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Models of Attitudes, Intentions and Behaviors in Environmental Communication

Helena Bilandzic and Anja Kalch

A crucial issue for environmental communication research is the question how attitudes, intentions, and behaviors relating to the environment can be changed by communication, either through regular news reporting, social media, strategic communication or even fictional formats. Therefore, a solid understanding of psychological processes either motivating or preventing people to engage in environmentally friendly behavior is necessary since these processes may be "entry-points for interventions" (Abrahamse, 2019, p. 11). While models describing how individual environmental behaviors are formed are essentially psychological, it is certainly relevant to consider social and cultural influences as well. One concern is how generalizable these models are across cultures, countries and regions and how universal mechanisms of environmental behavior can be distinguished from more culture-specific ones. Given the global characteristics of environmental action, international and global perspectives are highly relevant – but rarely foregrounded (Morren & Grinstein, 2016).

In this chapter, we provide an overview of the most common psychological models that have been applied to environmental behavior and review existing empirical research. In most of these models, media influence is not explicitly included. Thus, we conclude by identifying some characteristics of media presentations that need to be considered for an application in communication research and provide suggestions for future theoretical development.

OVERVIEW OF PSYCHOLOGICAL MODELS FOR ENVIRONMENTAL ATTITUDES, INTENTIONS AND BEHAVIORS

A number of models exist that successfully and reliably predict environmental behavior from a social-cognitive perspective. The main characteristic is that these models focus on cognitions and (social) perceptions as processes leading to individual behavior (Conner & Norman, 2015).

However, variations exist with regard to the factors considered to be relevant for intentions and behaviors and the relationships between the different processes. Based on these variations, we divide the models into three categories:

(1) *Rational choice models* explain environmental behavior with self-interests of individuals. Behavior results from weighting personal benefits against costs. The most common rational choice models to explain environmental behavior are the Theory of Planned Behavior (TPB, Ajzen, 1985, 1991) and its predecessor, the Theory of Reasoned Action (TRA; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975).
(2) *Pro-social behavioral models* regard environmental behavior as an altruistic, normative behavior (Abrahamse, 2019; Bamberg & Möser, 2007; Klöckner, 2015). The most commonly used models of this type are the Norm Activation Model (NAM, Schwartz, 1977; Schwartz & Howard, 1981) and the Value-Belief-Norm (VBN) Theory (Stern, 2000; Stern et al., 1999).
(3) *Integrating frameworks of environmental behavior* combine rational choice and pro-social behavioral models, e.g. the TPB and the NAM (Abrahamse et al., 2009).

We will give an overview of these three types and provide empirical evidence from environmental research.

Rational Choice Models: Theory of Planned Behavior and Theory of Reasoned Action

The TPB (Ajzen, 1985, 1991) and the TRA (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) were originally developed in social psychology but quickly transitioned to other fields, including environmental psychology (Klöckner, 2015; Steg & Nordlund, 2013). Both approaches assume that environmental behavior is based on an intention formed by reasoned choice, that is, according to expectations about and evaluations of the behavior (Ajzen, 1991; Steg & Nordlund, 2013). An intention is a person's plan to perform a specific behavior. The stronger an intention is, the more likely the behavior will be carried out (Ajzen, 1991). For example, people who strongly intend to reduce plastic waste are more likely to buy unpacked food than people with no or a weaker intention.

In both models, intention is predicted by attitudes toward the specific behavior and a subjective norm (see Figure 17.1). Attitudes are defined as an individual's overall evaluation of the specific behavior (Ajzen, 1985). Regarding environmentally friendly shopping behavior, a positive attitude may be to consider buying unpacked food a good action. *Attitudes* are specified as originating from (1) the belief that a behavior leads to a certain outcome, e.g. the expectancy or likelihood that buying unpacked food reduces plastic waste, and (2) the evaluation of that outcome, e.g. reduction of plastic waste is good. An attitude may consist of several pairs of expectancies and evaluations, and is conceptualized as the sum of all pairs of expectancies and evaluations, thus leaning the attitude toward the side which promises the most useful outcome for the individual (Ajzen, 1985, 1991). The "rationality" in rational choice models thus comes from this process of considering expected outcomes and choosing the action that carries most benefits and least costs.

The second determinant of intentions in both models is the *subjective norm*, which expresses the social pressure that an individual perceives to perform a specific behavior (Ajzen, 1985). It is composed of (1) the belief that persons or groups – considered as personally relevant by the individual (the "referents") – expect the individual to perform the behavior and (2) the motivation to

