

Beliefs and the Perception of Risks and Accidents

Dongo Rémi Kouabenan¹

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Identifying the causes of accidents is a necessary prerequisite for preventive action. Some research suggests however that the analysis of accidents does not only differ between experts and laymen but that it is also linked to certain characteristics inherent in the analyst and in the social group to which he belongs: beliefs, value systems, norms, experiences in common, attitudes, roles, social and technical practices, etc. Culturally determined bias seems to affect the perception of risk and the causes of accidents. This article presents a certain number of thoughts and results based upon research carried out on causal attributions of traffic accidents in The Ivory Coast (West Africa) and discusses the importance of culture in risk-taking and accident prevention. It shows in particular that fatalistic beliefs and mystical practices influence the perception of accidents and consequently incite one to take more risks and neglect safety measures.

KEY WORDS: Accidents causes; risk perception; culture; fatalism.

1. INTRODUCTION

Studies carried out on accidents and risks have demonstrated the value of taking into account the systems of values and beliefs of subjects noninitiated in the understanding of risk-taking and the explanation of accidents.⁽¹⁻³⁾ Indeed, several studies⁽⁴⁻⁷⁾ show that the non-initiated subject is not only just as preoccupied as the expert by the risks inherent in his surroundings, but that faced with risk and accident, the expert and the layman sometimes demonstrate different, if not opposing, rationales. It is not possible or even necessary to establish any sort of hierarchy relating to these two rationales.⁽⁶⁾ Both of them are essential and complementary. As noted by Slovic, Fischhoff, and Lichtenstein,⁽⁴⁾ "Subjective judgements, whether by experts or laymen, are a major component in any risk assessment. If such judgements are faulty, risk management efforts are likely to be mis-directed" (p. 17). Theoreticians in causal attribution

such as Kelley,⁽⁸⁾ while mentioning the importance for each individual of explaining the events which take place around him, emphasize that the causal inferences he draws will influence, in one way or another, his future behavior.

Experts and laymen are nevertheless subject to bias in their judgments concerning risks⁽⁴⁾ and in their explanations of accidents.^(1,7) One of the possible sources of bias in judgments concerning risk and accidents may be found in the culture which defines the system of beliefs, values, representation, and experience shared by people of the same member group. Indeed, the deep-rooted persistence of certain beliefs may lead to systematic errors of judgment which mean that any new information to the contrary is occulted.^(9,10) This bias influences risk perception as much at an individual level as at a collective level. According to Dake,⁽¹¹⁾ whatever the units and analytical level, the central question in analysing risk is to know who is frightened of what, and why. The author considers that in order to answer this question, the social, political, and historical context in which the risk is situated must be considered. "Mental models of risk are not only matters of individual cognition, but also cor-

¹ Laboratoire de Psychologie Sociale (LPS), Université Pierre Mendès France (Grenoble II-Sciences Sociales), UFR Sciences de l'Homme et Mathématiques, Laboratoire de Psychologie Sociale (LPS), BP. 47, 38040 Grenoble Cedex 9.

respond to world views entailing deeply held beliefs and values regarding society, its functioning, and its potential fate" (p. 62).

Certain authors^(3,11,12) even evoke the idea of a safety culture to designate "the set of beliefs, norms, attitudes, roles, and social and technical practices that are concerned with minimizing the exposure of employees, managers, customers, and members of the public to conditions considered dangerous or harmful. Within this broad definition, safety culture can be conceived of as the system of meanings through which a given people or group understands the hazards of the world" (p. 134).⁽¹¹⁾ Thus, a culture represents, for those who share it, a natural and unquestionable way of acting, and, as such, it serves to elaborate a particular version of risk, danger, and security. Such versions of the world's dangers contain in substance explicative schemes designed to account for accidents and to explain how and why they happen. Among these schemas figure customs, beliefs, and religious or animist practices which are renewed themselves from generation to generation. Some of these practices tend to understate risk, whereas others on the contrary tend toward dramatization. Some of them lead to the admittance of the inevitability of risk; others tend toward the belief that a certain number of practices, not always rational, make it possible to ward off danger and cope with a dangerous situation.

In the first case, one is confronted with fatalistic beliefs which are strongly reminiscent of Lerner's just world theory^(13,14) according to which people need to believe that they live in a fair world in which one gets what one deserves and deserves what one gets; a world, then, in which victims deserve their fate. Furnham and Procter⁽¹⁵⁾ advance the hypothesis that such beliefs in a fair world are "conditioned by cultural phenomena such as the system of legal justice, religion, the economic system, etc." (p. 379).

In the second case, one meets rather mystical or religious practices which are destined to prevent or protect one against risk and accidents (prayers, visits to fortune tellers or marabouts, astrology, various sacrifices, protective medallions, such as the St. Christopher medal in the Western world).

