



FRANCE

**NAIVE CAUSAL EXPLANATION AS A WAY OF ACCIDENT
ANALYSIS AND PREVENTION**

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Abstract:

Risk assessment and accident analysis constitute important and a prerequisite for any serious prevention action. This chapter presents an original approach for the evaluation of accident causation that we are developing since several years. It proposes not to limit oneself to the expert analysis while designing preventive measures, but also to take into account the causal point of view of individuals facing risks daily: workers, policy makers, investors, managers, stakeholders in organizations, etc. (Kouabenan 1985 a & b, 1999, 2002, 2006, 2009). This can be achieved by two complementary ways, spontaneous or naive causal explanations and risk perception. For brevity, this chapter focuses on the presentation of an overview of the work on the naive explanation of accidents (Kouabenan, 1999, 2006, 2009). This approach considers that to effectively curb accidents, it may be advantageous to take into account the explanations provided spontaneously by ordinary people, not experts in security issues. It relies on the idea that the search for explanation when confronted with negative, unusual or dramatic events such as accidents concerns both lay people and experts. We briefly describe what constitutes this approach, and how beliefs can influence explanations and safety behaviors. Then we show that the explanations provided spontaneously by the lay people, but also by experts, are often biased and may impact risk assessment, accident analysis and safety behaviors. We show that naïve causal explanations tend to guide behavior and that knowledge of biases and psychological mechanisms that underlie them is therefore becoming a serious avenue to explore in order to enhance accidents prevention. Illustrations taken from studies that demonstrate the effect of some variables on naïve causal explanations are presented. We conclude on the usefulness of this approach for the diagnosis and security expertise as well as the communication on safety and accident prevention.

Keywords: causal explanation, causal attribution, risk assessment and accident prevention, beliefs.

1. Introduction: Beliefs and the evaluation of risks and accidents.

Assessing risks and accidents causation is one of the essential steps in prevention strategies and risk management. According to us, all the actors of a risk situation should be involved in assessing risk and accidents causes, but not only experts and managers as it used to be. Indeed, we believe that the observed indifference vis-à-vis the prevention of accidents and non-compliance or lack of massive adherence to the security measures and actions could result from different «readings» of the same situation, but also of poor risk communication and how to control them. Such a situation can be generated by different and sometimes biased risk and accident causation representations.

Indeed, representations and beliefs operate at all levels of risk management. They influence especially the perception of risks related to the work environments and spontaneous (or naive) explanation provided for accidents. These perceptions and explanations will in turn influence the decisions and prevention actions (Kouabenan, 1998, 2009). Representations and beliefs also guide political or strategic, economic and cultural choices of the type and the level of risk deemed acceptable, unavoidable or useful. Moreover, the choice of actions to counter risks harmful effects, the assessment of one exposure and the decision to protect oneself, as well as the receptivity and the adherence to prevention messages, rely on representations and beliefs. The ambivalence in terms of the effects of risk that may be positive or negative, the ambiguity and complexity of risk situations and the issues they raise, even make the assessment of risks and accident causes more dependent upon individuals and social groups. Representations and beliefs allow the individuals to get an idea of the risks they are exposed to, but also to make causal inferences from the perception of the elements in the environment and their perceived ability to cope with. Identifying representations and beliefs of workers or employees, but also of policy makers, investors, executives, stakeholders in organizations and all those who engage in risky activities, is to give the means to understand their attitude vis-à-vis security issues and behavioral choices they make and how to act effectively (See Kouabenan, 2006). According to us, beliefs usually manifest themselves through two complementary phenomena, the causal inferences or explanations spontaneously provided for accidents and the perception of the risks inherent to the situation.

