



City of Motorcycles. On how objective and subjective factors are behind the rise of two-wheeled mobility in Barcelona



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ABSTRACT

In the past ten years, the number of motorbikes in Barcelona, Spain has grown to represent nearly one out of four vehicles in the city, making it now the highest two-wheeled motorisation rate of all European cities. In this study we explore the motorcycle phenomenon from a threefold perspective, following the temporal trend of this growth, seeking the sociodemographic profiles of its users, and assessing their subjective motivations that explain the use of this specific mode of transport. We first measure the impact of motorcycles along a 2004–2012 timeline that covers both pre- and post-crisis data. Secondly, logistic and multinomial regression models are implemented to analyse the drivers and significant predictors of motorbike ownership and modal choice. Finally, we compare how motorcyclists and car drivers rated their main use of transport and how they evaluated the inherent risk of riding and driving, respectively. The results highlight the importance of motorized two-wheeled modes of transport in everyday mobility and also emphasize the role of the affordability factor to help understand the rise of this kind of transport, even in times of economic crisis. Overall, motorcycle use is explained by a set of objective and subjective factors that are seeking to resolve specific and unique transportation needs, and that are not equal to those of car drivers.

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1. Introduction

In recent years, European cities have seen a dramatic increase in the number of motorized two-wheeled vehicles circulating through their streets. Although two-wheeled mobility is nothing new for many cities from developing countries, and it has already been high in some European Countries in the past (Nishitaten and Burke, 2014), the recent expansion of per capita motorcycle ownership throughout Europe has been unprecedented (Paviotti and Vogiatzis, 2012). Far from being thoroughly planned, the rise of motorbike mobility in some south European countries such as Greece, Italy and Spain, is shaping new mobile scenarios as well as brand new needs and challenges for authorities to cope with (Pinch and Reimer, 2012).

From the beginning, the two-wheeled motorized mobility expansion has been tolerated and has drawn complicity from local governments, as a cheap way to ease congestion in densely populated cities, at the same time that it solves the parking issue in the city centres (Albalate and Fernández-Villadangos, 2010). The

growing number of motorcycle users however has also unveiled new problems. For once, switching from car to motorcycle can represent a perceived improvement for drivers, but it does not solve any of the environmental problems caused by motorized mobility. In fact, two-wheelers emit a little less CO₂ than regular tourisms while having lower occupancy rates (Ducreux, 2008) and, additionally, they are much more pollutant in terms of noise (Barbusse and Ducreux, 2005; Paviotti and Vogiatzis, 2012). A sudden rise in motorcycle use can also cause additional congestion (Truitt, 2008), especially when new motorcyclists are not switching from car use, but are coming from transit or non-motorized modes of transport. However, the most troubling aspect of the rise of two-wheeled mobility is its accident rate. Motorcycles are the most vulnerable mechanised mode of transport, as they lack a protective chassis and most security devices (Albalate and Fernández-Villadangos, 2010). Because of that, and as reported by Jevtić et al. (2015), 15% of total fatalities in the EU-24 in 2010 involved a two-wheeled motorized vehicle and out of those, 45% corresponded with accidents which occurred inside urban areas (Albalate and Fernández-Villadangos, 2009). Jamson and Chorlton (2009) observed that in the specific case of the UK, motorbike fatalities were 40 times higher than for cars.

Because of these worrisome figures, most of the recent academic literature involving motorbike mobility has been focused

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either on its environmental outcomes (Barbusse and Ducreux, 2005; Ducreux, 2008; Kumar et al., 2011; Lin et al., 2008; Lumbreras et al., 2008) or on road safety and accident analysis (Albalade and Fernández-Villadangos, 2010; Chesham et al., 1993; Espié et al., 2013; Jevtić et al., 2015; Olabarria et al., 2012; Perez et al., 2009).

But, the rise of two-wheeled mobility in dense and complex urban environments of Mediterranean cities, like Barcelona, requires broader analysis going beyond accidentality. In this context there is a surprising lack of studies addressing the phenomenon of motorbike mobility (Kopp, 2011). The most significant corpus of studies belong to South Asian countries (Chen and Lai, 2011; Jou et al., 2011; Lin et al., 2008; Truitt, 2008; Yamamoto, 2009) although their conclusions are difficult to apply to European or Mediterranean urban realities. We still know very little of motorcyclist behaviour, their needs and motivations, and the underlying factors that are causing an ever-growing number of people to change their modal choice (Espié et al., 2013). This lack of thought on urban motorcycle use is even more striking when we compare it with the extensive literature on car driving, even when in some cities like Barcelona, there is now one motorcycle travel for every 2.7 trips made by car.

