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On time and ready to go: An analysis of commuters' punctuality and energy levels at work or school ☆

Charis Loong, Dea van Lierop, Ahmed El-Geneidy *

School of Urban Planning, McGill University, Suite 400, 815 Sherbrooke St. W., Montreal, Quebec H3A 2K6, Canada

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ABSTRACT

The strain of the daily commute can negatively impact performance at work. This study differentiates how various modes influence commuters' punctuality and energy levels at work and school. The data for this study come from the 2013 McGill Commuter Survey, a university-wide survey in which students, staff and faculty described their typical commuting experience to McGill University, located in Montreal, Canada. Ten multilevel mixed-effects logistic regressions are used to determine the factors that impact (1) a commuter's feeling of being energized when he or she arrives at work or school and (2) his or her punctuality. Our results show that weather conditions and mode of transportation have significant impacts on an individual's energy at work and punctuality. The models indicate that drivers have the lowest odds of feeling energized and the highest odds of arriving late for work. Cyclists, meanwhile, have the highest odds of feeling energized and being punctual. Overall, this study provides evidence that satisfaction with travel mode is associated with higher odds of feeling energized and being punctual. With these findings in mind, policy makers should consider developing strategies that aim to increase the mode satisfaction of commuters. Encouraging the habit of commuting by bicycle may also lead to improved performance at work or school.

1. Introduction

Commuting is without a doubt a necessary part of many people's daily routine. However, the strain associated with commuting can have a negative impact on academic and work performance. Long travel distances, in particular, contribute to an individual's level of stress and lack of energy (Kluger, 1998; Mokhtarian, Papon, Goulard, & Diana, 2014; Waddell, 2014), which lead to further consequences of lower academic and work performance (Adecco Canada, 2013; Gnoth, Zins, Lengmueller, & Boshoff, 2000; Taris & Schaufeli, 2014). A new Canadian study has shown that 40% of employees have fallen asleep at work, and that 74% of young adults (between the ages of 18–24) have fallen asleep during a class (Mediabrands & Reprise, 2015). The performance of a tired individual has been shown to drop significantly, and is comparable to that of well-rested individuals in the 9th percentile (Durmer & Dinges, 2005). In Canada, it is estimated that the cost of fatigue amounts to 750 million dollars in reduced workplace efficiency per year (Mediabrands & Reprise, 2015). Effectiveness in the workforce is also reduced due to employees arriving late to work. According to surveys conducted in the United States and in the United Kingdom, traffic during commute is the most cited reason for tardiness (Mercer, 2012; Peters-Atkinson,

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* Corresponding author.
E-mail addresses: charis.loong@mail.mcgill.ca (C. Loong), dea.vanlierop@mail.mcgill.ca (D. van Lierop), ahmed.elgeneidy@mcgill.ca (A. El-Geneidy).

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2012). While the evidence may not draw a direct connection between commuting and work performance, it is reasonable that an individual's commuting experience, based on the cited studies, would partially account for some of these negative impacts. Therefore, it is critical to understand the relationship between commuting and work performance.

The objective of this paper is to investigate how an individual's commute affects his or her (1) feeling of being energized and (2) punctuality at work or school. The study uses cross-sectional data from a university-wide travel behavior survey conducted during the spring of 2013 in which students, staff and faculty described their typical commuting experiences to McGill University, located in downtown Montreal, Canada. Building on a recent study which has shown that driving is the most stressful transportation mode (Legrain, Eluru, & El-Geneidy, 2015), we hypothesize that individuals who commute by driving are also the ones who feel the least energized when they arrive at their destination. In contrast, we expect those who commute using active transportation to feel the most energized, due to the benefits received from performing physical activity (Biddle, 2003; Fox, 1999). We also anticipate that cyclists and pedestrians will be the most punctual as a result of the greater control they can exert on their commute. On the other hand, due to the dependence on transit operators to provide transit service and thereby lack of control (Legrain et al., 2015), we predict that public transit users will have a relatively strong perception that their commute negatively impacts their punctuality.

