Gender identity and risky behaviors among young drivers

Ludivine Gueho, Marie-Axelle Granié, Thémis Apostolidis

GENDER IDENTITY AND RISKY BEHAVIORS AMONG YOUNG DRIVERS

Ludivine Guého [1,3]

Marie-Axelle Granié [2]

Themistoklis Apostololidis [3]

[1] IFSTTAR-LMA (Institut Français des Sciences et Technologies des Transports, de l'Aménagement et des Réseaux) / Laboratoire Mécanismes d'Accidents (LMA), 13300, Salon de Provence, France. Phone: +33 (0)4 90 56 86 21. E mail: ludivine.gueho@ujf-grenoble.fr (Corresponding author)

[2] IFSTTAR-LMA (Institut Français des Sciences et Technologies des Transports, de l'Aménagement et des Réseaux) / Laboratoire Mécanismes d'Accidents (LMA), 13300, Salon de Provence, France. Phone: +33 (0)4 90 57 79 79. E mail: marie-axelle.granie@ifsttar.fr

[3] AMU (Aix Marseille Université) / Laboratoire de Psychologie Sociale (LPS), 29, avenue Robert-Schuman, 13621 Aix-en-Provence, France. Phone: +33 (0)4 04 13 55 38 15. E mail: themistoklis.apostolidis@univ-amu.fr

Thematic axe: Health, safety and personal security, pillar 2

Key words: Gender identity; Sex stereotype conformity; Gender roles; Risky driving behaviors; Young drivers.

Submitted on 3rd March, 2014

Word count = abstract (265) + introduction (1588) + method (1313) + results (1254) + discussion (1816) + conclusion (154) = 6390 words.

+ 7 tables = 1750 words (8140 words total).

ABSTRACT

Globally, men, and particularly young men, are involved in more road traffic crashes than women, which may be due to a greater tendency to engage in risky behaviors. Understanding and explaining this "gender specificity" in risky behaviors, specifically among young drivers, has become a major public-health issue. The present study extends research on the effect of gender identity on risky driving behaviors by investigating the effect of sex, sex-stereotype conformity and gender group identification on self-reported driving behaviors among young drivers. 75 young drivers (28 males, 47 females) filled in a form including a series of scales assessing gender group identification by measuring three components of gender identity (typicality, contentedness and centrality), a French version of the Bem Sex-Role Inventory, an extended version of the Driver Behaviour Questionnaire (assessing violations, dangerous and inattention errors and positive behaviors) and questions about mobility and accident history. The effects were tested on outcome variables by using hierarchical regression analysis. It was found that sex (being female) only predicted the inexperience errors, while the femininity score negatively predicted the number of accidents. No effects of maleness and masculinity were observed in other driver behaviors, contrary to what was expected. Gender identity variables only had an effect among males, with typicality positively predicting dangerous errors and contentedness negatively predicting positive behaviors. Lastly, results showed that gender identification appears to be associated with low conformity to feminine stereotypes among males. Hypotheses were not confirmed but results underlined the importance of taking gender identity variables into account when explaining risk-taking differences between and within gender groups. Implications of these results are discussed.

1. INTRODUCTION

Gender differences are well known in accidentology and manifest themselves very early on in different types of accidents, and in particular in traffic injury rates. Men are involved in more road traffic crashes than women. In most Western countries, male drivers are 2 to 3 times more likely to die in road traffic crashes than female drivers *(1, 2)*. In France, men were nearly four times more likely to die and twice as likely to be injured for the same number of miles travelled, in 2007 *(3)*. Male drivers also commit more traffic offenses than females *(4)*, which is associated with active and passive accidents *(5, 6)*. This sexospecificity in accidents and offenses is particularly noticeable among young drivers. Studies underline several variables behind the high accident rates among young drivers, like life style, driving inexperience, lack of skills, risk perception, drinking and driving and risk taking *(7–11)*. Risk-taking would also explain gender differences in accidents rates. Generally, males tend to engage significantly more than women in high-risk activities *(12)*. More particularly, young male drivers are more prone to taking risks *(13)*, engaging in aggressive driving behaviors, driving fast, and committing more violations than other age groups *(14, 15)*, which contributes to increase the frequency and extent of trauma in this population.

Men's tendency to take more risks has been generally explained in the past by biological theories and notably by the effect of testosterone, a male steroid hormone, that has been associated with sensation seeking *(16)*, aggression *(17)* and venturesomeness *(18)*. However, according to recent researches, these relationships could be influenced by socialization *(19)*.

Recent studies have explored social environment influences on adults' gender differences in risk-taking behavior and transgression, taking into account the effects of gender roles, that is social expectations in terms of behaviors, personality traits and activity, depending upon the individual gender group *(20)*. The majority of people's beliefs regarding male and female behavior can be summarized in terms of differences on two dimensions, the communal and the agentic *(21)*. Women are expected to be friendly, unselfish, concerned with others, emotionally expressive, sensitive and caring, whereas men are expected to be assertive, directive, instrumentally competent, autonomous, adventurous and independent *(22–27)*. Gender roles are based on gender stereotypes, which can be defined as the set of beliefs regarding what it means to be a male or a female in a given society *(23)*. In particular, risk-taking is characterized as a typically masculine type of behavior *(28)*, which is consistent with risk-taking gender norms: while females are expected to be passive and non-competitive, and to not take risks, males are encouraged to be more aggressive and to take risks *(29)*. Thus, gender roles, through differential socialization, could lead to gender differences concerning compliance with traffic regulations *(29)* and risk taking *(30, 31)*. Nevertheless, an individual can conform to stereotypes associated with both sex groups *(28)*, thus gender roles could explain differences in risk-taking between and within sex groups.

Most of the studies showed the deleterious effect of masculinity on risky driving behaviors. For example, men who have been primed with the concept of masculinity exhibit more risky driving behaviors, particularly in terms of speed *(32)*. Men who exhibit a macho personality have been showed to report more aggressive driving behavior than other men *(33)*. Conformity to masculine stereotypes has been showed to predict self-reported injury risk behavior and driving style, with masculine people reporting more violations and offenses than feminine people *(34)*, overestimating their driving skills *(35)* and perceiving themselves as having better perceptual-motor skills *(36)*, which is associated with a risky driving style and road accidents.

