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Can Protection Motivation Theory predict pro-environmental behavior? Explaining the adoption of electric vehicles in the Netherlands

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ABSTRACT

Scholars have proposed that the Protection Motivation Theory provides a valuable framework to explain pro-environmental choices, by employing a wide set of predictors, such as the costs and benefits of current (maladaptive) behavior as well as prospective adaptive behavior. However, no comprehensive empirical tests of the Protection Motivation Theory in the slow onset environmental risk domain have been published yet to our knowledge. This paper aims at closing this gap. We first conceptualized the Protection Motivation Theory for the use in this environmental domain. Next, we present results of a questionnaire study among a large representative sample of Dutch drivers that showed that the Protection Motivation Theory is a relevant theory for modeling different indicators of full electric vehicle adoption. Notably, all theoretical antecedents proved to be significant predictors of different adoption indicators. Respondents were particularly more likely to adopt an electric vehicle when they perceived the negative consequences caused by conventional vehicles as more severe, and when they expected electric vehicles to decrease these consequences. The most important barriers for electric vehicle adoption were perceived high monetary and non-monetary costs of electric vehicles, and benefits associated with the use of a conventional vehicle. Interestingly, we found that environmental risks are more prominent in predicting close adoption indicators; while energy security risks are more prominent in predicting distant adoption indicators. As expected, our findings suggest that both collective concerns and individual concerns predict different indicators of adoption. Individual concerns (in particular perceived costs of driving an electric vehicle) played a more prominent role when predicting close measures of adoption, while collective concerns (e.g., perceived severity of environmental and energy security risks) played a somewhat more prominent role when predicting distant measures of adoption. Implications for research and practice are provided.

1. Introduction

Achieving a more sustainable, environmentally friendly future has long become an embraced goal of many societies worldwide where pro-environmental behavior is found at its core. Indeed, it is widely believed that changes in behavior are needed to promote a more sustainable future. However, engaging in and sustaining such behavior often comes at a price as it often costs more (e.g., organic products are more expensive than conventional products), requires more effort (like waste separation) or even new skills (like eco-driving). Important questions to be answered in this respect are: which factors determine whether people are willing to overcome such barriers to pro-environmental actions, and which factors promote pro-environmental (collective) actions?

Various theories have been applied to explain actions to reduce environmental risks. The most popular theories in environmental psychology to examine factors influencing environmental actions are the Theory of Planned Behavior (Ajzen, 1991), the Norm Activation Model (Schwartz, 1977; Schwartz and Howard, 1981),

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and the Value-Belief-Norm Theory of environmentalism (which is basically an extension of the Norm Activation Model; Stern, 2000; Stern et al., 1999). We argue that the Protection Motivation Theory (Rogers, 1975, 1983) offers another promising theoretical perspective for explaining environmental behavior. The Protection Motivation Theory, originally proposed to predict behavior in the context of personal health threats (Rogers, 1983; Prentice-Dunn and Rogers, 1986), employs a wider set of predictors than the Theory of Planned Behavior, Norm Activation Model and Value-Belief-Norm Theory that may enhance our understanding of motivators governing pro-environmental attitudes and behavior, which can be targeted to promote pro-environmental choices to reduce environmental risks. In particular, in addition to Theory of Planned Behavior, Norm Activation Model and Value-Belief-Norm Theory, Protection Motivation Theory not only focuses on cost and benefits of adaptive behavior that reduce environmental risks, but also considers benefits of current products or practices that increase the likelihood of maladaptive behavior that in turn increase environmental risks. Furthermore, similarly to Theory of Planned Behavior, Protection Motivation Theory is considering individual costs of adaptive action; but importantly, Protection Motivation Theory accommodates aspects of collective action as well (such as response efficacy, as we will explain below), which are key in Norm Activation Model and Value-Belief-Norm Theory.

