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The role of general and specific attitudes in predicting travel behavior – A fatal dilemma?

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ABSTRACT

Attitudes are increasingly used in travel behavior research to help explain and predict travel behavior. In such studies, empirical correlations between attitudes and behavior are routinely interpreted as causal effects, which paves the way for policy interventions aimed at changing attitudes and thereby, ultimately, behavior. This paper contributes to a recent and growing body of work which points at the shaky foundations underlying this attitude-behavior conceptualization. In contrast to previous work in this direction, we distinguish between general attitudes and specific attitudes and we study their potential and limitations in explaining and predicting travel behavior. We build and empirically confirm a set of hypotheses which argues that neither of these two types of attitudes is capable of providing empirical evidence for a causal effect of attitudes on behavior. General attitudes, which have the advantage of being relatively exogenous to the behavior being studied, only have a weak empirical association with specific travel behaviors. Specific attitudes towards these travel behaviors overcome this problem as they are much more strongly correlated with behavior, but this comes at the cost of a severe loss in exogeneity; in other words, the causal relation from specific behavior to specific attitudes is considerably stronger than the opposite effect. In combination, our findings suggest that it is very difficult, if not impossible, to identify and measure attitudinal variables that satisfy two necessary criteria for causal inference: empirical association and exogeneity. Implications for travel behavior researchers and transport policy makers are likely to be far-reaching.

1. Introduction

In travel behavior research attitudes are often assumed to play an important role; for example, in applications of social-psychological theories such as the Theory of Planned Behavior (Bamberg, 2006; Bamberg et al., 2003; de Groot and Steg, 2007; Heath and Gifford, 2002); in research dealing with the effects of the built environment on travel behavior (Handy et al., 2005; Cao et al., 2009; Van de Coevering et al., 2016); or in hybrid choice models of travel behavior (Ben-Akiva et al., 2002; Vij and Walker, 2016). Attitudes can broadly be defined as feelings of (un)favorability towards a particular attitude object or a particular behavior (Ajzen and Fishbein, 2005). In the transport domain as well as the discipline from where they 'originated', namely social psychology, they are generally regarded as more or less stable personal dispositions, which are effective in explaining past and predicting future behavior. In this paper, we will formulate and provide empirical support for a set of hypotheses that suggest that it is in fact very difficult to identify and measure attitudes that are effective in empirically explaining and predicting the causal mechanisms underlying (travel) behavior.

It should first be noticed that, while, presently, the role of attitudes in the prediction of behavior is largely undisputed, this was not the case in early social-psychological research. In those early days, the concept of attitudes was criticized on theoretical grounds, for lack of any mechanism though which they supposedly 'cause' behavior (Liska, 1984; Cooper and Croyle, 1984), as well as on empirical grounds, due to reported low correlations with overt behavior (Blumer, 1955; Wicker, 1969). With the rise of psychological action theories (like the Theory of Planned Behavior (Ajzen, 1991)) the theoretical void with respect to the assumed mechanism of causation has been filled. The empirical value of attitudes (as a means of explaining behavior), on the other hand, is still being questioned to the present day, but has actually been turned into a more constructive research line dedicated to the question 'under which circumstances do attitudes influence behavior?' (Fazio, 1990). Indeed, this question has inspired many researchers to identify and assess the various moderating factors that affect attitude-behavior consistency. For example, the internal consistency of the attitude (Norman, 1975), the temporal stability of the attitude (Schwartz, 1978)

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and the certainty with which the attitude is held (Fazio and Zanna, 1978) have been shown to affect the degree of attitude-behavior consistency. The results of these studies have been integrated in various meta-analyses (Kraus, 1995; Glasman and Albarracín, 2006).

One explanation, which has been firmly empirically established, has been provided by Ajzen and Fishbein (1977). They argued that the degree of empirical consistency between attitudes and behavior is a function of the substantive correspondence between the attitude and the behavior. In line with this notion, they showed that specific behaviors were more strongly correlated with specific attitudes than with general attitudes. In case researchers are interested in explaining specific behaviors (which is most often the case in travel behavior research, where researchers may for example be interested to explain choices for specific travel modes), Ajzen and Fishbein (1977) therefore recommend the use of specific attitudes to explain such behaviors. Intuitively, it is perhaps not surprising that defining attitudes in a way that they are in line with the behavior under study will increase the empirical correlation with the respective behavior. However, from a theoretical standpoint, the recommendation of Ajzen and Fishbein (1977) has been questioned (albeit indirectly) by Ogden (2003) who argues that the operationalization of distinct concepts within social-psychological theories (like the Theory of Planned Behavior) often overlap to such extent (semantically) that the results represent analytic truths (i.e. true by definition) rather than synthetic truths (i.e. true by empirical exploration). Take for example the semantic overlap between a positive attitude to using public transport for commuting, and a choice to use public transport for commuting. In response to such critiques, Ajzen and Fishbein (2005) have argued, that empirical studies have consistently reported evidence of discriminant validity among the different concepts.