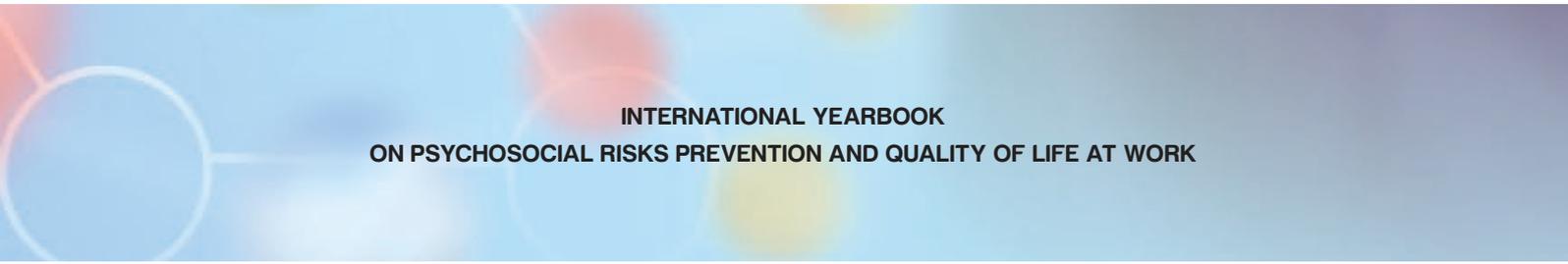
For brevity of the presentation but also for clarity, this article is limited to the presentation of the work on spontaneous or naive causal explanation that people provide for accidents and which is an approach we have been developing for several years and that open promising application (Kouabenan, 1985 a & b, 1999, 2002, 2006, 2009). We briefly outline what constitutes this approach, and describe how the beliefs and explanations from them can influence safety behaviors. We show that the explanations provided spontaneously by laypeople, but also by experts are often



biased but tend to guide their behavior. We show how knowledge of these biases and the psychological mechanisms that underlie them are becoming important to explore in order to improve the prevention of accidents. We illustrate by studies on the effect of certain variables on causal explanations and conclude on the usefulness of this approach for the diagnosis and safety expertise as well as for the communication on safety and accident prevention.

2. The naive causal explanation's approach: Theoretical bases and model.

It is often said that accidents prevention is or should be everybody's business. In the same vein, we believe that the analysis and explanation of the accident should also involve all stakeholders facing risky situations. We consider that to effectively curb accidents, it may be advantageous to take into account the explanations provided spontaneously by individuals faced with risks and accidents, whether specialists or not for safety issues. Unfortunately, accident analyses are usually carried out by experts or by the hierarchy without involving those directly dealing with risk and accident situations. According to us, such a view is limited and can be enriched by taking into account the assessments and explanations provided by ordinary people. Indeed, the processes of causal inference are often implemented implicitly or explicitly, when the individual is confronted with a strange or unusual adverse event, and are present in all phases of the analysis of accidents or risk management. Causal explanation helps to reassure oneself that we live in a regular and controllable environment. The lack of explanation, however, intrigues and generates a state of more or less transient and unbearable psychological imbalance. Therefore, the explanation and prevention of accident appears logically as a major concern for both specialists and operators facing risks. Indeed, even if they do not use a scientific approach, ordinary people, almost spontaneously develop their own theory of the causality of the accidents which they observe, or at the origin of which they are, or for which one of their colleagues or acquaintances, or themselves are victims. They are guided in this by their representations of the causality of the accidents, their previous experiences, their system of beliefs, and diverse cognitive capacities and motivational dispositions among which the need for control. Like Heider (1958) who speaks about «naive analysis» of the action, we are talking about naive causal explanation to describe the explanation provided spontaneously for accidents by ordinary individuals (Kouabenan, 1999). These explanations are called naive because they often arise from representations, beliefs and experiences, and do not rely on rigorous and proven methodologies like expert explanations. For us, all explanations, whether naive or expert, subjective or objective, make sense and should be taken into account in the analysis and prevention of accidents.



