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Still underdetected – Social norms and collective efficacy predict the acceptance of electric vehicles in Germany

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ABSTRACT

The role of social identity variables for predicting environmental decisions may often be underdetected by psychological lay people. Applying this to the acceptance of electric vehicles (EVs) in Germany we investigated whether social norms and collective efficacy predict EV acceptance and what psychological laypersons who are either EV experts or EV non-experts think predicts EV acceptance. In preliminary interview studies we explored the beliefs of EV experts and EV non-experts. In a survey study, we then tested whether cost-related advantages and disadvantages were predictive of EV acceptance and whether norms and collective efficacy have independent effects even when controlling for cost-related factors and demographic variables. Results suggest that both EV experts and EV non-experts considered cost-related factors as much more important than social identity processes. However, hierarchical regression analyses of the survey data showed that norms and collective efficacy have equal or even stronger effects on acceptance than cost-related factors. We discuss the theoretical and practical implications of these findings.

1. Introduction

Transportation is a major contributor to the global carbon footprint (Hertwich & Peters, 2009). In the face of climate change and dwindling natural resources and as an answer to increased pollution of inner city areas, the interest in alternative fuel solutions such as electric vehicles (EVs) has grown in recent years.[1] EVs have become an important part of the political agenda in Europe. For example, the government in Germany has decided to support this new technology with the goal for Germany to become a leading market of electric mobility and that by 2020 there will be at least one million EVs on German streets (Federal Government of Germany, 2010).

As Germany is still in an "early adopter stage" compared to other countries like Norway where EVs are much more common (see Klöckner, Nayum, & Mehmetoglu, 2013), it seems to be of central importance to identify the barriers and also the facilitative factors related to the acceptance of the new technology. Specifically, we were interested in the role of social norms and collective efficacy beliefs as predictors of EV acceptance. Public debates on barriers and opportunities for the

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[1] Although EVs are perceived as a more sustainable alternative to fuel-driven cars, this promise of a cleaner and environmentally friendly mobility choice is bound to additional requirements. For example, the electricity itself would need to be produced in a clean way. Currently, there are considerable regional differences in electricity CO_2 intensity (Tran, Banister, Bishop, & McCulloch, 2012) and large potential markets for EVs such as China and Germany still rely heavily on coal-generated electricity. Electric mobility has the potential to become a benefit to the environment but an integrated power-system planning will be one prerequisite to make sure that EVs are indeed the more environmentally responsible choice. As political support has grown as well, there is at least hope that EVs can make a meaningful contribution to fight the negative consequences of climate change.

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adoption of EVs often seem to focus on personal costs and benefits in terms of financial costs or incentives or worries about usability and convenience issues. However, beyond personal cost-benefit analyses people's attitudes and decisions are also driven by their perception of the social context and social affiliations. People not only define themselves as isolated individuals but also as members of groups and communities. This is why they do not make their decisions in a social vacuum but are affected by what others think and do (social norms; Cialdini & Trost, 1998) and whether they think that communities or groups can bring about social change, such as establishing sustainable mobility on a collective level (collective efficacy; van Zomeren, Postmes, & Spears, 2008). However, as previous research on social norms and private energy conservation (Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008) suggests, these social psychological predictors of sustainable behavior are underdetected by psychological laypersons. This is why in the present article we aim to test whether social norms and collective efficacy add to the prediction of EV acceptance above and beyond the influence of cost-benefit variables and whether psychological laypersons who are experts (e.g., developers and decision makers) or non-experts on EV are aware of the possible impact of collective cognition.

1.1. Theories on the diffusion of new technologies

In his seminal work, Rogers (2003) describes the decision to accept or reject an innovation in society, such as the adoption of EVs, as a social process that can be divided into discrete stages. In the *knowledge* stage, individuals are exposed to an innovation but are still in need of information. The next stage, *persuasion*, is characterized by the seeking of related details and positive or negative attributes of the innovation, which should lead to the third stage, *decision*, where advantages and disadvantages are weighed against each other and the individual decides whether he or she should adopt or reject the innovation. With the addition of a fourth and fifth stage (*implementation* and *confirmation*), Rogers' model describes the full course of the adoption process. In the specific context of EVs in Germany at this time, it can be argued that most people are still in the initial stages, *knowledge* and *persuasion*. Therefore, it seems to be important to (a) identify the variables related to EV acceptance and (b) investigate the relative importance of these variables for the acceptance of EVs. We propose that it is not only technical and cost-related information on range, recharge time and purchasing price that determine individual acceptance of EVs but that people also use information from interactions with others that indicate how similar others think and act and whether collective innovation seems feasible.

Successful diffusion depends on the adoption of the new technology by more and more people. That means, they need to become interested in it and need to decide to use it. Recently, Klöckner (2014) proposed a stage model to explain EV purchase decisions. He adapted a stage model of behavior change proposed by Bamberg (2013) that includes the pre-decisional stage, the pre-actional stage, the actional stage and the post-actional stage. Individuals move from one stage to the other by forming specific intentions (e.g., a goal intention for transition from the pre-decisional stage to the pre-actional stage, or a behavioral intention for transition from the pre-actional to the actional stage). Importantly, each type of intention is expected to be influenced by specific variables. Therefore, certain variables can become important at one stage of the process but are no longer influential at another stage. As stated above, Germany is still at the "early adopter stage" with regard to EV use. It could be argued then, that many potential German EV users are still at the pre-decisional stage. This stage is characterized by the realization that behavior has to be changed (here, mobility behavior) or that it does not need to change. According to Klöckner's (2014) adapted model, norms play an important role in the formation of goal intentions. This assumption fits a social identity perspective on decision-making processes

1.2. Social identity factors (social norms and collective efficacy)

As individuals are interdependent and often experience themselves as members of a group, it is very likely that social identity and group membership are relevant to the adoption of electric vehicles. We define ourselves by identifying with certain social groups (social identity; Tajfel & Turner, 1979). Individuals' thinking, emotions and behavior usually change when membership in a specific group (e.g., nation, gender, political groups) vs. personal identity becomes salient. Among other reactions, this can lead to discrimination of salient outgroups (Billig & Tajfel, 1973), participation in collective action and social movements (Simon et al., 1998) or changes in health-related behavior (Haslam, Jetten, Postmes, & Haslam, 2009). How people are affected by group membership depends on processes of self-stereotyping where people apply the perceived ingroup prototype (e.g., "Germans like innovations") as a description of themselves ("I like innovations"). Perceived ingroup norms inform the perception of what it means to be a group member. When group membership is salient and an individual identifies with that group, s/he is motivated to follow these unspoken rules and customs of her or his group and to act accordingly (e.g. Masson & Fritsche, 2014; Terry, Hogg, & White, 1999; White, Smith, Terry, Greenslade, & McKimmie, 2009).

There are different types of norms and all of them could be relevant for the adoption of EVs. When a norm refers to what group members commonly do it is called a descriptive norm (e.g., "Germans do not drive EVs"; Cialdini, Reno, & Kallgren, 1990). When it refers to what is commonly approved and disapproved within the group it is called an injunctive norm (e.g., "Germans approve of driving EVs"; Cialdini & Trost, 1998; Smith & Louis, 2009). Social norms could therefore influence the decision to adopt an EV if an individual perceives other group members to be in favor of adoption (injunctive norm). Of course, the perception that very few people use EVs could have the opposite effect and decrease the likelihood of adoption (descriptive norm; Smith et al., 2012).