On the other hand, femininity seems to have beneficial effect on risky behaviors. In driving, femininity has been showed to negatively predict the number of accidents and offenses, aggressive and ordinary violations, and errors *(34)*. Plus, high levels of femininity buffer the effects of masculinity on accidents and aggressive violations *(34)*. Özkan and Lajunen *(36)* highlighted the link between femininity and skills in terms of safety that are negatively related to the number of accidents. Thus, although masculinity seems to reinforce risky driving behaviors, femininity seems to be negatively associated with risky driving behaviors.

Research showed that sex-stereotype conformity would be a better predictor of declared injury-risk behaviors than biological sex *(31, 37)*. For example, in a study about risky driving behaviors, Özkan and Lajunen *(34)* showed that being male positively predicted only self-reported ordinary violations, while masculinity positively predicted the number of offenses, and aggressive and ordinary violations. Sibley and Harré *(35)* showed that gender role identification fully mediated the effect of gender on driving self-enhancement that is linked to risk-taking. Other researches assume that there may be a double risk factor for men due to both biological and social gender *(38)*.

Studies investigating the link between gender roles and risky behaviors generally used the Bem Sex Role Inventory *(28)*. In BSRI, masculinity and femininity are independent dimensions constituted with male-typed and female-typed traits, according to their social desirability in society. That is to say, masculinity consists of traits evaluated to be more suitable for males than females, whereas femininity consists of traits evaluated more acceptable for females than males in the society. Masculinity is ‘‘an instrumental orientation, a cognitive focus on ‘getting the job done’; and femininity has been associated with an expressive orientation, an affective concern for the welfare of others” *(28, p.156)*. Studies using the inventory have found masculine sex role orientation - that is to say, conformity to agentic traits such as competition, assertiveness or self-confidence - to be associated with sensation seeking *(39)* agression *(40)* and self-enhancement *(35)*, which have been linked to risky driving *(41, 42)*. On the other hand, conformity to communal traits appears to be linked to lower hostility *(43)*.

Most studies that have examined the relationship between gender roles and risky driving behaviors focus on the effect of masculinity and femininity on risky behaviors, considering gender identity in terms of gender stereotype conformity only. However, gender identity is now viewed as a multidimensional construct *(44)*, including not only the traditional dimensions of gender identity, that is to say, sex-stereotype conformity, but also other dimensions, such as the perception the individual has of his/her own gender identity. Egan and Perry *(45)* developed a multidimensional series of scales to assess the gender identity of 9-10 years-old and 13-14 years-old. These scales include traditional measures of gender identity (two scales assessing male and female-typed traits and two scales assessing male and female-typed activities), but also take into account other dimensions of gender identity: typicality (feeling one is a typical member of one’s gender group), contentedness (satisfaction of belonging to the sex-group to which one has been assigned), feeling under pressure (felt pressure from peers, parents and oneself to conform to gender roles associated with one’s gender); and intergroup bias (feeling that one’s gender group is superior to the other group). Researchers studied other dimensions of gender identity, such as centrality, that is the importance of gender identity in their self-concept *(46, 47)*.

The present study extended research on the effect of gender identity on self-reported risky driving behaviors among young drivers. More particularly, the aim was to replicate studies showing the effect of sex and sex-stereotype conformity on driving behaviors, including positive behaviors, which has not been studied yet *(34)*, and to investigate the

effects of gender group identification by assessing different dimensions of gender identity (typicality, contentedness and centrality), which has not been studied in the area of driving to the best of our knowledge. Plus, it is assumed that depending on the feeling of being a typical member of one's gender group, the contentedness with one's biological gender group and the importance of gender in the self-concept, individuals will try to conform either more or less to stereotypes associated with their group and, thus to behaviors associated with their group such as risky behaviors in driving.

In particular, the following hypotheses were examined:

Hypothesis 1: Male drivers report more risky driving behaviors than females.

Hypothesis 2: Drivers who highly conform to masculine stereotypes report more risky driving behaviors, whereas drivers who highly conform to feminine stereotypes report fewer risky driving behaviors.

Hypothesis 3: Gender group identification, through centrality, typicality and satisfaction levels explains risky driving behaviors, a strong identification among male group leading to more risky behaviors.

2. METHOD

2.1. Material

2.1.1. Gender Identity

2.1.1.1. Sex-Stereotype Conformity. Sex-stereotype conformity was measured by using a French version of Bem Sex-Role Inventory which contains three scales (masculine, feminine and neutral) *(28, 48)*. The masculine scale (9 items) includes characteristics that are perceived as male characteristics in society; that is, agentic traits (e.g., authoritarian, strong personality, dominating, etc.). The feminine scale (9 items) includes characteristics that are perceived as female characteristics in society; that is, communal traits (e.g., understanding, affectionate, sympathetic, etc.). The rest of the characteristics (9 items) consisted of neutral items that are perceived as neither male nor female characteristics (e.g., conscientious, frank, serious, etc.). Participants were asked to indicate the degree to which each of the 27 personality characteristics described their own personalities on a 7–point scale (from 1=almost never true to 7=almost always true).

2.1.1.2. Gender Identity Variables. Gender typicality, that is, feeling one is a typical member of one's sex, and gender contentedness, that is, feeling content with one's biological sex, were measured by using scales adapted from the French series of scales validated by Jodoin & Julien *(49)* among eight to 16-year-olds. The series of scales was originally validated by Egan and Perry *(45)* with an American sample. Items were adapted to adult people and were either for men or for women. Gender typicality scale includes four items (e.g. "I feel annoyed that I'm not supposed to do certain things just because I am a man/ a woman"). Gender contentedness scale includes six items (e.g. "I think I'm like all the other men/women of my age"). Gender centrality, that is the importance of gender as part of the self-concept, was measured by using the centrality subscale from Luhtanen and Crocker's collective self-esteem scale *(47)*. The scale includes four statements that were modified to assess the centrality of being a man or a woman to their self-concept (e.g., "My sex group is an important part of what I am"). For each scale, participants were asked to indicate the degree to which they agree with each item on a 7–point scale (from 1=strongly disagree to 7=

strongly agree). The scale had been previously pre-tested and validated on an adult population.

