



The effects of co-presence on risk perception and intention to engage in risky behaviors

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ABSTRACT

Introduction: This study investigated the relation between co-presence and bicyclists' riding behavior. We assumed that the presence of peer riders would either facilitate or inhibit risky behaviors depending on bicyclists' perceptions of three traffic contexts conducive to risk taking (i.e., red-light, go straight, and turn to left). **Method:** Young bicyclists ($N = 207$) were randomly assigned to two experimental conditions (alone vs. with peers). They filled in a scenario-based questionnaire about their intentions to adopt risky behaviors in three specific traffic situations as well as their risk perception of these situations and their general self-perceived efficacy as a bicyclist. We hypothesized that the presence of peer riders engaged in a risky behavior will facilitate the intention to adopt risky behaviors in situations where group risk is evaluated as lower than individual risk. In opposition, the presence of peer riders engaged in a risky behavior will inhibit the intention to adopt risky behaviors in situations where group risk is evaluated as higher than individual risk. **Results:** The results confirmed the hypotheses. **Practical Applications:** The findings offer insights for developing new effective education and intervention programs in order to reduce the frequency of dangerous behavior among bicyclists.

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1. Introduction

Road transportation can be defined as a social activity involving interactions between different road users (e.g., drivers, pedestrians, cyclists) and enabling them to adopt numerous risky behaviors depending on the presence or the absence of others. For example, the presence of passengers has often been linked to either *adopting safer behaviors* (Baxter, Manstead, Stradling, Campbell, Reason, & Parker, 1990; Doherty, Andrey, & MacGregor, 1998; Evans, 1991; Hing, Stamatiadis, & Aultman-Hall, 2003; Isaac, Kennedy, & Graham, 1995; Reiß & Krüger, 1995; Rueda-Domingo et al., 2004; Vollrath, Meilinger, & Kruger, 2002) or *engaging in risky ones* (Lam, Norton, Woodward, Connor, & Ameratunga, 2003; Preusser, Ferguson, & Williams, 1998). Sanders (1981) suggested that passengers enable the driver to divide his/her attention between the primary task (= driving) and the interaction with the passenger(s) which leads to a cognitive conflict. This conflict motivates drivers to compensate for the lack of cognitive focus on the primary task by *driving slower* (Black, 1978), *taking more distance when crossing intersections* (e.g., Ebbensen & Haney, 1973), *respecting more frequently the time headway* (Evans, Wasielewski & Von Busenck, 1982), *respecting the "stop" sign or using the seat-belt* (McKelvie & Schamer, 1988).

Nonetheless, the presence of passengers was also associated with engaging in risky behaviors such as *paying less attention to the driving activity* (Cooper, Atkins, & Gillen, 2005; Doherty et al., 1998; Vollrath et al., 2002), *drinking and driving* (Lee & Abdel-Aty, 2008; Williams, Rappold, Ferguson, & Wells, 1997; Williams & Shabanova, 2002), and *speeding* (Simons-Morton, Lerner, & Singer, 2005).

However, in most of these studies, the passengers were passive spectators; what happens in situations where we observe other road users engaged in the same activity performing a risky action/behavior?

Lately, researchers started focusing their attention on vulnerable road users (i.e., pedestrians and bicyclists) who are increasingly exposed to road crashes (Walker, 2011). The promotion of environmental sustainability and the development of programs encouraging the use of alternative eco-friendly modes of travel have contributed to increasing the number of road users choosing bikes or public transportation as main modes of travel. As a consequence, we can observe an increased ratio of road crashes involving bicyclists and pedestrians. According to the Inter-ministerial Road Safety Observatory (ONISR, 2009), road crash among bicyclists registered a 9.5% increase in 2008/2009 and encompassed 4.8% of the total road crashes in France. In addition, road crashes among pedestrians gradually increased since 2002, encompassing 13.7% of the total road crashes in 2009.

Recent empirical research showed that pedestrians (Rosenbloom, 2009; Zhou, Horrey, & Yu, 2009) and bicyclists (Wu, Yao, & Zhang, 2012) tend to run the red light more frequently when other pedestrians/bicyclists are already engaged in red light infringements. It is

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important to mention that in these studies, the “other” pedestrians/bicyclists were mere strangers to the participants involved in the studies. This aspect might have increased the feeling of anonymity (e.g., Kelpi & Aksanen, 2014) and could explain the results. Would the results be similar if the other pedestrians/bicyclists were significant people (e.g., family, friends, colleagues)? Would the presence of significant others determine more social pressure and, therefore, facilitate or inhibit risky behavior among pedestrians/bicyclists?

To our knowledge, no formal study has been conducted to investigate the effects of the presence of “significant” other riders (e.g., friends, colleagues, family members) on bicyclists' road behavior.

2. Aims and objectives

The general aim of the study was to investigate the effects of the presence of significant peer riders (= the co-presence) performing a risky behavior on bicyclists' intention to engage in a risky behavior. We have chosen bicycling as a common and frequently encouraged eco-friendly behavior. A pre-test was conducted in order to identify risky behaviors among bicyclists and formulate our hypotheses.