These beliefs are not necessarily opposing forces. Fatalistic individuals generally think that they have no control over events and that they are controlled by external factors which they cannot influence. Nevertheless, as it is difficult to live in a totally uncontrolled and unpredictable environment⁽¹⁶⁻¹⁸⁾ in which anything may happen without our being able to do anything about it, certain individuals try to find means (often irrational) to reduce dissonance, protect themselves, and feel safe. Ex-

amples include mystical or religious practices like those described above. As noted by Hewstone,⁽¹⁹⁾ almost all magical or superstitious beliefs "imply a straightforward course of action to, firstly, prevent an unwanted situation from occurring; and, if it has already occurred, to provide remedies to restore the world to its previous state" (p. 213).

It would be erroneous to think that these beliefs and practices, of which the limits concerning safety are known, are outmoded or that they only concern underdeveloped peoples. They are probably, of course, less tenacious, and vary in their intensity according to different cultures, but they continue, unhappily, to guide the behavior of a certain number of road-users.⁽²⁰⁻²⁴⁾ As Leplat⁽²⁰⁾ wrote: "our modern mentality is still impregnated with a fatalistic conception of accidents. How often do we hear accidents associated with bad luck, misfortune, or chance. People sometimes say that 'his time had come' when talking about an accident that someone has had" (p. 14). Talking about fatalism, Shaffer⁽²¹⁾ wrote: "If it is your day to die, you will die!; Somewhere there is a bullet with your name on it; There is no escape; you can run but you cannot hide" (p. 353). Observations made during the interviewing of drivers involved in serious accidents by the interministerial commission for the withdrawal of driving licenses² have enabled us to draw the following conclusion. If fatalism is generally denied as a decisive factor in accidents, it is easier for one to say that one has been a bit unlucky with regard to the accident in which one is directly involved, and this whatever the social level of the driver interviewed.

Using Heider's causality theory as a base, Shaffer⁽²¹⁾ analyzes fatalism as being an example of naive social psychology. In his opinion, "instead of applying the paradigm of impersonal causality to events like death, the fatalist applies the paradigm of personal causality" (p. 355). All roads lead to the same event which appears as being inevitable. Life's events have this property of equifinality for the fatalist; they are not chance

² There exists in the Ivory coast an Interministerial Technical Commission composed of the Director of Road Transport or his delegate, the Director of Police or his delegate, the Commander of the National Gendarmerie or his delegate, a doctor designated by the Ministry of Public Health and Population, a representative from the Interior Ministry, the Director of the Office of Road Security (OSER) or his delegate, and two representatives proposed by professional organizations. This Commission meets once a week and has the power, after hearing the protagonists of a serious traffic accident, to inflict sanctions ranging from suspended loss of driver's license up to its definitive loss and a total interdiction to drive a motor vehicle needing a driver's license. We were able to observe the seances of this Commission for one and a half years.

events, "which are pure coincidence"; they seem to be part of his destiny. Whatever one does, the result is the same. The author considers finally that fatalism appears to be a particular case of an attributional error likely to influence sentiment and behavior. The rarity of accidents, and the fact that there are survivors of accidents or catastrophes back up to some extent, for the fatalist, the idea of personal causality. In Africa, death, even accidental, and particularly that of an important person, is never accidental. Someone (or the gods) somewhere wants to hurt him, and, by means of a certain number of rites, one tries to unmask the guilty party.

It is not the aim of this article to verify the reality of such beliefs but rather to examine their impact on the explanation of accidents and the perception of risk. How can "fatalists" explain accidents or see the risks in comparison to those who think less like them? Who are they and why are they different from the rest? What is the link with ethnic or national grouping?^(3,24,25) What is the connection with accidents for people with these beliefs or practices? Do they have more accidents than others?

2. METHODS

2.1. Materials

In order to understand beliefs and social practices as well as their relation to risk perception and the explanation of accidents, we devised a questionnaire. There were 20 questions in the complete version, of which certain contained several elements. As well as questions concerning the definition of an accident, subject characteristics, their perception of accidents and their causes, their representation of a car (the last three categories being formulated on a scale of 1–4), a certain number of other questions were designed to constitute "scales" or indexes permitting the assessment of risk-taking and fatalism. Thus organized, this questionnaire enabled the construction of an index of belief in fate and an index showing of risk taking. The index for belief in fate consists of nine items (initially 11; see Table Id) which describe situations referring to popular beliefs expressing a certain level of fatalism or superstition and to which the subject had to express his agreement or disagreement on a scale of 1–4 (strongly agree, agree, disagree, strongly disagree). Example: "Accidents are due to fate, nothing can be done about it" or "When you indulge in forbidden customs, you expose yourself to an accident" or "If a black cat crosses the road in front of your car, you should redouble your attention." Concerning

the "risk-taking" index, it consists of 42 items intended to establish, for each subject, the degree of risk-taking as regards some conflicting traffic situations. With regard to fatalism, the subject had to express his agreement or disagreement on a scale of 1–4 (strongly agree, agree, disagree, strongly disagree). Examples of risk taking items: "One should be able to drive at the car's maximum speed"; or "When the road is clear, I don't need to stop at a stop sign"; or "Towards the crest of a hill, I overtake the vehicle in front of me if I'm going faster than he is." These indexes were then analysed in connection with the subjects' causal attribution and risk perception characteristics.

