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Causal attribution in explanations of near-crash events behind the wheel, and its relationship to comparative judgments

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ABSTRACT

Introduction: The development of skills essential for avoiding crashes depends, in particular, on how drivers explain the causes of dangerous driving behaviors that resulted in a near crash. Here, we analyze causes attributed to such behaviors by car drivers in a self-report study. We explore the relationships between the dimensions of causal attribution, attribution of responsibility for the near crash, and drivers' comparative judgments. *Method:* For approximately two months, drivers used logbooks to document the near crashes that occurred during their trips. The causes attributed in those reports to driving behaviors resulting in near crashes were then coded by two judges on the basis of several causal dimensions. Drivers also estimated their own and an average driver's skill levels, and their risk of being involved, as a driver, in a crash. *Results:* We distinguished main types of causes of the near crashes reported. Drivers had a tendency to more often attribute external causes to their own behaviors resulting in near crashes than to those of others. The probability of attributing a controllable cause increased with overestimation of one's own skills and decreased with underestimation of one's own risk in comparison to other drivers. The probability of attributing a stable cause increased with underestimation of one's own risk. *Conclusions:* When they explained their own behaviors resulting in near crashes, drivers mentioned different causes than when they explained those of others. Overestimation of one's own skills as compared to other drivers could be beneficial for developing crash-avoiding skills, insofar as it seems to foster attribution of controllable causes. By contrast, underestimation of one's own risk could have the opposite effect. *Practical applications:* Vulnerability to road risks should be stressed in driver's training and risk communication campaigns. However, self-confidence with respect to one's skills should not always be targeted as a safety problem.

1. Introduction

Driving a car consists of maintaining the speed needed to reach a destination within a desired time period, while keeping at a safe distance from stationary or moving entities in the road environment, in accordance with current road conditions (Summala, 1997). The driver regulates his/her activity according to the perceived level of task difficulty (Fuller, McHugh, & Pender, 2008), which depends, in particular, on driving experience (Delhomme, 1995). Near crashes, that is, interactions where safety margins are narrowed so that feelings of danger emerge, are crucial moments for the development of the skills essential to avoiding crashes (Fuller, 1984; Näätänen & Summala, 1976). It is therefore important to analyze the ways car drivers explain behaviors that lead to near crashes, in order to gain further knowledge about the factors that can facilitate or hamper the development of these skills. In the following paragraphs, we first expose a theoretical background useful for analyzing how individuals attribute causes to behaviors. Then we describe a socio-psychological phenomenon that arises when the probability of negative outcomes is estimated, and that, in line with our research aims, may have an impact on the causal-attribution process.

Causal attribution is an essential mental process for adapting to the physical and social environment (Heider, 1958; Malle, 2004). Research in social psychology has distinguished several dimensions that help systematically describe the causes attributed to behaviors, including locus of causality, controllability, and stability (Weiner, 1979). For the needs of applied research, further work has extended this categorization by adding two dimensions of specificity related to the individuals involved and the outcome (Stratton et al., 1986). *Leeds Attributional Coding System* (LACS, Stratton, Munton, Hanks, Hard, & Davidson, 1988) is a clinical tool designed for categorizing spontaneous causal attributions. According to LACS, most causes can be identified as:

- *internal*, originating in an actor's personality or behavior, or *external*, originating in situational elements or other people;
- *controllable* or *uncontrollable*, to the extent that any individual involved in the situation can or cannot have an influence on the outcome without effort;

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- *stable*, whose influence is maintained beyond one particular outcome, or *unstable;*
- *global*, which can bring about a variety of potential outcomes, or *specific*, restricted only to certain types of outcomes;
- *personal*, distinct to an individual, or *universal.*

Since individual cognitive resources and time available for processing information are limited, causal attribution is not a systematic examination, but is based on efficient mental schemes (Kelley, 1987) that are likely to produce biases. Thus, attributions (as described by the aforementioned dimensions) can vary according to the perpetrator's level of involvement and the valence of the outcome. Several attributional biases, such as the actor-observer effect (AOE, Jones & Nisbett, 1971; for a review, see Malle, 2006; Watson, 1982) and the self-serving bias (SSB, for a review, see Arkin, Cooper, & Kolditz, 1980; Mezulis, Abramson, Hyde, & Hankin, 2004), are firmly established and well documented in the psychological literature.