3. Pre-test

A sample of 59 participants ($N_{\text{males}} = 32$) between 23 to 38 years ($M = 28.87$; $SD = 4.28$) who were frequent bikers (2–3 times/week) took part in a pre-test study using an open-questions survey. These questions were focused on the advantages vs. disadvantages of bicycling alone or accompanied by friends in terms of conspicuousness, risk taking, attitudes towards complying with traffic rules and difficulties encountered in traffic, socio-demographic indicators (i.e., gender, age) and bicycling practices.

The field operator interviewed bicyclists in different green areas of Ile-de-France. She read the questions out loud to participants and then wrote down their answers. The approximate time to finish the survey was 25 min.

Thematic and categorical analysis was undertaken to pinpoint the recurrent themes and categories organizing participants' discourse about the advantages versus disadvantages of bicycling alone versus with peer riders and the risky behaviors frequently adopted by bicyclists. According to their discourse, biking alone allowed them to ride at their own pace ($n = 38$) and to concentrate on the road ($n = 18$). However, it also made them feel more vulnerable ($n = 18$) in relation to drivers due to lack of conspicuousness ($n = 16$). Similar findings (Herslund & Jørgensen, 2003; Miller, Kendrick, Coupland, & Coffey, 2010) suggested that vulnerable road users are struck following drivers' perceptual failures and blamed for failing to make themselves more conspicuous (e.g., “looked but failed to see” errors). In opposition, biking with peer riders distracted them from the road ($n = 32$) but made them feel more secure ($n = 26$) and more visible to the other road users ($n = 13$).

Furthermore, participants declared being more cautious when bicycling alone and more willing to take a risk when riding with friends ($n = 43$) due to group pressure ($n = 23$), which is consistent with other findings underlining the role of high social pressure to risk taking, especially among male bicyclists (e.g., Ronay & Kim, 2006; Wilson & Daly, 1985). When asked about their attitudes towards complying with traffic rules, bicyclists expressed difficulties stopping at the red light ($n = 30$) and managing stop ($n = 18$), no entry ($n = 8$), and priority signs ($n = 4$). They also declared transgressing traffic rules in order to avoid collisions or to gain time and energy. These results are consistent with the Inter-ministerial Road Safety Observatory surveys (2009), which pinpoint that the main factors leading to accidents among bicyclists relate to transgressing traffic rules (i.e., running the red-light when going straight, managing no entry signs, poorly negotiated turns left and, low light and visibility conditions).

4. Main study

Based on the results of the pre-test, we were interested in examining the effects of the presence versus the absence of significant peer riders engaged in a risky behavior on bicyclists' intention to adopt risky behaviors. Our pre-test results showed that risk perception played an important role in engaging or not in risky behaviors. As a consequence, we assumed that the presence of significant peer riders would act as a facilitator versus inhibitor to engaging in risky behaviors depending on the bicyclists' risk perception of the situation.

In this context, three hypotheses were formulated:

The presence of significant peer riders will facilitate bicyclists' intention to adopt risky behaviors in situations where group risk is evaluated as lower than individual risk. In opposition, the presence of significant peer riders will inhibit bicyclists' intention to adopt risky behaviors in situations where group risk is evaluated as higher than individual risk (*interaction hypothesis 1*).

Furthermore, we were expecting differences in terms of risk perception and risk taking according to gender and age. Men and younger participants will perceive less risk and, as a consequence, will be more inclined to engage in risky behaviors as compared to women (*hypothesis 2*) and older bicyclists (*hypothesis 3*).

5. Experimental design

In order to test these hypotheses, we used a factorial design with one within-subjects variable: *type of situation* (three situations conducive to risk-taking) and three between-subjects variables: *experimental condition* (alone vs. with peers), *gender* (male vs. female), and *age* (18–23 years vs. 24–33 years) on risk perception and the intention to adopt risky behaviors.

6. Method

6.1. Participants

A sample of 207 (56.3% men) frequent bikers (2 to 6 times/week) between 18 and 33 years ($M = 23.78$, $SD = 2.27$) participated to an online survey. They were randomly assigned in two experimental groups (alone vs. with peers) by a specialized website and were equally distributed according to age ($\chi^2 = 4.407$, $p > .01$) and bicycling experience ($\chi^2 = 5.209$, $p > .01$). However, they were slightly different in terms of gender ($\chi^2 = 36.205$, $p < .001$) in the sense that there were more men in both experimental groups as compared to women.

6.2. Procedure

Once bicyclists had agreed to participate—by clicking on the link of the survey—they were informed about the general objective of the study. A scenario-based questionnaire was provided to them and the approximate time taken to fill it in was 35 min.

6.3. Measures and instruments

Based on the results of our pre-test and previous studies (ONISR, 2009; Wu et al., 2012), we selected three situations (i.e., running the red-light, going straight in an intersection, and turning left) conducive to risk taking among bicyclists. Furthermore, three scenarios corresponding to each of these situations were created. The presence versus absence of significant peer riders was manipulated in these scenarios. To facilitate participants' understanding, the scenarios were accompanied by an image corresponding to each traffic situation. In order to check the validity of the scenarios, three “experts” (= PhD researchers in Traffic Psychology frequent bikers) were invited to judge the clarity and content of these scenarios and whether they reflected or not “real-life cycling contexts.”

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