Om de intentie om aan natuurbeheer te doen te voorspellen, maak ik gebruik van de Theory of Planned Behavior (Ajzen, 1991), waaraan de variabelen persoonlijke norm en zelfidentiteit zijn toegevoegd. Deze studie laat zien dat de intentie om aan gesubsidieerd beheer te doen wordt voorspeld door de attitude ten opzichte van dat beheer. De intentie om aan niet-gesubsidieerd beheer te doen wordt beter voorspeld door het gebruikte model, en wel door attitude, subjectieve norm en zelfidentiteit. Hoewel er dus duidelijke verschillen zijn tussen gesubsidieerd en niet-gesubsidieerd beheer in termen van motivatie, sluit het een het ander niet uit: naarmate de intentie om aan gesubsidieerd beheer te doen sterker is, is de intentie om aan niet-gesubsidieerd beheer te doen ook sterker.

In Hoofdstuk 3 wordt een interventie getoetst die gericht is op het verbeteren van agrarisch natuurbeheer. Deze interventie bevat zowel informatie (feedback) als een *public commitment* manipulatie. De deelnemende boeren werden verdeeld over drie condities: een groep ontving alleen feedback, een groep ontving zowel feedback als de commitment manipulatie, en een groep was de controle. Zowel voor als na de interventie werden relevante aspecten van natuurbeheer gemeten. Dit onderzoek laat zien dat met name de combinatie van feedback en commitment effectief is in het verbeteren van natuurbeheer. Boeren die beide manipulaties ontvingen, lieten een sterkere wens zien om aan natuurbeheer te doen,

vergrootten hun oppervlakte niet-gesubsidieerde natuur, en gingen meer tijd besteden aan natuurbeheer. Boeren die alleen feedback ontvingen, vergrootten ook hun oppervlakte niet-gesubsidieerde natuur, maar lieten verder geen veranderingen zien. Over het geheel genomen waren de effecten van de interventie sterker voor niet-gesubsidieerd natuurbeheer sterker dan voor gesubsidieerd natuurbeheer.

Nu we, op basis van het huidige en ander onderzoek weten dat het maken van commitments succesvol is in het veranderen van (milieu-relevant) gedrag, is het belangrijk te onderzoeken onder welke omstandigheden mensen bereid zijn zulke commitments te maken. In Hoofdstuk 4 onderzoek ik dit door het maken van commitments te zien als een structurele oplossing voor een sociaal dilemma. Zo'n dilemma ontstaat wanneer het eigen belang haaks staat op het belang van de groep. Veel milieuproblemen zijn in essentie sociale dilemma's. In het geval van agrarisch natuurbeheer moeten boeren kiezen of zij willen investeren in het verbeteren van de natuur. De kosten daarvan dragen zij zelf, maar de opbrengsten, namelijk de verbeterde natuur, zijn voor iedereen. Dit is een typisch voorbeeld van een publiek goed dilemma, waarbij groepsleden zelf bepalen of en hoeveel ze bijdragen aan de realisatie van een goed waarvan iedereen de vruchten plukt. Een manier om zo'n dilemma op te lossen is de structuur van de situatie te veranderen; dit wordt een structurele oplossing genoemd. Een voorbeeld van zo'n structurele oplossing is het aanstellen van een leider die bepaalt hoeveel iedereen bij moet dragen. In dit hoofdstuk beargumenteer ik dat het maken van commitments ook een structurele oplossing is. De studies die in dit hoofdstuk worden beschreven laten zien dat mensen bereid zijn te investeren in het maken van commitments wanneer hun mate van dispositioneel vertrouwen en hun mate van situatiespecifiek vertrouwen incongruent zijn. Dat wil zeggen dat mensen die van nature veel vertrouwen in anderen hebben, bereid zijn te investeren in het maken van commitments wanneer zij verwachten dat in het specifieke dilemma waarin ze zitten, mensen weinig zullen bijdragen aan het publieke goed. Voor mensen die van nature weinig vertrouwen in anderen hebben geldt het omgekeerde: zij zijn bereid te investeren in het maken van commitments wanneer zij verwachten dat in het specifieke dilemma waarin ze zitten, mensen veel zullen bijdragen aan het publieke goed.

