



## Women drive better if not stereotyped

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### ABSTRACT

A commonly held stereotype is that women are poor drivers. This stereotype is recognized and endorsed by women and girls very early on, long before taking their driving licence, nevertheless they are less involved in accidents and drive safer and less fast than men. In line with the stereotype threat theory, the present study tests the hypothesis that making the driving stereotype salient will lead women to underperform in a driving simulation task. In Experiment 1 women in the stereotype threat condition were told that the aim of the study was to detect gender differences in driving whereas in a control condition no study aim was provided. In Experiment 2, two conditions were compared: stereotype threat (same instructions as in Experiment 1), and stereotype boost (the alleged goal was to compare driving ability of young vs. old people). As predicted, the results of both experiments showed that women under stereotype threat, as compared to either control or stereotype boost participants, doubled the number of mistakes. Nevertheless, they overall expected/self-reported to drive/have driven poorly. Importantly, their level of expectation was a significant predictor of their actual driving performance only in the stereotype threat condition. Implications of these effects of stereotype threat on women's driving performance and self-assessment are discussed.

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### 1. Introduction

A commonly held stereotype leads to think that women are poor drivers (Chateignier et al., 2011). They are considered hesitant, overcautious and unsure behind the wheel (Berger, 1986; Harris and Miller, 2000), because of a presumed difficulty in making fast decisions (e.g., swerving or braking to avoid a collision). This supposed inability is considered the source of omission errors (e.g., stay too long at a stop sign, take too much time to start or to park), which are considered typical of women's driving style (Lawrence and Richardson, 2005). These beliefs are endorsed to different degrees, but they are widely shared, because they depend on gender role socialization and identification (Sibley and Harré, 2009); they define what is typically masculine or feminine, and driving is conceived as a masculine task. Consistent with these stereotypes, women tend to self-assess their driving abilities as poor (Özkan and Lajunen, 2006; Tronsmoen, 2008) and to feel less safe than men when driving (Bergdahl, 2007). Nevertheless, compared to men, they are more compliant with traffic rules (Yagil, 1998), engage less in risk behaviors (Bina et al., 2006), and

therefore report fewer traffic violations (Lonczak et al., 2007) and are less likely to die in a car accident (Hanna et al., 2006). This suggests a discrepancy between self-assessment and driving performance by women.

Since the age of 10 people describe women as unskilled, but careful and compliant drivers (Granié and Papafava, 2011). In addition, this image of women as poor drivers becomes more negative with increasing age (from 10 to 16), importantly before people obtain their driving licence. This further supports the assumption that these beliefs do not depend on actual performance, i.e. on experiencing difficulties in driving, which would then cause women's underperformance. Therefore, one possibility is that stereotypical beliefs affect women's self-evaluations of driving abilities as well as their actual performance. Specifically, in the present research we test the prediction that activating the stereotype of women as poor drivers will impair women's driving performance and their self-assessments.

#### 1.1. Stereotype threat and female driving

Following the stereotype threat (ST) theory (Steele and Aronson, 1995), stereotyped individuals tend to underperform when a negative belief about the performance of their group is made salient in a testing situation (e.g. 'women are poor drivers' before taking a driving test). Such negative stereotypes may be activated by

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reminding people's social category (e.g. asking for gender, ethnicity or age before performing the task) or by stressing a task-relevant stereotype (e.g. providing instructions about supposed gender differences). Fear of failure, reduced expectations, performance anxiety, worries about (not) confirming the negative stereotype about the group one belongs to are among the factors responsible for performance decrements (Steele, 1997). Being negatively stereotyped induces self-uncertainty and triggers performance-related thoughts, often accompanied by a physiological stress response and by an effort to control the negative thoughts and expectations (Schmader and Croft, 2011). These processes reduce the cognitive resources and, in particular working memory capacity needed to perform the task, thus leading to impaired performance. ST effects occur mainly in evaluative contexts, in which negatively stereotyped individuals face difficult tasks (Aronson et al., 1998).