2.1.2. Driving Behavior

Driving behaviors were measured by using an extended version of the Driver Behavior Questionnaire *(4)* validated among a large population of French drivers *(50)*. The new extended version of DBQ differentiates between six types of behaviors. The tool includes two types of violations: aggressive violations (3 items), which refer to behaviors of aggressive interpersonal violence, and ordinary violations, which refer to deliberate deviations in driving but without any aggressive purpose (6 items). Dangerous errors (6 items) contain unintentional behaviors that deviate from the planned action and are potentially dangerous. The tool includes two types of lapses: inattention errors (7 items) that refer to unintentional and slightly dangerous behaviors that appeared to be due to a lack of attention, and inexperience errors (4 items) that refer to unintentional and slightly dangerous behavior that appeared to be caused by the individual's lack of driving experience. Lastly, the tool includes positive behaviors (9 items), that is, pro-social behaviors intended to facilitate interactions with other users. Participants were asked to indicate on a 7-point scale how often they committed each of the 35 behaviors in the previous year (0= never to 7= very often). Even if lapses and positive behaviors are not critical for safety and not related to accidents, the whole tool was used in order to explore the link between gender identity and different types of driving behaviors.

2.1.3. Demographic Variables

Participants were asked to indicate their age, sex, frequency of driving and kilometers driven per week, the number of years as a fully licensed driver, and number of accidents and offenses since holding a license.

2.2. Population and Procedure

The data reported in this study was collected from 75 undergraduate students (28 males and 47 females) between 18 and 25 years of age (mean = 20.75 years, SD = 1.9). All individuals had a license B with a range of 0-8 years of driving experience (mean 2.2, SD = 1.6) and half the sample had less than 2 years of driving experience. 53.33% of the sample learned driving with AAC (early driver training). Concerning driving frequency, 20% of the sample declared that they drive every day, 28% stated that they drive four or five times a week, 45.33% stated that they drive one to three times a week, and just 6.67% of the participants said that they never drive. 34.33% of the sample drove a car less than 50 km a week and 32% drove 50 to 150 km. 30.66% of the sample drove more than 150km a week. Finally, as showed in table 1, the number of accidents since obtaining the category B driver's license ranged from 0 (69.33%) to 3 (4%), with 20% of the sample having had one accident and 6.67% having had two accidents since obtaining the category B driver's license. The number of offenses since obtaining the category B license ranged from 0 (78.67%) to more than 3 (2.67%) with 12% of the sample had one offence and 6.67% had two offenses since obtaining the category B driver's license. Characteristics for the whole sample as well as for male and female drivers separately are presented in Table I.

They were recruited at the University Library for an online survey. The link to the questionnaire was sent to all students by mail. They were guaranteed anonymity and confidentiality. The participants filled out a French version of the DBQ, after which they

filled out a tool measuring different aspects of gender identity, and items related to demographic variables. The questionnaire took about 20 minutes.

2.3. Data Treatment

The data were analyzed by using reliability analyses, Pearson correlations, linear regression analyses and hierarchical regression analyses.

TABLE 1 Sample characteristics

		Total	Males	Females
N		75	28	47
Age	Mean	20.75	21.43	20.34
	SD	1.9	2.12	1.66
Years holding a license	Mean	2.2	2.67	1.94
	SD	1.6	1.77	1.45
Number of accidents	Mean	.45	.36	.51
	SD	.79	.56	.91
Number of offenses	Mean	.39	.43	.36
	SD	1.01	.74	1.15

3. RESULTS

3.1. Reliabilities of scales

3.1.1. Sex-stereotype Conformity and Gender Identity variables

Reliability analyses of the French version of the BSRI answers indicated that Cronbach's alphas for the masculinity and femininity scales were 0.74 and 0.84, respectively. Reliability analyses have also been carried out for each cognitive dimension of gender identity. Cronbach's alphas for typicality, contentedness and centrality were .69, .83 and .72, respectively. Thus, the reliability of the masculine and feminine stereotypes and of the gender identity variables can be considered satisfactory.

3.1.2. DBQ

Cronbach's alphas have been calculated for each DBQ scale: "positive behaviors" (α =.50), "dangerous errors" (α =.54), "inexperience errors" (α =.64), "inattention errors" (α =.70), "ordinary violations" (α = .73) and "aggressive violations" (α =.43). A general score of violations including ordinary and aggressive violation items has been calculated (α =.75).

3.2. Correlates of DBQ and Gender Identity variables

Pearson's *r* correlations between background variables, the scores of DBQ and gender identity variables and sex-stereotypes conformity were calculated for men and women separately (see Table 2).

As regards background variables and the number of accidents and offenses among females, the number of years holding a license correlated positively with the number of kilometers driven per week and the number of accidents and offenses. The number of kilometers driven per week correlated negatively with contentedness. The number of accidents correlated positively with the number of offenses and violations, and negatively with positive behaviors and feminine-stereotypes conformity. Regarding DBQ scores, the inattention errors score was positively correlated with inexperience and the dangerous errors scores. Lastly, as regards gender identity variables, typicality was positively correlated with centrality. Correlations were moderate.

As regards background variables and the number of accidents and offenses among males, the number of offenses was positively correlated with violations. Correlation was relatively high. Regarding DBQ scores, inexperience errors, inattention errors and dangerous errors were positively inter-correlated. Correlations were relatively high. Furthermore, the dangerous errors score was positively correlated with typicality. Violations correlated positively with centrality. Positive behaviors were negatively associated with centrality and contentedness. Correlations were moderate to relatively high. Finally, as regards gender identity scales and sex-stereotype conformity, contentedness correlated positively with typicality and centrality, whereas feminine-stereotype conformity was negatively associated with contentedness and centrality. Correlations were moderate.

Correlations among the three measures of gender identity and sex stereotype conformity were either modest or insignificant, confirming the utility of a multidimensional approach to gender identity.