2.2. Subjects

The population sample was composed of 553 people of differing origins who possessed, by means of their work, differing levels of knowledge concerning accidents and driving risks. It included 90 students, 84 learner drivers, 82 professional drivers, 80 gendarmes, 62 policemen, 42 public works engineers, 89 nonprofessional drivers, and 24 chauffeurs of well-known people (political or administrative). It was a broad cross-section which aims less at representation than a balance between the different groups selected.³

The sample was for the most part masculine (93.5%). There was an almost normal age spread of between 18 and 55 with a maximum of 26 to 30-year-olds (26.2%). Containing 93.7% of Ivory Coast citizens, it ideally represents the different Ivorian ethnic groups: Akans (41.6%), Krous (11%), Gurs (11.6%), Malinkes (14.3%), Mandes (13.2%).⁴ Almost 60% (59.7%) of subjects had never had an accident against 19.9% who had had one accident and 16.2% who had had at least two accidents. 34% of them did not have a driving license and did not drive cars. Half of the subjects were un-

³ It was particularly difficult to interview more chauffeurs and engineers because (a) there are not many of them in the population at large, and (b) they were relatively hard to interview due to their work commitments.

⁴ The last census carried out in the Ivory Coast in 1988 (and published in 1991) by the National Statistics and Accounting Authority⁽²⁸⁾ showed a total population of 10,815,694 inhabitants among which there were 7,776,659 people of Ivorian stock. As far as these native Ivorians are concerned, it is clear that they are distributed in a similar manner to our sample. That is to say: 41.8% of Akans, 14.6% of Krous, 15.9% of Northern Mandes (the Malinkes in our sample), 10.7% of Southern Mandes (Mandes in our sample), and 16.3% of Voltaïcs (Gurs). Our classification is based on data supplied by the Institute of Applied Linguistics (ILA) at Abidjan University and on a study by J. H. Greenberg in 1966.⁽²⁹⁾

married against 24% who were married and 22.6% who lived together maritally.

2.3. Carrying out of Study

Most of the subjects were met at their place of work: professional drivers at the bus station, students at the university, gendarmes in their brigade H.Q. or other place of work, learner drivers at driving schools, etc. Others, more difficult to see at their workplace were met at their homes with or without pre-arranged meeting times. This was the case for nonprofessional drivers, certain chauffeurs, and engineers unavailable at their place of work. The questionnaire was filled in by each person individually. Except for the professional drivers, of whom a large number do not know how to write, all subjects filled in the questionnaire themselves. For this first category, the interviewer posed the questions to the subjects and filled in the questionnaires himself. The process lasted about 30–40 minutes.

3. RESULTS

3.1. Construction of Indexes and Statistical Analysis

Using the answers obtained we calculated a global index of fatalism and another for risk-taking. In order to do this we calculated the averages, standard deviations and correlations between the different items measuring the same dimension, as well as the correlation of each item with the whole formed by their total ("scale"). The internal coherence and reliability of each index was tested using Cronbach's alpha coefficient.⁽²⁶⁾ It was shown that for the fatalism index, two items out of 11 were little correlated to the global index and to the other items; they were consequently eliminated in order to ameliorate the global reliability of the index. Interitem correlations go from .13 to .44. The correlations between the index and each of the items are very close and go from .39 to .55. The obtained index can be considered as being reliable (alpha = .78; cf. Tables 1a–c).

As far as the risk-taking index is concerned, three items out of 45 were deleted for they showed little correlation with the global index. The global reliability of this index is of the order of .84. Once the indexes were established we then applied them to subject characteristics and their perception of risk and causes of accidents. Statistical tests of significance (analysis of

variance, rate t of Kendall form c) were applied to obtained data.