AOE consists on a systematic discrepancy, between the actor and an observer, in the attribution of a cause to a behavior. In this effect, the actor has a tendency to explain his/her own behavior by external causes, while the observer attributes causes internal to the actor. Three types of explanations for AOE have been proposed. First, the actor and the observer do not have the same type and/or amount of information about the actor (Nisbett, Caputo, Legant, & Marecek, 1973). Second, since the actor is naturally focusing on his/her environment and the observer is focusing on the actor, attention or visual perspective could also explain this effect (Storms, 1973). Third, as Nisbett et al. (1973) suggested, actors are thought to be motivated to refer to external causes so as not to lose their sense of freedom.

SSB is a phenomenon linked to the motivation to preserve a positive self-image (Bradley, 1978; Zuckerman, 1979). SSB is similar to AOE, but only for negative outcomes. When the outcome is negative, actors would indeed attribute external causes to explain their own behavior in order to downplay their responsibility for the outcome. However, when the outcome is positive, actors would explain it using internal causes so as to emphasize their personal qualities. Observers would either not show the same response pattern or show the reverse pattern (Wells, Petty, Harkins, Kagehiro, & Harvey, 1977).

In the realm of traffic psychology, attribution biases have been studied in research on driving behavior. A study by Bordel et al. (2007) is of particular interest because it analyzes reports of real, severe crashes, obtained by the French police from witnesses and drivers considered at fault. Moreover, since external attributions by at-fault drivers were found to be particularly frequent for very severe crashes, the authors interpreted the observed actor-observer asymmetries in attribution in terms of SSB or defensive attribution (Walster, 1966; for a review, see Burger, 1981; for an example of application in the field of traffic psychology, see Baldwin & Kleinke, 1994). Several other studies have found AOE in attributions of causes to risky driving. The driver behaviors targeted in those experiments were either defined generally (as “your” or “your friend's” risky driving; Harré, Brandt, & Houkamau, 2004) or presented to the participants by means of scenarios (videotaped or written) that showed the actor's perspective (i.e., the driver at fault) and/or the observer's perspective (i.e., a bystander or another driver; Baxter, Macrae, Manstead, & Stradling, 1990; Hennessy & Jakubowski, 2007; Herzog, 1994; Lennon, Watson, Arlidge, & Fraine, 2011).

Differences between the perception of oneself and of others are also apparent in risk assessments. In general, people tend to be overly optimistic, in such a way that they underestimate their own risk of undergoing a negative event in comparison to the risk of others (Weinstein, 1980). Claimed to play a positive role in facing health problems (Taylor & Brown, 1988), the impact of this optimism can also be seen as equivocal for behavioral adaptation to risks in a health-related context (Schwarzer, 1994). However, it seems that there are a number of relationships between such comparative optimism and self-efficacy with respect to self-protection (Desrichard, Verlhiac, & Milhabet, 2001). In the field of research on driver behavior and the risks inherent in driving, comparative judgments have also been studied extensively in terms of assessments of one's driving skills as a means of controlling risks (Delhomme, 1991, 1995; Sundström, 2008). Regardless of whether the comparative optimism is displayed with respect to the skill level or the perceived risk of being involved in a crash, research results fail to unambiguously show a link between the magnitude of the bias and actual risk-taking behavior (Delhomme, 2000). Moreover, it remains unclear to what extent the basis of drivers' comparative judgments are experiential or illusory (Causse, Delhomme, & Kouabenan, 2005a; Causse, Kouabenan, & Delhomme, 2007; Delhomme, Verlhiac, & Martha, 2009). However, studies in which drivers are explicitly asked to give explanations for their risk assessments in several specific driving situations have shown that attributions of causes to one's own risks differ from the attributions of causes to others' risks (Causse et al., 2005a; Causse, Delhomme, & Kouabenan, 2005b). More specifically, drivers tend to explain their own level of risk in terms of abiding by traffic laws while explaining others' level of risk in terms of violations and lack of control (Causse et al., 2005b). In the present study, we further explore the influence of comparative judgments on causal attributions in specific risky driving situations.