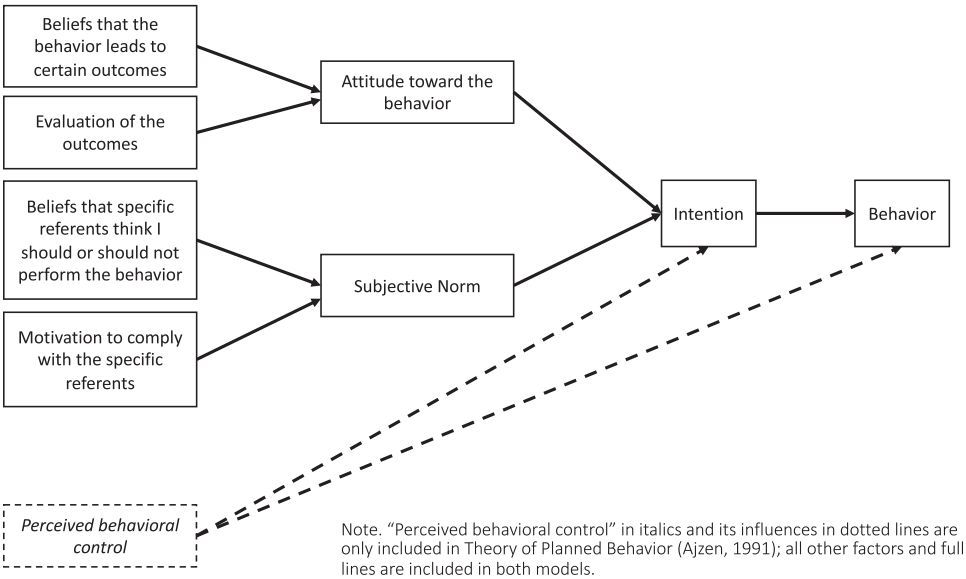

Figure 17.1 Theory of Reasoned Action (Ajzen & Fishbein, 1980) and Theory of Planned Behavior (Ajzen, 1991)

comply with the referents (Ajzen & Fishbein, 1980). For example, a student might perceive her roommate to be a referent; if the student thinks that the roommate expects her to reduce plastic waste (perceptions about the expected behavior) and if she wants to be on good terms with the roommate (motivation to comply), the student will perceive social pressure to buy unpacked food (social norm). In a similar way as attitudes, the social norm results from the sum of all pairs of perceptions about the expected behavior and the motivations to comply with each expectation, again with the social norm leaning toward the side which carries more weight from the perspective of the individual (Conner & Sparks, 2015).

Originally, social norm was conceptualized as an injunctive norm, one that shows what is preferable and what ought to be done (Cialdini et al., 1991). In a later discussion of their theoretical approach, Ajzen and Fishbein (2005) give up their focus on injunctive norms. Rather, an integration of injunctive and descriptive norms (with descriptive norms showing what is typical and what most people do; Cialdini et al., 1991) is recommended in empirical studies, "in order to obtain a complete measure of subjective norm" (Ajzen & Fishbein, 2005, p. 199). Indeed, descriptive norms sometimes prove to be more effective in influencing intentions than injunctive norms (Manning, 2009; Steg & Nordlund, 2013).

Perceived behavioral control was integrated as the third predictor of intentions in the TPB (Ajzen, 1985). It is the only determinant apart from intentions that has a direct effect on behavior (see Figure 17.1). Perceived behavioral control is defined as the likelihood that individuals feel able to perform a behavior (Ajzen, 1985). The likelihood is determined by facilitators and obstacles that may be based in an individual's emotions, abilities or skills (internal factors) but also in an individual's living conditions, available resources (e.g. money and time) or dependencies on the behavior of others (external factors) (Ajzen, 1991; Klöckner, 2015). In our shopping behavior example, a person may perceive that buying unpacked food is too expensive and too

time-consuming to integrate into their shopping routine, which would result in low perceived behavioral control.

Empirical Review of Applications of the TPB and the TRA to Environmental Behavior

A variety of empirical studies worldwide successfully applied the TPB and the TRA to several types of environmental behavior in different cultural and national contexts, e.g. green product consumption behavior in India (Paul et al., 2016), sustainable consumption behavior in rural China (Wang et al., 2014), environmentally friendly behavior in a UK media company (Greaves et al., 2013), water protection behavior of Australian farmers (Fielding et al., 2005), mobility behavior of German citizens (Haustein & Hunecke, 2007) or organic food consumption of Pakistani consumers (Al-Swidi et al., 2014). In these studies, the general structure of the TPB seems relatively comparable across countries and cultures (see also Klöckner, 2015). In a study including a 27-country sample, Oreg and Katz-Gerro (2006) find support for the assumed relationships of the TPB for various types of environmental behavior: Attitudes related to the environment as well as perceived behavioral control were positively related to willingness to sacrifice (corresponding to intentions), which, in turn, positively influenced pro-environmental behavior (recycling, refraining from driving, environmental citizenship such as donations, protests). These relationships were present in the overall sample, as well as in analyses of the 27 country samples, indicating relative stability of the factors assumed by the TPB across cultures. The study also included two nation-level values, harmony (support in a country for values such as "world at peace", "unity with nature" and "protecting the environment") and postmaterialism (support in a country for values such as "freedom", "self-expression" and "quality of life"). While harmony, contrary to expectations, turned out to have a very small negative relationship with environmental concern, postmaterialism correlated positively with environmental concern. As advanced industrial countries generally display higher levels of postmaterialist values, it seems plausible that better economic conditions pave the way for stronger environmental support.

International or bi-national comparative studies have also shown variations in the relationships between the TPB-variables across countries: Morren and Grinstein (2016) analyzed the explanatory power of the TPB for pro-environmental behavior in a meta-analysis, considering country development (developed vs. developing) and culture (individual vs. collective). A key finding is that the likelihood of intentions turning into actual pro-environmental behavior is higher in developed countries than in developing countries. The authors argue that this finding likely supports the "affluence hypothesis", according to which environmentally friendly behavior is facilitated by economic prosperity and available technologies that come with wealth. Additionally, the link between intentions and behavior is stronger in individualistic than collectivistic countries, which the authors tentatively explain by the benefits from environmental behavior for the individual, for example, concerning cost reduction or social status. The predictors of intentions also underlie some variation: Perceived behavioral control has a stronger influence in developed countries than in developing countries, which may be due to a greater sense of empowerment among the population of developed countries to act environmentally friendly – again, possibly due to an improved financial situation.