Still, the feeling of 'too good to be true' remains; that is, by simply formulating the attitude to be in line with the behavior, researchers will very likely find strong empirical correlation between the attitude and the behavior. Is there then no drawback associated with this practice? We argue there is. We do not question the notion that specific attitudes are more strongly (theoretically and empirically) associated with specific behavior(s) than general attitudes, but argue that their use comes with a price, namely a loss of exogeneity. That is, we hypothesize that since specific attitudes are relatively close to the specific behavior that is being studied, they are, in turn, also relatively strongly affected by the behavior being studied. As a result, we hypothesize that specific attitudes are relatively likely to be endogenous to the specific behavior being studied, and, for that reason, we hypothesize that specific attitudes, despite their high empirical correlation with corresponding (specific) behaviors, have low predictive power. General attitudes, on the other hand, are hypothesized to remain relatively exogenous to specific behavior being studied, but these attitudes are expected to show weak empirical correlations with the specific behavior being studied and, for that reason, are hypothesized to have low predictive power as well. The central thesis of this paper is then that it is intrinsically difficult – and perhaps impossible – to identify and subsequently measure attitudinal entities which strongly correlate with behavior while at the same time remaining exogenous to the behavior being studied. In other words, attitudes with high predictive power (i.e., having a strong empirical correlation with the behavior while at the same time being exogenous to that behavior) are expected to be very difficult to obtain. See Fig. 1 in the next section for a visual account of this line of argumentation. We empirically test and confirm our hypotheses using panel data concerning travel mode choices and related attitudes.

The remainder of this paper is structured as follows: in the next section, we will review the literature to provide additional theoretical support for the above-stated hypotheses. To empirically test our hypotheses, Section 3 presents the specification of a structural equation model suited to this end, namely a cross-lagged panel model. This section will also present the measures and participants. Sections 4 and 5 will provide the results and conclusions, respectively.

Finally, it should be noted that this paper extends, and builds on, two previous publications by the authors. First, Chorus and Kroesen (2014) highlight the potential risk of attitude-endogeneity in hybrid choice models that are used to analyze and predict travel behavior. That paper did not present any empirical analysis, as it built on previous scholarly work in social psychology. Second, Kroesen et al. (2017) empirically show that indeed, the causal relation from travel behavior to attitudes can be much stronger than the (usually assumed) causal relation from attitudes to travel behavior. Those results suggest that attitude-endogeneity cannot be ignored in travel behavior studies. This paper refines and contributes to this line of work by distinguishing between general and specific attitudes, and by showing that both have their own problems, precluding causal inference: general attitudes are shown to be only weakly (empirically) associated with specific travel behaviors, while specific attitudes (which overcome the problem of weak empirical association) are shown to be endogenous to the behaviors being studied. The data and methods we use partially overlap with the data on which Kroesen et al. (2017) base their conclusions. However, our present aim is not to re-affirm previously reported findings, but to identify and empirically test a hitherto overlooked but important distinction between general and specific attitudes – using partly the same data and methods as in our previous work.

2. Hypotheses

Ajzen and Fishbein (1977) argue that behaviors can be defined in terms four elements: the *action,* the *target* at which the action is directed, the *context* in which the action is performed, and the *time* at which it is performed. Both behavioral and attitudinal entities can be specified with respect to these four elements. Consequently, the correspondence of the attitude and the behavior is a function of the extent to which the attitudinal entity is identical, on all four elements, with the behavioral entity.

According to Ajzen and Fishbein (1977) 'general attitudes' are those that are either substantively unrelated to the behavior or only relate to a single element, e.g. the target or context. Given their broad nature, general attitudes are assumed by these and other authors to correlate most strongly with so-called multiple-act behaviors. For example, in case the attitude is defined as 'the attitude towards church', in which case only the target element is specified, a multiple-act behavior would represent an index of all behaviors (e.g. donating money to church, attending services, participating in church-related events) that can be conducted with respect to this target element.

Behaviors and attitudes become more specific as more elements are explicitly defined. Close correspondence is achieved if all four elements are defined in the same way. For example, in the words of Ajzen and Fishbein (1977, p. 890), if '(…) the behavioral criterion is a single act, such as the person's attendance or nonattendance of next Sunday's worship service in his church at 10:00 a.m., the corresponding attitudinal predictor would be a measure of the person's evaluation of "attending my church's worship service next Sunday at 10:00 a.m."' In this case, the behavior and the attitude are precisely defined and mutually aligned with respect to all four elements (action, target, time and context).

Surveying a sample of attitude-behavior relationships reported in the literature (n = 142 studies) Ajzen and Fishbein (1977) conclude that lack of a strong empirical attitude-behavior relation is often attributable to low or only partial correspondence between attitudinal and behavioral entities. With respect to specific behaviors (e.g. 'driving a car'), the authors' advice is therefore to ensure a high correspondence between at least the target (the 'car') and action ('driving') elements. This advice has been followed in social-psychological theories (like TPB) which aim to predict specific behaviors by using specific attitudes, i.e. the attitude towards the specific behavior being studied.

In conclusion, a high correspondence between attitude and behavior