This study has three aims. First, to apply the LACS in order to categorize causes attributed to behaviors resulting in a near crash. Second, to analyze comparative judgments of driving skills and of being involved as a driver in a crash, in order to estimate the extent to which drivers display comparative optimism. Third, to explore the relationships between the dimensions of causal attribution, attribution of responsibility for the near crash, and comparative judgments. We employ a methodology that we find more ecologically valid than hypothetical scenarios, namely, the analysis of self-reports about near crashes that occurred during everyday driving.

2. Materials and methods

2.1. Participants

The participants were 154 car drivers (72 females) averaging 39 years of age ($\sigma = 13.58$, $min = 23$, $max = 77$). They had had their driver's license for 18.9 years on average ($\sigma = 13.12$) and had driven a car for an annual average of 16,366 ($\sigma = 8806.69$) kilometers. In the sample, 59 participants had been involved in at least a minor collision during the three years preceding the study, and 83 had already lost points for various driving violations. They were all holders of a vehicle insurance policy from the insurance company that financed the study and received a financial compensation of 50€ for their participation.

2.2. Measures

There were three sources of information: a pre-experimental questionnaire (“Driving Habits Sheet”), a logbook (“Near-Crash Sheet”), and a post-experimental questionnaire (“Final Sheet”). The pre-experimental questionnaire contained questions about demographic characteristics (age, gender, kilometers driven, etc.) and about the participants' driving habits (motives for car use and habitual trips by car). The logbook served to describe a near crash by means of open- and closed-ended questions. In the logbook, the participant also identified the road users involved in the event, attributed responsibility for its occurrence (to the self vs. another road user), and specified the behavior deemed to have caused it.

The post-experimental questionnaire contained additional questions about driver characteristics (habitual speeds, prior involvement in crashes, driver's license points lost, etc.), as well as questions pertaining to perceived skill level and the risk of being involved, as a driver, in a crash. More specifically, the participants rated the extent to which they consider other drivers, in general, to be good drivers on

a five-point semantic-differential scale ranging from *very bad* to *very good*. They also rated the extent to which they have confidence in others' driving abilities, and the extent to which they believe others to be sufficiently careful behind the wheel, on five-point Likert scales ranging from *not at all* to *absolutely*. These three ratings were then repeated with respect to oneself. The questions pertaining to perceived skill level and the risk of being involved in a crash targeted other drivers in general, without specifying any further characteristics of the target. Because our study sample was diversified as concerns age and gender, we wanted to avoid influencing the participants' image of an "average driver" (similar approach as that adopted by Delhomme, 1991). The exact wording of these questions is given in the supplementary materials (items 1 and 14 in the post-experimental questionnaire).

The ratings of other drivers in general ($\alpha = 0.74$) and of oneself ($\alpha = 0.59$) were averaged in order to create aggregate measures of the perceived skill level of other drivers and of oneself. Finally, the measure of perceived other drivers' skill level was subtracted from the measure of one's own perceived skill level in order to obtain a measure of comparative judgment of skills (CJS). CJS took on positive values for drivers who overestimated their skills compared to other drivers, negative values for those who underestimated them, and was equal to zero for drivers who estimated that their skills were equivalent to those of other drivers.

Similarly, the participants rated the probability of being involved, as a driver, in a road crash in the next three years for an average driver, and then for oneself on five-point Likert scales ranging from *very low* to *very high*. The probability estimate for oneself was then subtracted from the average-driver estimate in order to obtain a measure of comparative judgment of risk (CJR). CJR was positive for drivers who underestimated their own risk of being involved in a road crash compared to an average driver, negative for those who overestimated it, and equal to zero for drivers who estimated that their level of risk was the same as that of other drivers. CJS and CJR were indirect measures indicating the extent to which the participants exhibited comparative optimism (Causse et al., 2005a, 2005b; Helweg-Larsen & Shepperd, 2001).