This result is corroborated by another multilevel analysis of 30 countries showing that the relationship between attitudes and behavior is stronger in developed countries (Pisano & Lubell, 2015). These results are also in line with an analysis by Tam and Chan (2017) who investigated the relationship between environmental concern and pro-environmental behavior across 32 countries. They found that this relationship was weaker in cultures that have higher

levels of distrust, belief in external control and present orientation. It was stronger in cultures emphasizing individualism and looseness. Similarly, Eom et al. (2016) in an analysis of 47 countries found that personal concern for the environment is a better predictor for support for environmental action in individualistic than collectivistic countries. The authors argue that this could be explained by a lower relevance of individual beliefs as well as a stronger need to conform with the dominant social norms in collectivistic compared to individualistic countries (Eom et al., 2016).

Based on such differences between individualistic and collectivistic cultures, Mancha and Yoder (2015) developed an environmental theory of planned behavior (ETPB) that adopts the TPB for environmental behavior and integrates a person's self-identity as a predictor for attitudes, norms and control beliefs. Self-identity is a self-construal either valuing connectedness with others ("interdependent self-construal"), or being an autonomous individual that values independence ("independent self-construal"). While the two types of self-construal are linked to individualist and collectivist societies, they are able to identify individual differences within a country as well as individuals that score high on both accounts. The results of the bi-national study (the USA and India) show that both individuals with high levels of interdependent self-construal and high levels of independent self-construal increase preservation attitudes in India as well as in the USA. In turn, a green subjective norm and green perceived behavioral control increase intentions (Mancha & Yoder, 2015). The connection of culture-specific and individual characteristics is also emphasized by Pisano and Lubell (2015) who compare the influence of national and individual difference variables and conclude that "the national-level variance is to a substantial degree explained by individual-level variables" (p. 31).

Summing up, the basic relationships between attitudes, norms and perceived behavioral control with intentions and indirectly with behavior seem to be positive across a large number of studies and countries; however, there are also differences in the strength of these relationships tied to basic value orientations of the countries.

Pro-Social Behavioral Models

The Norm Activation Model

The NAM originally aimed to explain everyday voluntarism and self-sacrificing helping behavior in low-emergency situations, such as volunteering to invest time or to intervene in a conflict (Schwartz, 1977). A key determinant of altruistic behavior is the activation of a personal norm – the self-expectation to act in a specific way in a specific situation, constructed by the individual (Schwartz, 1977, p. 226). This also includes the feeling of a moral obligation to act. For example, nice weather may activate the feeling of moral obligation in a student to go to a university by bike instead of going by car. The student then feels morally obliged to cycle. Four situational determinants lead to the activation of a personal norm: (1) Awareness of need, (2) outcome efficacy, (3) self-efficacy (or ability) and (4) ascription of responsibility (see Figure 17.2; Schwartz, 1977; Steg & Nordlund, 2013).

Awareness of need describes an individual's perception that someone or something is in a situation in which they need help (Schwartz, 1977; Schwartz & Howard, 1984). General, superordinate needs may be broken into more specific, subordination needs, with different implications for actions. For example, the general awareness that everyday behavior of humans causes environmental problems can be specified by more concrete needs, e.g. that going to university by car every day causes massive carbon dioxide emissions or that using plastic plates contributes to plastic waste.

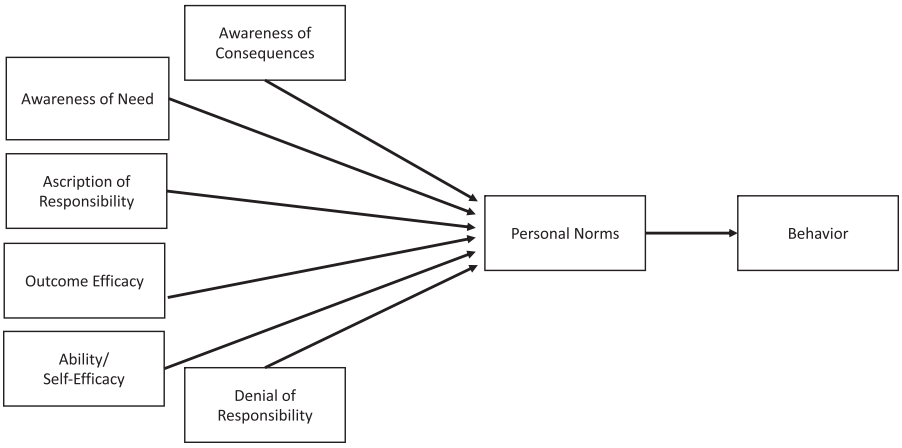

Figure 17.2 Norm Activation Model (Schwartz & Howard, 1981, 1984; visualization from Harland et al., 2007)

The second step – *outcome efficacy* – is the recognition that specific actions will solve the needs. When people perceive that nothing can be done to solve an existing problem, a personal norm will not be activated and people will rest inactive (Schwartz, 1977; Schwartz & Howard, 1984). For instance, regarding the mobility behavior, people need to perceive the reduction of individual car use as a relevant and effective means to reduce carbon dioxide emissions. If this is not the case, usage of alternative transportation modes will not be likely.

After recognizing possible actions, individuals also need to perceive themselves as capable of providing relief by executing these actions (*ability*, Schwartz, 1977; Schwartz & Howard, 1981, 1984). This feeling of an individual's ability to help corresponds to self-efficacy perceptions (Steg & Nordlund, 2013). When people do not perceive themselves as able to help, the personal norm will not be activated (Schwartz, 1977; Schwartz & Howard, 1984). For example, a student who lives in a city 50 kilometers from his university may not feel able to use the bike even if s/he considers cycling in principle as an effective means to reduce individual CO_2-emissions.