3.2. Beliefs and Personal Characteristics of Subjects

When considering subject characteristics we observed that, in general, the professional drivers were the most fatalistic (AS = 28.8)⁵ with, far behind, the gendarmes (AS = 24.3), the police (AS = 24.2), and non-professional drivers (AS = 24.2). The least fatalistic were the engineers (AS = 20.3) and the students (AS = 21.2) ($F(7; 545) = 6.65; P < .001$). This result is consistent with that of Saad⁽²⁷⁾ who noticed, when studying the representation of accident causes in the Ivory Coast, that for most of the drivers interviewed, fate appeared to be the ultimate cause of accidents. In the same way, those who had held their licence the longest (more than 20 years) and those who had just obtained it (less than 2 years) showed up among the most fatalistic ($F(6; 546) = 3.99; P < .001$). This may bely a lack of confidence. Men appeared more fatalistic (AS = 19.09) than women (AS = 18.69), but this difference is not statistically significant. Concerning ethnic membership, the most fatalistic were the Malinkes (AS = 20.94) followed by the Mandes (AS = 20.54) and the least fatalistic were the Gurs (AS = 18.03), the Akans, (AS = 18.30) and the Krous (AS = 18.72) ($F(6; 546); P < .04$). This last result seems to corroborate a priori ideas about ethnic distribution of beliefs in the country, the mainly muslim Malinkes and animist Mandes having a reputation for religious and mystical practices, and the Gurs (Senoufos, Lobis, Koulangos, Tagwanas, Mossis, Dogons, etc.) being known for their atheism. The last published general census carried out by the National Statistics and Accounting Authority,⁽²⁸⁾ shows a relative equilibrium be-

⁵ AS = average score. The average score for the global fatalism index is 24.0.

Table 1a. Reliability Analysis—Scale (Alpha) (Belief in Fate)

	Items	Mean	SD	Cases
1	Fate	2.0090	1.2917	553.0
2	Genii	2.4123	1.4546	553.0
3	Mystery	2.6040	1.5170	553.0
4	Conspir	1.7144	1.0215	553.0
5	Hearse	1.4195	0.8520	553.0
6	Transg.	2.2278	1.3196	553.0
7	Black cat	2.1248	1.3516	553.0
8	Mascots	2.3580	1.3865	553.0
9	Clairv.	2.1754	1.3119	553.0

Table Ib. Correlation Matrix (Belief in Fate)^a

Items	Fate	Genii	Mystery	Conspiracy	Hearse	Transgr.	Black cat	Mascots	Clairv.
Fate	1.0000								
Genii	0.3866	1.0000							
Mystery	0.3522	0.3672	1.0000						
Conspiracy	0.2846	0.3852	0.3126	1.0000					
Hearse	0.2402	0.1628	0.2003	0.3310	1.0000				
Transgress	0.2889	0.2841	0.1311	0.2911	0.2451	1.0000			
Black cat	0.2048	0.3055	0.1832	0.3081	0.3651	0.3842	1.0000		
Mascots	0.2521	0.3497	0.2174	0.2612	0.1625	0.2573	0.3038	1.0000	
Clairvoyant	0.2129	0.3503	0.2298	0.3218	0.2841	0.2605	0.3718	0.4395	1.0000

^a *N* of cases = 553.0. Statistics for scale: mean = 19.0723, variance = 48.7991, SD = 6.9856, *N* of variables = 9. Item means: mean = 2.1191, minimum = 1.4195, maximum = 2.604, range = 1.8344, max/min = 1.8344, variance = 0.1297.

Table Ic. Item-Total Statistics (Belief in Fate)^a

Items	Scale mean if item deleted	Scale variance if item deleted	Corrected item—total correlation	Squared multiple correlation	Alpha if item deleted
Fate	17.0633	39.3935	.4570	.2524	.7571
Genii	16.6600	37.0219	.5458	.3333	.7431
Mystery	16.4684	38.9052	.4012	.2205	.7679
Conspiracy	17.3309	41.0769	.5101	.2790	.7527
Hearse	17.6528	43.6365	.3942	.2219	.7673
Transgres.	16.8445	39.9069	.4289	.2303	.7613
Black cat	16.9476	38.7853	.4863	.2995	.7527
Mascots	16.7143	38.8458	.4647	.2640	.7562
Clairvoyant	16.8969	38.7883	.5073	.3082	.7496

^a Reliability coefficients: nine items. Alpha = .7777; standardized item alpha = .7827.

