18 Models to explain environmental behaviour

Linda Steg
University of Groningen, The Netherlands

Annika Nordlund
Umeå University, Sweden

CHAPTER OUTLINE

18.1   INTRODUCTION

In this chapter, we discuss models of factors that influence environmental behaviour. These models mostly assume that people make reasoned choices (see Steg & Vlek, 2009a); the role of automaticity and habits will be discussed in Chapter 19. We first discuss models that focus on the role of individual costs and benefits, of which the theory of planned behaviour is the most prominent example. Next, we elaborate on models that focus on morality, in particular the norm activation model and the value-belief-norm theory of environmentalism. Finally, we discuss goal framing theory, which provides an integrated framework for understanding factors influencing environmental behaviour.

18.2   THEORY OF PLANNED BEHAVIOUR

The **theory of planned behaviour** (TPB; Ajzen, 1985; see Figure 18.1) assumes that individuals make reasoned choices, and that behaviour results from the **intention** to engage in specific behaviour (i.e. whether they plan to do so). The stronger your intention, the more effort you will make to conduct a particular behaviour, and the more likely it is that you engage in the behaviour. The intention depends on **attitudes** towards the behaviour, **subjective norms** related to the behaviour and **perceived behaviour control**.

Attitudes reflect the extent to which engaging in the behaviour is evaluated positively or negatively. For example, you may have a favourable attitude towards cycling, but a negative attitude towards taking a bus. Attitudes are based on beliefs about the likely costs and benefits of behaviour, weighted with the extent to which these costs and benefits are considered important. For example, a person may believe that the car is fast, comfortable, reliable and enjoyable, and consider these aspects as highly important. On the other hand, this person may think the car is expensive and not environmentally friendly, but consider these aspects to be less important. This will result in an overall positive attitude towards car use, as the weighted benefits are higher than the weighted costs.

Subjective norms reflect the extent to which a person believes that important others would approve or disapprove of the behaviour (and are thus similar to injunctive norms; see Chapter 15) and reflect social costs and benefits of behaviour. Subjec-
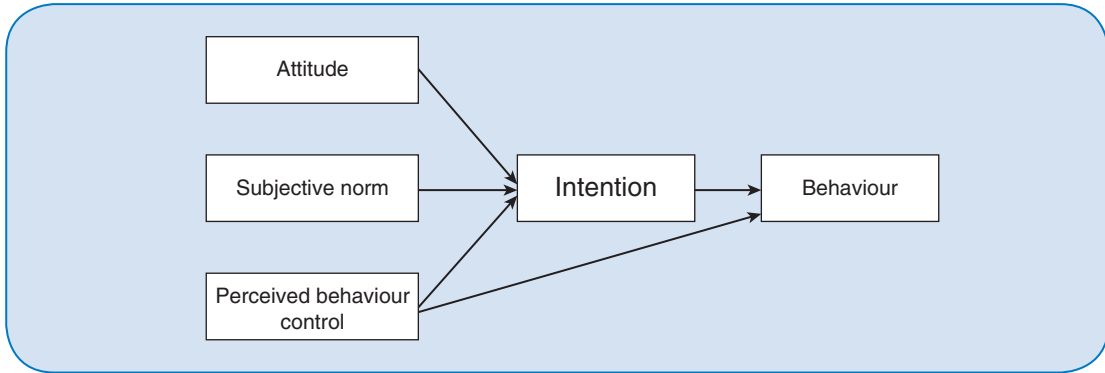
Figure 18.1 *A schematic representation of the theory of planned behaviour.*

tive norms are based on beliefs about the expectations of relevant reference groups concerning the behaviour, weighted by one's motivation to comply with these expectations. For example, your classmates and friends may expect you to cycle to university and you may be strongly motivated to comply with their expectations, while your neighbour, whose opinion you value far less, may approve of your driving to university. In this case, you will experience a subjective norm in favour of cycling rather than driving.

