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Why self-proclaimed environmentalists commit non sustainable behaviors?: Using normative motivation to understand personal attitudes and choices

Letty Y.-Y. Kwan[1] · **Yu Sheng Hung**[2]

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Abstract
Our behaviors are often inconsistent with our attitudes. In the current Study, we took a norm approach to understand why car owners continue to use private cars despite their support for environmentalism. In an experience sampling study, a large representative sample of 610 commuters from a megacity participated in a 2-part study. In the first part, they completed measures of their pro-environmental attitudes and their beliefs about society's perception of users using transportation types. After ten days, they recorded their commute behaviors on every trip they made over seven days (including a public holiday, four workdays, and a weekend). The results, which included recorded trips from 193 car owners, showed that car owners with strong pro-environmental attitudes used their cars more often when motivated by intersubjective norms. Interestingly, the results were reversed when car owners with strong pro-environmental attitudes were motivated by personal norms. The results concluded that pro-environmental attitudes alone could not predict pro-environment behaviors; instead, activating one's norms or changing one's perceived intersubjective norms are needed alongside strong pro-environmental attitudes to change one car driving behaviors.

Keywords Environmental psychology · Personal norm · Social norm

Introduction

Over the past decade, Gallup poll results showed a shift in people's prioritization of environmental protection over economic growth. Despite the economic recession, this prioritization still holds in the recent March 2022 poll results (Gallup, 2022). Nonetheless, private car usage has been on the rise in both developed countries and developing economies. For example, data from the U.S. Department of Transportation Federal Highway Administration in the United States (2021) indicated there is an increase of 4.7% in private vehicle registration from 2015 to 2020, and growing economy such as China has seen a growth of 18 million private car registrations from 2019 to 2020 (Statistica, 2022). This upward trend is evident even in countries like Singapore and China, where progressive economic measures, restriction policies, and public education have been in place to discourage private car usage (Feng & Li, 2013, Feng et al., 2013). Existing intervention strategies to discourage private car usage in megacities have focused primarily on increasing the financial costs, reducing the convenience of private car usage, enhancing the convenience of public transportation, and promoting environment-friendly attitudes among car owners (Davidson & Jaccard, 1979; Fishbein & Ajzen, 2005; Jakobsson et al., 2000; Steg et al., 2001; see also Ajzen & Fishbein, 1973, 1977). For example, in the city-state of Singapore, despite the government has made owning a car outrageously expensive (on average, a new compact car costs $99,000 in Singapore as compared to the same car would cost about $24,000 in the US), private car ownership increased by 1% from 2018 to 2019 (LTA, 2022). Although new data suggested that registration of electronic vehicles took up around 8% of new car registration in 2022, as reported by the polling agency SGYougov.

✉ Letty Y.-Y. Kwan
lettykwan@um.edu.mo

[1] The University of Macau, Avenida da Universidade, Taipa, Macau, China

[2] The Chinese University of Hong Kong, Central Ave, Ma Liu Shui, Hong Kong

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com (2022), the total EV cars on the road are less than 1% of total private car registration in Singapore (LTA, 2022). The above evidence suggests that these intervention strategies alone are insufficient to decrease private car usage.

Instead of driving their private cars, why are car owners who are pro-environment in their attitudes not taking up public transportation? We take a norm approach to understand this phenomenon in the current study. Past studies on norm activation (see theory of planned behavior (Ajzen, 1991)) have argued that personal attitudes and subjective norms drive one's behavioral intention. Under this argument, behavioral intention becomes more likely when a person has a positive evaluation of carrying out a task (personal attitude) and at the same time believes others also expect them to carry out this task (subjective norm). A large proportion of studies that took the norm approach in understanding attitudes and behaviors have used the theory of planned behavior to support their findings. Nevertheless, this approach has neglected two critical normative actions that can significantly impact our behaviors: personal norms and intersubjective norms.

Personal norms are the *expectations of how we want ourselves to be* (Schwartz, 1973). While our personal norms can be consistent with our personal attitudes, it does not necessarily have to be so. According to the norm-activation theory (Schwartz, 1973, 1977), a person can derive specific personal norms that need to be activated within a particular context. Besides inwardly looking at our personal attitudes and norms, researchers have also found that intersubjective norms -- values that we believe *are important to others* in their culture (Chiu et al., 2010; Kwan et al., 2014), to have a huge impact on one's behavior. Past studies have shown that intersubjective perceptions can sometimes override personal attitudes governing our actions (Wan et al., 2007).

In this current paper, we define personal attitudes as our own evaluation of an attitude subject, personal norms as our expectation of whom we want to be, and intersubjective norms as our estimation of what others would feel are important in our culture. Furthermore, we use personal norms and intersubjective norms as situational motives that interact with personal attitudes to determine whether they will partake in pro-environmental behaviors (Eriksson et al., 2008; Klockner & Blobaum, 2010). The current approach is important because past studies on pro-environmental behavior have mainly focused on using attitudes to understand and change behaviors (Itzchakov et al., 2018). Simultaneously, more and more studies have shown the important effect of norms on one's pro-environmental behaviors (Ben-Elia & Ettema, 2011; Fujii & Garling, 2003; Mann & Abraham, 2012; Sia & Jose, 2019). Nevertheless, normative perceptions in these studies were often used as an all-encapsulated concept to show the effect of social influence on specific

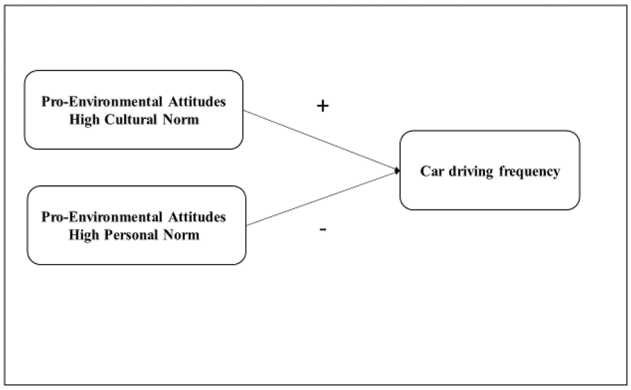

Fig. 1 Research framework

behaviors. Indeed, the different types of norms can affect our behaviors differently once we consider the social context and personal attitudes. The current paper proposed two types of norms, personal and intersubjective norms, in moderating individuals' attitudes.