Table Id. List of the Items for the Scale of Fatalism

Item number and abbreviation	Formulation of items
1. Fate	Accidents are due to fate, nothing can be done about it.
2. Genii	Certain sections of road in the Ivory Coast are haunted by genii who provoke accidents.
3. Mystery	Road accidents are often unexplainable.
4. Conspiracy	When you have an accident it's because someone (in your entourage) wants to hurt you.
5. Hearse seeing	To see a hearse while driving is a bad omen.
6. Transgressions	When you indulge in forbidden customs, you expose yourself to an accident.
7. Black cat	If a black cat crosses the road in front of your car, you should redouble your attention.
8. Mascots	There exist mascots and amulets which constitute an efficient protection against accidents.
9. Consultation of clairvoyants	It's better to consult a clairvoyant before starting a long voyage: you never know.

tween all of the different religious groups, that is to say Christians (31.2%), Muslims (25.1%), and animists (22.8%). It highlights in particular a predominance of muslims among the Malinkes (97.5% of them), a predominance of animism among the Mandes (44%), a predominance of Christianity among the Akans (34.3%), and the Krou (33.9%), the Gurs being divided between Islam (39.6%), animism (27.6%), and Christianity (32.8%). Nevertheless, as the variable of religion was not directly manipulated during this study, it would seem premature to try to come to any definitive conclusions based on it alone. On the other hand, the results of the study reveal a positive and significant correlation between fatalistic beliefs and mystical practices ($r = .30$, $P < .001$). In particular, fatalists are often to be found among those who regularly practice sacrificial rites ($r = .31$, $P < .01$), and those who often consult marabouts,

astrologists, fetishists, and other clairvoyants ($r = .28$, $P < .01$). Also noted was a positive and significant correlation between fatalistic beliefs and certain ritual practices such as initiations ($r = .11$, $P < .05$) and generational celebrations ($r = .15$, $P < .05$).⁶ No significant effect was noted on fatalistic beliefs for the factors of age, nationality, family situation, or number of previous accidents.

3.3. Fatalism and the Perception of Risks and Accidents

An analysis of the content of naive definitions of an accident, given by the subjects, permitted us to distinguish certain definitions according to whether the accident was placed upon:

- *Causes or elements of the accident.* Examples: "An accident is an incident caused by one or more vehicles or the state of the road"; "An accident is a tragedy caused by thoughtlessness and a lack of attention"; "An accident occurs when the driver loses control of the vehicle"; "It's a calamity which occurs after a mechanical or technical breakdown or as a result of a lack of knowledge of the Highway Code."
- *Consequences of the accident.* Examples: An accident is "a disastrous fact which causes more or less serious damage"; "It's the destruction of life or property"; "It involves material or corporal damage suffered by oneself or another person."
- *Circumstances of the accident.* Examples: "An accident is an anomaly which happens in a given situation or place"; "a violent collision between two objects or people."
- *The nature of the accident or an example of an accident.* Examples: "An accident happens when two vehicles collide or when a vehicle knocks over a pedestrian"; "It is a violent collision between a means of locomotion and another object"; "It's the result of what happens when a

static or moving vehicle is hit"; It's a "Collision between two or more objects."

- *Characterisation of the accident.* Examples: "An accident is unexpected, an involuntary action"; "an unexpected event"; "a tragic event"; "an abrupt, sudden and unexpected event."
- *A fatalistic definition.* Examples: "An accident is just bad luck"; "A phenomenon of chance"; "an accident is an unforeseen phenomenon"; "a phenomenon which happens about which the driver and the victim can do nothing"; "It's a mishap which happens according to god's wishes"; "It's a terrible event which can crop up at any time"; "It's god's work, it can't be foreseen."
- *A definition which rather resembles a slightly simplistic or offhand judgment.* "It's a bad thing"; "It's a terrible thing"; "a tragedy"; "a calamity"; "it's a terrible thing, a catastrophe, that happens to a driver on the road."
- *Various "hard to classify" definitions.* "An accident is a material fact which happens and which, according to the reasons, could be either a car accident or an accident at work"; "It's something dangerous"; or "an accident is a question of life or death"; "Something which should be avoided."
- Or various combinations of these different elements.

When we analyze naive definitions of an accident according to subject beliefs, it can be observed that the most fatalistic subjects are mostly to be found among those who give simplistic (AS = 23.45), fatalistic (AS = 21.85), imprecise definitions (AS = 21.14) or definitions based on the causes of accidents (AS = 21.07); $F(17; 535) = 2.25$; $P < .003$.

The most fatalistic are equally spread out among those who either overestimate accidental death rates or who underestimate them ($F(7; 545) = 2.85$; $P < .007$). They placed the Ivory Coast at the head of the six nations that we asked them to class according to road accident frequency, whereas the Ivory Coast actually occupied third place (at the time of the survey) ($F(5; 511) = 265$; $P < .03$). They figure among those who most feared unemployment ($F(4; 548) = 5.77$; $P < .001$), a serious illness ($F(4; 548) = 5.65$; $P < .001$), being attacked in the street ($F(4; 548) = 6.77$; $P < .001$), break-ins ($F(4; 548) = 5.74$; $P < .001$), road accidents ($F(4; 548) = 4.89$; $P < .001$), accidents at work ($F(4; 548) = 11.56$; $P < .001$), and sorcery ($F(4; 548) = 7.97$; $P < .001$). As Saad⁽²⁸⁾ mentioned, this could be replaced

⁶ Initiation ceremonies and generational celebrations are common events in certain regions of Africa (although they are attended by less and less people). Their principal aims are to give the young an opportunity of social insertion, to recognize their growing maturity and sometimes to confer upon them certain powers and rights. The particularity of these rites is that they continue to incorporate mythical and mystical elements which sometimes include retreats which last between a few days and 1 month or even longer, in sacred woods and forests, and endurance ceremonies which occasionally take on the form of veritable challenges and ritual sacrifices.