The basic idea of the Protection Motivation Theory is that people engage in adaptive actions when confronted with (environmental) risks through perceived risk vulnerability and severity on the one hand, and by considering the possibilities to manage these risks through response efficacy and self-efficacy on the other hand. We will explain the Protection Motivation Theory in more detail below. A distinctive feature of Protection Motivation Theory is that the model assumes that individuals consider current behavior as well as their expectation of a new behavior in terms of respective costs and benefits when making pro-environmental choices. This way, Protection Motivation Theory allows identifying both barriers and facilitators to adoption of protective behavior. However, beyond the area of health risk, to authors' knowledge, so far Protection Motivation Theory has mainly been successfully applied in the domain of acute environmental risks such as floods and wildfires to predict (intentions to engage in) self-protective behavior (see Grothmann and Patt, 2005; Grothmann and Reusswig, 2006; Martin et al., 2007; Bubeck et al., 2012). While Gardner and Stern (2002, p. 244) argue that "the (Protection Motivation) theory appears to have broad applicability, including to natural and technological hazards and to environmental threats", to our knowledge it has not been applied to understand engagement in pro-environmental actions governed by slow onset risks such as climate change or environmental sustainability. Following Gardner and Stern (2002), we argue that Protection Motivation Theory has every potential to be a useful framework to understand why people do or do not engage in pro-environmental actions and how to motivate and facilitate pro-environmental behavior. In this paper we aim to test whether Protection Motivation Theory is successful in explaining pro-environmental actions (adaptive behavior) that are believed to reduce slow onset environmental risks such as climate change, environmental pollution, or security of energy supply. The following research questions will be answered: which barriers impede the adoption of pro-environmental actions and how to overcome them? And: which factors promote the adoption of pro-environmental actions?

In this paper, we will first present a general operationalization of the Protection Motivation Theory framework for application in the domain of slow onset environmental risks. Subsequently, we apply our conceptualization of the Protection Motivation Theory to modeling protective behavior related to slow onset risks. As a case in point, we focus on the adoption of full battery electric vehicles (which we refer to as electric vehicles from now on). In doing so, we explore the role of different types of risks, that is environmental and energy security risks, and examine which of these two risks is more likely to motivate pro-environmental action. Also, we consider different indicators of adoption, both 'close' and 'distant', as will be further explained below.

2. The Protection Motivation Theory

2.1. Description of the Protection Motivation Theory

The Protection Motivation Theory was introduced by Rogers (1975) as a model to explain which factors predict risk adaptive behavior that can be used for effective risk protection communication aiming at attitude and behavior change. The original model aimed to study behavioral change to address health-related risks (Rogers, 1975, 1983), although already in Maddux and Rogers (1983) posited that Protection Motivation Theory is a theoretical framework with broad applicability. The Protection Motivation Theory assumes that people balance different risks and benefits when making choices. This process of deliberation and decision-making does not necessarily have to be explicit and within conscious awareness (Rogers, 1975, 1983); the described processes may well posses a certain degree of latency. The theory proposes that two processes determine whether people engage in risk protective behavior: threat appraisal and coping appraisal (see Fig. 1).

Threat appraisal is a primary cognitive process essentially directed at answering the question: is the existing risk (so) threatening? It includes three elements: assessment of the perceived severity of the current threat, the perceived vulnerability to the current threat, and the rewards connected to current practices (which may inhibit risk protective actions). Perceived severity of the threat reflects how serious an existing risk is perceived to be. Perceived vulnerability reflects perceptions of how susceptible one is to the existing threat. Rewards represent all perceived benefits connected to current behavior or practice, which can be divided into intrinsic (inherent to self) and extrinsic

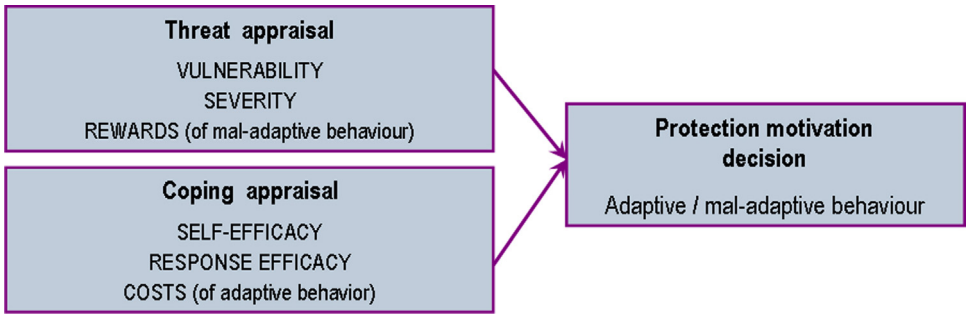

Fig. 1. Conceptual model of the Protection Motivation Theory.