Effects of ST have been observed in a wide range of tasks and populations, such as African-Americans (Steele and Aronson, 1995) and low socioeconomic status individuals with intelligence tests (Croizet and Claire, 1998), and women with math (Cadinu et al., 2005; Good et al., 2008) and with spatial abilities (Moè and Pazzaglia, 2006; Moè, 2009). To the best of our knowledge, only two studies so far have addressed the potential role of ST in women's driving abilities. In Chateignier et al.'s (2011) study, women in the ST condition were told that the test measured their attitudes toward driving and they were induced to think about women's poor driving performance. Women under ST failed more questions about driving behaviors in hypothetical situations than women in a control condition who were told that the aim of the study was to test materials for future research. However, this study only assessed driving knowledge rather than actual driving behavior. This limitation was overcome in a study by Yeung and von Hippel (2008), who examined the effects of ST on female's driving performance in a simulation paradigm. They found that women under ST (told that the goal of the study was to understand why men drive better than women) were less able to face an unexpected event (a group of pedestrians crossing the road) than women in the control condition (told that the goal of the study was to investigate the mental processes involved in driving). Although very telling about ST in driving, the study of Yeung and von Hippel (2008) addresses a type of error that is atypical of women's real-life driving behavior given that women generally cause fewer severe accidents than men do (ISTAT, 2013; NHTSA, 2012). A more typical type of error, namely incompetent parking, was addressed in two additional studies (Derks et al., 2011; Wolf et al., 2010). However, neither of these included a control condition without stereotype activation, making it impossible to judge whether ST does, indeed, have detrimental effects on driving performance.

## 1.2. Stereotype threat and underlying mechanisms

ST may cause underperformance through a range of mechanisms. Among the most studied are anxiety (Osborne, 2007), intrusive thoughts (Cadinu et al., 2005), poor expectations of success (Cadinu et al., 2003), and reduction of working memory capacities (Schmader and Johns, 2003; Beilock et al., 2007). The fear of underperforming or the concern to demonstrate that the stereotype is not true require emotional regulation processes that absorb working memory resources that would otherwise be devoted to the task (Johns et al., 2008). This has been demonstrated in a wide range of tasks, including the area of driving, confirming that ST reduces working memory resources (Yeung and von Hippel, 2008) and that it affects cardiovascular responses indicative of threat or challenge in car parking (Derks et al., 2011). Using a lexical decision task, Chateignier et al. (2011) also found that women who were told that their driving skills would be measured recognized the word *anger* faster than controls, and the

level of anger experienced caused underperformance in driving knowledge, supposedly because women were involved in inner speech and wished to disconfirm the stereotype. In line with this interpretation, Yeung and von Hippel (2008) reported that women under ST were more motivated to show they were good drivers than women in the control condition, and Chateignier et al. (2011) (Study 1) found that women under ST did not endorse the stereotype of women as poor drivers, and, in fact, considered themselves better drivers than men (for similar effects of driving stereotypes on elderly participants see Joannis et al., 2013; Levy et al., 2013).

Together, these studies show that ST produces effects on performance through the involvement of emotional regulation and working memory reduction, but possibly also through self-evaluations and expectations, which can play a crucial role, given that self-assessment of overall driving ability – in the absence of stereotype induction – has been shown to be related to parking and overall driving performance (Tronsmoen, 2008; Wolf et al., 2010). In addition, these self-perceptions could be related with intrinsic motivation toward driving such as perceived difficulty of the task and safety, satisfaction, and enjoyment. Yet these variables have not been examined in relation to driving tasks and when a ST is induced.

## 1.3. The present study

Previous studies have found effects of ST induction on women, who showed performance decrements on knowledge tests about driving behavior in hypothetical situations (Chateignier et al., 2011) and a higher likelihood to hit pedestrians in a driving simulation task (Yeung and von Hippel, 2008). However, the effects of ST on daily driving under normal conditions have not been tested yet. This is surprising, because the content of the commonly held stereotype is that women are poor drivers (i.e. make more mistakes and are uncertain when making fast decisions on the road), not that they have more accidents. On the contrary, men are stereotypically perceived as reckless drivers, prone to drive fast, and to cause accidents (Mast et al., 2008).

Therefore, the goal of the present study is to test the effects of ST on women's common driving performance, measured through the number of mistakes, which overtly show poor driving skills in daily driving, and could lead to accidents under certain conditions. The aim was to simulate what happens in daily driving situations to women who are reminded of the negative stereotype about female drivers.

In addition to the number of driving mistakes, we measured women's expectations, the self-assessment of their driving performance, and their intrinsic motivation (perceived difficulty and safety, satisfaction, and enjoyment), which may also be affected by the ST induction. To the best of our knowledge, the effects of a ST induction on these variables have not been tested before. We hypothesized that a stereotypical message may exert negative effects on expectations, self-assessment of driving performance, and intrinsic motivation.

In sum, it was predicted that a ST message would affect women's performance, causing more driving mistakes, and possibly also lower expectations, self-assessment of driving performance, and intrinsic motivation.

## 2. Experiment 1

### 2.1. Method

#### 2.1.1. Participants

Eighty-one women ( $M_{age} = 23.24$ ,  $SD = 2.53$ ) attending the University of Padua, Italy, participated on a voluntary basis. They had

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