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ABSTRACT

Beyond their functional purpose, cars are often considered a status symbol. There may exist a certain level of pride associated with owning and using cars, especially in regions where motorization is rapidly growing. However, there is little empirical evidence in terms of how car pride is related to different behavioral aspects, such as car ownership and use, especially in the context of developing countries. This paper presents an exploration of car pride and its association with car-related behavior. In this work, car pride is defined as the self-conscious emotion derived from the appraisal of owning and using cars as a positive self-representation. It pertains to both the symbolic and affective functions of the car. Using survey data (n = 1389) from Shanghai, China, we empirically measure car pride as a latent variable based on five Likert-scale statements and test the association of car pride with car use, vehicle preferences, and car ownership. Based on two structural equation models, we show that: (1) car pride is positively correlated with car use; (2) car pride correlates significantly with owning newer, more expensive, and luxury cars, and Shanghai's more expensive local car licenses; (3) car owners in general have higher car pride than non-owners; and (4) car pride is largely independent of one's socio-economic characteristics. Although the analysis focuses on Shanghai, the findings of the positive correlation between car pride and behavior are consistent with prior studies in developed countries. These findings highlight the importance of car pride regarding multiple behavioral aspects of car ownership and use and its potential impact on mobility management.

Keywords: car pride, structural equation model, car ownership, car use, Shanghai

1. INTRODUCTION

"No other man-made device since the shields and lances of ancient knights fulfills a man's ego like an automobile."

—William Rootes (1894–1964), British car manufacturer

The car has been studied extensively in its instrumental capacity as a mode of transport. However, people are attracted to cars for reasons beyond mere mobility, which is reflected in the nature and prevalence of car use. Like other status goods, the car has symbolic meanings that are related to people's self-concepts. Possibly even more so in many developing countries where motorization rate is low but rapidly growing, car ownership is one of the most conspicuous signals of social status and worth. With cars, people "wear" their status on the road. Whether they own a car, what type of car they own, and how often they drive, are all representations of themselves based on their self-evaluation and their perception of others' evaluation. People take pride in who they are, and they may also pride themselves in possessing or using cars. We call this type of pride *car pride*, and will define it more precisely after the literature review in Section 2.

Previous studies such as Steg (2005) have investigated the importance of psychological factors in influencing travel behavior; in this paper, we focus specifically on car pride as one concrete psychological phenomenon. Few attempts have been made to quantify car pride and its relationship with travel behavior in the literature. A better understanding of car pride provides insights into the social and psychological motivations of car ownership and use, which can inform mobility management and car-related policymaking. In this paper, we focus on a particular psychological factor, car pride, and discuss its behavioral and potential policy implications.

Car pride, its existence, its socioeconomic drivers, its formation process, and its behavioral implications may differ significantly according to country developmental stage, motorization history, and cultural background. This paper focuses on Shanghai, China—a city within a country experiencing rapid shifts in the way cars are owned, used and valued. Because of its unique characteristics, we take caution not to over-generalize the results from one single region. China is experiencing a sharp increase of private car ownership since early 2000, which has greatly contributed to worsening traffic congestion and air pollution in large cities. Rising personal income and changing urban form have been identified as major drivers of the rapid motorization in China (Li et al., 2010; Wu et al., 2016). However, psychological factors, such as car pride, may have also played a role. On one hand, the fact that car ownership and use is not as common as in the developed world, combined with rapidly growing personal income, may contribute to the potential status value of the car, and as a result rising car pride. On the other hand, car pride can be an important motive for car ownership and use, further fueling the motorization in Chinese cities. This study aims to shed light on this phenomenon.

2. LITERATURE REVIEW

2.1 Changing Car Cultures

In sociology and human geography, cultural approaches have long sought to understand the socially embedded meanings of private vehicles and how they evolve over the years (Sheller, 2004; Urry, 2004; Kent & Dowling, 2013). Beyond individual attitudes and emotions, these studies provide a more general evaluation of the way images are constructed and maintained through automobility. In the 20th century, the car has been an integral part of what constitutes the good life in the developed countries. However, recent years have seen a decline in driving and car ownership, especially for millennials (Garikapati, Pendyala, Morris, Mokhtarian, & McDonald, 2016; Klein & Smart, 2017). Although the recent economic recession played a role in the decline, changing altitudes and shifting lifestyles have been identified as key factors (McDonald, 2015). Another possible reason is that the perception of the car's symbolic values can be affected by its availability and affordability. In fact, it has been shown that the ubiquity of the car can lead to it being perceived as an everyday tool, much like a refrigerator (Gärling and Loukopoulos, 2008). This also means that the situation can be very different for developing countries where motorization is relatively low but rapidly changing. Focusing on undergraduate students in seven countries, Belgiawan et al. (2014) found that students in developed countries have significantly less desire to purchase cars. In contrast, Chinese college students showed a strong desire for car ownership, and its psychological values (e.g., feelings of freedom) were perceived to be more important than the instrumental values (Zhu et al., 2012).