Another major drawback of past studies is the use of behavioral intention as a proxy for actual pro-environmental behaviors, rendering the results difficult to translate into actual practical usage. A solution to this drawback is using an event diary to record driving behaviors. In this current study, participants were asked to record their transportation behavior for seven days to test the proposed framework on how and when attitude interacts with different types of norms to predict driving behavior (Fig. 1).

In sum, we argue that personal pro-environmental attitudes are important in affecting behaviors. Still, they are only meaningful when we account for personal and intersubjective norms as situational motives. Furthermore, we argue that normative behaviors manifested within the same individual in two different forms – personal norm adherence and intersubjective norm adherence. When individuals have a high personal norm motive (the motive to become what they believe is an ideal in society), they are more likely to act according to their personal attitudes. On the contrary, when they have a high intersubjective norm motive (the motive to be similar to what they believe others believe is ideal in society), they are less likely to act according to their attitudes.

The current study is important because policymakers have found that changing people's attitudes to curb their destructive environmental behaviors is not effective and practical. Therefore, it is crucial to increase our understanding of encouraging environmentally friendly behaviors. The results of this study also offer a new theoretical knowledge of how contextual meaning (such as personal versus intersubjective norms) can moderate our attitudes in an entirely reverse manner in the context of transportation behaviors. To provide some background understanding of this topic,

we will start by reviewing past literature on how personal environmental values and attitudes affect pro-environmental behaviors and how norms have been used to understand decision-making behavior.

Pro-environmental attitude and pro-environmental behaviors

Recent studies on environmental psychology have revealed that our motivation to drive is complex (Chng et al., 2018; Viola, 2021). A meta-analytical study has sought to understand the effect of pro-environmental attitudes and their link with pro-environmental action, intention, and actual behavior (Gardner & Abrabam, 2008). The findings showed weak support for the association between pro-environmental attitudes and pro-environmental behaviors. These past studies often used behavioral ***intention*** as a proxy for ***actual*** pro-environmental behaviors, rendering the results challenging to interpret. Additionally, these studies have largely ignored the contextual norms within which pro-environmental behaviors occur. For example, although some pro-environmental behaviors (e.g., buying expensive green products) can be relatively costly, individuals would perform such behaviors to signal their higher socioeconomic status (Griskevicius et al., 2010). Therefore, individuals who engage in pro-environmental behaviors may not only do so to express their pro-environment attitudes but also to signal their higher social status. Hence, a person's behavior can be governed by different norms, one of which is to satisfy the socially expected normative behaviors (Haustein et al., 2009; Heath & Gifford, 2002; Klockner & Friedrichsmeire, 2011).

Personal norms and intersubjective norms

Theories of cultural evolution suggest that conformity is a strategy that individuals learn to become competent members of their society (Henrich & Boyd, 1998). Imitating the psychological attributes of what most others in the community possess or aspire to possess (conformist transmission) is a common strategy that individuals use to figure out which behavioral option is most appropriate within a particular context. In the context of environmentally friendly behaviors, individuals are likely to derive concrete personal norms of these environmentally friendly behaviors based on their attitudes, and these behaviors are often perceived to be heterogeneous across individuals. These personal norms guide the kinds of behaviors that are accepted as environmentally friendly. An example of a personal norm of sustainable behavior would be the reduction of private car usage. However, based on the norm activation theory (Schwartz, 1973, 1977), individuals only act sustainably when these personal norms are being activated or are salient to the individual. For example, when you have a high motivation to be similar to an individual whom you perceive to be the ideal within your social group (Abrahamse et al., 2009; Baumgärtner & Quaas, 2009; Daly et al., 1994; Ekins et al., 2003; Nordlund & Garvill, 2003; Pearce et al., 2017; Stero et al., 1989).

Interestingly, personal normative behaviors can sometimes contradict the behaviors one believes are important to others in the culture. Consistent with this view, recent research on the intersubjective norm (see Chiu et al., 2010; Vesely & Klockner, 2018; Vinnell et al., 2018) has shown that people often make decisions based on the behaviors that they believe others in their cultural group would do in a particular situation (e.g., "I would not want fellow Americans to think that I don't respect their rights to bear arms"), even when they do not personally believe in the norms, when the perceived norms do not correspond to the actual preferences of the group, or when the decision is a high stake one (e.g., a decision to pass a gun control bill in the Congress). This is the case, particularly when people aspire to possess the characteristics of their reference group.

Based on the past literature, the current study used personal norm motive as the participants' motivation to be similar to a society member who possesses the values and attitudes that the ***participants themselves*** would like to have. This study also uses the intersubjective norm motives as the participants' motivation to be similar to those others who possess values and attitudes that the participants believe ***other society members*** would like to have (Abrahamse, Gifford & Vlek, 2009; Nordlund & Garvill, 2003; Stero et al., 1989). It is best to explain the interaction between personal attitudes, personal norms, and intersubjective norms in a real-life situation, such as driving behaviors. For example, although an individual might hold strong pro-environmental attitudes and acknowledge the personal normative behaviors (e.g., decrease the use of a private car) for environmental sustainability, the same individual might believe that driving a private vehicle is a more desirable intersubjective normative behavior in the society. The current study sought to determine which norms govern individuals' behaviors when conflict exists between their attitudes, personal norms, and intersubjective norms.

