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For which types of trips do French drivers carpool? Motivations underlying carpooling for different types of trips

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ABSTRACT

Carpooling can be understood as an informal agreement between several individuals to share a privately owned car for a trip and to contribute to its expenses. It represents one of the most appealing strategies for reducing car use since it could reduce the number of kilometres driven by car, save money, and contribute to lowering CO_2 emissions. Despite these advantages, and even if accepted and somewhat practiced, carpooling is still underused. The aims of this study are to investigate for which type of everyday trips French drivers use carpooling, to analyze their characteristics, and determine whether the motivations for carpooling are different for each type of trip, as well as to find out whether the motivation changes according to the number of carpooled trips. 634 carpool drivers and/or passengers (aged 19–75 years, $M = 43.85$, $SD = 12.05$, 42.7% men) were recruited to answer an online survey. Factual data (socio-demographics, transportation accessibility) and motivational factors (attitudes regarding car use, public transportation, environment) were used to describe and explain carpooling for four types of trips (work, children, leisure, and shopping). Carpooling was most frequently used for leisure trips, followed by shopping, and then by work and children trips. Among the motivations underlying carpooling, most notable were the following: perceived pressure from family and peers (for all types of trips) and public transportation attitudes. Finally, motivations for carpooling use differed according to whether participants carpool for one, two, three or four trips, regardless of the type of trip.

1. Introduction

With the increased use of personal cars for all everyday trips, concern about environmental issues has been growing. The negative consequences of car use involve excessive fuel consumption, air and noise pollution, congestion, and extensive land use (Litman, 2009; Shulman et al., 2012). Long-term sustainable transportation could be achieved if households would consider changing their travel behavior. Several strategies can be employed to encourage households to use their car less or to use it differently. These strategies are referred to as travel demand management (TDM) measures and carpooling is one of the strategies proposed (Eriksson et al., 2006). Carpooling is usually understood as an informal agreement between two or more individuals to share a privately owned vehicle for a trip and to contribute to its expenses (Ciari, 2012; Rodrigue et al., 2006). The main aim of carpooling is to reduce the

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number of kilometres driven by car and to increase the number of occupants per vehicle, thus reducing the number of cars required per trip, especially of single occupant vehicles. It is estimated that people who carpool for distances of 48 km can save up to 33% of the monthly costs of commuting compared to those who choose to drive alone (TDM Encyclopedia, 2012). Carpooling improves traffic flow, saves time and lowers fuel consumption. Adding only one more person per commute trip, would result in a daily savings of 263 tons of oil (International Energy Agency, 2005) which would have a substantial impact on pollution and congestion levels (Minett and Pearce, 2011). Another important advantage of carpooling is the increase in vehicle life (de Almeida Correia et al., 2013). These advantages should make carpooling attractive to users. However, data from car-occupancy rates seem to indicate that this is not the case. Unfortunately, there is no data regarding carpooling use at the European level (Galizzi, 2004), but its usage could be inferred from car-occupancy rates and from usage reports of online sites that propose this type of transportation (such as blablacar.com). Data regarding car-occupancy rates is scarce and not very up to date. However, some estimation exists. For example, the European Environment Agency (2006) assessed that the car occupancy rate in Western Europe was 1.6 and even lower in France, 1.4 (Tregouët and Le Jeannic, 2010). Carpooling sites such as www.carpooling.com[1] estimated that approximately 1 million individuals use each day carpooling in Europe and that there are three million carpoolers in France. These numbers must be interpreted with caution since there is no information regarding the user's number of carpooling trips. Taking into account the aforementioned information, it seems that there still are some barriers to overcome in order to achieve carpooling's main objective (to reduce the number of single occupant vehicle trips).