Facing severe traffic congestion and air pollution problems, many Chinese cities have implemented car restriction policies to control private vehicle ownership and usage. Shanghai is an early adopter. In 1994, when car ownership was still low, the Shanghai government began to use monthly auctions to limit the number of vehicle licenses issued, which effectively dampened the growth of car ownership in Shanghai compared to other major Chinese cities (Wu et al., 2016). However, as a result of growing population and economy, the price people are willing to pay to get a Shanghai car license has risen dramatically over the years. In 2011, the average auction price of the Shanghai license was $7,600 (Chen & Zhao, 2013). The high price of licenses in Shanghai led to speculative activities and car owners obtaining non-local licenses, partially offsetting the policy's effect (Hao et al., 2011). It was reported that about a quarter to a third of car owners in Shanghai had their cars registered non-locally (Chen and Zhao, 2013). Because of the high price associated with a local Shanghai license, the license itself may also have symbolic value. In this paper, we treat license choices as part of vehicle preferences, and investigate its relationship with car pride.

2.2 Car as a Status Symbol

Many psychological factors related to cars are rooted in consumer psychology literature. The car is a consumer good; in fact, it is one of the most important, and expensive, consumer goods in people's lives. The theory of the meaning of material possessions suggests that consumer goods fulfill a range of instrumental, social symbolic and affective functions (Dittmar, 1992). The instrumental functions relate to the functional properties of a product. The instrumental function

of a car is to provide mobility: moving fast, safely and conveniently from one location to another (Jakobsson, 2007). Consumer goods also have symbolic functions, as they can signify personal qualities, social standing, group affiliation and gender role. Possessions contribute to defining one's identity and become an extension of the self (Belk, 1988). The symbolic functions can be subdivided (Dittmar, 1992). As a categorical symbol, a car enables individuals to communicate their social standing, wealth and status, and group membership. As a self-expressive symbol, a car can represent a person's unique qualities, values and attitudes. Both instrumental and symbolic functions are related to affective functions, such as the excitement or pleasure evoked by the physical properties of a brand-new car. Emotional responses to cars and feelings about driving are crucial to the experience of owning and using a car (Sheller, 2004).

Based on Dittmar's material possession model, Steg (2005) examined how different aspects of psychological factors can be related to commuter car use. Her research showed that the effects of instrumental, symbolic and affective factors on behavior can be distinguished empirically. Further studies demonstrated that psychological factors significantly influence mode choice (Steg, 2005; Vredin Johansson, Heldt, & Johansson, 2006), frequency of car use (Lois and López-Sáez, 2009; Bergstad et al., 2011), and adoption of electric vehicles (Schuitema et al., 2013). Gärling and Loukopoulos (2008) argued that psychological factors might play an even more decisive role than economic factors, which was partially supported by Steg (2005). In addition, it was found that young people and low-income groups seemed to value affective functions of the car more than older and higher income groups, and male drivers valued symbolic functions more than female drivers (Steg, 2005; Steg et al., 2001).

It is well established that individuals care a great deal about their status and strive to attain higher status (Barkow, 1989). Higher status offers several psychological rewards, including self-esteem (Berger et al., 2015) and sense of power (Rucker & Galinsky, 2008), making status a valued commodity. This motivates individuals to engage in conspicuous consumption, i.e., the act of acquiring goods not for their inherent value, but to signal social status. After housing, cars may be the most important item of individual consumption that provides status to their owner/user (Urry, 2004). The fact that the car can serve as a salient status symbol enables people to derive a sense of pride from it.

2.3 Pride as a Psychological Construct

Studies on pride in psychology contend that pride is one of the core self-conscious emotions—along with shame, guilt, and embarrassment—and that it plays a central role in motivating and regulating people's thoughts, feelings, and behaviors (Tracy & Robins, 2004, 2007). Self-conscious emotions drive people to work hard in achievement and task domains (Stipek, 1995; Weiner, 1985) and to behave in moral, socially appropriate ways in their social interactions and intimate relationships (Baumeister and Stillwell, 1994; Leith and Baumeister, 1998). They are cognitively and functionally different from basic emotions such as anger, fear, disgust, sadness, happiness, and surprise, which are biologically based (Davidson, 2001; Ekman et al., 1983; LeDoux, 1996; Panksepp, 1998). Self-conscious emotions are subsumed under basic emotions in linguistic hierarchical classifications; for example, sadness subsumes shame, and joy subsumes pride (Shaver et al., 1987). Like other self-conscious emotions, pride can motivate human behavior, especially in social contexts (Tracy and Robins, 2007; Williams and DeSteno, 2008).

The theory of self-conscious emotions suggests that pride is a complex psychological construct that requires cognitive processes as the necessary foundation for the emotional experience of pride. According to Tracy and Robins (2004)'s theoretical model, self-representations must be activated (either explicitly or implicitly) for self-conscious emotions to occur. In the case of car pride, the self-representation is based on the symbolic function of the car. Car pride may occur when a person perceives the car as a symbol of their identity, self-image, or social status. On the other hand, car pride as an emotion reflects the affective function of the car—the feeling of accomplishment, fulfillment, or satisfaction. These feelings are enabled by self-representations, which makes them different from other types of emotions triggered by cars, such as the enjoyment about driving. Therefore, an appropriate definition and measurement of car pride need to consider both the symbolic and affective values of cars.

2.4 Car Pride

Zhao (2009) used the term "car pride" and included it as one of the psychological factors that influence travel behavior, along with personality traits, environmental attitudes, and perceptions of convenience and comfort. The author found that incorporating these factors as latent variables improved the explanatory power of the travel behavior models, but did not define the concept of car pride formally. In this paper, we define car pride as the self-conscious emotion derived from the appraisal of owning and using cars as a positive self-representation.