TABLE 2 Correlates among DBQ scores, Gender Identity variables and Background variables, by sex

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sex-stereotype conformity														
1. Masculine traits	-	-.02	.15	-.09	.08	-.01	-.17	.09	-.21	.14	.20	.12	-.08	.05
2. Feminine traits	-.11	-	.04	.12	.10	.07	-.15	-.10	.18	-.16	-.3*	-.27	-.01	-.14
Gender identity														
3. Gender contentedness	-.13	-.52**	-	.03	-.15	.06	-.15	.04	-.21	.26	.02	-.21	-.29*	.06
4. Gender typicality	.06	-.21	.37*	-	.49***	.16	-.03	-.17	-.10	.01	.19	.04	-.11	-.09
5. Centrality	.01	-.44*	.5**	.20	-	.27	.02	-.04	-.13	.04	.26	.04	.02	-.08
DBQ scales														
6. Inexperience errors	.22	-.05	-.24	.25	-.27	-	.34*	.13	.07	.10	.05	-.18	-0.04	-.13
7. Inattention errors	-.11	.14	-.14	.24	-.20	.63***	-	.42**	.09	.20	.14	-.09	0.22	-.07
8. Dangerous errors	.21	.08	-.20	.40*	-.02	.73***	.44*	-	-.07	.28	.09	.05	0.15	.10
9. Positive Behaviors	.14	.20	-.62***	-.28	-.46*	.27	.18	.19	-	-.26	-.36*	-.22	-0.00	-.11
10. Violations	.13	-.29	.30	.08	.44*	-.03	-.01	.16	-.25	-	.31*	.11	-0.14	.25
Background variables														
11. Number of accidents	-.06	-.19	-.08	-.35	.03	.06	.08	-.14	.13	-.00	-	.42**	.04	.39**
12. Number of offenses	-.26	.02	.15	.12	.17	.14	.07	.18	-.07	.50**	-.13	-	.22	.34*
13. Kilometers driven weekly	.14	.11	-.09	.16	-.27	.27	.36	.19	.20	.06	-.16	.07	-	.29*
14. Years holding a license	.15	-.06	-.15	.07	-.03	.31	.14	.29	.19	.25	.09	.29	-.23	-

*Note : Correlations for females are above the diagonal; correlations for males are below the diagonal. * p < .05 ; ** p < .01 ; *** p < .00*

3.3. Effect of Gender Identification on Sex-stereotype Conformity

Linear regression analyses were carried out to observe the effect of gender identification on sex-stereotype conformity. Two analyses were carried out among males and females separately: the first one tested the effect of gender identification on the masculine-stereotype conformity; the second one tested the effect of gender identification on the feminine-stereotype conformity. A global score of gender identification was calculated by averaging the scores of items constituting the three specific scales: centrality, contentedness and typicality. A low score indicated weak gender identification and a high score indicated strong gender identification.

Results showed no effect of gender identification on masculine stereotype conformity among females and males. No effect of gender identification was observed on feminine stereotype conformity among females, but gender identification negatively predicted feminine-stereotype conformity among males (see Table 3).

TABLE 3 Linear regression analyses of Gender Identification on Sex-stereotype Conformity, by sex

	Females						**Males**					
	Masculine traits			Feminine traits			Masculine traits			Feminine traits		
	R2	F	béta	R2	F	Béta	R2	F	béta	R2	F	Béta
Gender identification	-.02	.14	.06	-.01	.8	.13	-.04	.00	-.01	.24	9.63*	-.52*

** p < .05 ; ** p < .01 ; *** p < .001*

3.4. Effect of Sex

3.4.1. Effect of Sex on Sex-stereotype Conformity

T tests were carried out to discern sex differences among masculine and feminine stereotype conformity scores. Results showed no effects on masculine and feminine traits. Means and standard deviations by sex are present in Table 4.

TABLE 4 Means and standard deviations of Sex-stereotype Conformity, by sex

	Males		Females		
	Mean	SD	Mean	SD	t
Sex-stereotype conformity					
Masculine traits	4.01	0.92	3.94	0.82	0.3
Feminine traits	5.14	0.99	5.33	0.86	-0.9

* $p < .05$; ** $p < .01$; *** $p < .001$

3.5. Effect of sex and Gender Identity on DBQ scores, Accidents and Offenses

3.5.1. Effect of Sex and Sex-stereotype Conformity on DBQ scores, Accidents and Offenses

In order to examine the effect of sex and sex-stereotype conformity on driving behaviors, accident involvement and traffic offenses, seven separate hierarchical regression analyses were performed on each of the outcome variables (inexperience errors, inattention errors, dangerous errors, violations, positive behaviors, number of accidents, number of offenses). In each of these regressions, years holding a license, kilometers driven weekly and sex were entered in the first step to initially control for their effect, and masculine and feminine stereotype conformity were entered in the second step.

As presented in Table 5, the number of years holding a license positively predicted the number of accidents and offenses. Kilometers driven weekly positively predicted the inattention score. Finally, sex significantly predicted the inexperience and inattention errors' score, suggesting that females declared more inexperience and inattention errors than males. The variance explained accounted for by these variables was 8% for inexperience errors, 11% for inattention errors, 6% for dangerous errors, 4% for violations, 3% for positive behaviors, 9% for accidents and 12% for offenses.

After controlling the effects of kilometers driven weekly, number of years holding a license, and sex, the results of the regression analyses in the second step showed no effect of masculine stereotype conformity on driving behaviors, number of accidents and traffic offenses. Nevertheless, feminine stereotype conformity negatively predicted the number of accidents. The proportion of variance accounted for by masculine-stereotype conformity and feminine-stereotype conformity was 1% for inexperience errors, 3% for inattention errors, 2% for dangerous errors, 6% for violations, 3% for positive behaviors, 7% for accidents and 3% for offenses.

TABLE 5 Hierarchical analyses on DBQ scales, number of Accidents and number of Offenses

		Inexperience errors			Inattention errors			Dangerous errors			Violations			Positive Behaviors			Number of accidents			Number of offenses		
		R2	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**
1.	**License (years)**	.08	2.15	.04	.11	3.02	.08	.06	1.39	.10	.04	0.98	.17	.03	.69	-.01	.09	2.29	.29*	.12	3..23	.31**
	Weekly km			.06			.25*			.16			-.07			.06			-.04			.16
	Sex[1]			.28*			.24*			.15			-.13			-.15			.15			.05
2.	**Masculine traits**	.01	1.33	.06	.03	2.38*	-.17	.02	1.01	.11	.06	1.78	.08	.03	.96	-.07	.07	2.38*	.09	.03	2.29	-.02
	Feminine traits			.03			-.08			-.04			-.17			.18			-.23*			-.15
	Total R2	**.09**			**.15**			**.07**			**.12**			**.07**			**.15**			**.14**		

[1] *males = 1 ; females = 2* * *p < .05 ; ** p < .01 ; *** p < .001*

3.5.2. Effect of Sex-stereotype Conformity and Gender Identity variables scales on DBQ scores, Accidents and Offenses

Observing the effect of gender identity on the whole sample without taking the gender group of the individual into account would not be relevant and would not provide interpretable results given that the effect of gender identity on driving behaviors is expected to be different according to the gender group. Thus, in order to examine the respective effects of sex-stereotype conformity and gender identity variables on driving behaviors and accident involvement and offenses, seven separate hierarchical regression analyses were performed on each of the outcome variables (inexperience errors, inattention errors, dangerous errors, violations, positive behaviors, number of accidents, number of offenses) among males and females separately. In each of these regressions, years holding a license and kilometers driven weekly were entered in the first step to initially control for their effect. Masculine-stereotype and feminine stereotype conformity were entered in the second step and the three variables of gender identity, typicality, contentedness and centrality were entered in the third step.