Until now, a large and growing body of literature has investigated carpooling for work (Abrahamse and Keall, 2012; Buliung et al., 2010, 2009b; Correia and Viegas, 2011; Shaheen, 2001; Vanoutrive et al., 2012) because these trips have a high frequency (usually five days a week) as well as fixed departure and arrival points (Shaheen, 2001). Furthermore, commuting to work can have a large impact on the environment since "of all trips made by car, work trips are the most significant in terms of time and distance travelled" (Abrahamse and Keall, 2012, p. 45) and are considered responsible for increasing traffic jams in already congested urban areas during rush hours (Vanoutrive et al., 2012). Studies have shown that those who carpool to work are more likely to be women, to work full time on a fixed work schedule, and to have access to a vehicle (Delhomme and Gheorghiu, 2016; Neoh et al., 2015).

However, road users make other everyday trips such as for shopping, for leisure, or for family and relatives (Santos et al., 2011). Even if other everyday trips have been largely overlooked in the carpooling literature, they represent an appealing niche for those who either do not carpool for work trips or for those who wish to expand the use of carpooling for other types of trips. The interest in these trips is supported by findings showing that short trips could contribute significantly to pollution (Joumard and Andre, 1990). Indeed, cold engine emissions are regarded as one of the biggest contributors to emission pollution (Concas and Winters, 2007). Trip chaining or increasing passenger occupation per vehicle for shorter duration trips via carpooling could help reduce environmental stress.

The present study focused on analyzing carpooling use for different types of everyday trips, including commuting. This paper is divided into five main sections, the first of which has three sub-sections. The first sub-section defines carpooling and examines various ways of using a vehicle for trip-related purposes; the second reviews the research on other everyday trips such as ones related to children, shopping or leisure; the third presents the aims of the present study. The second section focuses on the method of the present study. The third section provides the results. The fourth section discusses the findings and the implications. The fifth section provides the conclusion and future research.

Definitions of carpooling vary according to whether or not the participants who carpool belong to a stable carpooling group. When carpool members form a stable group, i.e. the same persons carpool together for various types of trips, terms such as ride-sharing or car-sharing are often used interchangeably. In the broadest sense, ride-sharing refers to sharing the same car for one or more trips (Morency, 2007). Car-sharing occurs when a group of individuals share a fleet of cars with other members and book each single service of car use (Katzev, 2003; Prettenthaler and Steininger, 1999; Steininger et al., 1996). Car-sharing does not suppose ownership of the fleet vehicles because, generally, the car fleet belongs to a car-sharing organization (Steininger et al., 1996). When carpool members do not form a stable group, two situations arise: casual carpooling and dynamic carpooling. Dynamic carpooling allows drivers and passengers belonging to a carpool database to be matched automatically, in real time, thus making on-the-spot arrangements of possible rides (Agatz et al., 2010; Massaro et al., 2009). Casual carpooling refers to sharing a ride with a driver and/or passengers, usually strangers, where the ride-sharing is not pre-planned, but coordinated on the spot (Kelley, 2007). In the present study, carpooling is understood as an agreement, made in advance between two or more people, not belonging to the same household but who know each other, to share a privately owned car for a trip or a part of a trip, and to contribute to drivers' expenses (Ciari, 2012; Rodrigue et al., 2006).

Even if carpooling has been investigated mainly in relation to commuting, car dependents make more than one type of trip on any given day (Stradling, 2007). For example, in 2009, in the United States, a road user took, an average of 3.79 trips per day. Among these trips, 0.59 were for work-related purposes, 1.61 were for personal and family errands, 1.04 were for recreational and social purposes, and 0.54 were for other purposes (Santos et al., 2011).

Both recreational and personal/family-related trips represent an important segment of daily life and carpooling should be considered for this type of trip. For example, carpooling may be used for children-related trips such as taking/picking up children (their own and at least one child foreign to the household as well) to/from their schools or leisure activities. According to the research on this issue, the decision to drive one's children to school is heavily influenced by the distance from the school (the longer the distance,

[1] http://www.carpooling.com/press/companypressmedia-kit/carpooling-without-borders.