A distinction needs to be made between *experienced* and *anticipated* car pride. Both types of pride share the same fundamental valuations of the symbolic functions of cars. But for car owners, their pride can be realized via their cars. For non-owners, their pride is based on expectations, which are likely shaped by their exposure to or past experiences with cars. Given the prevalence of cars and car advertisement in our society, it is reasonable to assume non-owners generally have accumulated adequate knowledge about cars to anticipate the potential influence that car ownership *would* have on their status. Anticipated outcomes play an important role in human decision making. For example, Carrus et al. (2008) showed that anticipated affective outcomes were important predictors of the desire to recycle and use public transportation. This is an important generalization, allowing the concept of car pride to be defined, measured, and modeled consistently for both car owner and non-owners. It is of practical importance to include non-owners in the research because one main goal of studying car pride is to understand what motivate non-owners to purchase cars in order to better manage the process of motorization through policy intervention.

Despite the prior studies on the car's symbolic-affective values and psychological theories of pride, there is little empirical evidence in terms of how car pride is related to different behavioral aspects, such as car ownership and use, especially in the context of developing countries. The next section will show how survey data and structural equation models can be used to analyze car pride and its behavioral implications.

3. METHODOLOGY

Building upon the conceptual discussion of car pride, we describe below the questionnaire survey conducted in Shanghai, the psychometric measurement of car pride, and two structural equation models that examine the relationship between car pride, car use and ownership behavior and socioeconomic status and location variables.

3.1 Data

The data for this study were collected via a questionnaire survey in Shanghai, China. We hired a professional customer survey company to distribute the questionnaires via its online survey platform. The questionnaires were in Chinese, and the relevant questions and statements are translated into English in this paper. The participants in the survey were at least 18 years old. To ensure that the sample reflects the socioeconomic characteristics of Shanghai residents, the survey company imposed quotas on the distributions of potential respondents' gender, age, educational attainment, resident status, and household income, based on the city's statistical yearbook (Shanghai Municipal Bureau of Statistics, 2012). Note that the car owners were purposefully oversampled, so that the data could adequately capture the car use and vehicle choice behavior. 1,500 complete responses were collected in 2012. The final dataset contains 1,389 records after data cleaning. A comparison between the sample and city statistics is described in Appendix A.

3.1.1 Car pride

The survey included five psychometric statements on car pride as shown in Table 1, and the respondents were asked to indicate their level of agreement on a 5-point Likert scale ranging from -2 (totally disagree), -1 (partially disagree), 0 (neutral), 1 (partially agree) to 2 (totally agree). Both car owners and non-owners are asked to answer the same five questions. It is important to note that Chinese is not a morphology-rich language, a Mandarin sentence can often be interpreted as either in indicative mood or subjunctive mood (Bloom, 1981; Liu, 1985). For example, the Chinese sentence "买车让我觉得有成就感" can be understood by car owners as "I *have* a sense of accomplishment after buying a car"; and by non-owners as "I *would have* a sense of accomplishment after buying a car". Table 1 compares the means of the responses from car owners and non-owners. Among the five statements, S4-5 are meant to represent the symbolic values of the car (pertaining to self-representation), while S1-3 are meant to reflect the affective values of the car (pertaining to self-conscious emotion). The last column Cohen's *d* shows the effect size indicating the standardized difference between the two means. All the differences are significant at the 0.05 level with car owners more likely to agree with car pride statements.

TABLE 1 Summary of Car Pride Indicators

Variable	Statements on Car Pride	Car Owners (N=725)	Non-Owners (N=664)	Cohen's *d*
S1	Driving [would] meets my self-esteem to some extent	0.65	0.44	0.21
S2	I [would] have a sense of accomplishment after buying a car	0.73	0.49	0.24
S3	I [would] feel proud of owning a car	0.88	0.50	0.39
S4	A car is a status symbol	0.66	0.41	0.24
S5	Having a car is connected with one's social image	0.74	0.45	0.31

Note: The values presented for car owners and non-owners are scaled between -2 (totally disagree) and 2 (totally agree). The Cronbach's alpha is 0.71 for car owners and 0.72 for non-owners.

The Cronbach's α is computed to evaluate the reliability, or internal consistency, of these 5 statement variables; the higher the α coefficient, the more likely the variables are measuring the same underlying concept. Based on the survey data, the α coefficient is 0.71 for car owners and 0.72 for non-owners. This suggests that the internal consistencies of our car pride measurements are reasonably strong, and similar between car owners and non-owners.

3.1.2 Car use and vehicle preferences

Apart from car ownership, the survey also asked people's car use behavior and vehicle preferences for those who own a car, as reported in Table 2. Individual car use was measured in four variables, including whether the car is used as a primary commuting mode (either as a driver or as a passenger), the car use frequency, the vehicle kilometers traveled, and the car mode share (proportion of trips taken by car). Vehicle preferences included the price and age of the car, whether the license was registered locally in Shanghai, and one's preference for luxury cars.