The paper begins with a review of the existing literature about the impact of commuting on an individual being energized and punctuality. It then presents the data used for the study, and describes the results of a series of multilevel mixed-effects logistic regression analyses used to determine the factors of a commute that affect a person's energy and punctuality. Finally, the paper concludes with a discussion of the results and proposes suggestions for future transportation studies and policy recommendations.

2. Literature review

Commuting can be a tiring experience (Evans, Wener, & Phillips, 2002; Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004a; Koslowsky, Kluger, & Reich, 1995; Stutzer & Frey, 2008). Kahneman, Krueger, Schkade, Schwarz, and Stone (2004b) identified commuting as one of the least enjoyable activities in a day, and Mokhtarian et al. (2014) found that among other trip purposes, commuting to work was deemed as the most tiring. Transportation researchers have typically associated fatigue to commuting stress, where higher stress levels are correlated with exhaustion (Barden & Lucas, 2003; Mokhtarian et al., 2014). Legrain et al. (2015) examined the factors that contribute to commuting stress and found that stressors are mode-specific. For instance, a pedestrian's level of stress is influenced by his or her sense of comfort and safety from traffic. Legrain et al. (2015)'s study also found that drivers are concerned with travel duration, whereas transit users become anxious when the time they spend waiting is too long.

Some researchers have begun to specifically examine the factors that influence how energized a person feels after a commute. In their analysis of the 2007–2008 French National Travel Survey, Mokhtarian et al. (2014) found that both individual and trip characteristics impact the perception of whether a trip is tiring. Their findings suggest that less healthy individuals find traveling more tiring, as do people who live in suburban areas compared to those who live downtown. These researchers also found that socioeconomic characteristics (age, gender, household composition and social status), as well as attitudinal characteristics are also associated with whether a person feels tired because of a trip. In addition, they found that time of travel, travel duration, travel mode and activities performed during the trip all have an effect on travel-induced fatigue. More specifically, drivers and individuals with longer commutes are more likely to feel tired than others. Interestingly, those whose trips take place in the evening and at night are more prone to feeling tired. Mokhtarian et al. (2014) proposed that this is due to an accumulation of strains during the day, as well as heightened anxieties regarding safety.

The commuting experience impacts mental and physical energy differently. For example, Gatersleben and Uzzell (2007) found that bicycle trips are the most mentally stimulating, while walking trips are the most relaxing for commuters. On the other hand, Mokhtarian et al. (2014) suggested that those who utilize active transportation are more inclined to experience physical tiredness, and those who use public transportation or drive tend to feel tired mentally. Understanding how each mode affects the physical and mental energy of commuters is important in order to analyze the productive capacity of employees and students. For example, an employee working in a labor-intensive job may consider using transportation modes that are less physically draining.

Commuting can also affect work performance. For example, Schaeffer, Street, Singer, and Baum (1988) demonstrated that an exhausting commuting experience can have a negative impact on eventual task performance, and White and Rotton (1998) found that a stressful commuting experience can influence a person's subsequent frustration tolerance and persistence in problem solving.

Finally, commuting affects punctuality due to its potential unpredictability (Kluger, 1998; Nicholson & Goodge, 1984). The variability in travel time can be attributed to various events within the commute such as traffic congestion, limited parking availability or delayed transit service (Emre & Elci, 2015; Koslowsky, 2000). This frequently results in tardiness. Travel distance is also a factor; the greater the commuting distance, the more likely it becomes that an individual could arrive late (Leigh & Lust, 1988). As well, a previous study has shown that weather plays a role in influencing when a person arrives at work (Muesser, 1953). Apart from the environmental factors of the commute, Koslowsky (2000) mentioned individual characteristics, which influence the punctuality of workers as well. These include an individual's attitude, personality, culture and sense of time urgency. A recent study examining the relationship between personality and punctuality of university stu-