



# Psychological effect of passenger presence on drivers and its dimensions: Scale development and validation



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## ABSTRACT

Passenger presence in vehicles has both positive (i.e., crash-reducing) and negative (i.e., crash-inducing) effects on drivers. Although many earlier studies have empirically investigated conditions under which negative or positive effects predominate, few of them considered why passenger presence has these effects. The present paper aimed to contribute to the understanding of this question by identifying dimensions of psychological effects of passenger presence that can influence the likelihood that drivers are involved in crashes. A multidimensional scale was developed by means of factor analysis. Data were collected from drivers who drive regularly with their spouses as passengers. Five dimensions were identified: “pique,” “flattery, vanity, and overdependence,” “relief,” “responsibility,” and “annoyance.” Each dimension’s subscale was shown to have a sufficient level of internal consistency and significant associations with external criteria on marital relationships and personality characteristics. The findings could serve as an important scientific basis for consideration of how to maximize the positive effects or minimize the negative effects of passenger presence.

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## 1. Introduction

With regards to driving safety, an increasing number of researchers are focusing on the psychological effects of passenger presence on drivers; passenger presence can influence the risk of the car crashing (hereafter, crash risk).

On the one hand, there is empirical evidence that passenger presence has protective effects on drivers in specific circumstances. Hing, Stamatiadis, and Aultman-Hall (2003) found that the presence of two or more passengers negatively affected the probability of drivers aged 75 years or older being at fault in crashes. Lee and Abdel-Aty (2008) found that drivers aged 60 years or older generally displayed safe driving behavior when accompanied by passengers and that the presence of additional passengers reduced crash risk. Likewise, Engström, Gregersen, Granström, and Nyberg (2008) found that crash risk was higher for those who drove alone, regardless of their age, and that the protective effect increased with every extra passenger (up to eight). Rueda-Domingo et al. (2004) found that this protective effect was higher for drivers older than 45 years and lower for drivers of 23 years or younger.

Conversely, passenger presence can be a risk factor for drivers in specific circumstances, especially when young (teenage) drivers are accompanied by passengers of the same generation (Cooper, Atkins, & Gillen, 2005; Doherty, Andrey, &

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MacGregor, 1998; Lin & Fearne, 2003; Quimet et al., 2010). Given the increasing risk of crash, injury, and mortality for young drivers around the world (Horvath, Lewis, & Watson, 2012), finding measures to reduce such negative influences of passenger presence is paramount.

However, the psychological mechanisms underlying these effects on drivers are yet to be sufficiently understood. Many researchers have given interpretations of how these effects emerge, in order to account for the observed increase or decrease in crash risk with regards to the presence of passengers in specific circumstances. For example, Rueda-Domingo et al. (2004) considered the possibility that decreased crash risk in the presence of passengers younger than 15 years is the result of a more defensive driving behavior by parents. They also considered that the protective effect of female passengers on male drivers is attributable to the active role of women in trying to modify male drivers' style towards safer practices. Hing et al. (2003) suggested that passengers pose a distraction to older drivers and enhance crash rates if the level of distraction exceeds a certain point. Simons-Morton, Lerner, and Singer (2005) considered that teen passengers cause distractions to the driver by various actions, such as talking, fiddling with the radio or CD player, moving about, or touching the driver. They also considered that teenage drivers are inclined to drive in a more reckless manner (e.g., drive faster, catch up with, and pass another vehicle) when accompanied by teenage passengers because the drivers perceive that the latter view such driving behavior as desirable or expected. Vollrath, Meilinger, and Krüger (2002) considered the following possibilities: passengers help drivers in detecting critical situations; the presence of passengers leads to a more responsible driving behavior; and conversations with passengers draw drivers' attention away from driving-related tasks. Lam, Norton, Woodward, Connor, and Ameratunga (2003) considered that passenger presence may be a distraction to drivers, because of the greater verbal interaction, music playing or even physical interactions with drivers. They also considered that passenger presence distracts drivers and impairs their ability to detect changes in the surrounding environment. Regarding the promotion of dangerous driving by passengers Horvath et al. (2012) distinguished between direct (i.e., more tangible and observable) and indirect pressures on drivers.

Despite these speculations, few studies have clarified why passenger presence influences drivers in specific circumstances. One reason may be that most studies of passenger effects rest on accident databases, which do not include detailed information such as on how drivers are psychologically affected by passengers at the moment of crashes. Some recent theoretical contributions aimed to understand the psychological process by which young drivers are motivated to engage in aggressive driving behaviors in the presence of passengers in the same generation (Allen & Brown, 2008; Horvath et al., 2012; Conner, Smith, & McMillan, 2008). However, this motivation is only a part of the whole picture of the psychological effects of passenger presence on drivers.

Clarification of the mechanisms underlining the psychological effects of passengers is important for creating measures not only to decrease the negative effects but also to increase the positive effects of passenger presence on drivers. This motivation is strengthened by studies showing that older drivers have higher rates of crashes per vehicle-mile of travel (Massie, Campbell, & Williams, 1995; McGwin & Brown, 1999; Retchin & Anapolle, 1993). Although it is inappropriate to jump to the conclusion that older drivers have higher risks, based on a recent study suggesting that the comparison of driver's risk by this index is applicable only after considering the typical duration of a single trip (Nakagawa & Park, 2013), the need to support elderly drivers is recognized widely. In this context, Nakagawa and Park (2013) insist that ensuring that elderly drivers are accompanied by passengers is a very promising measure toward compensating for their decline in driving ability.

With this background, the present paper aimed to comprehensively identify distinct constructs of the psychological consequences of passenger presence on drivers, by developing a multidimensional scale and validating its subscales.

Although passengers may influence drivers regardless of whether they are drivers' spouses, the present paper considered only spousal passengers. In order to validate the measures of passengers' effects to be developed in the present study, it was essential to check how these measures are associated with external criteria, such as the intimacy of the driver-passenger relationship. The present paper considered only spousal passengers so that it can utilize existing instruments on spousal relationships in the scale validation. To our knowledge, most earlier studies considered the effects of passengers in general, while only one study by Dillon and Dunn (2005) considered the spousal/partner passengers' effects on drivers. In their study, fifty-two couples were surveyed about their behavior while driving together. The findings were that the riskier the driver's behavior, the more the passenger complained, and the more the passenger complained, the less it helped. In contrast to their study, the present study considered focused on spousal passengers for a purely practical reason.

## 2. Method

### 2.1. Sample

Data were collected via an internet research company, Cross Marketing Inc. Participants who satisfied the following two conditions were invited to participate in the main survey.

**Condition 1:** The participant is married.

**Condition 2:** The participant drives with their spouse as the sole passenger at least once per month.

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