TABLE 2 Summary of Car Use and Vehicle Variables

Variable	Type	Explanation	Mean
C_PRIM	Binary	Whether the car is the primary commuting mode	0.72
C_FREQ	Interval (0-7)	The number of days per week the person uses a car	4.31
C_VKT*	Ordinal (1-8)	Vehicle kilometers traveled in the past year in 8 categories	3.41
C_SHAR	Interval	Percentage of trips traveled by car	61.5
C_PRICE	Interval	The price of the car in 100,000 CNY	1.75**
C_AGE	Interval	The number of years since purchasing the car	3.06
C_SHLIC	Binary	Whether the car is registered locally in Shanghai	0.77
C_LUX	Binary	Whether the person prefers a luxury vehicle	0.18

* In the survey, the respondents were asked to choose a range of their vehicle kilometer traveled in the past year, with 8 categories: (1) < 2,000 km; (2) 2,000-5,000 km; (3) 5,000-10,000 km; (4) 10,000-15,000 km; (5) 15,000-20,000 km; (6) 20,000-25,000 km; (7) 25,000 - 30,000 km; (8) > 30,000 km

** In 2012 (when the survey was conducted), 175,000 CNY was roughly 27,800 USD, or 21,600 EUR.

3.1.2 Socio-economic status and location variables

Socio-economic information included age, gender, education level, residency status (i.e., local resident or non-local resident), employment status, annual household income. These variables were coded into one or more dummy variables in Table 3 to capture potential nonlinear relationships. We also collected information on people's home location, commuting distance and public transit accessibility. Specifically, a person's household location was categorized into the three areas: the central district (within the Inner Ring), the periphery district (in between Inner and Outer Rings), and the suburb (outside the Outer Ring). The central district has the highest population and job density, and people living in the central and periphery districts have higher trip rates and shorter trip lengths (Zhao et al., 2013). People with longer commuting distance generally have a higher need for cars, unless very competitive public transit options are available. We asked 8 questions in two groups regarding public transit accessibility (last 8 rows in Table 3): 1) the self-reported distance and walking time to the nearest subway station and bus stop; 2) the perceived public transit availability in where the person lives and works, and where and when the person needs to travel. The two groups of transit accessibility variables are represented as two latent factors: PT_ACC1 and PT_ACC2 in the structural equation models discussed in Section 3.2.

TABLE 3 Summary of Socio-Economic and Location Variables

Variable	Type	Explanation	Mean
YOUTH	Binary	Whether the person's age is under 35	0.34
SENIOR	Binary	Whether the person's age is 60 or above	0.19
COLLEGE	Binary	Whether the person has college education	0.54
MALE	Binary	Whether the person is male	0.50
LOCAL	Binary	Whether the person has a local Hukou	0.60
EMPLOYED	Binary	Whether the person is employed	0.72
L_INCOME	Binary	Whether the household income is less than 50k CNY per month	0.19
H_INCOME	Binary	Whether the household income is greater than 150k CNY per month	0.15
INNER	Binary	Whether the person lives inside the Inner Ring road	0.20
OUTER	Binary	Whether the person lives outside the Outer Ring road	0.42
SHOR_COM	Binary	Whether the commuting distance is less than 5 km	0.30
LONG_COM	Binary	Whether the commuting distance is greater than 15 km	0.23
SUB_DIST	Ordinal (1-5)	The distance from the person's home to the nearest subway station	2.98
BUS_DIST	Ordinal (1-5)	The distance from the person's home to the nearest bus stop	2.20
SUB_WALK	Ordinal (1-5)	The time it takes to walk from home to the nearest subway station	2.97
BUS_WALK	Ordinal (1-5)	The time it takes to walk from home to the nearest bus stop	2.21
PT_LIVE	Ordinal (1-5)	The availability of public transit in where the person lives	3.66
PT_WORK	Ordinal (1-5)	The availability of public transit in where the person works	3.80
PT_GO	Ordinal (1-5)	The availability of public transit in places the person goes	3.71
PT_TRAV	Ordinal (1-5)	The availability of public transit when the person needs to travel	3.68

Note: The distance to transit service is measured in following levels: (1) < 0.25 km, (2) 0.25-0.5 km, (3) 0.5-1 km, (4) 1-2 km, and (5) > 2 km. The walking time to transit services is measured in following levels: (1) < 5 min, (2) 5-10 min, (3) 10-20 min, (4) 20-30 min, and (5) > 30 min. The availability of transit services is measured subjectively in the following level: (1) very low, (2) low, (3) medium, (4) high, and (5) very high.

3.2 Structural Equation Models

In this study, we aim to empirically test the relationship between car pride and a series of travel behavior variables, including car use, vehicle preferences, and car ownership. Specifically, we built and tested two structural equation models (SEMs) to quantify these relationships.