Driving behaviors, pro-environmental attitudes, and personal and intersubjective norms

Driving versus taking public transportation provides an excellent context to test the role of normative influence and personal attitudes on pro-environmental behaviors. In cities/countries where public transportation is common, the government is often proactive in developing a sustainable

environment through education and attitude changes (Leicht et al., 2018). However, car driving behavior in these cities/countries does not always decrease; on the contrary, it is often on the rise, for example, in megacities such as Los Angeles and Beijing and city-states such as Singapore. Interestingly, another important factor for car driving behaviors in these cities/countries where public transportation is readily available, driving is not only a means to get around but a way to signal one's competence, achievements, and higher socioeconomic status (Steg, 2005). The effect of signaling one's status does not always come into play in consumption, and research has consistently found that signaling is much more prominent when the situation triggers the signaling need. For example, in a study that examined dominance on male customers' status-signaling consumption, the authors found that male customers tend to spend more to signal their elite status when they reported having a higher level of intra-sex competition (male to male) (Otterbring et al., 2018). Researchers also found that consumers are willing to pay more for an environmentally friendly hotel only when status-signaling is apparent. Consumers default to savings when the consumption is made private and are inclined to choose conventional hotels versus the more expensive ecologically friendly green hotel. These studies' results show that status signaling is prevalent across different situational contexts, but they also highlight that individuals opt for status signaling via their consumption of goods and services only in social contexts. Even though these past studies have always explored signaling from the perspective of the self, it is also possible that the need to signal is triggered by extrinsic factors such as our intersubjective normative perceptions. A recent study on country-level big data on country-level consumption opinions has shown that in societies where there is a greater need to display the self to be from a higher echelon (i.e., from a society that has higher income inequality), there is a significant higher mentioning of luxury brands such as Rolex and Louis Vuitton in their social media tweets (Dubois et al., 2021). These findings support the possible influences that intersubjective perception has on one behavior. Therefore, in this current study, we combine both personal and intersubjective normative perception to understand how it interacts with our personal attitudes in predicting pro-environmental behaviors.

The best way to understand the above interactions is to locate conditions under which personal norms and intersubjective norms motivations interact with our attitudes. Therefore, in the current study, we will study driving behaviors within the context where personal attitudes, personal norms motive, and intersubjective norms motive could potentially contradict. In the current model, we proposed that when participants have a high intersubjective norm motive, that is, when they want to be similar to target characters whose values, beliefs, and preferences are believed by others to be valuable in society, their behavior will be driven by the intersubjective norm irrespective of their internalized personal norms or attitudes (Fujii & Garling, 2003; Garling et al., 2001). On the contrary, participants with high personal norm motives, that is, those who want to be similar to the target characters whose values, beliefs, and preferences are those that the participants value, are more likely to act according to their personal attitudes (Abrahamse et al., 2009; Gardner, 2009; Nordlund & Garvill, 2003).

At times, the intersubjective norm motivation may be strong enough to overpower both the personal norm motivation and our pro-environmental attitude. This may explain why in many megacities where car owners have been encouraged to use public transportation, some car owners who value environmental protection prefer public transportation while others still prefer to drive. The current study will differentiate conditions under which car owners are inclined to conform to their personal or intersubjective norms and examine the interaction between personal pro-environmental attitudes and both types of normative motivations.

The current study

The current study recruited real commuters in Singapore to better understand the push and pull dynamics between personal attitudes and the two normative motivations (personal and intersubjective norms). The study was carried out in Singapore because it is a megacity with efficient public transportation and a considerably higher cost of commuting by private cars than public transportation. Despite the low costs of using public transportation, Singapore has the lowest average daily public transport trips per person than other big cities with comparable GDP per capita (e.g., London, Tokyo, New York, and Hong Kong). Moreover, developing environmentally friendly attitudes and public transport infrastructure is critical to Singapore's sustainable growth, with Singapore ranking first among Asian countries in sustainable development (Sustainable Cities Index, 2018). In 2021, the Singapore government released the "The Singapore Green Plan 2030," and decreasing carbon emissions is one of the focal targets. Indeed, encouraging the use of EV vehicles through financial incentives for EV car owners paired up with new infrastructure implementation (such as the installation of charging stations and enhancement of roadside assistance for EV car owners) is currently underway. Green commutes, such as expanding the public transportation system and building and expanding cycling path in the city, is also under rapid development (The Singapore Green Plan 2030, 2021). Aside from attitude change promotion, infrastructure development, and financial incentives, the Singaporean government has imposed massive financial

costs on car owners through taxation and toll charges (LTA, Singapore Government, 2022). The city-state has a small total land area (687 km^2), a shortage of expressways (only 161 km of expressways out of 3,456 km of paved roadways), and a high population density (estimated population was 5.64 million in 2018). As a high-income country (estimated GDP per capita in 2021 was US$72,794) (World Bank, 2018), many citizens can afford a car. Indeed, one out of 10 Singaporeans owns a vehicle (LTA, Singapore Government, 2019), and despite the above incentives, new car registration has still risen from the year 2020 to the year 2021. In short, Singapore presents a relevant and excellent context to understand why car owners do not take public transportation despite the need of the country to reduce private car usage and associated costs.

Data collection

The current study obtained actual transportation behaviors from a large sample of Singaporean citizens (610 commuters) over a representative period of 7 days, including workdays, weekends, and public holidays. Before tracking the participants' transportation behaviors, participants' pro-environmental attitude was measured. Participants' normative motivation (personal and intersubjective) to use private cars was also measured by asking participants to rate the extent to which they perceived other car owners' values, beliefs, and preferences to be similar to what most Singaporeans would like to have (intersubjective norm) and similar to what they would like to have (personal norms). The study captured participants' perspectives of private car owners in relation to themselves. Based on the past literature on normative perception (Chiu et al., 2010; Kwan et al., 2015), the current hypothesis argued that among car owners, the strength of the two different normative motivations (intersubjective norm and personal norm) would have distinct effects on the relationship between pro-environmental attitude and the frequency of commuting by private cars (see Fig. 1). Specifically, we predicted that car owners with higher intersubjective norm motives are more likely to use private vehicles as their means of transport.