Perceived behavioural control refers to the perceived possibility to perform the behaviour, which depends on beliefs about the presence of factors that may facilitate or hinder the relevant behaviour. For example, you may believe you cannot afford to drive to work, resulting in a low perceived behaviour control to drive, or you may believe that cycling to work is exhausting and that you are not fit enough to cycle, resulting in a low behaviour control to cycle. Perceived behavioural control can influence behaviour via intention, as explained in the examples above, but may also influence behaviour directly. For example, suppose that you intend to take the bus to work, but then learn that the bus drivers are on strike. In that case, perceived behaviour control to travel by bus will be low and directly affect your travel behaviour.

The TPB assumes that all other factors, such as socio-demographics, general beliefs and values, influence behaviour indirectly, via attitudes, subjective norms and perceived behavioural control. For example, strong **biospheric values** (see Chapter 14) may result in positive attitudes towards cycling and a negative attitude towards driving, given their different environmental impacts. Also, owing to poor public transport services, people living in the countryside may have a lower perceived behavioural control to take the bus than urbanites.

The TPB has been successful in explaining various types of environmental behaviour. Bamberg and Schmidt (2003) found that students were more likely to travel by car to university when they intended to do so. The intention to drive was higher when they had a positive attitude towards driving, when subjective norms were in favour of car use, and, to a lesser extent, when they thought they were able to drive to university. Harland, Staats and Wilk (1999) found that the TPB variables, and

particularly attitudes and perceived behavioural control, predicted a wide range of environmental behaviours, including the intention to use transport forms other than the car, the use of unbleached paper, reductions in meat consumption and the use of energy-saving light bulbs. They did not include intentions as a predictor of behaviour, since they measured intentions and past behaviour at the same moment of time; indeed, it makes theoretically no sense to predict past behaviour from future intention.

The predictive power of the TPB increases when other motivational predictors are included in the model (e.g. habits; see Chapter 19). Harland and colleagues (1999) found that **personal norms**, that is, feelings of moral obligation to engage in particular pro-environmental actions, predicted different pro-environmental intentions and behaviours over and above the TPB variables (see Box 18.1 for details). Similar results were reported by Bamberg and Schmidt (2003): personal norms predicted students' car use and bus use, respectively, over and above the TPB variables.

Personal norms are a key factor in two other prominent theories in environmental psychology that we will discuss below: the **norm activation model** and the **value–belief–norm theory of environmentalism**. These models assume that morality plays a key role in pro-environmental behaviour because pro-environmental actions often involve higher costs and effort for individuals: in many cases, people will only act pro-environmentally because they feel it is the right thing to do.

BOX 18.1   EXTENDING THE TPB WITH PERSONAL NORMS

Harland and colleagues (1999) asked respondents to indicate how often they had used unbleached paper during the last 6 months. Respondents indicated (1) how they evaluated the use of unbleached paper (attitudes), (2) to what extent important others expect them to use unbleached paper (subjective norms), (3) whether they could in most instances use unbleached paper when they wanted to do so (perceived behaviour control) and (4) whether they felt personally obliged to use unbleached paper (personal norms). The TPB variables explained 28 per cent of the variance in the behaviour: positive attitudes towards using unbleached paper and a higher perceived behavioural control resulted in a higher use of unbleached paper. Subjective norms did not significantly contribute to this regression model. When adding personal norms to this regression model, 34 per cent of the variance in behaviour was explained. Personal norms appeared to be the strongest predictor: participants used unbleached paper more often when they felt morally obliged to do so. Attitudes and perceived behaviour control were still significant predictors as well. So, adding personal norms significantly improved the predictive power of the TPB. Similar results were found for other types of pro-environmental intentions and behaviour included in this study.

18.3   THE NORM ACTIVATION MODEL

The norm activation model (NAM; Schwartz, 1977; Schwartz & Howard, 1981; Steg & De Groot, 2010) proposes that pro-environmental actions follow from the activation of personal norms, reflecting feelings of moral obligation to perform or refrain from specific actions. Personal norms are activated by four key variables:

- **Problem awareness** (or awareness of need): level of awareness of the adverse consequences of not acting pro-environmentally.
- **Ascription of responsibility**: feeling responsible for the negative consequences of not acting pro-environmentally.
- **Outcome efficacy**: the identification of actions to reduce environmental problems.
- Ability or **self-efficacy**: recognition of own ability to provide relief to environmental threats.