In Model 1 (Figure 1), we examine, for car owners only, the influence of car pride on car use and vehicle preferences. Model 1 includes three sets of measurement equations and three sets of structural equations. Car pride is a latent factor measured by the 5 indicators described in Table 1. PT_ACC1 and PT_ACC2 (not shown in the figure to reduce clutter) are measured by the eight transit accessibility indicators described in Table 3. The estimation results of the measurement equations are reported in Appendix B. Structural equation set 1 represents the influence of the socioeconomic and location variables on car pride; set 2 represents the influence of the socioeconomic and location variables on car use and vehicle preference; set 3 represents the influence of car pride on car use and vehicle preference.
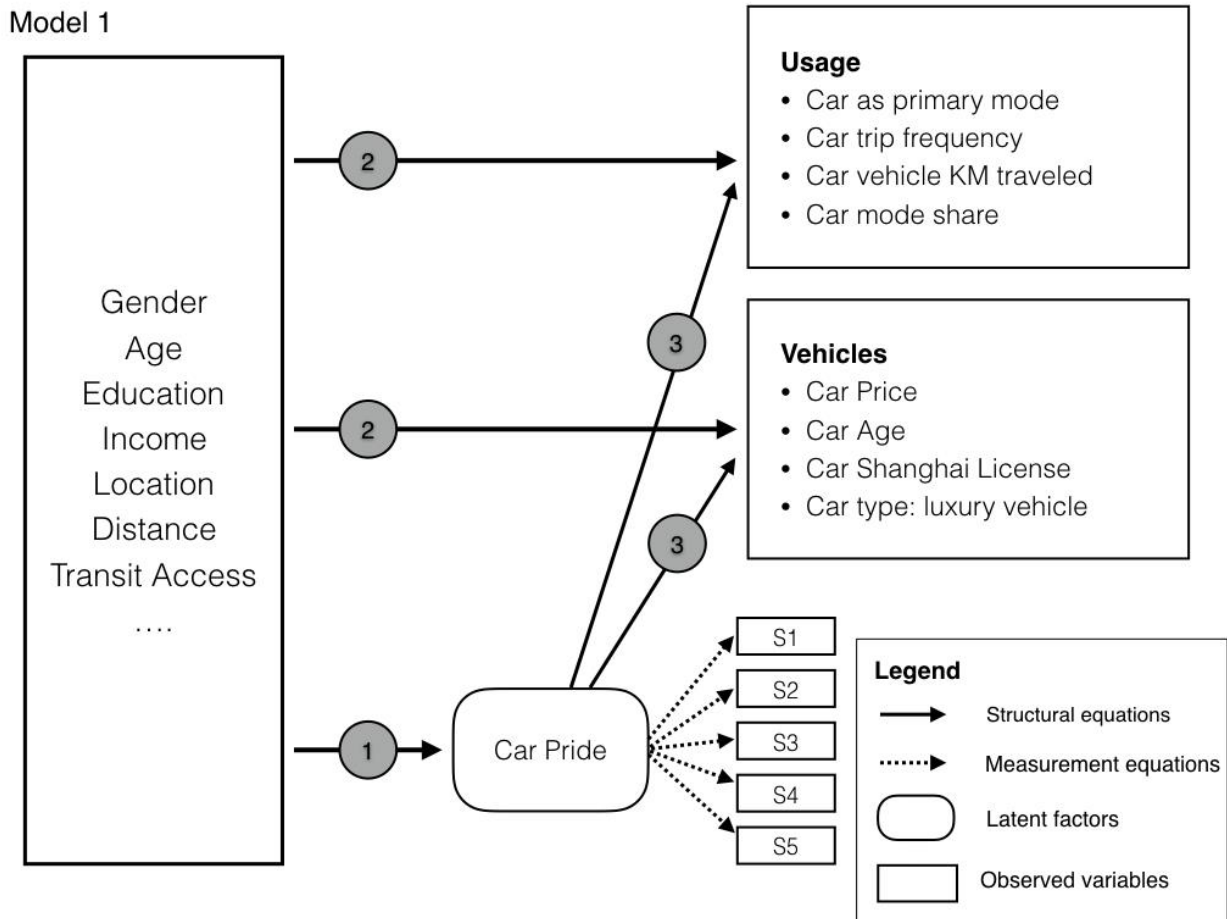

FIGURE 1 Structure of Model 1 for relationship between car use, vehicle choice and pride