The literature now acknowledges that the use of private individual modes of transport like the car and potentially the motorbike, is determined by a large combination of factors (De Witte et al., 2013). Out of those, subjective and affective factors play a significant role (Mann and Abraham, 2006). Internal decisions and individual choices that trigger a specific modal choice, respond to instrumental factors such as travel time, speed and economic cost, but also to emotional and non-instrumental factors like symbolism, status or habit (Miralles-Guasch et al., 2014; Steg, 2005). In addition, modal choice does not only depend on projected qualities of a specific mode of transport but also by the perceived inability of other modes of transport to meet the same qualities (Thøgersen, 2006). Most literature on modal choice takes into account both built environment characteristics, people's socioeconomic features and the character and potentials of each mode of transport (Marquet and Miralles-Guasch, 2014). Because of the latter, factors affecting motorbike choice, are significantly different from that of public transport, and even that those affecting other private modes of transport such as the car. Despite that, there are also some factors that have been proved to affect car use that can also be related to the motorbike. Among those variables, the importance of vehicle ownership as a pre-requisite to move by car is equally applied to the motorbike. Existing literature has proven a strong relationship between socioeconomic variables and vehicle ownership (Law et al., 2015), particularly with income levels, due to the high cost of the vehicle. Spatial characteristics of the built environment also affect both the decision of purchasing a vehicle and the afterwards modal choice decision (Santos et al., 2013). However, spatial and socioeconomic factors alone can't explain neither vehicle ownership nor vehicle use by themselves (Acker et al., 2013) without taking also into account subjective variables and personal rationalities (Acker et al., 2011).

Despite the recent interest drawn by the subjective and symbolic factors associated with car use (Chen and Lai, 2011), symbolic and instrumental drivers of motorbike use still remain deeply unknown. It is to address these literature gaps that this paper sets out to answer which are the variables that better predict motorcycle ownership and use in Barcelona. In doing so, this paper also analyses some of the underlying and subjective aspects of motorcycle use.

2. Two-wheeled mobility and the dense city: Barcelona city of Motorcycles

The advantages of riding a motorcycle inside a dense and compact city with favourable weather conditions such as in Barcelona are numerous. The first and most evident is that it avoids most of the congestion that mainly affects car driving. Being able to manoeuvre between cars in traffic makes the driver immune to traffic jams and unexpected traffic congestion (Pinch and Reimer, 2012). Thus, the motorcycle allows not only faster speeds, but also eliminates costs in terms of time and inconvenience of having to find a parking spot. Thus, it provides a better anticipation of total travel times, as the motorcyclist is less dependant on optimal traffic conditions (Espié et al., 2013). In one of the few papers that addresses motorcycle mobility in European cities, Kopp (2011) estimates that motorcycle travel times within the city of Paris are 49% shorter than car travel times. Lower travel times may also mean lower costs and most importantly, higher speeds enhance the driving experience (Broughton et al., 2009). Finally, the possibility of free and easy parking makes it even more attractive for the citizens of Barcelona to change their modal choice and to adopt motorcycling (Ballart and Riba, 1995).

However, the fact that Barcelona has become the European city with more motorcycles, ranking second only with respect to Rome, and the first one in terms of motorcycles per inhabitant (Albalade and Fernández-Villadangos, 2010), cannot only be explained by operational factors. In the specific case of Barcelona, in 2004 the Spanish government enacted a regulatory measure that actually provided car drivers with a motorcycle license if they had been driving a car for a period of three years. The measure allowed veteran car drivers to switch to motorbikes with capacity up to 125 cc without any further examination or test (Perez et al., 2009). Many car drivers that were dissatisfied with driving conditions inside the city saw the opportunity to improve those conditions without having to completely abandon motorized private transport (Albalade and Fernández-Villadangos, 2010). Resulting from that policy change, that was mainly oriented to ease traffic congestion in the city centre, the number of motorcycles in Barcelona increased by an average of 7.5% annually from 2004 to 2007, with the majority of new users being, as we shall further see in the results section, middle-aged veteran drivers.

Also noteworthy is the fact that the rise in the number of motorcycles, which had its origin in a pre-crisis era, has continued even if it has slowed down slightly during the economic crisis that has deeply affected not only the income and purchasing power of families throughout Spain – Barcelona being no exception- but also their travel behaviour (Sobrino and Monzon, 2014). Studying the specific trend of motorcycle use before and after Spain's economic crisis of 2008, can broaden the issue of how the motorcycle relates with economic development, along with the income level of its users. On that specific context Nishitaten and Burke (2014) and Pinch and Reimer (2012) highlight that the affordability of the motorcycle, particularly in relation to the car, is a central factor in explaining the role and importance of motorbike mobility both at the local and the global scales.

3. Methodology

3.1. Design and study population

Our aim was to study the travel behaviour of motorcycle users in the city of Barcelona. It is a cross-sectional study that uses

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