



A model of factor analysis: Reasons for using a helmet in a sample of non-competitive Italian cyclists



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ABSTRACT

Introduction: The increased bicycle use for transport as an alternative to motorized vehicles has by now become a common occurrence in all Italian cities. Even though the benefits of using a helmet to protect against trauma in bicycle accidents have been demonstrated, its use is still limited. The objective of this study is to analyse those motivations for helmet wearing that can influence their adoption.

Methods: Data was gathered through an online questionnaire in collaboration with the Federazione Italiana Amici della Bicicletta (Italian Federation of Friends of the Bicycle), a recreational cyclists association.

Motivations to use a helmet were investigated using a factorial analysis model. Factors were analysed through a points allocation system and compared according to gender, area of residence and whether the cyclist was a helmet-enthusiast.

Results: The sample was made up of 1781 individuals, with a declining participation rate from North to South; 63% of respondents were men.

Three factors were identified from the sample: helmet use as a safety benefit; helmets being perceived as a hindrance; and helmet used out of habit as well as to follow the virtuous example of friends and/or acquaintances during cycling outings. The major kinds of evidence are: regarding gender, differences in the perception of a helmet as a hindrance ($p < 0.001$) and its use out of habit ($p < 0.001$); as for area of residence, differences in the perception of a helmet as a hindrance ($p = 0.01$) and its use out of habit ($p < 0.01$); as regards being a helmet-enthusiast, differences were found for all the factors ($p < 0.01$).

Conclusions: These results contribute to understanding the scenario that affects motivational beliefs through facilitating or deterring cyclists from using a helmet during recreational cycling. The evidence suggests how to argue the helmet use discussion among Italians. In such a homogeneous population of respondents in terms of passion for cycling, opinions on helmet use were dissimilar from the point of view of both its perception and the subsequent motivation for using it.

Exploring perceptions and motivations on helmet use is a key element in understanding cyclists' behaviour in order to characterize different users. A combination of friends/peer influence, reduction in the perception of helmets as a hindrance, and reinforcing of safety could represent the starting point for planning interventions.

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1. Introduction

Recent research has focused on how to promote and successfully stimulate bicycle use (Fernández-Heredia, Monzón, & Jara-Díaz, 2014), since bicycle is playing a key role in the transportation means scenario. In the twenty-eight EU countries, it has surpassed mopeds and motorcycles, and in the Netherlands it is used nearly as much as cars (36% vs 45%) (European Commission, 2014). Recent studies have shown a real improvement in good health when cycling: a marked effect on cardiovascular fitness, a HDL-cholesterol increase, and a reduction in mortality rate due to any cause (Menai et al., 2015; Mueller et al., 2015; Oja et al., 2011; Stewart, Anokye, & Pokhrel, 2015; Whitmee et al., 2015). Moreover, the bicycle as a mode of transportation, both for commuting and for leisure, reduces exhaust fumes, helps users avoid expensive direct costs, requires no licence, and needs fewer parking facilities than a car does (Pucher, Buehler, Merom, & Bauman, 2011; Pucher, Buehler, & Seinen, 2011; Reynolds, Harris, Teschke, Crompton, & Winters, 2009). Furthermore, the convenience of a non-motorized two-wheeled vehicle is also leading to an improvement in the infrastructures in big cities (Panter, Heinen, Mackett, & Ogilvie, 2015), with bicycles being viewed as the best example of a “green solution” in the transportation field for both its environmental impact and its effect on traffic congestion (Hitchcock & Vedrenne, 2014). In sum, environmental, health and economic reasons can motivate people to stop using private cars and choose a bicycle as a means of transport (Pucher & Buehler, 2008, 2017).