3.5.2.1. Effects among Males. Regarding males, as presented in Table 6, the number of years holding a license positively predicted the inexperience errors score. Plus, although the model is not significant, results showed that kilometers driven weekly positively predicted inattention errors. The variance accounted for by these variables was 22% for inexperience errors, 18% for inattention errors, 15% for dangerous errors, 8% for violations, 10% for positive behaviors, 3% for accidents and 1% for offenses.

When entering sex-stereotype conformity into the model, results of the regression analyses showed no effect of masculine and feminine stereotype conformity on driving behaviors, accidents and traffic offenses. The proportion of variance accounted for by masculine-stereotype conformity and feminine-stereotype conformity was 1% for inexperience errors, 9% for inattention errors, 2% for dangerous errors, 8% for violations, 5% for positive behaviors, 4% for accidents and 21% for offenses.

Finally, when entering gender identity variables, although models were not significant, results showed that typicality positively predicted the score of dangerous errors and that contentedness negatively predicted positive behaviors. The variance accounted for by these variables was 15% for inexperience errors, 6% for inattention errors, 19% for dangerous errors, 18% for violations, 33% for positive behaviors, 16% for accidents and 9% for offenses.

3.5.2.1. Effects among Females. Regarding females, as presented in Table 7, the number of years holding a license negatively predicted the number of accidents and offenses, and although the model was not significant, negatively predicted violations. The variance accounted for by these variables was 2% for inexperience errors, 7% for inattention errors, 3% for dangerous errors, 11% for violations, 1% for positive behaviors, 16% for accidents and 13% for offenses.

When entering sex-stereotype conformity into the model, results of the regression analyses showed no effect of masculine stereotype conformity on driving behaviors, accidents and offenses. Feminine-stereotype conformity negatively predicted the number of accidents. The proportion of variance accounted for by masculine-stereotype conformity and feminine-stereotype conformity was 0% for inexperience errors, 4% for inattention errors, 2% for dangerous errors, 3% for violations, 7% for positive behaviors, 9% for accidents and 7% for offenses.

Finally, when entering gender identity variables, results showed no effect of typicality, contentedness and centrality on the variables tested. The variance accounted for by these variables was 8% for inexperience errors, 0% for inattention errors, 2% for dangerous errors, 4% for violations, 6% for positive behaviors, 11% for accidents and 5% for offenses.

TABLE 6 Hierarchical analyses on DBQ scales, number of Accidents and number of Offenses for Males

		Inexperience errors			Inattention errors			Dangerous errors			Violations			Positive Behaviors			Number of accidents			Number of offenses		
		R2	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**
1.	**License (years)**	.22	3.44*	.4*	.18	2.67	.23	.15	2.15	.19	.08	1.0	.28	.10	1.28	.25	.03	.36	.06	.1	1.36	.32
	Weekly km			.36			.41*			.19			.13			.25			-.15			.14
2.	**Masculine traits**	.01	1.68	.09	.09	2.08	-.29	.02	1.09	.08	.08	1.06	-.05	.05	.97	.14	.04	.38	-.08	.21	1.52	-.35
	Feminine traits			-.05			.09			.10			-.3			.20			-.19			-.01
	Typicality	.15	1.71	.29	.06	1.36	.24	.19	1.51	.48*	.18	1.39	-.19	.33	2.49	-.11	.16	.8	-.37	.09	1.2	-.01
3.	**Contentedness**			-.28			-.14			-.34			.25			-.54*			-.13			.17
	Centrality			-.27			-.13			.07			.37			-.2			-.0			.26
	Total R2	**.39**			**.33**			**.36**			**.34**			**.48**			**.23**			**.31**		

** p < .05 ; ** p < .01 ; *** p < .001*

TABLE 7 Hierarchical analyses on DBQ scales, number of Accidents and number of Offenses for females

		Inexperience errors			Inattention errors			Dangerous errors			Violations			Positive Behaviors			Number of accidents			Number of offenses		
		R2	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**	**R2**	**F**	**béta**
1.	**License (years)**	.02	.35	.12	.07	1.65	.15	.03	.61	-.06	.11	2.74	-.32*	.01	.29	.12	.16	4.12*	-.41**	.13	3.36*	-.3*
	Weekly Km			-.01			.27			.14			-.23			.03			-.08			.14
2.	**Masculine traits**	.00	.2	-.01	.04	1.42	-.15	.02	.50	.10	.03	1.64	.11	.07	.93	-.2	.09	3.48*	.17	.07	2.59	.12
	Feminine traits			.06			-.17			-.09			-.11			.17			-.25*			-.23
	Typicality	.08	.6	.01	.00	.78	-.03	.02	.42	-.16	.04	1.22	-.02	.06	1.00	-.09	.11	3.13*	.15	.05	1.88	.13
3.	**Contentedness**			.11			-.04			.09			.21			-.22			-.00			-.22
	Centrality			.27			.04			.05			.11			-.13			.24			-.02
	Total R2	**.10**			**.12**			**.07**			**.18**			**.15**			**.36**			**.25**		

** p < .05 ; ** p < .01 ; *** p < .001*

4. DISCUSSION

The aim of the study was to replicate findings showing the effect of sex and sex-stereotype conformity on driving behaviors *(34)* and to examine the effect of gender group identification by investigating the effect of three components of gender identity (typicality, contentedness and centrality). It was assumed that depending on the feeling of being a typical member of one's gender group, satisfaction with one's biological gender group and the importance of gender in the self-concept, individuals would more or less try to conform to stereotypes associated with their group and, thus to behaviors associated with their group such as driving behaviors.