On the contrary, the behaviors of individuals with a high personal norm motive are more likely to be driven by their norms derived from their internalized attitudes. Past studies have shown that we conform to normative cultural behaviors due to the higher status perception of certain behaviors (Steg, 2005). If the above propositions were confirmed, car driving could be used as a symbolic way to signal one's status within a cultural group more than as a means of transportation. To understand this, we sought to use personal and intersubjective normative motivations as moderators on the effects of our attitudes towards the environment and status perceptions of car drivers (Fig. 1).

Table 1 Demographic Information

All Subjects ($N = 609$)		Car owner ($N = 193$)
Characteristic	% of respondents	% of respondents
Sex		
Female	57%	49%
Male	43%	51%
Age		
< 18	9%	
18–25	46%	31%
26–35	6%	6%
36–50	14%	22%
51–65	23%	39%
> 65	1%	1%
Education		
Primary	8%	5%
Secondary	26%	26%
Junior College	7%	9%
Polytechnic	11%	14%
ITE	2%	3%
University Graduate	13%	17%
Masters	2%	4%
Undergraduate	31%	22%
Income (SGD)		
< 1000	60%	35%
1000–3000	24%	32%
3001–6000	11%	20%
6001–8000	2%	4%
8001–10,000	2%	7%
> 10,000	1%	3%
Car ownership		
Car owner	32%	
Non-Car owner	68%	

Method

A total of 610 commuters in Singapore (43% male, Age (mean) = 26–35) volunteered to participate in an experience sampling study. There are 193 (32%) (51% male, Age(mean) = 26–35) car owners in our sample. Car owners are those who responded "yes" to our question "do you own a private car?" in our survey ownership. Table 1 shows the demographic information of all the participants, including both car owners and non-car owners. The study consists of two parts. In the first part of the study, participants' personal environmental attitudes, personal norms, and intersubjective norms were measured. They will also fill out their demographic information (age category, gender, socioeconomic status, education level, and car ownership). To ensure there is no carry-over effect from Part 1 of the study, Part 2 of the study was scheduled ten days after Part 1, with the

same start and end date for all 610 participants. In Part 2 of the study, participants were asked to keep daily records of their transportation activities over seven days. This period was strategically chosen because it included four workdays, a Saturday, a Sunday, and a public holiday. It can capture the commuters' travel patterns over workdays, weekends, and holidays.

Measures

To understand participants' personal pro-environment attitudes (referred to as the PEA from this point onwards), the Environmental Awareness Subscale (8 items) of the Newly Revised Ecological Paradigm Scale (NEP scale; Dunlap et al., 2000; Pierce et al., 1999; Stern et al., 1995) was used. Dunlap and colleagues (2000) show that the NEP can be treated as a single construct with good psychometric properties. The scale demonstrates good internal consistency in the original study, with coefficient alpha = 0.83, and principal-components analysis indicated all the items load heavily on the first unrotated factor, confirming the presence of one major factor in the NEP scale. Dunlap and colleagues' study also demonstrates that the NEP has good predictive validity related to other well-established measurements such as the perceived seriousness of world ecological problems ($r = .61$), support for pro-environment policies ($r = .57$), the perceived seriousness of state and community air and water pollution ($r = .45$), and pro-environmental behaviors ($r = .31$). In addition, the original study shows that endorsement of the NEP is correlated with political liberalism ($r = .32$), age ($r = -.11$), and education ($r = .10$), indicating the high construct validity for the NEP Scale used in our current study. Two sample items are "Humans are seriously abusing the environment" and "If things continue on their present course, we will soon experience a major ecological catastrophe." Past studies on understanding pro-environmental attitudes and their correlation with pro-environmental behavior have shown that individuals with high PEA scores are more aware of the effects of their actions on the environment and are more likely to engage in pro-environment activities (Pierce et al., 1999; Stern et al., 1995). Participants were asked to indicate their agreement with each item on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree). Cronbach's alpha coefficient of the scale was 0.82.

We adopted and modified the methodology used in past studies in measuring intersubjective norms in measuring personal and intersubjective norms in this current study (Wan et al., 2007). Both personal and intersubjective norms were measured in a person perception task in which the participants were asked to use a 7-point scale to rate Singaporeans who used different types of transportation on two major dimensions: (a) the extent to which the character's (i) values, (ii) beliefs, and (iii) preferences represent those that most Singaporeans would like to have and (b) the extent to which the character's (i)values, (ii) beliefs, and (iii) preferences represented those the participants would like to have. Six target persons were presented to the participants. The only information about the target persons the participants received concerned the primary means of transportation the target persons used: three drive a private car (a sedan, a luxurious sedan, and an SUV), and three use public transportation (bus, subway, and taxi). Specifically, participants will be presented with six profile pages, and on each page is a picture of one of the means of transportation. For example, under the Sports Utility Vehicle profile, they will see a colored picture of a Sports Utility Vehicle (with gender-unidentified protagonists, the vehicle's brand name blurred, and the vehicle's color controlled to be silver across all conditions). They received an instruction such as, "This Sports Utility Vehicle (SUV) is character A's main mode of transportation around Singapore. Tell us more about what you think character A is like by answering the questions below". Sample items for measuring personal norms and intersubjective norms are "Character A's values are those I would like to have" and "Character A's values are those MOST SINGAPOREANS would like to have," respectively.

To understand whether personal norms and intersubjective norms will interact with one's personal attitudes in influencing their perception towards the status-related characteristics of a private car driver or a public transportation user. We asked the participants to use a 7-point scale to rate each target on two positive status-related characteristics, intelligence and success. These characteristics were supported by decades of research to correlate positively with one's socioeconomic status (Strenze, 2007). Participants were also asked to rate two status-unrelated positive characteristics, honesty and wholesomeness, as a comparison.

