



Modelling social norms: Case study of students' car purchase intentions



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ABSTRACT

In this paper we aim to quantify the influence of *social norms* on car ownership intention by estimating ordered hybrid choice models (OHCM) with car purchase intention as dependent variable. Our sample consists of 1229 university students from three developed and four developing countries. We construct *subjective social norms* (SSN) by interacting the perceived expectation to buy a car with motivation to comply with the expectation. Four approaches to incorporate social norms into OHCM are presented while controlling for other explanatory variables such as attitudes and socio-demographics. From the four estimated models we find that social norms significantly correlate with car purchase intention. Though differently defined in the four models, we find similar parameter estimates in all models, which leads us to conclude that the effect is fairly robust even with simplified definitions. From a model with person-group specific observed SSN, we further find though that group specific influences can differ significantly and that parents and university peers significantly influence car purchase intention.

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1. Introduction

Decisions of all kinds, including car purchase decisions, are influenced by a multitude of factors. Among others, it is well known that the perceived usefulness of an option is often influenced by not only one's perception but also the perception that the decision maker supposes others to have of this option. This has led to a large literature on the role of "expectation of others" on decision-making. Asch (1951) already concludes that "a substantial minority yielded, modifying their judgment in accordance with the majority" indicating the role the general wider social network has on one's decisions.

Similarly, to explain behavior related decision-making, the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975), the subsequent theory of planned behavior (TPB) (Ajzen, 1985, 2012; Ajzen and Driver, 1991) and the latest Reasoned Action Approach (RAA) (Fishbein and Ajzen, 2010) were developed. These theories posit that the immediate antecedent of behavior (action/decision) is behavioural intentions (intention/

motivation), which in turn have several determinants that include "subjective norm." The strength of subjective norm refers to an individual's perceptions of how others expect him/her to behave regarding the behavior in question as well as the individual's motivation to comply with the expectations of those important others.

The importance of "norms" has been reported as instrumental for a wide range of repeated behaviours in research related to health and environmental friendly behavior. In the field of health, we can refer to work on college students drinking (DeJong et al., 2006; Neighbors et al., 2007) and on smoking behavior (Nyborg and Rege, 2003). Several researchers have successfully investigated and explained the effect of norms on environmental friendly behavior such as Goldstein et al. (2008) on hotel towel re-use, Schultz et al. (2007) on house energy reduction, and some on the case of littering and recycling (Cialdini et al., 1990; Harland et al., 1999). Ravis and Sheeran (2003) review several studies that incorporate the influence of norms on several behavioural intentions such as healthy eating, smoking, and drug use. In transportation research, we can also find the positive influence of norms on transportation behavioural intentions as can be seen from a growing body of literature that is reviewed in the next section.

Since there are several ways of defining social norms related factors for transportation modelling, the question remains, which is a better way for modelling social norms as a determinant of transportation behavioural intentions? How many person

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reference groups should we incorporate in order to find the best representation of *social norms*? These are the key questions motivating this paper. We aim to quantify the influence of *social norms* on transportation behavioural intentions, particularly car purchase intentions of students with different model formulations. Though there is a significant body of literature illustrating the effect of norms, our literature review will show that findings are not coherent and that there is no agreement on the best modelling approach for social norms.

We further emphasize that in this paper we discuss desire for “cars in general” though recent literature has been often on attitudes towards alternative fuel vehicles (AFVs). Our choice is conscious as we believe that car ownership itself, independent of whether it is an AFV or not, remains an important policy topic. We explore *social norms* in more detail by developing ordered hybrid choice models (OHCM) with car purchase intention as dependent variable. Our results are limited to a specific population subgroup, undergraduate students. However, besides the estimation results, we believe the more important contribution of this paper is a methodological discussion on how *social norms* might be estimated and modelled.

The structure of this paper is as follows: Section 2 discusses previous research on the role of social norms in transport planning related literature. In Section 3, we discuss different forms of how we formulate our choice models incorporating *social norms*. In Section 4, we describe how the data were collected and include some descriptive analysis of the data. Section 5 then explains the car purchase intention model and in Section 6 we discuss our findings, conclusions and the implications for transport modelling.