3. Procedure

The study was part of a broader research project on near crashes behind the wheel. It was approved by the ethics committee of the research institute in charge of the study and registered at the French National Commission on Informatics and Liberty.[1] The aim of the recruitment process was to obtain a sample of drivers of all ages. Therefore, we attempted to have an even distribution of drivers from six groups,[2] defined according to gender and three age ranges: 19–30, 31–50, and over 50 years old (drivers under 19 were excluded because their driving behavior is known to differ from that of a typical sample due to their lack of experience). The recruitment proceeded iteratively. The representatives of the insurance company that financed the project used the database of their car-insurance policy holders living in Ile-de-France[3] region. First, they contacted a subsample of policy holders within each of the six targeted groups at random and asked them if they would like to take part in the project. Second, a list of those who volunteered (10 drivers from each of the six groups) was given to the researchers, who contacted the volunteers again on the phone in order to explain the tasks that the participants were expected to accomplish and to schedule an individual appointment. At this stage, several drivers who volunteered at first decided not to participate because they found it too time consuming or were afraid that their insurer would get too much information about their risk-taking behavior. Third, after the first wave of volunteers had begun to participate, the researchers asked the insurance company for further lists of volunteers belonging to age and gender groups that were under-represented in the research sample.

During the appointment that took place on the premises of the research institute or in another place chosen by the participant, the driver signed a free and informed consent form, received detailed instructions about the task to accomplish, and a folder with logbooks. A near crash was defined as an unexpected interaction with the infrastructure or with other road users which, without an appropriate reaction, could have ended in an accident. Then, during the following period of approximately two months, the participant's task consisted of driving his/her car in the usual way, and to report every near crash by filling in a logbook as soon as possible after the occurrence of the incident (ideally, immediately after the participant's arrival at his/her destination). Finally, a second appointment was scheduled in order to recover the logbooks about near crashes occurred during the participation period, administer the post-experimental questionnaire, and give the participant a check for 50€. Most of the participants filled in the final questionnaire immediately on site. Others filled it in after a short period of time and either sent it back to the researchers by mail, or scanned it and sent it back by e-mail.

4. Results

Among the participants, 30 reported no near crashes, 35 provided insufficient explanations of the reported events, and for five of the reported near crashes, the participants attributed more than one cause to the behaviors that led directly to those events. Hence, the final sample consisted of 167 reports, provided by 89 participants.

Before the quantitative analyses, two researchers independently coded the causes attributed to the behaviors that resulted in near crashes, in accordance with the dimensions of the LACS. Whenever discrepancies appeared between the two codings, the researchers discussed them until they fully agreed on the final coding.

First, we will describe the attribution categories defined using the LACS dimensions. Then, we will present descriptive statistics for CJS and CJR. Finally, we will explore the relationships between each attribution dimension as a binary response variable (*internal* = 0, *external* = 1; *uncontrollable* = 0, *controllable* = 1; *unstable* = 0, *stable* = 1; *global* = 0, *specific* = 1; *universal* = 0, *personal* = 1) and the following predictors: attribution of responsibility (*self* = −1, *other* = 1), CJS, CJR, interaction between attribution of responsibility and CJS, and interaction between attribution of responsibility and CJR. We use penalized quasi-likelihood generalized linear mixed models (GLMM) so as to control for the repetition of near crashes by several participants.

4.1. Descriptive analysis of causal attributions

We distinguished 18 categories of causes attributed to the behaviors that resulted in near crashes (see Table 1). We chose to describe four of them, namely, those whose frequency was at least as great as that expected for a category if all the categories were equally distributed in the sample ($167 / 18 \approx 9$). The first category ($n = 94$, 56.3%) consisted of internal, controllable, unstable, specific, and universal causes. It comprised trivial errors: transient attention deficits, misperceptions, erroneous decisions, etc.

The second category ($n = 14$, 8.4%) consisted of external, controllable, unstable, specific, and universal causes. It included: other road users appearing unexpectedly or making unexpected maneuvers, imposing maneuvers to avoid a collision, or distracting the driver from his/her primary focus of attention (e.g., the road ahead of him); distraction caused by GPS notifications; overlooking road users approaching from behind because of the side-mirror blind spot; traffic conditions (linked to traffic density) causing unexpected

[1] Commission Nationale de l'Informatique et des Libertés.
[2] We expected those groups to differ in driving style and the type of reported near-crash events.
[3] The most accessible for the experimenters.

Table 1
Attribution categories, in decreasing order of frequency.