In Model 2 (Figure 2), we include both car owners and non-owners, and investigate the association between car pride and ownership. There are plausible causal relations in both directions: car pride motivates car ownership while owning a car increases one's car pride. Our cross-sectional survey data do not allow us to disentangle the mutual causal influence. As an initial exploration, we only examine the correlation between these two variables. Structural equation set 1 and set 2 represent the influence of the socioeconomic and location variables on car pride and car ownership respectively. Set 3 represents the correlation between car pride and car ownership.
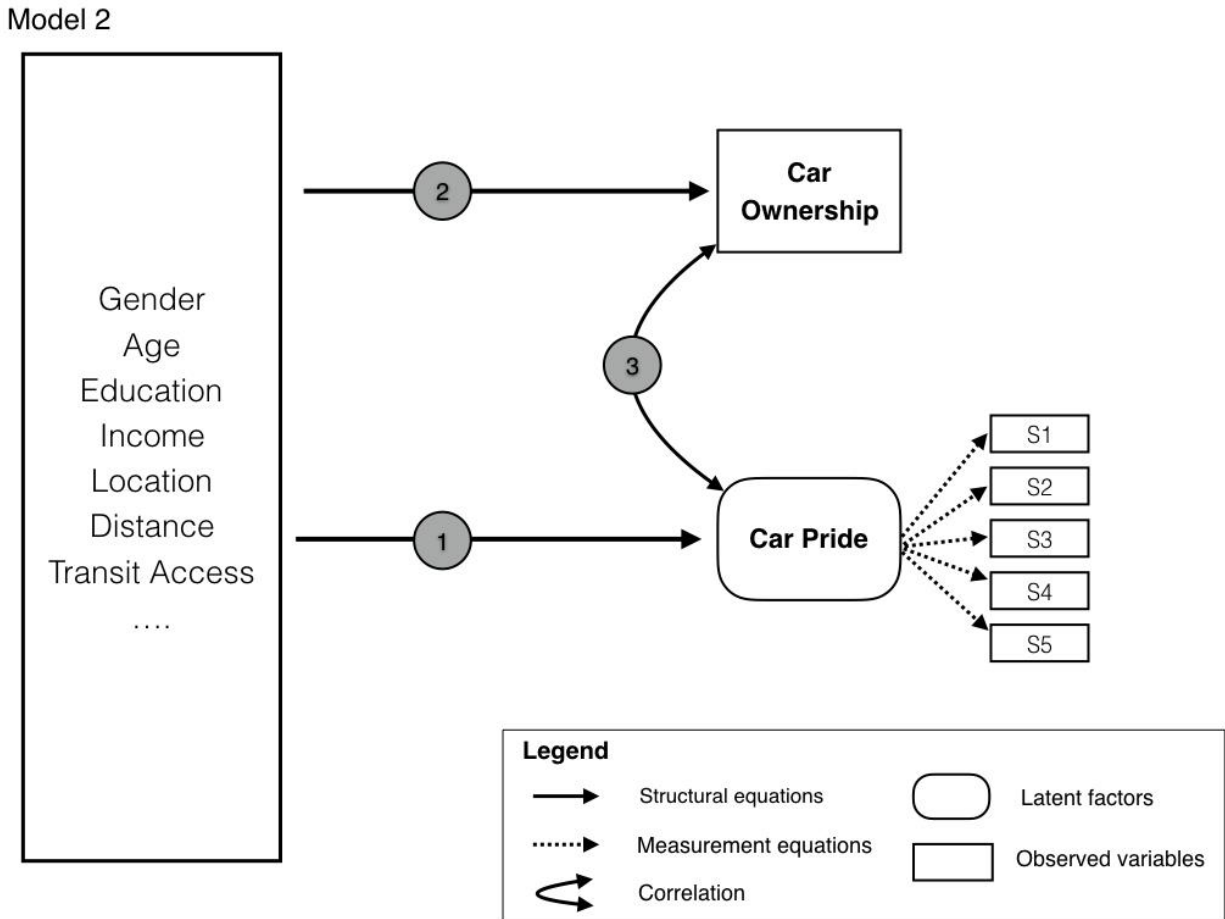

FIGURE 2 Structure of Model 2 for relationship between car ownership and pride

4. RESULTS

4.1 Model 1

Table 4 shows the coefficient estimates of the structural equations for Model 1 as well as the key model fit indices[1]. After controlling for the socioeconomic and location variables, car pride has a significant influence on all four car use variables and all four vehicle preference variables. Higher car pride is associated with a higher probability of choosing a car as primary commuting mode, more frequent car use, greater distance traveled, and higher share of car trips, in line with prior studies in Netherlands (Steg, 2005), Spain (Lois & López-Sáez, 2009), and Sweden (Bergstad et al., 2011). Higher car pride is also associated with more expensive, newer, luxury cars and Shanghai local license. Only the highest bidders can place Shanghai licenses on their cars, reinforcing the symbolic status of car ownership in Shanghai. Having a local license in Shanghai is similar to having a luxury car. According to our model, people's car pride is a very strong predictor for the choice of a Shanghai license. People with strong car pride are more likely to be willing to pay for these licenses. By making it more expensive to get Shanghai-licensed cars, the auction policy may inadvertently make possessing cars more exclusive and therefore desirable.

None of the socioeconomic variables influence car pride. The only significant predictors for car pride are living in the central district (positive influence) and, to a lesser degree, having a short commuting (negative influence). The overall explanatory power of socio-economic and location variables for car pride is minimal. Similar results are reported by Zhao (2009) and Moody et al. (2016). Car pride cannot simply be approximated by one's socio-economic status, and it requires its own dedicated measurement.

4.2 Model 2

With a larger sample size and simpler model structure, the model fit for Model 2 is much better than Model 1. Table 5 shows that, after controlling for socioeconomic and location variables, there is still a significantly positive (0.196) correlation between car pride and ownership. This is consistent with the result in Table 1 that car owners have on average significantly higher car pride than non-owners. All extant theories and prior studies suggest that car pride is likely to be a motive for car ownership. However, the causality can go both ways. Car pride may lead to the purchase of a car, but, after buying a car, people may adapt their car pride to match their ownership status. In this paper, we focus on their correlation, rather than the causal effects between car pride and ownership.

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[1] Root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker-Lewis index (TLI) are commonly used model fit indices and preferred for one-time analyses (Schreiber et al., 2006). RMSEA represents the square root of the average of the covariance residuals; zero represents a perfect fit, but the maximum is unlimited. Both CFI and TLI are based on comparison against a baseline (independence) model. They roughly represent the extent to which the model of interest is better than the independence model; values that approach 1 indicate acceptable fit. In particular, TLI tends to be lower if the model is complex. The rule of thumb cutoff criterion for model selection are (1) RMSEA < 0.06, (2) CFI ≥ 0.95, and (3) TLI ≥ 0.95 (Hu & Bentler, 1999). However, these criteria are merely guidelines, and it has also been shown that they may over-reject true models at small size and thus are less preferable when sample size is small. For Model 1, we find that the model fit is reasonably good in terms of RMSEA and CFI, but poor in TLI. This may be because of the relatively smaller sample size (compared to Model 2) and more complex model structure.