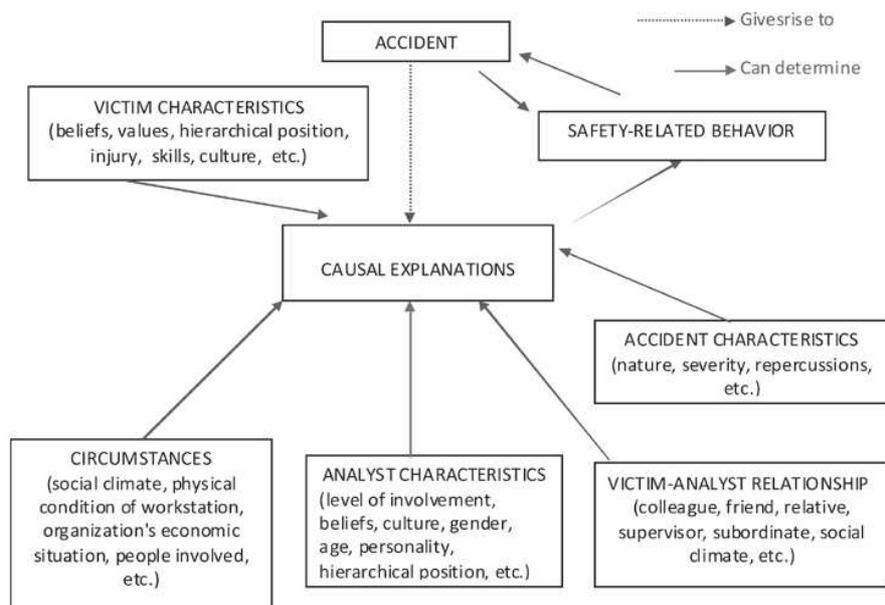
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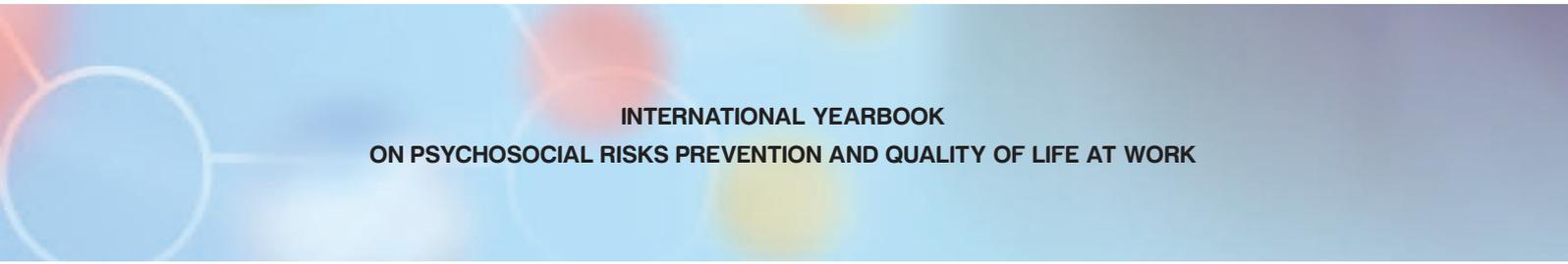
Such an approach is all the more necessary that the experts who generally design preventive measures have not the same rationality as the laymen who must implement them. It is rightly believed that one of the reasons why risk management is puzzling is that experts and laymen, approach it differently. They have different and sometimes even opposite rationalities (Kouabenan, 1999). Better, a number of studies indicate that non-experts individuals tend to rely more on their own judgment than that of experts (Flynn, Slovic & Mertz, 1993; Prince-Embury & Rooney, 1987). Furthermore, the situation in which the accident occurs is very often ambiguous so it is not easy to infer causes with absolute certainty. Thus, authors such as Slovic, Fischhoff, and Lichtenstein (1981) showed that experts and laymen are subject to biases in their assessments of the risks and causes of accidents. It could easily be understood that the explanation offered by lay people are biased because they bear the marks of their subjectivity, their cognitive limitations, their motivations, experiences and socio-cultural values. But the ones of experts are also biased because they always rely on intuitive elements, especially when generating hypotheses and designing the research, even if later, they use scientific methods. Bias in experts' assessments may also result from their original training, their subjectivity in relation to their personal and professional experiences, but also their motivations and the stakes of the expertise they load. The selection of the situations and the variables to analyse and the kind of assumptions formulated are all potential sources of bias related to the subjectivity of the expert, whatever the method used. «Unbeknownst to them, the a priori ideas and attitudes, even the cultural patterns of the observer or analyst about the causes of accidents in general and this particular accident, will have an influence on the facts they will withhold, that they will value and those they will consider immediately as unimportant and that they may neglect ... » (Goguelin, 1996, p.84). It is however not possible or even necessary to establish any hierarchy between the two rationalities. One can not say for example that experts' explanations are more valid than those of the profane, or vice versa. Both seem essential and complementary and are at the heart of preventive action. The study of this subjectivity seems highly instructive not only in theory but also in practice. It helps to understand scientifically, the explanation of the ordinary individual, but also, it can be the engine of the preventive action process. We agree with DeJoy (1994) who argued that causal inferences provided more or less regularly by employees, supervisors, managers and safety experts on events related to hazards in their organization, largely determine their behavior towards risks and accidents prevention. Therefore, the assessment of the causes of accidents is an integral part of the formal analysis of risks and accidents.