					Frequency	%
Internal	Controllable	Unstable	Specific	Universal	94	56.3
External	Controllable	Unstable	Specific	Universal	14	8.4
External	Controllable	Stable	Specific	Universal	10	6
Internal	Controllable	Stable	Global	Personal	9	5.4
External	Controllable	Stable	Global	Personal	6	3.6
External	Uncontrollable	Stable	Specific	Universal	6	3.6
External	Controllable	Stable	Global	Universal	4	2.4
Internal	Controllable	Stable	Specific	Personal	4	2.4
Internal	Controllable	Unstable	Global	Universal	4	2.4
External	Uncontrollable	Unstable	Specific	Universal	3	1.8
Internal	Controllable	Unstable	Specific	Personal	3	1.8
External	Controllable	Unstable	Specific	Personal	2	1.2
External	Uncontrollable	Stable	Global	Universal	2	1.2
Internal	Controllable	Stable	Global	Universal	2	1.2
External	Controllable	Unstable	Global	Universal	1	0.6
Internal	Uncontrollable	Stable	Global	Personal	1	0.6
Internal	Uncontrollable	Stable	Specific	Personal	1	0.6
Internal	Uncontrollable	Unstable	Specific	Personal	1	0.6

difficulties in executing a maneuver or facilitating the behavior that resulted directly in a near crash.

The third category consisted of external, controllable, stable, specific, and universal causes ($n = 10$, 6%). It comprised: infrastructure characteristics (flaws, deficiencies, temporary modifications because of construction work, speed limits, etc.); other road users' behavior or traffic conditions (e.g., light traffic) considered "normal" at a given spot; stationary vehicles imposing additional maneuvers to other road users.

The fourth, quite frequent category consisted of internal, controllable, stable, global, and personal causes ($n = 9$, 5.4%). It included inherent disobedience of traffic rules (ignorance, granting oneself "special" rights, bad attitude, stupidity, disrespect of others, etc.) or fatigue.

4.2. Descriptive analysis of comparative judgments

According to the results of the Shapiro–Wilk normality test, neither CJS ($W = 0.96$, $p < .0003$; $min = -0.67$, $Q_1 = 0.67$, $Mdn = 1.33$, $Q_3 = 1.67$, $max = 3$) nor CJR ($W = 0.85$, $p < .0001$; $min = -2$, $Q_1 = 0$, $Mdn = 1$, $Q_3 = 1$, $max = 4$) was normally distributed. The two measures indicated a slight amount of comparative optimism (see Fig. 1). The two measures were also moderately correlated on the basis of Spearman's rank correlation coefficient ($r_s = 0.35$).

4.3. Relationships between attributions of responsibility, comparative judgments, and dimensions of causal attribution

In this section, we report the significant results obtained from fitted GLMM models (for detailed results, see Table 2). The probability of attributing an external cause decreased when responsibility for the near crash was attributed to other road users (Wald $\chi^2 = 17.61$, $p < .0001$; OR = 0.45, 95% CI [0.3, 0.66]; see Table 3). The probability of attributing a controllable cause increased with CJS ($b = 1.15$, $p < .03$; OR = 3.16, 95% CI [1.12, 8.95]) but decreased with CJR ($b = -1.06$, $p < .004$; OR = 0.17, 95% CI [0.35, 0.71]). The probability of attributing a stable cause increased with CJR ($b = 0.63$, $p < .02$; OR = 1.87, 95% CI [1.15, 3.04]).

5. Discussion

We systematically categorized the causes attributed to behaviors that resulted in a near crash, by car drivers involved in such events, and explored how those causes varied with the attribution of responsibility and with comparative judgments. We found an effect similar to those documented in the literature on attribution theory, AOE, and SSB. Indeed, in our study sample, the drivers were more likely to attribute external causes to their own behaviors that resulted in near crashes than to such behaviors of others. We also found main effects of both types of comparative judgments (CJS and CJR) on controllability, and a main effect of CJR on the stability dimension of causal attribution. Interestingly, comparative judgments did not interact with the attribution of responsibility when participants were assigning causal attributions.