Finally, people also need to feel responsible for the person or entity in need of help (Schwartz, 1977). This factor, the *ascription of responsibility*, is conceptually different from the feeling of moral obligation to perform a concrete action, which manifests in the personal norm. Responsibility reflects the level of connectedness with the person or entity in need (Schwartz, 1977).

Originally, Schwartz (1977) also integrated a trait factor that influences norm activation – awareness of consequences, the "tendency to become aware of the consequences of one's behavior for others" (p. 229) or "individual receptivity to need cues" (p. 242). However, in the environmental application of the NAM, the original trait factor awareness of consequences is increasingly used as a synonym for the situational factor "awareness of need" (De Groot & Steg, 2009; Klöckner, 2015).

Once the norm is activated and the obligation to act becomes obvious, a person may consider the costs of an action on a social, physical, psychological or moral level. A conflict arises if the action that a person feels obliged to perform is associated with high costs. In this case, persons can "neutralize" the feelings of obligation with three strategies (defense steps, Schwartz, 1977): First, they can deny that there is, in fact, a need at all (*denial of the state of need*). For example, climate change skeptics deny that the phenomenon of climate change really exists, claiming that scientific evidence is inconclusive. This reduces perceived seriousness of the

danger and thus the personal norm to act. Another way to deny the state of need is to increase the perceived seriousness of need and to redefine the situation as one beyond hope. If nothing can be done to help, an individual is relieved from his/her obligation to help. This is the case when individuals claim that climate change is too far advanced and any action cannot really prevent impending doom.

Second, a person may deny his or her own responsibility to act (*denial of responsibility to respond*). Especially when other actors are present who are also potentially responsible or even have a higher competence to act, persons tend to feel less obligation. This effect is also known as "diffusion of responsibility" (Schwartz, 1977). An example from the climate change issue are citizens who ask for state or industry action rather than individual action.

Third, deciders may also question the suitability of norms activated thus far (*shifting the suitability of norms perceived*). A situation may be redefined to make a different course of action seem more appropriate, e.g. measures that are associated with lesser costs. For example, while climate change may imply the obligation to use the bike rather than the car, having to hurry to an exam to the university may shift the norm from saving the climate to saving one's semester.

The NAM goes beyond the cost-benefit calculations of rational choice models. It centers on moral beliefs about right and wrong behaviors. Nonetheless, costs are considered and may present a way for the individual to engage in cognitive activities that would ultimately exonerate him or her from action.

Empirical Review of Applications of the NAM to Environmental Behavior

Even if the TPB received far more attention for modeling environmental behavior, the NAM was also applied to various types of environment-related behaviors in a number of different national and cultural contexts: Mobility behavior of Canadian office workers (Abrahamse et al., 2009), acceptance of energy policies to reduce emissions of carbon dioxide and car use reduction (De Groot & Steg, 2009), reduction of car emissions (Steg & de Groot, 2010), willingness to pay for recycled products of US-American participants (Guagnano, 2001) or pro-environmental behavior of public servants in Taiwan (Fang et al., 2019). Regarding the international application of the model, a good number of these studies were conducted in the Netherlands and far fewer studies were conducted worldwide. Comparisons between different studies are often difficult to make, since they refer to various versions of the model, slightly changing the variables used (e.g. excluding variables, differentiating sub-dimensions and varying the conceptualization of the variables) as well as their relationships to each other.

Since the causalities between the processes are not formalized in the original description of the theory, various approaches exist regarding their sequence and possible interactions (Harland et al., 2007; Klöckner, 2015; Steg & Nordlund, 2013). Least empirical support was found for the moderator model, which assumes that the relationship between personal norm and pro-social intentions or behavior is changed (*moderated*) by awareness of consequences and ascription of responsibility (De Groot & Steg, 2009). More support was found for mediator models that either assume that awareness influences personal norm through both ascription of responsibility and outcome efficacy (full sequential model, Steg & de Groot, 2010) or that the factors contribute to activating the personal norm in parallel (parallel mediator model, Harland et al., 2007; Steg & de Groot, 2010).

The NAM has a higher explanatory power for more low-cost types of environmental behavior than high-cost behaviors that require time, money or personal investments (Steg et al., 2005). For high-cost behaviors (reduction of car use), the TPB seems to be more successful (Abrahamse et al., 2009; Bamberg & Schmidt, 2003).

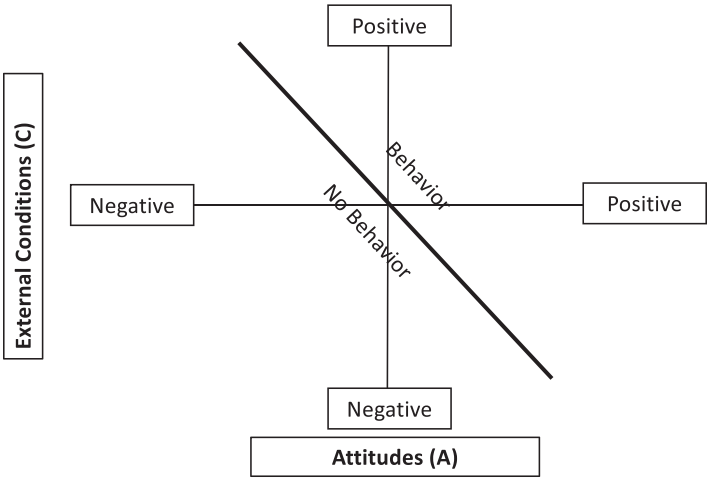

Figure 17.3 Attitude Behavior Context (ABC) Model (Guagnano et al., 1995)

In developing the NAM further, Guagnano et al. (1995) suggest considering external costs caused by the behavior. They proposed the A-B-C model where A stands for attitude, B for behavior and C for external conditions. The model assumes that environmental behavior depends on an interacting relationship of existing attitudes and external conditions (see Figure 17.3). Behavioral change is most likely in a context with modest preexisting attitudes and modest external conditions, while in the extreme combinations of attitudes and conditions, behavior is either too unlikely or too common in order to result in sufficient variance of behavior change (Guagnano et al., 1995). In a first empirical test, changes in recycling behavior were successfully explained for households, in which recycling required a modest effort but not for households where recycling was absolutely convenient (Guagnano et al., 1995). Hunecke et al. (2001) also confirmed that external conditions (transportation costs) influenced transportation behavior in a German city, but did not find an interaction effect of attitude and condition as proposed by the A-B-C model.

