

Car-Free Day on a University Campus

Subjects: Transportation

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Intensive car use is associated with serious damage to the environment, human health and the economy. It has a great impact on climate change as passenger cars account for nearly half of the worldwide carbon dioxide emissions from the transport sector. Locally, it is a major source of air pollution—mainly from nitrogen oxides, volatile organic compounds and particulate matter emissions, which causes hundreds of thousands premature deaths every year. Moreover, the growing number of cars in urban areas increases congestion and traffic accidents, decreases citizens' quality of life and brings about considerable economic losses. Although recent research has indicated that car use has reached its peak and has begun a downward trajectory, there are still major concerns about other issues such as improvements in fuel consumption, the pace of electric vehicle adoption and the increasing demand for heavier and more polluting vehicles. More recently, with the onset of the COVID-19 pandemic, tight circulation restrictions significantly reduced the average distance traveled by car. However, post-pandemic trends in car use are uncertain as the combined result of widespread disruptions in public transit, increased substitution of traveling by teleactivities and the rise of active transport remains unclear.

Keywords: Car-Free Day ; university campus mobility ; soft transport policy

1. Behavioral Foundations

Explaining pro-environmental behavior is a challenging task. Many behavioral theories underpin this theoretical endeavor such as the Prospect Theory, the Norm Activation Theory, the Value-Belief-Norm Theory, the Theory of Planned Behavior and the Self-Regulation Theory ^[1]. Referring specifically to car use, Bamberg et al. ^[2] state that the most successful approaches are the Theory of Planned Behavior (TPB) and the Norm-Activation Theory (NAT).

TPB evolved from the Attitude Theory ^{[3][4]} and postulates that the individual's intention to perform a behavior can be predicted from the attitude toward this behavior (opinion/appraisal), subjective norms (social pressure) and his/her perceived behavioral control. The latter can be interpreted as the recognition of the difficulty to perform an action, which is contingent upon many situational constraints such as the place of residence, workplace and other restrictions on how the trip can be made. Additionally, TPB scholars claim that these three factors are caused by a set of salient beliefs derived from information stimuli the individuals receive throughout their lives.

On a different note, NAT was developed to explain altruistic behavior ^[5] and was later refined into the Value-Belief-Norm Theory ^[6] to specifically account for pro-environmental behavior. The rationale behind NAT is that individuals seek to adjust their actions to meet personal norms that are grounded on a set of values and beliefs. The psychological process encompasses the recognition of adverse consequences induced by these actions, the perception of the ability to reduce the resulting threat and the following motivation to implement the behavioral change. It is important to distinguish between subjective and personal norms from TPB and NAT, respectively. The former refers to the expected social pressure of performing (or not performing) certain types of behaviors, whereas the latter is related to the felt obligation of changing the behavior considering the individual's own moral standards. The significance of the theorized relationships between the constructs claimed by both approaches has been widely demonstrated in many studies ^{[7][8][9]}.

More recently, theories considering the inertial effects of habits on travel behavior expanded the explanatory power of travel choice models ^{[10][11][12]}. Admittedly, the repetitive nature of travel choices and the cost of searching and evaluating travel alternatives enhance the likelihood of the automaticity of behavior. Empirical studies found that—in relatively stable circumstances—habits moderate the relationship between the antecedents of behavior theorized in TPB and behavior itself ^{[13][14][15]}. An important framework that reconciles TPB and the effects of habits is the Theory of Interpersonal Behavior (TIB), first introduced by ^[16]. This theory agrees with TPB that intention precedes behavior, but only under new or unfamiliar circumstances ^{[12][17]}, which requires deliberation to form a conscious decision. However, if this decision setting is regularly faced by an individual, the automaticity of behavior will be increasingly more likely to occur.

2. The Car-Free Day Initiative

The first initiatives resembling the current Car-Free Day campaigns were held in Switzerland from January to February 1974 as a reaction to the oil crisis ^[18]. However, it took two decades for these events to reappear with the kind of motivation they are currently acknowledged. Given the growing concern with the adverse effects of car dependency on the environment, public health and the economy, the municipal government of Reykjavik (Iceland) carried out their first Car-Free Day in June 1996 ^[19]. From 1997 to 1999, similar campaigns were launched in the United Kingdom, France, the Netherlands and Italy. These events were later centralized and articulated in the context of the European Mobility Week, taking place every 3rd week of September from 2000 onwards. Replicates emerged outside Europe shortly after that such as the Car-Free Days in: Bogotá, Colombia (2000); Chengdu, China (2000); Fremantle, Australia (2000); and Toronto, Canada (2001) ^[20]. Since then, 22 September has become the official celebration date of World Car-Free Day.

Although two decades of Car-Free Day experiences have passed, research investigating the outcomes of this practice are somewhat limited. Among the existing work, studies concerning the environmental impacts measured on the day of the campaign predominate. By comparing the concentration of pollutants on the day of the event to control periods of time, researchers evaluate whether these differences are statistically significant ^{[21][22][23]}. Overall, expressive reductions in pollutants were observed when the measurements were performed at the site of the event. However, when these emissions were surveyed on a city scale, the counterintuitive result of increased pollution was sometimes noted. Farda and Balijepalli ^[24] argue that by restricting the circulation of cars on the streets within the event site, persistent drivers will detour from original routes, thereby increasing the average distance traveled; consequently, this additional traffic will likely result in increased pollution outside the event area (sometimes outweighing the reduction in the restricted region).

Beyond these immediate and local effects, more relevant goals of Car-Free Days are to give rise to new habits and promote long-term sustainable behaviors. Considering the rationale from TPB, NAT and TIB frameworks, these campaigns can impact early and middle stages of the decision process (i.e., values, beliefs, norms and attitudes) that activate intentions toward a sustainable behavior. Nonetheless, this kind of investigation is even scarcer in the Car-Free Day literature. It is worth mentioning the work of ^[25], who found evidence that greater car dependency, measured by frequency of use, implies less acceptability of Car-Free Day initiatives. Similarly, Ref. ^[26] obtained analogous results by measuring car dependency with the vehicle miles traveled (VMT) indicator. Moreover, both studies observed that the initiative acceptance was higher on weekends than on weekdays.

It is also important to consider the academic context under which the Car-Free Day event under analysis was undertaken. College campuses are often self-contained communities, where people from different backgrounds, incomes and lifestyles interact ^[27]. Their infrastructure usually comprises classrooms, offices, shopping places, sports facilities, apartments, open spaces and streets, which can be located in a city center, a suburb or a rural area. Due to the proactive behavior of its members, university communities are considered relevant places to test the implementation of sustainable ways of living ^{[27][28]}. In fact, after considerable efforts to investigate mobility patterns and gaps within such contexts ^{[29][30]}, several guidelines for developing sustainable mobility plans in university campuses have been proposed and discussed in the literature ^{[31][32][33]}.

For campuses inside urban areas, mobility issues are mainly related to aspects of walking, cycling, parking management and public transport ^[30]. Regarding the active travel modes, the most salient problems are: safety at intersections (e.g., lack of speed limitation zones, absence of signage and road marks), personal security (e.g., increased vulnerability to crime) and insufficient pedestrian and cycling networks (e.g., poor infrastructure, lack of street connectivity and proximity) ^{[27][30][34][35][36][37][38][39][40]}.

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