Drivers who perceived themselves as having a lower risk of being involved in a road crash than an average driver tended to attribute more uncontrollable and stable causes to near crashes. It seems plausible that their motivation was to represent the near crashes as non-trivial events and/or exceptional events, in line with the view that near crashes are unlikely. However, the more the drivers perceived their skills as superior to those of other drivers, the more they tended to attribute controllable causes to behaviors that resulted in near crashes. We contend that the more drivers perceive themselves as skillful in comparison to others, the more they seem to see on-road situations as controllable in general. However, in the present study, comparative judgments of skills and comparative judgments of the risk of being involved in a crash, which were positively correlated, had different effects on the attribution of causes to dangerous driving behaviors. This effect calls for further research aimed at gaining additional insight into the relationship between self-efficacy with respect to

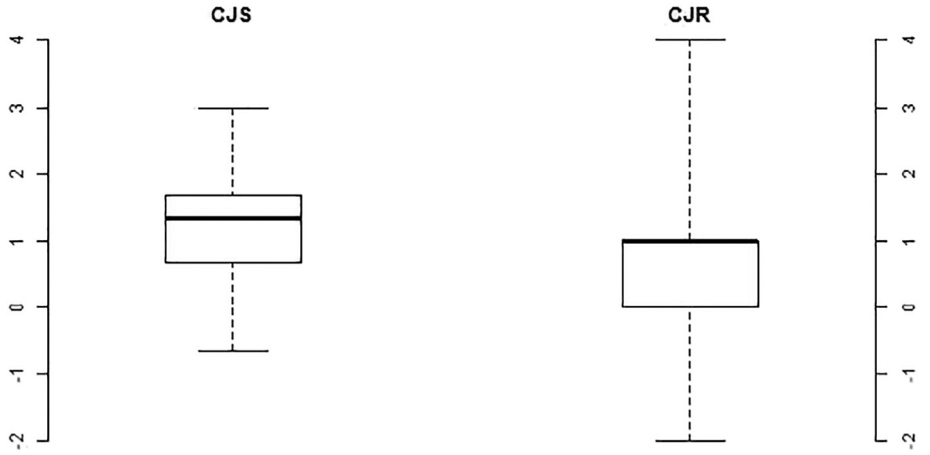

Fig. 1. Boxplots of CJS and CJR.

Table 2
Results obtained from GLMM models.

Causal-attribution dimension (dependent variable)[1]	Model R^2	Independent variable (fixed effect)	*b*	Wald χ^2	Fixed-effect R^2	OR	OR lower 95%CI	OR upper 95%CI
Internal (0)–external (1)	0.16	Responsibility[2]	−0.77***	18.49***	0.09	0.46	0.32	0.66
		CJS	−0.58†	4.2*	0.03	0.56	0.32	0.99
		CJR	0.1	0.17	0	1.11	0.68	1.79
		Responsibility × CJS	0.08	0.09	0	1.08	0.63	1.87
		Responsibility × CJR	−0.22	0.99	0.01	0.8	0.52	1.25
Uncontrollable (0)–controllable (1)	0.07	Responsibility[2]	0.67	1.27	0.02	1.95	0.87	4.38
		CJS	1.15*	5.12*	0.03	3.16	1.12	8.95
		CJR	−1.06**	6.84**	0.03	0.35	0.17	0.71
		Responsibility × CJS	0.15	0.08	0	1.16	0.41	3.3
		Responsibility × CJR	−0.48	1.8	0.01	0.62	0.3	1.26
Unstable (0)–stable (1)	0.06	Responsibility[2]	−0.12	0.68	0	0.89	0.61	1.3
		CJS	−0.41	2.22	0.02	0.66	0.39	1.14
		CJR	0.63*	6*	0.05	1.87	1.16	3.04
		Responsibility × CJS	0.09	0.1	0	1.09	0.64	1.84
		Responsibility × CJR	−0.19	0.7	0.01	0.83	0.52	1.3
Global (0)–specific (1)	0.03	Responsibility[2]	0.16	0.34	0	1.18	0.74	1.86
		CJS	−0.1	0.03	0	0.91	0.51	1.63
		CJR	−0.3	1.89	0.01	0.74	0.46	1.2
		Responsibility × CJS	0.22	0.58	0	1.25	0.7	2.25
		Responsibility × CJR	−0.31	1.63	0.01	0.73	0.45	1.19
Universal (0)–personal (1)	0.03	Responsibility[2]	0.04	0.11	0	1.05	0.63	1.73
		CJS	−0.11	0	0	0.89	0.48	1.65
		CJR	0.38	2.86†	0.01	1.47	0.91	2.36
		Responsibility × CJS	0.35	1.27	0.01	1.42	0.76	2.64
		Responsibility × CJR	0.08	0.1	0	1.08	0.67	1.74

† $p < .1$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.
[1] Category codes in parentheses.
[2] Category codes: *self* = −1, *other* = 1.

driving skills and comparative judgments with respect to the risk of being involved in a road crash as a driver.