The results did not confirm the first hypothesis which expected an effect of gender on driving behaviors. Males did not report more violations, accidents and offenses than women which is not consistent with literature *(14, 34, 36, 51, 52)*. Nevertheless, being a female is associated with higher inexperience errors which is in line with the results of many studies that have shown a greater propensity among women to declare more lapses *(4, 6, 36)* and inexperience errors *(51)*. This lack of effect of biological sex on other types of behaviors could provide the idea to take into account social variables in explaining gender differences, supporting the idea that gender differences are fully explained by gender roles, contrary to integrationist models that suggest that gender differences are due to both biological and social factors *(38)*. Nevertheless, the rest of the results did not support that idea.

Gender-stereotype conformity was expected to be associated with driving behaviors, replicating previous findings that showed this relationship *(34)*. No effect of masculine stereotype conformity on driving behaviors was observed in the results of the present study. Nevertheless, feminine-stereotype conformity was negatively associated with the number of accidents. That is to say, after controlling the effect of sex, individuals who highly conform to feminine stereotypes report a lower number of accidents, which is in keeping with a previous study by Özkan et al. *(34)* among Turkish drivers. This effect also appears when looking at females separately. Previous findings on DBQ showed that accident involvement was predicted by violations, both retrospectively and prospectively *(6)*, and in the present study, violations correlated with the number of accidents among females. Thus, the negative link between feminine stereotype conformity and violation and error scores that can be observed in literature *(34)* was not observed in the present study, but the low number of accidents among individuals who highly conform to feminine stereotypes could nevertheless be due to a lower tendency towards risky driving behaviors. Thus, it could be argued that caring for others could lead to more careful driving, and thus, fewer accidents. The results showed no relationship between accidents and masculinity. This might be due to the fact that an accident is a relatively rare event, as not all risky behaviors result in an accident. In addition, the study was conducted among young drivers, with a relatively short driving history. Nevertheless, the percentage of variance explained by gender stereotype conformity was only weak, suggesting that other social variables must be taken into account in order to explain differences between and within gender group in risky behaviors.

The third hypothesis predicted that gender identification of males and females would have an effect on driving behaviors. More particularly, it was assumed that males who strongly identified with their gender group would demonstrate greater conformity to masculine gender roles and would report more risky driving behaviors than males who weakly identified with the male gender group.

Results showed no effect of contentedness, typicality and centrality on driving behaviors among females, whereas results showed effects of typicality and contentedness on driving behaviors among males. More precisely, the typicality 'score positively predicted the

dangerous error ‘score, whereas contentedness negatively predicted positive behaviors. In other words, the dangerous errors ‘score increases as a function of the male individuals ‘feeling of typicality within their group. Thus, it seems that gender identification leads to riskier driving and exhibiting more errors, in order to conform to gender roles, since risk-taking is seen as a typically masculine type of behavior *(28)*. The positive correlation between centrality and violations among men seems to suggest the same. Furthermore, the positive behaviors’ score decreases as a function of the contentedness of belonging to the group of males. Thus, it seems that high gender identification, as assessed by contentedness, leads to exhibiting less positive behavior that could be socially linked to feminine stereotypes. Indeed, results also showed that conformity to feminine stereotypes decreases as a function of the global gender identification’ score among males. Additionally, among males, contentedness correlated negatively with feminine stereotype conformity, which negatively predicted the number of accidents. Thus, it can be suggested that high gender identification among males leads to lesser conformity to communal traits, which can lead to less positive behaviors as regards contentedness level. In terms of implications, it may be helpful to attach feminine characteristics (e.g. “caring for others”) which were found to be related to more careful driving and fewer errors *(34)* to masculine characteristics through role models, in driver education and media campaigns.

The percentage of variance explained improves by adding variables of gender identity, showing the importance of taking gender identification into account. Indeed, studies investigating the effect of gender roles on risky behaviors used to focus on gender stereotype conformity, given the relationship between masculine attributes and variables associated with risk taking *(39, 40)*. Although popular, the practice of assessing self-perceived gender typicality in terms of self-perceived personality traits thus has limitations. Sex typing is multidimensional *(53, 54)*, meaning that there is only modest consistency in the degree to which people display male-typical or female-typical behavior across different domains (e.g., personality traits, activity preferences, academic pursuits, and occupational preferences). Thus, it could be hazardous to infer an individual's overall gender identity from self-perceived sex typing in any single domain. Furthermore, the degree to which one identifies with one’s gender group may partly explain the conformity to attributes associated with one’s gender group or the other one and the behaviors associated with it. That’s why it is suggested to take gender identity variables into account rather than only sex-typed attributes in explaining differences between and within gender group in risk-taking. Interestingly, effect of gender identity variables on driving behaviors only appears among men, not among females. Plus, the proportion of variance explained obtained by adding gender identity variables to the model is greater among males than among females. In this type of activity, the effect of gender identity must be particularly relevant among males, given that risk taking is a masculine type of behaviors and that driving is an activity associated with maleness.

Furthermore, those results highlighted the importance of taking feminine stereotype conformity into account when investigating sex and gender differences in risky driving. Most of the studies investigated the effect of masculinity on risky behaviors because of the relationship that exists between attributes associated with masculinity and variables associated with risky behaviors, such as aggressiveness, self-enhancement and sensation seeking *(35, 39, 40)*. But few studies investigated the effect of femininity on risky behaviors *(34)*. However, it can be suggested that it is the lack of femininity that leads to taking more risks instead of high conformity to masculine stereotypes *(37)*. Indeed, people can conform to both masculine and feminine stereotype and it can be assumed that femininity buffers the effect of masculinity as it has been shown by Özkan et al. *(34)*.

The present study has some methodological limitations that have to be taken into account when planning future research. First, the data was comprised of drivers' self-reported behaviors, which may have limits, notably concerning the negative impact of social desirability. It is possible that some respondents embellished their answers about aggressive driving, although the bias caused by social desirability has been shown to be minimal in the answers on the DBQ *(55)*. Consequently, observational studies combined to surveys are needed, and would allow comparison between self-reported and effective behaviors. Second, the sample is relatively small, which can explain the lack of reliability of the scales and can impact the validity of the results. Plus, there were clearly more female drivers than male drivers in the sample, which is unbalanced. Besides, young male drivers are the most problematic drivers. Next, half the sample consisted of novice drivers, so they may not actually be active drivers, which can lead to less exposure to traffic situations and so, explain the lack of expected results. Plus, the effect of inexperience may interact with the effects of gender identity. Finally, the study has been carried out on a student sample, which may not be representative of the young driver population, as psychosocial and cultural variables, such as level of education, can influence people's driving behaviors and gender identity. Thus, the study must be replicated in a wide sample equivalent in terms of sex, age and socioeconomic status.