Schwartz and Howard (1981) called these situational variables, because the strength of these variables differs across situations; they are not stable over time. The basic idea is that personal norms are activated when someone is aware of the environmental problems caused by his or her behaviour, and when he or she feels personally responsible for these problems and does not attribute these problems to the actions of others, industry or the government. Moreover, people should believe that their actions may help to reduce the relevant problems (i.e. outcome efficacy). This is particularly important in case of environmental problems that can be solved only when lots of people cooperate, such as to reduce harmful emissions or resource use. In these cases, outcome efficacy strongly depends on the expectation that others will engage in pro-environmental actions too. Finally, one should feel to be able to engage in the actions needed to reduce the relevant environmental problems (i.e. self-efficacy); this is comparable to perceived behavioural control in the TPB.

The NAM appeared to be successful in explaining various types of pro-environmental intentions and behaviours, such as energy conservation (Black, Stern, & Elworth, 1985), willingness to pay for environmental protection (Guagnano, Dietz, & Stern, 1994), intention or willingness to reduce car use (Abrahamse, Steg, Gifford, & Vlek, 2009; Eriksson, Garvill, & Nordlund, 2006), using the car for short distances and turning off the tap while brushing teeth (Harland, Staats, & Wilke, 1999), political behaviour (Gärling, Fujii, Gärling, & Jakobsson, 2003) and general pro-environmental behaviour (Nordlund & Garvill, 2002). However, studies typically did not include all four situational variables listed above. Notably, most studies did not include self-efficacy and included either ascription of responsibility or outcome efficacy.

Two issues make it difficult to compare results across studies (Steg & De Groot, 2010). First, the main constructs of the NAM have been conceptualised differently across studies. Some studies measured the situational variables listed above on a general level such as general awareness of environmental problems (e.g. Stern, Dietz,

Abel, Guagnano, & Kalof, 1999), while other studies included behaviour-specific variables, such as awareness of problems caused by energy use (e.g. Nordlund & Garvill, 2003; Steg, Dreijerink, & Abrahamse, 2005). Behaviour-specific beliefs are generally more strongly related to intentions and behaviours than are general beliefs (Ajzen, 1985). This suggests that the NAM, like the TPB, will be better able to explain variance in environmental intentions and behaviour when the predictor variables are tuned towards the intention or behaviour explained (see also Schwartz, 1977).

Second, the causal relationships between the model variables have been interpreted differently. Some scholars argued that situational factors **moderate** the relationship between personal norms and intention or behaviour (e.g. Schultz & Zelezny, 1998), which implies that personal norms are particularly predictive of intentions and behaviour when problem awareness, responsibility feelings, outcome efficacy and self-efficacy are strong. Other scholars argued that the situational factors predict personal norms (e.g. Bamberg & Schmidt, 2003; Nordlund & Garvill, 2002, 2003), and that the strength of personal norms thus depend on the situational variables. Steg and De Groot (2010; De Groot & Steg, 2009) compared the predictive power of both model interpretations, and found most support for the latter **mediator model**. Apparently, people first should be aware of the problems caused by their behaviour before they consider their own responsibility for these problems, and before considering whether they can effectively help to reduce these problems and feeling morally obliged to do so (see Box 18.2). The mediator model is also theoretically more plausible, because it is not likely that people will think about their obligation to protect

BOX 18.2   TESTING CAUSAL RELATIONSHIPS IN THE NAM

Steg and De Groot (2010) tested causal relationships in the NAM in an experimental study. They manipulated problem awareness by presenting half the respondents with a text in which the problems of particulate matters were stressed, whereas the other respondents read a text in which these problems were trivialised. The manipulation was successful: problem awareness was higher in the first group than in the second group. Next, they examined to what extent this manipulation influenced feelings of responsibility to take action to reduce emissions of particulate matters (e.g. I believe that I am co-responsible for the reduction of particulate matters in the city), personal norms towards

doing so (e.g. I feel morally obliged to demonstrate against particulate matters) and intention to participate in such actions (e.g. to what extent are you prepared to collect signatures to reduce the emissions of particulate matters?). As expected, higher problem awareness resulted in stronger ascription of responsibility, personal norms and intention to participate in actions to reduce the emission of particulate matters. As this was an experimental study, in which one variable was manipulated while all other variables were kept constant, we can conclude that higher problem awareness causes stronger responsibility feelings, personal norms and increased pro-environmental intentions.

the environment and to act accordingly when they are not aware of any environmental problems caused by their behaviour, and when they do think they can not engage in effective actions to reduce these problems.