Hoofdstuk 5 biedt een overzicht van de verschillende manieren waarop publieke commitments worden ingezet om milieuvriendelijk gedrag te stimuleren. In dit hoofdstuk onderzoek ik hoe het kan dat het maken van commitments invloed heeft op menselijk gedrag. Ik stel drie mogelijkheden voor. Ten eerste kan het zo zijn dat het maken van een commitment ervoor zorgt dat mensen het nieuwe gedrag zien als onderdeel van het zelf. Het maken van een commitment om bepaald gedrag te gaan vertonen leidt ertoe dat mensen zichzelf gaan zien als "het soort mensen die dit gedrag vertoont". In dit geval loopt de relatie van het maken van commitments en gedrag via het *zelfconcept*.

Een tweede mogelijkheid is dat mensen een persoonlijke of sociale *norm* ervaren die voorschrijft dat je je houdt aan wat je hebt beloofd. Als het gaat om een sociale norm, houd

je je aan je commitment omdat anderen dat belangrijk vinden. Wanneer het gaat om een persoonlijke norm, houd je je aan je commitment vanwege een persoonlijke overtuiging. Vaak wordt ervan uitgegaan dat mensen zich aan publieke commitments houden vanwege de sociale norm; echter, onderzoek van Kerr, Garst, Lewandowski, and Harris (1997) laat zien dat mensen zich aan beloftes houden ook al er niemand aanwezig om ze op het eventuele verbreken ervan te betrappen.

Ten derde kan het ook zo zijn dat het maken van een publieke commitment het onderwerp waar het om gaat extra saillant maakt; dat de commitment zelf mensen aan dit onderwerp herinnert. Mensen gaan dan bewuster nadenken over het gedrag waar het om gaat en dit proces leidt tot een sterke en centrale *attitude* ten opzichte van het gedrag.

Ik onderzoek in dit hoofdstuk of de milieupsychologische studies die een effect van het maken van publieke beloftes op gedrag rapporteren, ook aanwijzingen geven voor wat betreft de drie voorgestelde processen. Ik kom tot de conclusie dat voor geen van drieën sterk empirisch bewijs is, maar dat het lijkt dat zelfconcept en normatieve overwegingen een belangrijke rol spelen.

In Hoofdstuk 6 worden de belangrijkste bevindingen van het huidige onderzoek beschreven. Ook beschrijf ik hier de algemene conclusies en aanbevelingen die voortvloeien uit deze dissertatie. Samenvattend laat dit onderzoek zien dat het maken van commitments succesvol kan zijn in het verbeteren van milieurelevant gedrag, in het bijzonder agrarisch natuurbeheer. Dit succes is uiteraard afhankelijk van de bereidheid van mensen om zulke commitments te maken. Het blijkt dat mensen geneigd zijn te investeren in het maken van commitments wanneer hun mate van dispositioneel vertrouwen en hun mate van situatie-specifiek vertrouwen incongruent zijn. Daarnaast laat dit onderzoek zien dat er drie mogelijke routes zijn waardoor het maken van commitments gedragsverandering teweeg brengt: zelfconcept, attitude en normatieve overwegingen.

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Curriculum Vitae



Anne Marike Lokhorst was born on August 22, 1980 in Amsterdam. She received her secondary education diploma from the Noordgouw in Heerde in 1998. She went on to study Social & Organizational Psychology at the University of Groningen. After receiving her Master's degree in 2004, she started working on her PhD at Leiden University in 2005, which resulted in the current dissertation. She now works at the Netherlands Institute for Social Research (SCP), The Hague, doing research on poverty and social exclusion among children.

Anne Marike Lokhorst werd geboren op 22 augustus, 1980, in Amsterdam. Ze haalde haar VWO diploma op de Noordgouw in Heerde in 1998. Ze studeerde Sociale en Organisationspsychologie aan de Rijksuniversiteit Groningen. Na haar afstuderen in 2004 begon ze in 2005 aan haar promotieonderzoek aan de Universiteit Leiden, wat geresulteerd heeft in dit proefschrift. Momenteel werkt ze bij het Sociaal en Cultureel Planbureau (SCP) in Den Haag, waar ze onderzoek doet naar armoede en sociale uitsluiting bij kinderen.

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