Table II. Fatalism and Accident Explanation^a

Important accident factors for fatalists	F	Eta	P	Less important accident factors for fatalists	F	Eta	P	Factors showing no difference between fatalists and no fatalists
Headlight glare	4.39	.17	.002	Sudden change of direction	6.99	.22	.001	Bad weather
Bad road state	4.12	.17	.003	Drivers carelessness	3.45	.16	.009	Excessive speed
Absence of pavements or verges	3.13	.15	.02	Lack of control	3.36	.15	.01	Refusal of priority
Lack of pedestrian crossings	4.25	.17	.002	Nonrespect of the stop signal	5.35	.19	.001	Pedestrians imprudence
Lack of signals at junctions	4.97	.19	.001	Nonrespect of pedestrians crossings by drivers	3.03	.15	.02	Dangerous overtaking
Traffic lights in bad state	3.65	.16	.006	Underestimation of danger by drivers	2.72	.14	.03	Driving on the left-hand lane
Bad luck	18.23	.34	.001	Nonrespect of authorized weight	2.45	.13	.05	Dangerous parking
Nonrespect of traffic lights	3.96	.17	.004	Lightness in applying sanctions	2.38	.13	.05	Drivers overconfidence
Pedestrians neglecting crossings	2.74	.14	.03	Drivers contempt for pedestrians	3.22	.15	.01	Insufficient knowledge of highway code
				Drivers impatience and irritability	2.79	.14	.03	Nonrespect of regulations
				Motorcyclists imprudence	5.59	.20	.001	Drivers fraudulence
				Mechanical breakdown	2.77	.14	.03	
				Drug or alcohol consumption	5.08	.16	.002	
				Pedestrians ignorance of regulations	2.84	.14	.02	

^a *F* indicates the difference of attribution between fatalists and non fatalists subjects. *Eta* indicates the size of the effects.⁽²⁶⁾ *P* is the level of significance.

within the wider cultural context of the causal representation by fatalists of social phenomena as imposed from the outside, as an aggression resulting from an evil intention or as a consequence of a superior or divine will.

Based on a list of 34 potential factors of accidents⁷ proposed to them, and for which they were asked to estimate the importance in road accidents, the most fatalistic mentioned primarily headlight glare ($F(4; 548) = 4.39; P < .002$), the bad state of the roads ($F(4; 548) = 4.12; P < .003$), the absence of pavements or verges ($F(4; 548) = 3.13; P < .02$), the lack of pedestrian crossings ($F(4; 548) = 4.26; P = .002$), the absence of signals at junctions ($F(4; 548) = 4.97; P < .001$), traffic lights in bad working order ($F(4; 548) = 3.65; P = .006$), malediction ($F(4; 548) = 18.23; P < .001$), pedestrians neglecting good use of pedestrian crossings ($F(4; 548) = 2.74; P < .03$), the nonrespect of traffic lights ($F(4; 548) = 3.96; P < .004$). But fatalists thought that mechanical breakdowns ($F(4; 548) = 2.77; P < .03$), sudden changes of direction ($F(4; 548) = 6.99; P < .001$), driver carelessness ($F(4; 548) = 3.45; P < .009$), lack of control ($F(4; 548) = 3.36; P < .01$), nonrespect of stop signs ($F(4; 548) = 5.35; P < .001$), nonrespect of pedestrian crossings by drivers ($F(4; 548) = 3.03; P < .02$), nonrespect of authorized weight limits ($F(4; 548) = 2.45; P < .05$), lack of application of pen-

alties for infractions ($F(4; 548) = 2.38; P = .05$), ignorance or underestimation of danger ($F(4; 548) = 2.72; P < .03$), the contempt of drivers for pedestrians ($F(4; 548) = 3.22; P = .01$), impatience and irritability of drivers ($F(4; 548) = 2.79; P < .03$) were less responsible than nonfatalists did (cf. Table II). It can be easily seen that fatalistic subjects attribute accidents more readily to factors out of the driver's control (infrastructure, other people, fate) and that they consider as being less important the factors implying their responsibility or initiatives (sudden change of direction, carelessness, nonrespect of stop signs, contempt for pedestrians, impatience, etc.). In Table II, we mention other factors which did not show significant differences between fatalists and nonfatalists, but the above trends are observed.