Value-Belief-Norm Theory

The VBN Theory (Stern, 2000; Stern et al., 1999) was developed as an extension of the NAM (Stern, 2000, p. 413). In contrast to the TPB and the NAM that were applied to various types of social behavior, the VBN specifically addresses environmental behavior as a special case of altruistic behavior (Stern, 2000; Stern et al., 1999).

Similarly to the NAM, the VBN (see Figure 17.4) assumes that environmental behavior is motivated by a personal norm, which is again defined as a feeling of moral obligation to act. Environmental behavior is divided into four distinct types: Environmental activism (e.g. participation in demonstrations and engagement in an environmental organization), environmental citizenship (e.g. signing petitions for environmental politics and contributing funds to movement organizations), policy support (e.g. willingness to pay higher prices/taxes or to accept behavioral regulation) and private sphere behaviors (e.g. consumption of organic products and recycling) (Stern et al., 1999, p. 82). These four types of behavior may be affected by values, beliefs and personal norms in different ways (Stern, 2000).

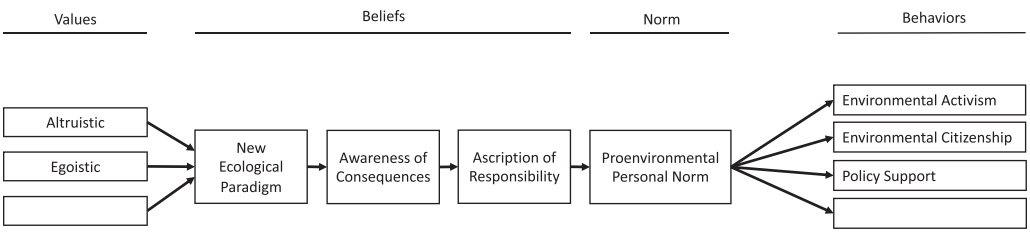

Figure 17.4 Value-Belief-Norm Theory (Stern, 2000; Stern et al., 1999)

The personal norm is activated by a causal sequence of two situational processes. Awareness of consequences[1] (the perception that valued objects are under threat) is the first predictor of a personal norm (Stern et al., 1999). The second predictor causally following awareness of consequences is the ascription of responsibility to self, the belief that "individual actions … (can) alleviate threats to valued persons or things" (Stern, 2000, p. 414).

Going beyond the NAM, the VBN integrates the ecological worldview as a predictor for the awareness of consequences. The ecological worldview is described as a "sort of 'folk' ecological theory" that includes general perceptions about the relationship of humans and the biosphere (Stern et al., 1999, p. 85). In turn, the ecological worldview is shaped by individual values. The VBN differentiates between biospheric values, altruistic values and egoistic values (Stern et al., 1999). Egoistic values refer to a person's individual benefits and are negatively related to the ecological worldview. Altruistic values, which emphasize the relevance of collective goods and the well-being of other people, as well as biospheric values, which emphasize the well-being of other species and the nature, are positively related to the ecological worldview (Stern et al., 1999). The values and the ecological worldview are relatively stable and may have weaker relationships to situational beliefs and norms (Stern, 2000).

Empirical Review of Applications of the VBN to Environmental Behavior

The VBN was successfully applied to general environmental behaviors (Klöckner, 2015), such as the general willingness to sacrifice for the environment and environmentally friendly consumer behavior (Stern et al., 1999) or general pro-environmental behavior (Nordlund & Garvill, 2002). Support for the model was found by Steg et al. (2005) regarding the acceptability of energy politics in the Netherlands (see also Steg et al., 2011) as well as the acceptability of transport policy in Sweden (Eriksson et al., 2008). The VBN – with the exception of ecological worldview – also successfully explained interest and participation (an add-on technology was provided free of charge) in smart energy systems of Dutch households (von der Werff & Steg, 2016). Kaiser et al. (2005) however found that TPB explains conservation behavior better than the VBN.

Limitations of the VBN include high-cost behaviors, since larger investments are typically based on a rational decision process (Fornara et al., 2016; Steg et al., 2005; Steg & Nordlund, 2013). In a study analyzing the intention of Sardinian house owners to invest in and use green energy devices – a relatively high-cost behavior – most of the assumed relationships of the VBN were supported. In contrast to the theoretical assumption, awareness of consequences and ascription of responsibility were not significantly related to each other, but both beliefs predicted the personal norm independently (Fornara et al., 2016). Such a direct effect between awareness of consequences and personal norm – as well as some other direct effects originally

not assumed by the VBN – was also reported in a study about car use reduction in Norwegian urban areas (Lind et al., 2015; see similar results for car use reduction in Swedish cities; Nordlund & Garvill, 2003).