2. Literature review

2.1. Social norms and transportation decisions

Norming effects have been described in various studies with different terms such as mass effects, herd behavior, peer effects, fashion or conformity (Abou-Zeid et al., 2013). Though the terms are partly used interchangeably, the former terms mostly include a notion of dynamics and are associated with modelling the spread of behavior. Instead *social norms* is the term mostly used in social psychology to explain the behavior of an individual which is also our focus here. For a more detailed review on the psychological foundations, with a focus on implications for mobility decisions, we refer the reader again to Abou-Zeid et al. (2013). In the remainder of this section, we focus on empirical evidence for the importance of the influence of others for transportation related decisions.

Thøgersen (2006) explores the correlation between mode choice for different trip purposes and subjective social norms. Subjective social norms (SSN) were constructed by asking the respondents about their agreement with a five-point Likert scale statement “I believe that most of my acquaintances expect that I take the bus or train to work and shopping if the choice is between bus or train and my own car.” The results show that subjective social norms have a strong correlation with commuting behavior. Closely related, according to Jakobsson et al. (2000), expectations about others’ intentions were found to be one determinant of car use reduction. Muñoz et al. (2016) propose a number of cycling indicators based on TPB for their bicycle commuting logistic regression model. They construct a “subjective norms” factor by asking 654 respondents from one city in Spain about the approval of certain specific groups on bicycle commuting as well as the importance of those specific groups on the decision to commute by bicycle. They conclude that subjective norms influence bicycle commuting decision.

Bamberg et al. (2007) investigate if there is empirical evidence for the assumption that social norms do influence intentions indirectly via their impact on attitude, perceived behavioural control and personal norms. Their research obtains the social norms construct by asking respondents in two German cities about the extent to which people who are important to them think they should use public transport instead of car. They find that in both data sets social norm is strongly associated with personal norm, attitude, and perceived behavioural control but has no direct association with intention. Partially following on from Bamberg et al. (2007), Zhang et al. (2015) utilize the same approach in Shanghai context and find that SSN might have stronger effects on one’s intention in the Asian context compared to Western context. Dharmowijoyo et al. (2015) investigate if subjective norms influence the intention to use motorized vehicle/public transport/non-motorized transport for out-of-home activity in the context of Bandung, Indonesia and find positive significant effect.

Also for the usage/ownership of alternative fuel vehicle (AFV), norming effects appear to be important. Jansson (2011) points out that there is a significant difference in perceived personal and social norms between adopters and non-adopters of AFV in Sweden. Personal and social norms were constructed in his paper by using principal component analysis (PCA) using indicators that emphasize on reducing oil/petrol usage and the use of AFV. The research found that the prevailing norms are to use fossil fueled vehicles. Ozaki and Sevastyanova (2011) analyse the Prius market share in the U.K. They used a sample of 1263 individuals who had purchased a Prius in the 24 months prior to January 2009. They construct two social norm factors based on PCA results. The first one is *social orientation* while the other norms factor is *identity* which is constructed from comments in open comments questions that are related to compliance with norms of the social group and the expression of self. Both of the above studies suggest that social norms are important for AFV purchase decisions, though they do not conduct a regression analysis in order to understand the relative importance of norms.

Moons and De Pelsmacker (2012) use intention to use an electric car as dependent variable in the regression model with a sample of 1199 individuals from Belgium. In their regression analysis they include subjective norms of peers and of media. These were constructed by asking several questions related to peers’ expectation and media influence related to electric car. They found that those two norms variables significantly influence electric car intention. They do not though distinguish person groups, the role of perceived expectations and the importance of the group for the respondents which we aim to explore in this paper.

In conclusion, there appears to be some evidence that social norms are an important determinant of mode choice and consequently vehicle ownership choice. What the above studies have though not discussed is how best to implement their social norms construct into a “standard” random utility choice model (RUM) framework where one can better control for a wide range of socio-demographics and attitudinal factors (Kim et al., 2014). Some of their studies relied on structural equation modelling which explains correlation but arguably is less suitable for choice prediction. Achieving the formulation of such a RUM framework (Hybrid Choice Model) with different social norm constructs is precisely the objective of the present study. As a background to this, the following section continues this literature review by pointing out different prevailing norms and discusses how they have been measured.

2.2. Types and measurement of norms

Schwartz (1977) and Schwartz and Howard (1982) distinguish norms into personal norms and social norms. Personal norms are

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