TABLE 4 Model Estimation Results for Model 1

	Car Use				Vehicle Choice				Pride
	C_PRIME	C_FREQ	C_VKT	C_SHARE	C_PRICE	C_AGE	C_SHLIC	C_LUX	PRIDE
PRIDE	0.217*	0.176*	0.083*	0.125*	0.082*	-0.101*	0.245*	0.135*	NA
YOUTH	-0.260†	-0.055	-0.259*	-0.276*	0.103	-0.194	0.061	0.289†	0.114
SENIOR	0.060	0.350	0.299	0.480*	0.100	-0.709*	-0.173	0.898*	0.012
COLLEGE	0.108	0.187†	0.109	0.245*	0.133	-0.117	0.104	0.352*	-0.099
MALE	0.041	0.175†	0.005	0.015	-0.068	-0.050	-0.040	0.047	0.090
LOCAL	0.206	0.164	0.084	0.065	0.015	0.012	0.319*	-0.135	0.164
EMPLOYED	0.284	0.219	0.424*	0.630*	0.106	-0.549*	-0.132	0.672*	-0.184
L_INCOME	-0.190	-0.266*	0.051	0.061	0.109	0.112	0.235	0.002	-0.046
H_INCOME	-0.188	0.088	0.002	-0.097	0.586*	0.041	-0.134	0.260	-0.083
SHOR_COM	-0.412*	-0.226†	-0.306*	-0.235*	-0.082	-0.016	-0.406*	0.093	-0.222†
LONG_COM	-0.038	-0.202†	0.084	-0.207†	0.133	0.196	0.027	-0.079	-0.079
PT_ACC1	-0.181*	0.009	-0.091*	-0.081*	-0.031	0.058	-0.036	0.030	-0.058
PT_ACC2	-0.042	-0.078†	0.071	0.032	-0.033	-0.022	0.048	-0.090	0.064
INNER	-0.098	0.199	0.032	0.015	0.101	0.307*	-0.285	0.185	0.349*
OUTER	-0.074	-0.083	-0.021	-0.030	-0.065	0.124	-0.712*	0.016	-0.010
Model Fit	RMSEA = 0.053		CFI = 0.92		TLI = 0.871		N=725		

Note: coefficients with "*" are significant at 0.05 level; coefficients with "†" are significant at 0.1 level.

TABLE 5 Model Estimation Results for Model 2

		CAR_OWN	PRIDE
Correlation		0.196*	
Socio-Economic Variables	YOUTH	0.289*	-0.001
	SENIOR	-0.128	-0.212
	COLLEGE	-0.487*	0.021
	MALE	-0.105	-0.044
	LOCAL	-0.01	0.008
	EMPLOYED	-0.084	-0.214
	L_INCOME	-0.189	-0.223
	H_INCOME	0.159	0.143
Location Variables	SHOR_COM	-0.29*	-0.371*
	LONG_COM	0.444*	-0.256*
	PT_ACC1	-0.058	-0.062
	PT_ACC2	-0.084†	0.073
	INNER	-0.135	0.127
	OUTER	-0.383*	0.091
Model Fit		RMSEA = 0.043	CFI = 0.951
		TLI = 0.942	N=1,389

Note: coefficients with "*" are significant at 0.05 level; coefficients with "†" are significant at 0.1 level.

In addition to car pride, other predictors of car ownership include age, education status, commuting distance, transit accessibility, and household location. Socio-economic and location variables have minimal effects on car pride, with commuting distance being the only significant variable in this case. The specific coefficients are different from those in Table 1, because both car owners and non-owners are included for Model 2.

5. DISCUSSION

Despite the prior studies on the car's symbolic-affective values and psychological theories of pride, there is little empirical evidence in terms of how car pride is related to different behavioral aspects, such as car ownership and use, especially in the context of developing countries. This study demonstrates how survey data and structural equation models may be used to analyze the association between car pride and behavior, using Shanghai, China as a case study. In this paper, we define car pride as the self-conscious emotion derived from the appraisal of owning and using cars as a positive self-representation. We empirically examine its connection with car use, vehicle preferences, and car ownership based on survey data from Shanghai. Based on two structural equation models, we find that: (1) car pride is positively correlated with car use; (2) car pride correlates significantly with owning newer, more expensive, and luxury cars, and Shanghai's more expensive local car licenses; (3) car owners in general have higher car pride than non-owners; and (4) car pride is largely independent of one's socio-economic characteristics.

Our findings suggest car pride has strong association with multiple aspects of car-related behavior, which needs to be considered in future mobility management and policy evaluation. For example, people with higher car pride may be more resistant to policies to reduce car use, e.g. road pricing. New strategies incorporating social psychological factors should be developed targeting this group of users. As car types and prices are shown to be significantly correlated with car pride, these factors may be used to identify users with high car pride. Specifically in Shanghai the car license auction policy has likely made car ownership seen as more prestigious and thus increased overall car pride. As a result, people who bought a car through the auction are likely use the car more, offsetting some of the policy impact on traffic. A more comprehensive policy design may include restrictions or surcharges on car use in addition to car ownership.