Comparisons of the VBN across countries are absolutely rare. One exception is the study by Oreg and Katz-Gerro (2006) that showed partial support for the proposed relationships of the VBN in a 27-country sample study. Postmaterialistic values, which were included as country-specific values and replaced the individual values in the VBN, were shown to affect environmental concern (used as equivalent for an ecological worldview). In turn, environmental concern, perceived threat (used as an equivalent for awareness of consequences) and perceived behavioral control (used as an equivalent for ability to reduce threat) predicted the intention to sacrifice for the environment. Given that this study was a secondary data analysis, personal norm was not integrated. Also, cross-cultural comparisons were not provided, since the sample mainly consists of people from Western democracies (Oreg & Katz-Gerro, 2006).

Integrating Frameworks of Environmental Behavior

While rational choice models focus on self-interest determinants of behavior, and pro-social models emphasize moral values and norms, various researchers argue that pro-environmental behavior "is probably best viewed as a mixture of self-interest […] and concern for other people, the next generation, other species, or whole ecosystems" (Bamberg & Möser, 2007).

Accordingly, various approaches integrated the TPB and the NAM in empirical studies to investigate different types of environmental behavior, for example, the intention to reduce car use in Canada (Abrahamse et al., 2009), consumers' willingness to select green housing in China (Sang et al., 2019) or recycling behavior in an US-American sample (Park & Ha, 2014). Other authors also merged the VBN and TPB, e.g. in order to predict visitors' willingness to pay for the conservation of a suburban Spanish park (López-Mosquera & Sánchez, 2012) or environmental behavior of travelers using green lodges (Han, 2015). However, the models used in these studies differ from each other and were only tested in one study, resulting in limited evidence about their generalizability.

Meta-analytic evidence was provided by Bamberg and Möser (2007), who found support for an integrated model combining the TPB and the NAM in a meta-analytical structural equation model (MASEM), with perceived behavioral control, attitudes and moral norm as parallel predictors for intentions. In turn, these three predictors are directly and indirectly affected by an interplay of cognitive, emotional and social factors (i.e. problem awareness, internal attribution, guilt and social norm). Klöckner (2013) also provided evidence based on a MASEM for the comprehensive action determination model (Klöckner & Blöbaum, 2010), combining TPB, NAM and VBN to explain environmental behavior.

Both rational models and pro-social models require some sort of reflection and deliberation on the part of the individual, be it about costs and benefits, or the extent of the moral obligation, respectively. However, much of the behaviors that are relevant for the environment are habitual, executed following a shortcut from situational cues and demands to behavior, without intervening reflections about costs and benefits, or moral obligation. Thus, it seems useful to include habits as a factor of environmental behavior, as Klöckner and Blöbaum (2010) have done in their comprehensive action determination model. The relevance of considering habits was confirmed in a meta-analysis by Klöckner (2013) that found positive influences of habits on behaviors.

ENVIRONMENTAL COMMUNICATION AND BEHAVIORAL MODELS

The psychological models discussed so far are intended to explain environmental decision-making processes and behavior. Applying these models to media processing and effects requires to consider entry points for media usage, media information seeking behavior as well as media-specific psychological processes. We discuss these in the following sections.

Integration of Media and Communication in Models or Attitudes, Intentions and Behaviors

None of the psychological models reviewed so far envisage an "entry point" for environmental media content or other environmental communication. However, media are one of the primary sources to learn about environmental topics (e.g., Special Eurobarometer, 2017). At the same time, people choose specific types of media information depending on their environmental knowledge and preexisting beliefs or attitudes (Leiserowitz et al., 2011; Metag et al., 2015) – factors that are relevant in the model described above. It is not surprising that the provision of informational and persuasive media content is assumed to be "the dominant approach to encourage and attitude and behavior change" (Abrahamse, 2019, p. 30). We have evidence of media influence on some of the factors typically contained in the models, for example, on knowledge about climate change, problem awareness, intentions or behavior (Liao et al., 2015; Östman, 2013). Also, there is cross-national evidence that media use relating to ecological issues is related to environmentally friendly behavior (D'Amato et al., 2019).

However, in contrast to the large amount of studies investigating media effects on single outcome variables, relatively few studies integrate media effects into one of the psychological models. An example of a systematic integration is Chan (1998) who investigated the role of mass communication and TPB to predict recycling behavior in Hong Kong. Mass media recommendations to recycle were found to be a relevant aspect of the subjective norm of the participants. However, the role of the media was directly included in the measurement of the subjective norm, so that a relationship between both aspects could not be empirically tested. This was done in a study by Ho et al. (2015) who investigated effects of media usage, media dependency and TPB-variables on green buying and environmental civic engagement. TPB-variables as well as media dependency and attention to mass media were positively related to green buying. Additionally, internet attention and media dependency, together with attitude and descriptive norm, influenced civic engagement (Ho et al., 2015).

In principle, behavioral models offer a number of factors and processes that can be targeted by environmental communication (Abrahamse, 2019; Steg & Vlek, 2009), and single studies exist that investigate media influence within these models. What is needed, however, is a systematic investigation and theoretical integration of media influence in the psychological models that specifies which types of media content are most likely to influence which factor and which type of behavior.

Explaining Information Seeking Behavior Itself

Although the influence of media content has not yet been sufficiently incorporated into the models of environmental behavior, there has been systematic theoretical work on information seeking about environmental topics in the media (Eastin et al., 2015; Hmielowski et al., 2019; Yang et al., 2014). This research explains exposure to environmental information rather than explaining

environmental behavior itself. Nonetheless, exposure is an indispensable precondition for effects of any kind. Notably, two models have emerged that have been used in environmental contexts: The Model of Risk Information Seeking and Processing (RISP) and the Planned Risk Information Seeking Model (PRISM).