In the experience sampling study, following past research (Reis & Gable, 2000), the participants were asked to keep a diary of their transportation behaviors and record every trip they had made during the day. For each trip they made, the participants were asked to record the time of the trip, starting location and destination, the purpose of the trip, the means of transportation, and the cost of the trip. We measured the private car usage by dividing the number of trips for which private cars were used during the data collection period by the total number of trips made during the week to get the percentage during this period.

Results

Descriptive statistics of car owners and driving behaviors

To test the normality of the sample distribution, we explored the data of PEA by assessing the skewness and kurtosis as well as the Shapiro-Wilk test using SPSS 25 software. According to Byrne (2013), a skewness value between − 2 and + 2 and a kurtosis value between − 7 and + 7 indicate the normality of the distribution. In the present research, the skewness value for PEA is 0.008, and the kurtosis value for PEA is − 0.398. The results of the Shapiro-Wilk test also confirmed that the data of PEA were normally distributed (p > .05).

Descriptive statistics for the measured variables and their correlations are shown in Table 2. The participants reported taking 8,335 trips during the data collection period. The private car was the means of transportation for 1,622 trips. The participants who owned a car (N = 193) took 2688 trips, and 594 trips of them were by private vehicle (22%), while those who did not own a car (N = 417) took 5647 trips and 1028 trips of them were by private car (18%), indicating that participants who did not own a car also use private cars at times for their means of transportation. On average, the participants who owned a car (N = 193) used private cars to take 3.16 trips (SD = 7.01) during the week, while those who did not own a car (N = 417) used private cars to take on average, 2.49 (SD = 6.25) trips during the week, t(327.73) = -1.124, *n.s.* (unequal variances assumed in the t-test). Public transportation was the means of transportation in 6,713 trips. The participants who owned a car used public transportation to take 11.41 trips (SD = 9.08) on average during the week, while those who did not own a car used public transportation to take, on average, 11.58 (SD = 8.18) trips during the week, t(330.13) = 0.215, *n.s*. Correlations between participants' environmental attitudes and car users' status-related characteristics and private car usage frequency were non-significant. We also found no significant differences between car users and non-car users in pro-environmental attitudes (Cohen's d = 0.012).

Predicting private car usage

Before compiling the score on personal and intersubjective norms on private and public transportation, we sought to clarify the relationship between personal environmental attitudes and the perception of the different vehicle users. The correlation analysis results showed no significant relationship between the PEA score and the six types of transportation ratings.

Table 2 Mean, Standard Deviations, Reliability and Correlations for Car Owner (N = 193)

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10
1. Gender	1.49	0.5										
2. Age	3.73	1.3	− 0.13									
3. Edu	4.81	2.74	0.01	− 0.70**								
4. Status-unrelated characteristics of Car user	5.1	0.72	0.06	0.06	0.02							
5. Pro-Environment Attitudes (PEA)	5.18	0.83	0.01	− 0.1	0.08	0.12						
6. Intersubjective Norm toward Car user	4.74	0.85	− 0.01	0.06	− 0.05	0.42**	0.03					
7. Intersubjective Norm toward Public Transportation user	3.97	0.87	0.02	0.02	0.04	0.05	0.21**	0.04				
8. Personal Norm toward Car user	4.46	0.88	0.02	− 0.01	0.01	0.39**	− 0.1	0.69**	0.02			
9. Personal Norm toward Public Transportation user	3.81	0.89	0.06	− 0.07	0.05	− 0.06	0.12	.	0.74**	0.07		
10. Status-related characteristics of Car user (SRC)	4.49	0.71	0.07	− 0.03	− 0.03	0.53**	0.02	0.41**	0.06	0.52**	0.05	
11. Car use frequency	0.45	0.45	− 0.36**	0.42**	− 0.27**	0.05	− 0.05	0.08	− 0.06	0.03	− 0.04	0.03

* p < .05. ** p < .01. *** p < .001. Two-tailed.

Secondly, to understand whether personal norm motivation (e.g., character X's values are those I would like to have) and intersubjective norm motivation (e.g., i.e., character X's values are those most Singaporeans would like to have) differed across different types of transportation users. ANOVA analysis showed that the personal norm motivation for sedan was the highest ($M = 4.51$, $SD = 1.1$) and lowest for the taxi ($M = 3.46$, $SD = 1.37$). There was no significant difference among the three types of private cars ($F = 1.24$, $p > .05$). The analysis also indicated that intersubjective norm motivation was the strongest for luxury sedans ($M = 4.91$, $SD = 1.21$) and lowest for the bus ($M = 3.83$, $SD = 1.24$). Intersubjective norm motivation for luxury sedans was significantly higher when compared with the other two private car types. Because we hypothesized on the relationship among private car users' perceptions versus public transportation users' perception of private car usage, composite scores for the personal norm and intersubjective norms were composited by collapsing across the three types of private car types and three types of public transportation types). (Table 3)

To understand whether pro-environmental attitudes (PEA) can help predict car driving behaviors, we regressed car driving frequency on PEA. PEA failed to predict car frequency usage in the current study (Table 4). We hypothesized that the effect of PEA would be moderated by personal or intersubjective norms motivation. Hence, multiple regression was used to analyze the above interaction while controlling participants' gender, age, and educational level. Consistent with our predictions, the interaction between pro-environmental attitudes and the intersubjective norms was positive and significant, b = 0.12* (Table 4, M4; Fig. 2), while the interaction between pro-environment attitude and the personal norm was negative and significant, b = -0.14* (Table 4, M4; Fig. 3). The results did not show any interaction effect between the pro-environmental attitude, personal norm, and intersubjective norm (Table 4, M5, and M10).