On the other hand, helmet use is generally still limited, especially in Europe, even though there are differences among countries in this regard (European Cooperation in Science and Technology, n.d.; McGuire, 2000; Osberg, Stiles, & Asare, 1998; Ritter & Vance, 2011). Although many studies have proven that helmets play a protective role in case of an accident (Harada et al., 2015; Orsi, Ferraro, Montomoli, Otte, & Morandi, 2014; Romanow, Hagel, Williamson, & Rowe, 2014), there are various schools of thought on its real usefulness (Uibel, Müller, Klingelhofer, & Groneberg, 2012).

Motivational system theory attempts to provide the basis for explaining the analysis of perceptions and to point out which concurrent behaviours lead to certain conclusions. It is useful to determine which groups regard a bicycle helmet as either a safety benefit or a hindrance, to identify what characteristics habitual helmet wearers have, and to identify the social context in which people are more used to wearing one. Everett, Price, Bergin, and Groves (1996) carried out a study using motivational system theory to explain the motivations for helmet use or non-use. They found that helmet-wearers were significantly more likely to use a helmet when the behaviour achieves multiple personal goals.

The Theory of Planned Behaviour (TPB) has been applied to determine adherence to helmet wearing (Ajzen, 1991; Lajunen & Räsänen, 2001, 2004) and to guide the development of the questionnaire items in order to investigate the intentions of road users (Shinar et al., 2018). These studies show that the encouragement from and shared opinions of important others (such as parents, friends or peers) play a key role in helmet use.

From a motivational point of view, an important predictor of helmet use is helmet law. People living in countries with mandatory helmet use are more likely to wear one than are those living in countries without such a law: in Australia helmet use increased by about 44%, in New Zealand by 59%, in Canada from 10% to 46% depending on the province (Jewett, Beck, Taylor, & Baldwin, 2016; Schroeder & Wilbur, 2013; Karkhaneh, Rowe, Saunders, Voaklander, & Hagel, 2011; Karkhaneh, Kalenga, Hagel, & Rowe, 2006; Lajunen & Räsänen, 2004). As noted by Thompson, Sleet, and Sacks (2002), an existing law makes helmet use easier to justify and more common, thereby impairing the peer pressure against use. Laws can also increase compliance through enforcement measures (Bandura, 1969; Prochaska, DiClemente, & Norcross, 1992).

In addition to legal requirements, other factors are positively associated with helmet wearing or non-wearing use as non-obligatory circumstance. Studies on the reasons for helmet wearing have found that factors deterring adult cyclists from helmet use are related to short distance travelled, obstruction of the rider's view of the road, and vanity. Other reasons strictly connected with helmet characteristics are its negative image in terms of comfort and attractiveness, the fact it is too hot, its high price, and its inadequate protective role (Richard, Thélot, & Beck, 2013; Schroeder & Wilbur, 2013). Orsi et al. (2014) used data from the GIDAS (German In-Depth Accident Study) database to analyse cyclists involved in a road accident between 2000 and 2010 to evaluate alcohol consumption, helmet use, head trauma, and bicycle crash characteristics. Alcohol consumption was found to be a predictor in adults for helmet non-wearing. The intoxicated cyclists were twice as likely as the sober ones not to wear a helmet. Similar findings were made by other scholars, who showed that unsafe riding behaviours were associated with helmet non-wearing (Airaksinen, Lüthje, & Nurmi-Lüthje, 2010; Andersson & Bunketorp, 2002; Crocker, Zad, Milling, & Lawson, 2010; Irvine, Rowe, & Sahai, 2002; Li, Baker, Smialek, & Soderstrom, 2001).

An investigation into voluntary helmet use in France revealed that younger people and riders cycling in urban areas are less likely to use a helmet. Women had a lower helmet use. On the contrary, having children, not smoking, not indulging in excessive alcohol consumption, and being well informed on health topics was positively associated with helmet wearing (Richard et al., 2013).

A study by Teschke et al. (2012) found that helmet users were more likely to be older, females, more highly educated, with a high income, and with no consumption of alcohol before cycling. Bike light use and bike type are also predictive factors related to helmet use.

In another study (Jewett et al., 2016), high income and living in a metropolitan area were found to be associated with helmet wearing.

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