The RISP model was first articulated by Griffin et al. (1999) for the context of health risks. It predicts the extent to which a person seeks out information about risks as well as the extent to which this person will engage in thorough, effortful (systematic) or superficial, quick (heuristic) processing of the risk information. These outcomes are predicted by three factors: (1) "Information sufficiency" describes the amount of information people need to feel confident that they are able to cope with a risk. (2) "Relevant channel beliefs" describes the attributed properties of information sources (honest, trustworthy, biased, etc.). (3) "Perceived information gathering capacity" denotes a person's impression of their own ability to learn about a risk. These three factors are predicted by several individual characteristics (e.g. hazard experiences and demographics) as well as perceptions of the risk (e.g. emotional reactions to the risk, subjective norms about information gathering, and perceived severity of or susceptibility of the risk). The RISP has guided research on risk information seeking on environmental topics (Hmielowski et al., 2019). Its propositions have been tested in a meta-analysis that found good support for the prediction of risk information seeking and systematic processing, but less support for heuristic processing (Yang et al., 2014).

Building on the RISP and other models, the PRISM model seeks to explain risk information seeking, originally in the context of risks for personal health (Kahlor, 2010). As the RISP model, the PRISM assumes that perceived knowledge insufficiency, affective response to risk and risk perception predict information seeking. In addition, it integrates three factors from the TPB: Attitudes toward the behavior, subjective norms and perceived behavioral control that explain both the perceived knowledge insufficiency and risk information seeking intent. Differently from the RISP that puts information insufficiency between all factors and information seeking, the PRISM also suggests direct paths between predictors and the outcome. The model has been applied to environmental risk successfully (Eastin et al., 2015; Ho et al., 2014).

Media-Specific Aspects for Explaining Media Effects on Environmental Behavior

Typical media presentations have implications for the way in which media effects on environmental behavior need to be modeled. In particular, three aspects need to be considered: Morality, emotion and narrative.

(1) Morality: Issues of the environment are often depicted as a question of right and wrong – as essentially *moral questions* (Markowitz & Shariff, 2012). Accordingly, presentations of the environment in media content or communication campaigns mirror such moral aspects (Dannenberg et al., 2012; Laksa, 2014; Raymond, & Delshad, 2016). Moral media content is directly compatible with pro-social models of environmental behavior like the NAM or the VBN. At the core of a potential media influence is the media presentation of information about injunctive norms (behavior that is desirable) and descriptive norms (behavior of most people), which may, in turn, shift the audience's norms. Media have many different ways to present these norms, for example, by showing exemplary virtuous behavior, norm violations or social endorsements of the norm. In addition, media may also shape the audience's sensitivity toward problematic environmental behaviors, giving consumers the ability to generalize and apply in decisions.

Similarly, media may endorse the environmental values over individualistic values, allowing a more general change in the way in which audiences prioritize their values. The decision for

or against a pro-environmental behavior can be considered a (smaller or larger) moral dilemma: Should I use the car and sleep longer, or should I use the bike and get up earlier? Should I buy cheap conventional apples or the more expensive organic brand? Should I take my plastic wrappers home to recycle or simply get rid of them in the public trash can? For such dilemmas, individuals engage in inner moral deliberations or moral reasoning (Adger et al., 2017) or they may decide according to their moral intuitions (Nisbet et al., 2012). It seems reasonable to assume that media may be able to influence both the type of moral reasoning that people apply for environmentally relevant decisions and moral intuitions.

(2) Emotion: Emotions elicited by media content are well-known drivers of media effects (Nabi, 2009). Recently, studies in environmental communication have also begun to consider the role of emotions for pro-environmental behavior (Feldman & Hart, 2018; Leiserowitz, 2006; Lu & Schuldt, 2015; Nabi et al., 2018; Wonneberger, 2018). Specifically, moral emotions such as guilt or shame have been found to be motivating pro-environmental views and intentions (Baek & Yoon, 2017; Bilandzic & Sukalla, 2019). Negative emotions in general increased risk perception in a study by Cooper and Nisbet (2016). Fear is also known to positively influence pro-environmental outcomes (Bilandzic et al., 2017; Meijnders et al., 2001; Spence & Pidgeon, 2010), as is hope (Chadwick, 2015; Feldman & Hart, 2018; Feldman et al., 2015; Nabi et al., 2018; Smith & Leiserowitz, 2014). However, research by O'Neill and Nicholson-Cole (2009) also shows a detrimental effect of threatening visual representations of climate change for motivations to engage in climate change. While this reservation is in line with warnings about "climate fatigue" and backlashes evoked by alarmist media coverage (Kerr, 2009), a large meta-analysis on the effectiveness of fear appeals by Tannenbaum et al. (2015) finds a consistent positive effect of fear appeals on attitudes, intentions and behaviors, which is robust under various conditions.

Relating to hope, Ojala (2012) specified the effect as a positive driver for pro-environmental that is not based on denial. Yet, many questions remain open, for example, what emotions influence what factors in the environmental behavioral models, how incidental and message-driven emotions are effective and how they interact with each other, or, what content (text and visuals) arouses what emotions. Also, the duration of effects is not sufficiently clear, but there are references, arguing that emotional effects on environmental decision making may be rather short-lived (Schwartz & Loewenstein, 2017).