The interaction effect indicated that participants who scored high on pro-environmental attitudes and at the same time had strong intersubjective norm motivation reported the highest car driving frequency. Their driving frequency was higher than that of participants who were low on PEA and high on intersubjective norm motivation or high on PEA but low on intersubjective norm motivation (Fig. 2). What is most interesting is that the reverse pattern emerged when personal norm motivation was high. As predicted, strong personal norms motivation and a strong endorsement of pro-environmental attitudes (PEA) resulted in the lowest car driving frequency (Fig. 3). The results confirmed our hypothesis that when the participants want to be similar to target characters whose values, beliefs, and preferences are believed by others to be valuable in society, their behavior will be driven by the intersubjective norm irrespective

Table 3 Mean, Standard Deviations for Norms on Different Transportations (N = 193)

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Intersubjective Norm toward SUV	4.64	1.19												
2. Intersubjective Norm toward Sedan	4.66	1.	0.35**											
3. Intersubjective Norm toward Luxury Sedan	4.91	1.21	0.34**	0.30**										
4. Intersubjective Norm toward Bus	3.83	1.24	−0.03	0.11	−0.08									
5. Intersubjective Norm toward Subway	4.1	1.17	0.09	0.07	0.01	0.56**								
6. Intersubjective Norm toward Taxi	3.98	1.17	0.01	0.11	−0.01	0.18*	0.15*							
7. Personal Norm toward SUV	4.37	1.25	0.57**	0.20**	0.22**	−0.06	−0.01	−0.09						
8. Personal Norm toward Sedan	4.51	1.1	0.30**	0.65**	0.25**	0.04	0.01	0.11	0.21**					
9. Personal Norm toward Luxury Sedan	4.49	1.31	0.30**	0.30**	0.53**	−0.03	−0.01	0.17*	0.25**	0.36**				
10. Personal Norm toward Bus	3.84	1.2	−0.09	0.08	−0.04	0.68**	0.37**	0.26**	−0.1	0.11	−0.02			
11. Personal Norm toward Subway	4.14	1.14	0.01	0.07	0.01	0.48**	0.75**	0.18*	−0.01	−0.03	−0.09	0.55**		
12. Personal Norm toward Taxi	3.46	1.37	0.06	−0.01	−0.05	0.15*	0.05	0.62**	0.1	0.07	0.25**	0.19**	0.11	

* $p < .05$. ** $p < .01$. *** $p < .001$. Two-tailed.

Table 4 Moderation Model

	Car Use Frequency					SRC				
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
Intercept	0.34	0.34	0.34	0.33	0.33	4.53	4.57	4.54	4.53	4.48
Gender	−0.14***	−0.14***	−0.14***	−0.14***	−0.14***	0.04	0.01	0.01	0.02	0.02
Age	0.18***	0.19***	0.19***	0.17***	0.18***	−0.07	−0.13*	−0.12	−0.13*	−0.12*
Edu	−0.01	−0.01	−0.01	−0.01	−0.01	−0.08	−0.12	−0.12	−0.11	−0.1
Intersubjective Norm toward Public Transportation user		−0.07	−0.07	−0.06	−0.06		−0.03	0.01	0.01	−0.01
Personal Norm toward Public Transportation user		0.05	0.05	0.03	0.03		0.08	0.03	0.02	0.04
Status-unrelated characteristics of Car user		0.02	0.02	0.01	0.01		0.41***	0.30***	0.28***	0.27***
Status-related characteristics of Car user (SRC)		0.02	0.02	0.01	0.01					
Pro-Environment Attitudes (PEA)		0.01	0.01	0.02	0.02		−0.04	−0.01	−0.01	−0.03
Intersubjective Norm toward Car user (INTC)		.	0.02	0.02	0.03			0.01	0.02	0.04
Personal Norm toward Car user (PNTC)			−0.02	−0.01	−0.01			0.27**	0.27**	0.26**
PEA X INTC				0.12*	0.12*				0.03	0.07
PEA X PNTC				−0.14*	−0.14*				−0.11+	−0.12*
INTC X PNTC					0.01					0.07+
PEA X INTC X PNTC					0.01					0.04
R^2	0.27	0.28	0.29	0.34	0.34	0.01	0.31	0.41	0.42	0.44

+ $p < .10$. * $p < .05$. ** $p < .01$.

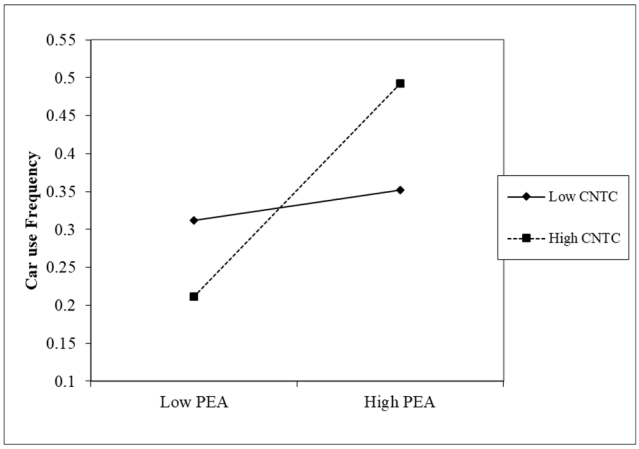

Fig. 2 Interaction between Pro-environmental attitudes (PEA) and CULTURAL NORM (CNTC) on Car Use Frequency

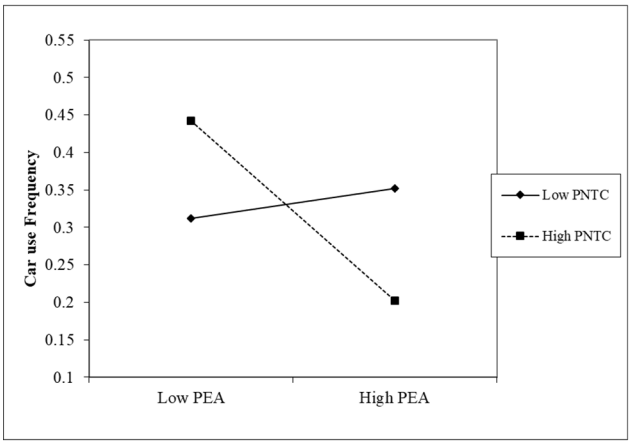

Fig. 3 Interaction between Pro-environmental attitudes (PEA) and PERSONAL NORM(PNTC) on Car Use Frequency

of their internalized personal attitudes. On the contrary, when their personal norms endorsement is high, they are more likely to behave in ways consistent with their personal attitudes.