Although the analysis focuses on Shanghai, the findings of the positive correlation between car pride and behavior are consistent with prior studies in the developed countries (Steg, 2005; Lois & López-Sáez, 2009; Bergstad et al., 2011). Nevertheless, the degree of correlation may differ across regions/countries, potentially as a result of the differences in the developmental stage, motorization history, and cultural background. It is important to have a cross-culture study based on surveys with standardized measurement protocols in multiple countries in the future study.

Car pride is a complex psychological construct, and this paper only serves as an initial exploration. We would like to point out a few directions for future studies to better understand the psychological structure of car pride. First, it is valuable to examine the composition and categorization of car pride. The social psychology literature suggests that car pride consists of multiple dimensions. Section 2.4 discussed the distinction between experienced and anticipated car pride. In addition, car pride may be categorized based on its source: the pride derived from car ownership may be different from the pride derived from car use. For some people the pride

mainly comes from owning a (new, expensive, and luxury) car, while for others driving everyday may be the main source of pride. Furthermore, the self-representation theory distinguishes between the private and public aspects of the self (Robins et al., 2008), based on which we may make a distinction between personal versus social pride. Presumably different components of car pride (personal pride and social pride) may relate to different aspects of travel behavior in different ways—a hypothesis to be tested in future studies with the more granular measurement of car pride.

Second, one main methodological limitation of this paper lies in the measurement scale of car pride. A 5-item measure, as used in this analysis, cannot possibly fully tap into a complex multidimensional psychological construct of car pride. Future studies should develop and rigorously validate the measurement scale of car pride as a multidimensional psychological construct. This requires a more sophisticated survey design with multiple sets of statements, each attributable to a specific component of car pride.

Third, this paper shows that both car ownership and use are positively correlated with pride, but it cannot determine the causal relationships between car pride and behavior. For car pride to be relevant in transportation management, future studies should explore panel data, instrumental variables, and, preferably, behavioral experimentation to investigate the causal relationship between car pride and behavior.

Fourth, our results show that car pride varies across individuals but cannot be well explained by their socio-economic characteristics. Therefore, it remains unknown what shapes one's car pride. Possible factors include one's social networks, public media and advertising, childhood experience, etc. In-depth interviews are useful to understand the formation process of car pride. Longitudinal studies can shed light on the dynamics of car pride over time. A better understanding of the determinants of car pride is important in transportation planning and policy design to shape car pride and cultivate a more sustainable car culture.

Although this paper focuses on car pride, we expect that much of the discussion about car pride can be applied to pride or lack thereof in other modes of transport. If people take pride in owning or driving cars, they may also pride themselves in using public transportation, biking, or walking. Unlike car pride, the pride for alternative modes is not necessarily based on material possessions. The necessary condition of pride is not material possessions, but self-representations. Other modes of transport can have symbolic values that enable self-representations and elicit pride. For example, in many European cities biking is seen as a symbol of being sustainable and having active lifestyles, from which people may derive pride. Again, there is likely significant variation across regions. We may see a higher level of bike pride in the Netherlands, bus pride in London, and Metro pride in Paris. Future studies should collect data and analyze the pride (or shame) regarding all modes of transport.

CONFLICT OF INTEREST STATEMENT

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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APPENDIX A SAMPLE STATISTICS

In Table A1, we show the comparison of sample and city statistics regarding some key socio-economic variables. Note that we deliberately oversampled car owners because we want to obtain adequate observations to estimate the influence of car pride on car use and vehicle choice. Also, our sample skews toward population with higher education, which is likely a result of using online surveys. To address these issues, we apply iterative proportional fitting (IPF) to assign a weight to each sample response based on the city statistics. Also, as shown in our model results, socio-economic variables have minimal effect on car pride.

TABLE A1 Comparison of Sample Distribution and City Statistics

Parameters	Sample Distribution	City Statistics
Age		
18-34	34%	38%
35-59	46%	43%
60 and older	19%	19%
Gender		
Male	50%	52%
Female	50%	48%
Education		
Up to high school	46%	76%
College and above	54%	24%
Resident status		
Local Hukou	60%	61%
Other	40%	39%
Household location		
Central district	20%	20%
Periphery district	38%	34%
Suburb	42%	46%
Car ownership		
Without cars	48%	84%
With cars	52%	16%

APPENDIX B EXTENDED SEM RESULTS

There are three latent variables involved in Model 1—PRIDE, PT_ACC1, and PT_ACC2. The estimated coefficients for their measurement equations are summarized in Table B1. All estimates are statistically significant. Note that all the variables used for measuring car pride are highly correlated. Both PT_ACC1 and PT_ACC2 represent transit accessibility. The difference is that the former is an objective measure of transit accessibility at home, while the latter is a subjective measure of general transit accessibility.

TABLE B1 Estimates of Measurement Equations in Model 1

PRIDE		PT_ACC1		PT_ACC2	
Variable	Estimate	Variable	Estimate	Variable	Estimate
S1	0.717*	SUB_DIST	0.810*	PT_LIVE	0.758*
S2	0.900*	BUS_DIST	0.818*	PT_WORK	0.679*
S3	0.853*	SUB_WALK	0.794*	PT_GO	0.852*
S4	0.842*	BUS_WALK	0.761*	PT_TRAV	0.833*
S5	0.779*				

Note: coefficients with "**" are significant at 0.05 level.