3.4. Beliefs and Risk Taking

Based on the same principles used above, we observe in reference to the "scale" of risk-taking that subjects who consider fate as being an important accident factor are also those who take more risks ($r = .34, df = 527, P < .001$). The highest risk concerned speed ($r = .31, df = 527, P < .001$), imprudent driving habits—for example, "keeping a distance of 50 m between yourself and the car you are following," or "during a long trip, stopping as little as possible in order not to lose time" ($r = .27, df = 527, P < .001$), jumping of traffic

⁷ These factors derived from research on accidents and preliminary interviews with a small sample of subjects. They are not necessarily of equal value. The most important thing is how fatalists and less fatalists perceive them.

lights ($r = .19$, $df = 527$, $p < .001$), interpretation and use of lighting signals (indicators for example) or horn signals ($r = .16$, $df = 527$, $P < .001$) and stopping or parking ($r = .16$, $df = 527$, $P < .001$). Those subjects who take more risks are notably learner drivers ($AS = 91.59$)⁸ and professional drivers ($AS = 90.84$) ($F(7; 519) = 5.54$; $P < .001$); those without a license ($F(6; 520) = 3.03$; $P = .006$) and up to 21 years of age ($AS = 92.67$), or between 22 and 25 ($AS = 87.82$) ($F(6; 520) = 2.28$; $P = .035$). Finally, experience of an accident seems to calm people down seeing as those who have had two or more accidents ($AS = 79.03$) tend to take less risks than those who have never had one ($AS = 85.96$) ($F(3; 501) = 2.09$; $P = .10$).

4. DISCUSSION

These results show that beliefs and social practices (religious rites, sacrifices, mystical, or parascientific consultations, ritual, or initiational practices) influence the perception that one can have of risk as well as the causal explanation that one may give for accidents. They reveal notably that fatalistic subjects have a limited knowledge of risks and accidents, that which leads them to overestimate them but also, sometimes, to underestimate them. In both cases, such considerations lead them to take bigger risks; either because they think that whatever they do, they cannot do anything to prevent the inevitable from happening; or because they hope that by respecting certain rites, the danger will be avoided.

This appears even more plausible in view of the fact that the fatalists are distinguished by causal attributions which express in a certain manner their lack of control over events. We observe in fact that they attribute an accident more to factors outside of the driver's control (headlight glare, bad state of roads, absence of pavements or verges, lack of pedestrian crossings, absence of signals at junctions, traffic lights in bad working order, malediction, etc.) and that they consider as being less important the factors implicating their responsibility or taking of initiative (sudden changes of direction, driver carelessness, lack of control, nonrespect of stop signs, nonrespect of pedestrian crossings by drivers, ignorance or under estimation of danger, etc.).

One could be tempted to find, in this sort of attribution, mechanisms of defense and self-protection^(30,31) via which subjects somehow admit their powerlessness as drivers, while at the same time denying their respon-

sibility. This may be explained by the fact that the attribution of factors imputable to the driver is more common among gendarmes, policemen, engineers, and students than among professional drivers ($F(7; 545) = 2.64$; $P < .01$) and that professional drivers seem at the same time to be the more fatalistic and the most mystical. Shaffer,⁽²¹⁾ in demonstrating the centrality of the notion of the inevitability of the event what he calls "naïve fatalism," describes how the fatalist vision of events acts as a defensive mechanism: "it could be a rationalisation that minimizes my responsibility for the accident and, therefore, minimizes my guilt" (p. 353). Nevertheless, to know in advance that one is going to have a bad day, may lead to a certain anxiety symptomatic of being unable to change the situation. The need to control events is, as we have said, central to the naïve explanation of these events. According to Anderson and Deusser,⁽¹⁷⁾ "control of events in our lives may be so important that when control is unattainable we may suffer considerable psychological and physical distress" (p. 117). Explanations involving external or supernatural forces may be a means of reducing the dissonance experienced but it does not appear to resolve the problem. Fatalists, by making external attributions, do not necessarily want to believe that the world in which they live is altogether unpredictable and that any kind of catastrophic event could happen to them at any moment. That is why they are also the most likely to indulge in mystical practices which permit them to predict the future in their own way, and to anticipate it. It also explains their participation in various rites aimed at changing the course of things. Referring to Bains, Hewstone,⁽¹⁹⁾ wrote: "one can interpret the existence of superstitious beliefs about causation (both in Third World countries today and in the West, historically) as arising, in large part, from the need to avoid feelings of passivity in the face of natural and social calamities. Thus, witchcraft served as a theory of causality in medieval Europe for a variety of mundane as well as catastrophic events" (p. 213). This evokes what Alloy, Clements, and Koenig⁽³²⁾ called "secondary control" by which people try to fit in with the environment, either by the "prediction of aversive events in order to avoid disappointment"; or by "illusory control, in which the person aligns himself with the forces of fate in order to share in the control exerted by those forces," or finally, by "vicarious control, in which the person associates with powerful others" (p. 35).