18.4   THE VALUE–BELIEF–NORM THEORY OF ENVIRONMENTALISM

The value–belief–norm theory of environmentalism (VBN theory; Stern, 2000; Stern et al., 1999) is an extension of the NAM. The VBN theory proposes that the situational factors, notably problem awareness, depend on **values** (i.e. general goals that serve as guiding principles in your life) and **ecological worldviews** (i.e. beliefs on relationships between humans and the environment; see also Chapter 14). The VBN theory proposes that egoistic values are negatively related and altruistic and biospheric values are positively related to ecological worldviews. Ecological worldviews predict problem awareness, which in turn influences one's beliefs on whether one can act to reduce the environmental threat, personal norms and subsequently behaviour (see Figure 18.2). Each variable in the causal chain is related to the next variable, but may also be directly related to variables further down the chain, although these relationships should be weaker. This is in line with the NAM as a mediator model discussed above. Personal norms may influence all kinds of behaviours taken with pro-environmental intent, including environmental activism (e.g. active involvement in
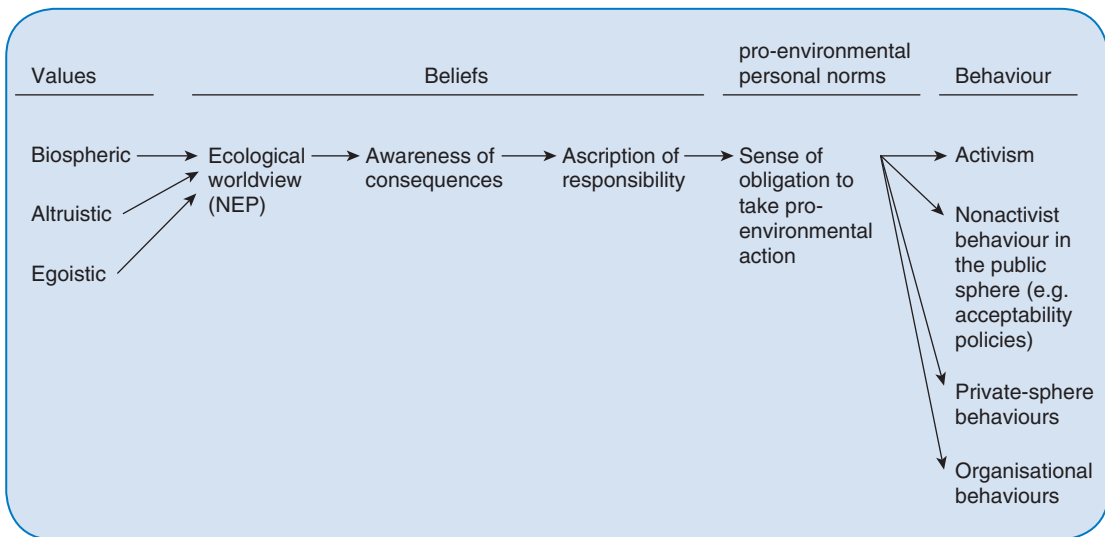

Figure 18.2 *A schematic representation of the value–belief–norm theory of environmentalism.* Adapted from Stern (2000).

environmental organisations or demonstrations), non-activist behaviours in the public sphere (e.g. environmental citizenship, acceptability of public policies), private-sphere environmentalism (i.e. the purchase, use and disposal of products that have environmental impact) and organisational actions (e.g. the design of environmentally benign products; see Figure 18.2).