In the light of our findings, the influence of comparative judgments on the attribution of causes to behaviors resulting in near crashes behind the wheel is not clear-cut. It is legitimate to consider that the attribution of controllable causes to behaviors generating the risk of a crash is desirable because the driver who attributes such causes should normally be motivated to adapt his/her future behavior in order to avoid similar, undesirable outcomes. From the standpoint of behavioral adaptation, then, perceiving one's own risk of being involved in a crash as lower to that of an average driver would have negative consequences, whereas perceiving one's driving skills as superior would have positive consequences on the attribution of causes to dangerous driving behaviors.

In terms of the impact of these factors on causal attribution, the lack of an interaction between comparative judgments and the attribution of responsibility for near crashes provides further insight into the nature of comparative optimism as a psychological phenomenon. The fact that the tendency to perceive one's skills as superior and one's risk of being involved in a crash as lower, compared to other drivers, did not accentuate the differences in causal attributions to one's own and others' dangerous driving behaviors, suggests that this kind of optimism is relatively superficial, or at the very least, is not based on systematic comparisons. It should be regarded as a general belief aimed at enhancing self-confidence and coping with the sense of danger behind the wheel rather than as a strong conviction.

Table 3
Frequency of internal and external causal attributions according to the attribution of responsibility to other drivers or oneself.

		Internal	External	Row total
Other	Count	88	17	105
	Row %	83.8	16.2	62.9
	Column %	73.9	35.4	
	Total %	52.7	10.2	
Self	Count	31	31	62
	Row %	50	50	37.1
	Column %	26.1	64.4	
	Total %	18.6	18.6	
Column total	Count	119	48	167
	%	71.3	28.7	

In spite of the fact that the participants said they were at fault for a non-negligible proportion of the reported near crashes, one limitation of our study is that it included only one (the participant's) point of view for the behavior in question. However, with the methodology we chose, it would have been virtually impossible to obtain reports, for the same event, from the points of view of both the party at fault and one or more observers (active or passive). Moreover, coding the participants' spontaneous attributions instead of gathering them by means of closed, questionnaire items makes the results vulnerable to the subjective influence of the judges. Still, it seems to us that this method is better at capturing the spontaneous nature of the attribution process. Moreover, the impact of comparative judgments, as well as their interactions with attributions of responsibility on causal-attribution dimensions, may be stronger for behaviors resulting in real crashes than for behaviors resulting in near crashes, which are quite common and have no serious consequences. Note that employing such a methodology demands special consent from authorities, which implies lengthy procedures and is therefore difficult to obtain within the duration of a research project. Finally, our sample consisted of drivers originating from only one region of France, and is therefore not representative of the entire country. However, our research focused on rather universal sociocognitive phenomena, so we believe that the results can be generalized at least to the entire population of urban French drivers. Future research on the subject should take into account the strengths and the weaknesses of our methodological choices so as to gain new insight into this issue.

6. Conclusions

Our car drivers had a tendency to refer more often to external causes when they explained their own behaviors resulting in near crashes than when they explained the behaviors of other road users. This tendency may simply reflect a difference in information or a difference in perspective, but it could also be motivated by the desire to maintain a positive self-image by downplaying one's responsibility. Comparative optimism with respect to one's driving skills was positively associated with the probability of attributing a controllable cause to dangerous driving behavior, and therefore may enhance drivers' behavioral adaptation. Comparative optimism with respect to the risk of being involved, as a driver, in a car crash influenced causal attributions, in accordance with the view that near crashes are exceptional events, and can hamper behavioral adaptation aimed at avoiding such situations in the future.

Practical applications

For the needs of safety communication campaigns and driver's training, the perceived superiority of one's own driving skills should not always be targeted as dangerous overconfidence, because its impact on behavioral adaptation to risky situations seems to be mostly positive. Nevertheless, it should be stressed that every road user is equally exposed to risks, and that risky situations can occur at any time. Stressing these facts should reduce beliefs about one's own lesser vulnerability and therefore enhance safety-oriented behavioral adaptation to such situations.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jsr.2018.02.009.

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