Finally, it is important to note that fatalistic subjects tend to take more risks than the others and that the fact of having several times been victims of accidents ("victimization") seems to lead, on the contrary, to less risk-

⁸ The average for all subjects for the index of risk-taking is of the order of 84.62.

taking. The functional character of beliefs and perceptions may be seen in these results. The link between perception and behavior has been evoked several times in accident research.⁽³³⁻³⁶⁾ Fatalism can lead to a certain passivity, or toward help-seeking from mystical practices, that which would result in an incitation to neglect security precautions and to being less sensitive toward recommended measures of prevention. On the other hand, "victimization" seems to lead one to admit the risks involved and to provide oneself with the means of opposing them. Nothing, however, seems truly established, seeing as other research finds, on the contrary, that on the one hand the experience of a major accident diminishes rather than increases the threats perceived,⁽³⁶⁾ and that on the other hand accident victims tend to take more risks than those who have never had an accident.⁽³⁷⁾ Consequently, the true effect of accident experience on risk-taking remains to be established. Note that like Harrell,⁽³⁸⁾ we found that an individual's prior accident history was not associated with ratings on accident fatalism.

The taking into account of collective beliefs can be of precious help in explaining accidents and reinforcing the feeling of control with respect to threatening events, and this in developed countries as well as in developing countries. Van der Colk⁽³⁹⁾ considered beliefs as the main cause of traffic safety. Referring to Pepitone, Shaffer⁽²¹⁾ notes that certain types of metaphysical beliefs exist in all cultures and that scientific research would not have developed without interesting itself in the origins, the characteristics and the functional signification of systems of human beliefs. We would like to add that accident studies would do well to try to understand the exact nature of these beliefs for each culture as well as their fundamental bases, and to study the possibilities of integrating them into prevention strategies. Morris and Peng⁽⁴⁰⁾ showed that attribution patterns reflect implicit theories acquired from induction and socialization and are differentially distributed across human cultures. In particular, dispositionalism in social attribution reflects an implicit theory about social behavior that is more widespread in individualist than collectivist cultures. Furthermore, Agunloye⁽⁴¹⁾ shows us a promising example of the link between culture and accident prevention in Nigeria. In his paper, the author shows how the Federal Road Safety Commission in Nigeria tried to build a safety program by integrating Nigerian culture even trying to improve the Highway Code by taking into account the "psychology of drivers, passengers and road users in general in Nigeria." More than national or ethnic membership,^(24,25) it is fundamental cultural values which need to be considered because, as Johnson⁽⁴²⁾ notes, differences between people from different coun-

tries, or from different ethnic groups or belonging to different organizations are not necessarily determined by culture (pp. 141-142).

The role of certain variables, such as the socioeconomic situation, education or religion on beliefs, and notably on fatalistic beliefs, deserves to be specifically defined in ulterior studies. Hewstone⁽¹⁹⁾ considers that conspiracy, persecution, or witchcraft explanations seem particularly propitious in times of crisis. We have observed that fatalistic subjects not only fear an accident, but also social phenomena such as unemployment, serious illness, or random muggings. One is tempted to ask questions concerning the impact of socioeconomic level, education, or culture on this type of representation. Another point which needs to be elucidated is that of knowing whether or not religious subjects are more or less fatalistic than nonbelievers; or if religious subjects make more internal or external attributions; or whether there exist differences in fatalistic beliefs according to religion which influence the explanation of accidents and mystical practices. Research^(43,44) shows a strong link between belief in a fair world and religious beliefs. The religious person seems to have a greater belief in a just world than the nonreligious, but at the same time, appears to be more compassionate than the less religious person vis-à-vis a victim.⁽⁴⁴⁾ Rubin and Peplau⁽⁴⁴⁾ admitted that belief in a just world would be associated with an internal locus of control as well as with external forces, such as fate, a just deity, or other authorities. They labeled this last version of the belief in a just world as "superstitious" manifestations depending on the working of external or supernatural forces" (p. 79). Thus, if a belief in a fair world may be useful for the purposes of increasing the personal efficiency of people,⁽⁴⁴⁾ further studies are necessary in order to determine its exact role in the reinforcement of a sense of control over events. In general, collective or popular beliefs seem to be necessary in order to maintain or increase the sense of control over events or to cope with threatening or catastrophic events. Their great variability through the ages, epochs, and peoples renders the study of them particularly pertinent and ensures that they remain a matter of continuing interest.

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