Predicting status-related characteristics of car users

Next, we sought to understand whether normative motivations can moderate the effect of pro-environment attitudes on car users' status-related characteristics. Specifically, we are interested in whether a strong endorsement in the intersubjective norm will make private car drivers loom to be of higher status compared with participants who have a lower endorsement in the intersubjective norm.

Same as above, we regressed pro-environmental attitudes (PEA) on car drivers' perceived status (SRC). Our results showed no significant main effect of pro-environmental attitudes (PEA) on the perceived status of car drivers (SRC) (Table 4). Participants' pro-environmental attitudes do not affect their perceptions of car drivers having status-related or status-non-related characteristics.

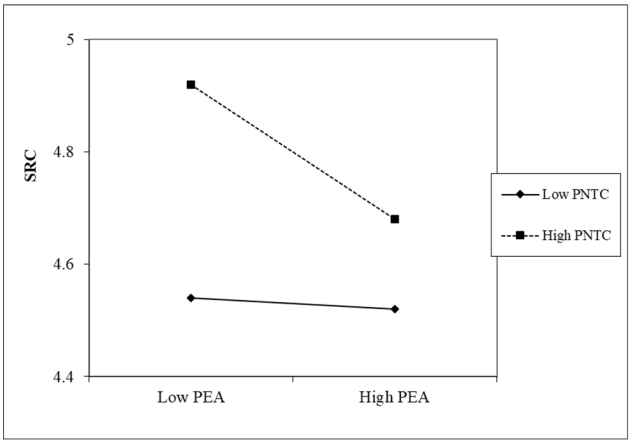

Fig. 4 Interaction between Pro-environmental attitudes (PEA) and PERSONAL NORM on Perceived status of car driver (SRC)

As hypothesized, we believed that personal and intersubjective normative motivations moderate the effect of environmental attitudes (PEA) on the perceived status of car drivers. To test this hypothesis, we include intersubjective norms and personal norm motivation in the regression model (Table 4, M9). The interaction between pro-environmental attitudes (PEA) and the personal norm was negative and significant, b = -0.11+ (Fig. 4), but the interaction between pro-environment attitude and the intersubjective norm was non-significant, b = 0.03.

Consistent with our prediction and consistent with the car driving frequency results we presented earlier, when participants had a high personal norm motivation coupled with a high pro-environment attitude (PEA), they were less likely to perceive the car driver protagonist in this study as having status-related characteristics compared to participants who had low PEA and high personal normative motivation (Fig. 4).

Discussion

Environmentally friendly attitudes have increased over the years. A survey done by Mediacorp (Singapore) in 2019 showed that over 60% of all respondents and around 90% of millennials respondents reported that they "strongly agree" to partake in environmental conservation efforts in Singapore (Elangovan, 2019). However, a recent survey conducted by the OCBC climate index in Singapore indicated that younger generations possess more environmentally friendly attitudes and are more likely to commit to non-environmentally friendly behaviors (OCBC Climate Index, 2022). Consistent with past studies' results, our results also showed that car owners' environmental attitudes have no direct effect on their driving behavior. As explained earlier in our paper, past findings failed to find a positive correlation between pro-environmental attitudes and pro-environmental behaviors because of inaccurate research measurements (see Roberts & Bacon, 1997; Samarasinghe, 2012; Steg, 2005). For example, using memory-based self-reports of transportation patterns to measure transportation behaviors could have produced noisy data. This methodological issue is addressed in the current study by collecting actual transportation behaviors using experience sampling methodology from a representative community sample over a representative period. Despite improving our data collection process precision, the pro-environmental attitude was still non-predictive of sustainable transportation habits. Thus, at least in Singapore, promoting changes in environmental attitudes *alone* might not be enough to overturn peoples' motivation to use sustainable transportation means.

Taking the norm approach, our current study provided an alternative explanation for understanding why pro-environmental attitudes do not translate directly into using sustainable transportation means. That is because normative concerns can often overpower and change the effect of private attitudes (Chiu et al., 2010), particularly in Asian contexts (Reimer et al., 2014). The current results showed that when Singaporean car owners idealize the values and beliefs of other normative Singaporeans (high intersubjective norm motivation) tend to ignore their pro-environmental attitudes and use their personal vehicles even more if they show pro-environmental attitudes. In contrast, Singaporean car owners' pro-environmental attitude caused them not to drive a private car if they feel that their existing values and aspirations are similar to those they want to have (high personal norm motivation).

In Singapore, people perceive private car users (vs. public transportation users) to be more similar to other Singaporeans and their aspirations than public transportation users. Private car users were also perceived to possess more status-related characteristics. Participants' perceptions that most Singaporeans have attitudes similar to private car users could reinforce conformity to the perceived status-related intersubjective norms in the society and encourage Singaporean car users to signal their higher social status by driving their cars, even when these participants have a strong pro-environmental attitude. However, when participants strongly believe that they want to be similar to other private car owners in their values and beliefs, their personal norms on sustainable behavior are more likely to be activated (see norm activation theory, Schwartz, 1973, 1977). Moreover, our study demonstrated that participants were less likely to use private cars and less likely to evaluate private car drivers as having high status-related characteristics under this condition.