5. CONCLUSION

In summary, the present study showed neither the effects of sex nor masculine-stereotype conformity on driving behaviors, but an effect of feminine-stereotypes on the number of accidents. Plus, this study showed the effect of contentedness and typicality, respectively on positive behaviors and dangerous errors among males. The proportion of variance explained by sex-stereotype conformity was low but was increased by adding gender identity variables to the models. Thus, even if hypotheses are not confirmed, this study can highlight the importance of taking gender identity variables into account when explaining differences between and within gender group in risk-taking, rather than only look at the effect of sex-stereotype conformity. Furthermore, it highlighted the beneficial effect of feminine-stereotype conformity on risky behaviors, suggesting that lack of femininity might be one of the key factors behind high traffic accident mortality among young male drivers. Nevertheless, results need to be put into perspective, given the size of the sample.

REFERENCES

1. Hanna, C. L., D. M. Taylor, M. A. Sheppard, and L. Laflamme. Fatal crashes involving young unlicensed drivers in the US. *Journal of Safety Research*, Vol. 37, No. 4, 2006, pp. 385–393.
2. Nell, V. Why young men drive dangerously: Implications for injury prevention. *Current Directions in Psychological Science*, Vol. 11, No. 2, 2002, pp. 75–79.
3. ONISR. (2008). Grands thèmes de la sécurité routière en france - le piéton. from http://www2.securiteroutiere.gouv.fr/IMG/Synthese/Pietons.pdf. .
4. Reason, J., A. Manstead, S. Stradling, J. Baxter, and K. Campbell. Errors and violations on the roads: a real distinction? *Ergonomics*, Vol. 33, No. 10-11, 1990, pp. 1315–1332.
5. De Winter, J. C. F., and D. Dodou. The Driver Behaviour Questionnaire as a predictor of accidents: A meta-analysis. *Journal of Safety Research*, Vol. 41, No. 6, Dec. 2010, pp. 463–470.
6. Parker, D., R. West, S. Stradling, and A. S. R. Manstead. Behavioural characteristics and involvement in different types of traffic accident. *Accident Analysis & Prevention*, Vol. 27, No. 4, Aug. 1995, pp. 571–581.
7. Chliaoutakis, J. E., C. Darviri, and P. T. Demakakos. The impact of young drivers' lifestyle on their road traffic accident risk in greater Athens area. *Accident Analysis & Prevention*, Vol. 31, No. 6, 1999, pp. 771–780.

8. Doherty, S. T., J. C. Andrey, and C. MacGregor. The situational risks of young drivers: The influence of passengers, time of day and day of week on accident rates. *Accident Analysis & Prevention*, Vol. 30, No. 1, 1998, pp. 45–52.
9. Finn, P., and B. W. Bragg. Perception of the risk of an accident by young and older drivers. *Accident Analysis & Prevention*, Vol. 18, No. 4, 1986, pp. 289–298.
10. Mayhew, D. R., A. C. Donelson, D. J. Beirness, and H. M. Simpson. Youth, alcohol and relative risk of crash involvement. *Accident Analysis & Prevention*, Vol. 18, No. 4, 1986, pp. 273–287.
11. Summala, H. Young driver accidents: Risk taking or failure of skills? *Alcohol, Drugs & Driving*, 1987.
12. Byrnes, J. P., D. C. Miller, and W. D. Schafer. Gender differences in risk taking: A meta-analysis. *Psychological Bulletin*, Vol. 125, No. 3, May 1999, pp. 367–383.
13. Deery, H. Hazard and Risk Perception among Young Novice Drivers. *Journal of Safety Research*, Vol. 30, No. 4, 1999, pp. 225 – 236.
14. Blockey, P. N., and L. R. Hartley. Aberrant driving behaviour: errors and violations. *Ergonomics*, Vol. 38, No. 9, 1995, pp. 1759–1771.
15. Jonah, B. A. Age differences in risky driving. *Health Education Research*, Vol. 5, No. 2, 1990, pp. 139–149.
16. Aluja, A., and R. Torrubia. Hostility-aggressiveness, sensation seeking, and sex hormones in men: re-exploring their relationship. *Neuropsychobiology*, Vol. 50, No. 1, 2004, pp. 102–107.
17. Book, A. S., and V. L. Quinsey. Re-examining the issues: A response to Archer et al. *Aggression and Violent Behavior*, Vol. 10, No. 6, 2005, pp. 637–646.
18. Coccaro, E. F., B. Beresford, P. Minar, J. Kaskow, and T. Geracioti. CSF testosterone: relationship to aggression, impulsivity, and venturesomeness in adult males with personality disorder. *Journal of psychiatric research*, Vol. 41, No. 6, 2007, pp. 488–492.
19. Rowe, R., B. Maughan, C. M. Worthman, E. J. Costello, and A. Angold. Testosterone, antisocial behavior, and social dominance in boys: pubertal development and biosocial interaction. *Biological Psychiatry*, Vol. 55, No. 5, 2004, pp. 546–552.
20. Basow, S. A. *Gender stereotypes and roles*. Brooks/Cole, Pacific Grove, CA, 1992.
21. Bakan, D. *The duality of human existence*. Rand Mc Nally, Chicago, 1966.
22. Pomerantz, E. M., and D. N. Ruble. The Role of Maternal Control in the Development of Sex Differences in Child Self-Evaluative Factors. *Child development*, Vol. 69, No. 2, 1998, pp. 458–478.
23. Deaux, K., and L. L. Lewis. Components of gender stereotypes. *Psychological Documents*, Vol. 13, 1983, p. 25.
24. Feingold, A. Gender differences in personality: A meta-analysis. *Psychological bulletin*, Vol. 116, No. 3, 1994, p. 429.
25. Spence, J. T., and C. E. Buckner. Instrumental and expressive traits, trait stereotypes, and sexist attitudes: What do they signify? *Psychology of Women Quarterly*, Vol. 24, No. 1, 2000, p. 44.
26. Williams, J. E., and D. L. Best. *Measuring sex stereotypes: A multination study (rev*. Sage Publications, Inc, 1990.
27. Newport, F. Americans see women as emotional and affectionate, men as more aggressive: Gender specific stereotypes persist in recent Gallup poll. *Retrieved September*, Vol. 10, 2001, p. 2006.
28. Bem, S. L. The measurement of psychological androgyny. *Journal of Consulting and Clinical Psychology*, Vol. 42, No. 2, Apr. 1974, pp. 155–162.
29. Yagil, D. Gender and age-related differences in attitudes toward traffic laws and traffic violations. *Transportation Research Part F: Traffic Psychology and Behaviour*, Vol. 1, No. 2, Dec. 1998, pp. 123–135.
30. Granié, M.-A. *Genre, Risques, Education Socialisation. Rapport final sur subvention PREDIT/DSCR*. INRETS, Salon de Provence, 2008.
31. Granié, M.-A. Gender stereotype conformity and age as determinants of preschoolers' injury-risk behaviors. *Accident Analysis & Prevention*, Vol. 42, No. 2, Mar. 2010, pp. 726–733.
32. Schmid Mast, M., M. Sieverding, M. Esslen, K. Graber, and L. Jäncke. Masculinity causes speeding in young men. *Accident Analysis & Prevention*, Vol. 40, No. 2, Mar. 2008, pp. 840–842.