The VBN appears to be successful in explaining environmental citizenship (Stern et al., 1999), household energy use (Abrahamse & Steg, 2011) and policy acceptability (Eriksson, Garvill, & Nordlund, 2006; 2008; Steg et al., 2005). Steg and colleagues (2005) found support for the causal structure as proposed in the VBN theory: all variables were significantly related to the next variable in the causal chain, and in most cases, the explanatory power of the model hardly increased when other predictor variables further up the causal chain were entered into the regression model as well. Only biospheric values were also significantly related to feelings of moral obligation when intermediate variables were controlled for, which suggests that biospheric values can directly activate personal norms.

Overall, studies revealed that the NAM and VBN theory are particularly successful in explaining low-cost pro-environmental behaviours and 'good intentions' such as willingness to change behaviour, political behaviour, environmental citizenship and policy acceptability (as explained above), but have less explanatory power in situations characterised by high behavioural costs or strong constraints on behaviour, such as reducing car use (e.g. Abrahamse & Steg, 2009; Bamberg & Schmidt, 2003). In such settings, the TPB appears to be more powerful in explaining environmental behaviour (Bamberg & Schmidt, 2003), probably because the TPB considers a wider range of factors, notably non-environmental motivations. However, it is not clear yet which theoretical model is most useful in which situation because systematic research on the range of application of each theory is lacking.

When acting pro-environmentally is costly, people are probably tempted to reduce feelings of moral obligation via self-serving denial (Lindenberg & Steg, 2007; Schwartz & Howard, 1981). They can do so by downplaying the four situational factors described earlier. For example, people can deny the seriousness of environmental problems, reject their liability for these problems or identify others such as authorities or industry as responsible for environmental problems, indicate that individual pro-environmental actions are not effective in reducing environmental problems or deny their personal ability to perform the necessary actions.

18.5 GOAL FRAMING THEORY

Various scholars have integrated concepts and variables from different theories, such as including variables from the NAM in the TPB, as described above (e.g. Abrahamse & Steg, 2009; Harland et al., 1999). This suggests that behaviour result from cost–benefit considerations (as proposed by the TPB) as well as normative considerations. **Goal framing theory** (Lindenberg & Steg, 2007; see also Chapter 12) proposes that

goals govern or 'frame' the way people process information and act upon it. When a goal is activated (that is, when it is 'focal'), it influences what a person thinks of at the moment, what information he or she is sensitive to, what alternatives he or she perceives, and how he or she will act. As described in Chapter 12, goal framing theory distinguishes three general goals that influence behaviour: **hedonic goals** 'to feel better right now', **gain goals** 'to guard and improve one's resources' and **normative goals** 'to act appropriately'. Hedonic goals are a priori strongest, while especially normative goals need external support to become focal.

According to goal framing theory, one goal is focal and influences information processing the most, that is, it is the **goal frame**, while other goals are in the background and increase or decrease the strength of the focal goal. Thus, multiple goals may be active at any given time. When background goals are compatible with the goal frame, they strengthen it. For example, when normative goals are focal, you are probably more motivated to act pro-environmentally, and when this choice is also most beneficial (e.g. cycling is cheaper than driving) or comfortable (e.g. insulating your house also increases comfort), gain or hedonic goals will strengthen your normative goal. But when the goal frame and background goals conflict, the latter weaken the strength of the goal frame. For example, when your normative goal is focal and then you realise that organic food is very expensive (so it conflicts with your gain goal), the normative goal will be weakened, and one may decide to choose products that are somewhat less environmentally friendly yet not as expensive. Normative goals provide the most stable basis for pro-environmental actions, because acting pro-environmentally is always the most appropriate way to act. However, if people act pro-environmentally based on gain or hedonic goals, they will do so only as long as it is profitable and comfortable to do so, which may not always be the case (De Groot & Steg, 2009). For example, when hedonic goals are focal, people may engage in pro-environmental actions when they are in a good mood but not when they are in a bad mood.

The three goal frames coincide with three theoretical frameworks commonly used in environmental psychology (Lindenberg & Steg, 2007): theories and models on affect (see Chapter 16) focus on hedonic goals, the TPB focuses on gain goals, while the NAM and VBN theory focus on normative goals. Thus, goal framing theory offers an integrative framework for understanding environmental behaviour.