(3) Narrative: The factors commonly used in models of environmental behavior seem to demand good arguments and scientific evidence. For example, the strongest case for the factor "ascription of responsibility" in climate change seems to be scientific evidence for the anthropogenic causes of climate change. However, the availability of information, even if sound and scientific, does not automatically entail acceptance of the information. In many cases, it is not an actual information that is needed, but a narrative that puts a piece of information into perspective, provides context and makes an abstract idea concrete. Narratives show events and actions in a chronological and causal order and describe individual fates and their implications, which are more impressive and memorable that abstract argument or statistics (Green et al., 2019), and often yield greater effects (Braddock & Dillard, 2016). Media heavily rely on narratives in all of their content, be it television news, personal contributions on social media or films – and this is also true for environmental issues in the media. To some extent, all communication about the environment is narrative, from the minimal story of reporting one event in the news to the full feature film. There is a budding area of narrative effects research on environmental communication integrating fictional media content (Bilandzic & Kalch, 2021). For example, several studies show that fictional films about climate change outcomes influence pro-environmental norms, attitudes and intentions (Bilandzic & Sukalla, 2019; Leiserowitz, 2004; Lowe et al.,

2006). Intensive experiences of a narrative, e.g. narrative involvement (Cooper & Nisbet, 2016) or narrative engagement (Bilandzic & Sukalla, 2019), increased effects in such studies. It seems plausible that an entertaining format may affect audiences that are otherwise hard to reach for scientific or environmental issues (Kaplan & Dahlstrom, 2017). Also, narratives may yield effects that are much more difficult to achieve with rhetoric texts, for example, exercising social and moral judgment or transcending one's horizon in the sense that enables experiences otherwise not possible (Green et al., 2019). Full feature films may also allow for "visceral" experiences that allow simulating and understanding a world changed in its fundamentals due to environmental problems (Weik von Mossner, 2017).

CONCLUSIONS

Environmental behavior is a complex phenomenon. Its causes are manifold, and the variety of psychological models that explain such behavior reflects this complexity. Rational models put forward cost-benefit considerations of the individual, by focusing on personal advantages of acting – or not acting – environmentally friendly. Other models consider environmental behavior as a type of pro-social action because at least some of the benefits do not reflect back on the individual but promote the common good of "nature", the "climate" or "intact future resources". In this case, aspects such as norms and value orientations play a decisive role for an individual's environmental decision making. These models, generally, inform about cognitive, emotional and social origins of environmental behavior, thus enabling a precise account of the relative importance, for example, of being simply aware of a problem and knowing that relevant others expect actions from a person. Different environmental issues emphasize different factors at different times: For example, not so long ago, citizens needed to learn the fact that meat consumption is a major factor for climate change. Conversely, they were well aware of the problem of recycling but needed to boost their perceived behavioral control to actually recycle properly in their daily lives. The models allow for a detailed diagnosis and explanation of the concrete situation for a specific environmental behavior in a cultural or national context. In addition, constellations may change over time – once problem awareness has diffused through a population, the emphasis may be on norms or perceived behavioral control. The complexity may further increase, when new scientific evidence or political agreements result in changes of recommendations for individual behavior.

Regarding the international and cultural boundaries of actions, psychological models have been used in a multitude of single countries; in addition, some comparative research shows that the principles of these models work fairly well across many contexts. However, there are also some observations of cultural differences: For example, in developed countries, the relationship between attitudes and behaviors is stronger than in developing countries (Morren & Grinstein, 2016; Pisano & Lubell, 2015). The same result was found for individualistic compared to collectivist countries (Eom et al., 2016; Tam & Chan; 2017). If postmaterialist values are prevalent in a country, environmental concern is increased (Oreg & Katz-Gerro, 2006). While some of these patterns (i.e. for developed and postmaterialist countries) are attributable to economic well-being, differences between individualistic and collectivist societies need more fine-grained explanations and more research. As the models we discussed earlier are essentially psychological and have been developed in the Western sphere, they do not "naturally" provide space for different cultures and transnational validity.

In order to explain effects of environment-related media messages, three aspects need to be considered in more detail: The entry point of media usage, environmental information seeking

as well as media-specific reception and engagement processes. Even if psychological models of environmental behavior do not specify an entry point for media influences, there are many ways environmental communication can support – or constrain – the development of pro-environmental attitudes, intentions and behaviors. The field of media effects research on environmental issues is, at this point, somewhat disjointed from the psychological models explaining such environmental behavior – with only a few exceptions. In order to make use of the evidence we have obtained so far on the relationship of media and environmental views in the audience, it will be necessary to integrate media influence into the psychological models. At the same time, we need to expand the models to include and consider media-specific characteristics of presentation, i.e. moral, emotional and narrative elements. Moreover, most of the influences coming from media are not persuasive communications, for example, from an environmental agency or NGO. Much environmental information is news media coverage that may or may not have a clear-cut message and behavioral recommendation. Thus, there is some semantic ambiguity in regular media content. This issue is amplified by the presence of user-generated content in social media, where accurate content goes hand in hand with false or misleading content, fact with moral commentary and science with anecdotes. Where experimental research often only considers one text and one source, actual users are often confronted with a multitude of sources and conflicting assertions. Aspects such as the credibility of the communicator or the medium may become important in these situations.

Ultimately, media effects emerge through an ongoing process, in which multiple messages may converge and reinforce each other, or, conversely, contradict and weaken each other. Theories for media influence on environmental behavior can make use of the solid foundations provided by the general psychological models of environmental behavior and combine them with well-established media effects theories. Ultimately, delineating the mechanisms through which media shape beliefs and actions for the environment is as important as considering the wide array of media content and the interactions between single exposures for understanding the media's contribution to and potential for environmental change.

NOTE

1. Note that the term "awareness of consequences" is not defined in the same way as in the original version of the NAM, where it serves as a trait of a person to be sensitive for cues of need. Rather, this factor is closer to "awareness of need" in the original version of the NAM.

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