These findings suggested that in megacities, status signaling norms of driving private cars were widespread irrespective of the high cost of owning a private vehicle (average 110,000 USD for a light-weight sedan), around 471,000 household owns a private car in Singapore, of which 12%, or 56,520, have two cars, and more than 50% of all vehicles on the roads were private cars (LTA, 2022). In the past, most studies on status signaling in consumption behavior focused on using the self as a vantage point. The results do not negate past study results but provide new insights on how external motivation (intersubjective motivation) can affect the need to signal and the perception of these signallers in society. Furthermore, it opens up new research direction on the importance of intersubjective perception, that is, not only the descriptive norm but the belief one hold on such norms, which can profoundly affect decision and consumption behaviors. The current study put to the test when personal attitudes interact with personal and intersubjective norms to illustrate the importance of this important perspective. Future studies can explore how status signaling can be more or less critical under personal vs. intersubjective norm motivation.

Moreover, changing the normative perceptions toward drivers can be a practical approach to increasing sustainable driving behaviors. Our findings showed that personal attitudes matter only when we can manage their norm expectations. Particularly, when the person holds a high pro-environmental attitude, personal norm motivation can be beneficial (instead of the intersubjective norm) to encourage more sustainable means of transportation. This effect is exciting as personal attitudes in themselves are not enough to motivate behavior, yet, when they were made aware of such personal expectations (having personal norm motivation), they possibly ascribed higher responsibilities to uphold their own personal attitudes and, in this case, displayed less private car usage. In future studies, it will be useful to detangle personal agency's effect as a motivator to enhance sustainable behavior under personal norm activation. Future studies should also address whether such intervention can improve individuals' conservation behaviors in other domains of life.

Nonetheless, normative intersubjective perceptions can also be institutionalized aside from the activation of personal normative motives. The symbolic meaning of transportation choices is well documented in recent studies (Ashmore et al., 2020; Ashmore et al., 2019). The interview results revealed in the above studies suggested that cultural values strongly affect how different modes of transportation were perceived even within the public transportation system (e.g., the bus is viewed as low-class while the metro is perceived as modern). Other studies on the symbolic meaning of transportation modes adoption also suggested that aside from our personal choices, transportation means adoption was influenced by how we perceived the mobility culture within our community (Klingerr et al., 2013). These studies confirmed the importance of changing people's intersubjective perception of what is ideal within one's community. For example, cultural icons that possess higher social status can be paired with sustainable transportation usage. Studies have also shown that frequent exposure can influence norm perceptions and affects implicit preferences for attitudinal objects (Kwan et al., 2015).

The current study also has important practical implications in implementing sustainable changes, especially in densely populated cities worldwide. Take, for example, Singapore, where the data was collected; the new Green Plan 2030 was announced in February 2021 with a reduction in carbon emissions as one of the key pillars. To reduce a major contributor of carbon emissions, -- private car usage, the government, is vastly expanding their public transportation systems, as well as building green commute and bike pathways. Besides, the government wants to implement pro-environmental attitudes into its habitants (Ministry of National Development, 2022). For example, environmentally sustainable practices are integrated into the regular educational curriculum, and ongoing promotion of different practices of green living (Ministry of Education, 2022). However, based on our results, hard preaching of attitude changes is not helpful as it does not directly translate into sustainable practices. Indeed, the government should consider evoking individuals' personal norm motivation along with attitudinal changes for green behaviors to occur.

Besides attitudinal changes, the government has also curbed public transportation costs from rising over the years. Indeed, Singapore has one of the lowest transportation costs compared to cities with similar GDPs (Lee, 2019). However, our results indicated that when an individual's intersubjective norm motivations are being activated, their behavior would follow what they believe others believe is ideal in the society, and this will motivate them to use their cars more despite having high pro-environmental attitudes. This pattern of behavior can also be exacerbated if the intersubjective beliefs on public transportation users are seen as less ideal citizen of the community. Therefore, the government should focus on changing the collective perceived image of public transportation users instead of just curbing the price of public transportation.

Limitations

Even though the current study explored an important and urgent topic in the current discourse, it has limitations. First, the participants were recruited voluntarily for the study, and despite covering a representative sample of Singapore, the

results could suffer from self-selection bias. Second, the current study used an event sampling diary method to record the use of transportation behaviors. Participants were asked to record their responses on a pre-printed booklet. Participants can falsely report the data, especially when they fail to record their travel record immediately upon making a trip. Future studies can explore the option of using electronic recording or tracking devices for accuracy.

Another limitation of this study is that it has not considered electric vehicles in its person perception task. At the time of this study, electric vehicles had just been introduced into the market, and the market only started to warm up towards the end of 2021 and early 2022. Despite that, less than 1% of private cars are currently electric. Whether private car consumption and usage can be replaced by the recent introduction of electric cars into the market, and in the long run, how much electric cars can alleviate the current carbon emission problem is questionable and something worth investigating. In particular, applying the current study results to encourage the adaptation of electric vehicles would create an intersubjective normative culture for seeing the use of electric vehicles as what an idealized citizen would do. Future studies should explore whether this paradigm can enhance the sustainable use of an electric vehicle when the cost and convenience of electric versus private cars become comparable. Similar studies should also be carried out in other megacities and rural areas to understand whether the results can be generalizable to other megacities and also in rural areas where alternative transportation is scarce.

Conclusion

In conclusion, the current results showed that different normative motivations could interact with pro-environmental attitudes to affect sustainable transportation behaviors differently. These results have important implications for decreasing private car usage in many megacities where environmental protection awareness is rising. It provides fresh insight to understand the psychological mechanism that understands why, despite one declaration of environmentally friendly attitude, they still commit behavior contrary to their beliefs. The studies also explain the boundary conditions and some specific suggestions on how one can increase pro-environmental behaviors. The study used a representative sample in a megacity to understand an urgent social problem and open new questions for future investigations.

Data availability statement The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Compliance and ethical standards To my understanding, there is no potential conflict of interest; no funding has been received for the current project. The data collection protocol aligns with the ethical requirements of the APA standards. The project has received IRB approval, and all participants were informed and consented to their participation.

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