18.6   SUMMARY

This chapter discussed a number of prominent models explaining environmental behaviour. The theory of planned behaviour (TPB) assumes that individuals make reasoned choices, and that behaviour results from the intention to engage in specific behaviour. Environmental intentions and behaviours are more likely when people have a positive attitude towards the relevant behaviour, when subjective norms support this behaviour, and when one feels in control over the behaviour. The norm

activation model (NAM) and the value–belief–norm theory of environmentalism (VBN) focus on the relation between morality and environmental behaviour. The NAM proposes that pro-environmental actions follow from the activation of personal norms, reflecting feelings of moral obligation to perform or refrain from specific actions. Personal norms are activated when someone is aware of the environmental problems caused by his or her behaviour, feels personally responsible for these problems, has the feeling that her or his individual actions may help to reduce the relevant problems, and perceives her- or himself to have the abilities to engage in actions needed to reduce the relevant environmental problems. The VBN theory is an extension of the NAM, and proposes that the situational factors, notably problem awareness, depend on ecological worldviews and on value orientations. The NAM and VBN theory have successfully explained low-cost environmental behaviour and 'good intentions', while the TPB shows more explanatory power in situations characterised by high behavioural costs or strong constraints on behaviour.

Goal framing theory provides an integrated framework for understanding factors influencing environmental behaviour, with an emphasis on multiple goals being active at any given time. Goal framing theory distinguishes three general goals that influence behaviour (hedonic, gain and normative goals), which coincide with theoretical frameworks in environmental psychology: theories and models on affect (hedonic goals), the TPB (gain goals), and the NAM and VBN theory (normative goals).

GLOSSARY

ascription of responsibility   Feeling responsible for negative consequences of not acting pro-environmentally.

attitudes   Mental dispositions to evaluate an attitude object (i.e. a person, place, thing, or event) with some degree of favour or disfavour.

biospheric values   A value type reflecting the concern with the quality of nature and the environment for its own sake.

ecological worldviews   Beliefs regarding humanity's ability to upset the balance of nature, the existence of limits to growth and rejecting humanity's right to rule over the rest of nature.

gain goal   The goal to maintain and improve one's resources.

goal frame   The focal goal in a particular situation.

goal framing theory   Integrated framework for understanding factors influencing environmental behaviour, with an emphasis on the relative strength of hedonic, gain, and normative goals.

hedonic goal   The goals to feel good right now.

intention   A person's specific purpose to engage in a particular action.

mediator model   A model that seeks to identify the mechanism that underlies an observed relationship between an independent variable and a dependent variable via a third explanatory variable, known as a mediator variable.

moderate   A moderator variable increases or decreases the strength of an effect.

norm activation model   A model proposing that pro-environmental action follows from the activation of personal norms.

normative goal   The goal to behave appropriately, conforming to social norms and legitimate rules.

outcome efficacy   The extent to which a person identifies actions to reduce environmental problems.

perceived behaviour control   The perceived possibility to perform behaviour in light of present facilitating or hindering factors.

personal norm   Feelings of moral obligation to perform or refrain from specific actions.

problem awareness   The extent to which one is aware of the adverse consequences of not acting pro-environmentally.

self-efficacy   The extent to which one recognises own ability to provide relief to environmental threats.

subjective norm   Perceived social pressure to engage in behaviour.

theory of planned behaviour   A model assuming that individuals make reasoned choices and that behaviour results from the intention to engage in specific behaviour.

value–belief–norm theory of environmentalism   An extension of the norm activation model, proposing that problem awareness depends on ecological worldviews and value orientations.

values   Desirable transsituational goals varying in importance, which serve as guiding principles in the life of a person or other social entity.

SUGGESTIONS FOR FURTHER READING

Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, *27*, 14–25.

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, *29*, 309–317.

Vining, J., & Ebreo, A. (2002). Emerging theoretical and methodological perspectives on conservation behaviour. In R. B. Bechtel & A. Churchman, *Handbook of environmental psychology* (pp. 551–558). New York: Wiley.

REVIEW QUESTIONS

1. Describe the theory of planned behaviour.
2. What is the main difference between the norm activation model and the value–belief–norm model of environmentalism?
3. Which four situational factors influence the strength of personal norms?
4. Which goals steer behaviour according to the goal framing theory?