33. Krahé, B., and I. Fenske. Predicting aggressive driving behavior: The role of macho personality, age, and power of car. *Aggressive Behavior*, Vol. 28, No. 1, 2002, pp. 21–29.
34. Özkan, T., and T. Lajunen. Why are there sex differences in risky driving? the relationship between sex and gender-role on aggressive driving, traffic offences, and accident involvement among young turkish drivers. *Aggressive Behavior*, Vol. 31, No. 6, 2005, pp. 547–558.
35. Sibley, C. G., and N. Harré. A gender role socialization model of explicit and implicit biases in driving self-enhancement. *Transportation Research Part F: Traffic Psychology and Behaviour*, Vol. 12, No. 6, 2009, pp. 452–461.
36. Özkan, T., and T. Lajunen. What causes the differences in driving between young men and women? The effects of gender roles and sex on young drivers' driving behaviour and self-assessment of skills. *Transportation Research Part F: Traffic Psychology and Behaviour*, Vol. 9, No. 4, 2006, pp. 269–277.
37. Granié, M.-A. Effects of gender, sex-stereotype conformity, age and internalization on risk-taking among adolescent pedestrians. *Safety Science*, Vol. 47, No. 9, Nov. 2009, pp. 1277–1283.
38. Brown, T. G. Sex Differences in First-Time DWI Offenders: Role of Alcohol and Neurobiological Factors. , 2013.
39. Öngen, D. E. The relationships between sensation seeking and gender role orientations among Turkish university students. *Sex Roles*, Vol. 57, No. 1-2, 2007, pp. 111–118.
40. Weisbuch, M., D. Beal, and C. O'Neal. How masculine ought I be? Men's masculinity and aggression. No. 40, 1999, pp. 583–592.
41. Deffenbacher, J. L., R. S. Lynch, L. B. Filetti, E. R. Dahlen, and E. R. Oetting. Anger, aggression, risky behavior, and crash-related outcomes in three groups of drivers. *Behaviour research and therapy*, Vol. 41, No. 3, 2003, pp. 333–349.
42. Lonczak, H. S., C. Neighbors, and D. M. Donovan. Predicting risky and angry driving as a function of gender. *Accident Analysis & Prevention*, Vol. 39, No. 3, 2007, pp. 536–545.
43. Steenbarger, B. N., and R. P. Greenberg. Sex roles, stress, and distress: A study of person by situation contingency. *Sex roles*, Vol. 22, No. 1-2, 1990, pp. 59–68.
44. Spence, J. T. Gender-related traits and gender ideology: evidence for a multifactorial theory. *Journal of personality and social psychology*, Vol. 64, No. 4, 1993, p. 624.
45. Egan, S. K., and D. G. Perry. Gender identity: A multidimensional analysis with implications for psychosocial adjustment. *Developmental Psychology*, Vol. 37, No. 4, 2001, pp. 451–463.
46. Ashmore, R. D., K. Deaux, and T. McLaughlin-Volpe. An organizing framework for collective identity: Articulation and significance of multidimensionality. *Psychological bulletin*, Vol. 130, No. 1, 2004, p. 80.
47. Luhtanen, R., and J. Crocker. A collective self-esteem scale: Self-evaluation of one's social identity. *Personality and Social Psychology Bulletin*, Vol. 18, No. 3, 1992, pp. 302–318.
48. Gana, K. Androgynie psychologique et valeurs socio-cognitives des dimensions du concept de soi. *Cahiers Internationaux de Psychologie Sociale*, Vol. 25, Mar. 1995, pp. 27–43.
49. Jodoin, E., and D. Julien. Validation d'une batterie d'échelles en français portant sur l'identité de genre chez des jeunes de huit à 16 ans. *Psychologie Française*, Vol. 56, No. 2, Jun. 2011, pp. 119–131.
50. Guého, L., M.-A. Granié, and J.-C. Abric. French validation of a new version of the Driver Behavior Questionnaire (DBQ) for drivers of all ages and level of experiences. In press.
51. Aberg, L. Traffic rules and traffic safety. *Safety Science*, Vol. 29, 1998, pp. 205–215.
52. Lawton, R., D. Parker, S. G. Stradling, and A. S. R. Manstead. Predicting road traffic accidents: The role of social deviance and violations. *British Journal of Psychology*, Vol. 88, No. 2, 1997, pp. 249–262.
53. Spence, J. T., and R. L. Helmreich. Masculine instrumentality and feminine expressiveness: Their relationships with sex role attitudes and behaviors. *Psychology of Women Quarterly*, Vol. 5, No. 2, 1980, pp. 147–163.
54. Ruble, D. N., C. L. Martin, and S. A. Berenbaum. Gender development. *Handbook of child psychology*, 1998.

55. Lajunen, T. J., and H. Summala. Can we trust self-reports of driving? Effects of impression management on driver behaviour questionnaire responses. *Transportation Research. Part F: Traffic Psychology and Behaviour*, Vol. 6, 2003, pp. 97–107.