The model of the naive explanation of the accident that we have developed (Kouabenan, 1985a, 1999) postulates that any accident gives rise to a search for causal explanation, either implicitly or explicitly. This approach involves all stakeholders in the situation of an accident regardless of their status or level of responsibility in the organization.



Causal explanations are usually influenced by variables related to the characteristics of the victim (hierarchical position, age, nature of injury, sex, etc.), those of the person making the analysis of the accident (system of beliefs and values, hierarchical position, degree of involvement in the accident, sex, age, risk perception and his capacity to cope, etc.), the relationship between the analyst and the victim or the protagonists of the accident (colleague, work supervisor, subordinate, etc.), the characteristics of the accident severity of the consequences, type of accident, etc.) and surrounding circumstances (work climate, safety culture, physical state of places, economic organization, social environment, etc.). In turn, the resulting explanations are likely to influence attitudes and behavior vis-à-vis security. If these behaviors are inappropriate, it can promote the occurrence of an accident. Finally, being a victim of an accident can influence the attitudes and behavior vis-à-vis safety (see Figure 1).





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This model applies to the subjective evaluation of the causes of any type of accidents: occupational, road, sports, health, domestic, etc. For the purposes of this chapter, we will provide in the following sections, in so far as possible, some illustrations from occupational accidents, but sometimes also examples from other hazardous areas.

3. Beliefs and accident explanation.

Because of the uncertainty that contain the notions of risk and accident, their evaluation and their explanation constitute moments favourable to the expression of beliefs and inferences. Indeed, beliefs can compensate for the lack of rational explanation and give meaning to accidental events or risky situations very complex, uncertain or ambiguous. They also lead to inferences about the relationships between things and opportunities to prevent or counteract adverse effects thereof. These inferences in turn allow individuals to structure their environment and nurture the feeling to recover a sense of control. The notion of belief can be defined as the degree of conviction or adherence in an idea, an object, a proposal or a value. We can cite for example the religious beliefs that refer to a deity, normative beliefs (what is believed to be the expectations of the reference group - subjective social norm), control beliefs (perceived control or sense of control), role beliefs (what we believe that others expect of us because of our status). One can also quote fatalistic beliefs that are related to a non-controllable object (i.e fate) and cultural beliefs conveyed by culture.

The role of beliefs in explaining accidents has been stated several times in the work (See Kouabenan, 1985a, 1999), but very few studies check it directly. Nevertheless, we can mention some studies on the relationship between the causal explanation of accidents and fatalistic beliefs, religious beliefs, and control beliefs. Some authors (Morris & Peng, 1994; Hewstone, 1993; Hewstone, 1994) showed how in Western and non-Western societies, negative events, disasters, even natural, were explained by witchcraft, conspiracy, persecution or looking for a scapegoat. According to Shaffer (1984), the fatalist favours in his explanations the personal causality to the impersonal causality and considers that, whatever is the way which we borrow, the events are inevitable. However, Kouabenan (1998) observed that the fatalistic participants generally tend to attribute the accident to external and uncontrollable factors, outside the control of drivers (*infrastructure, others, fate*) and tend to minimize the role of factors involving their initiative (*sudden change of direction, reckless, failure to comply with stop signs, pedestrians contempt, impatience, etc.*)»(p.249). In addition, the author notes that fatalistic explanations of accidents are related to greater risk-taking. This result is confirmed by Peltzer and Renner (2003) who showed that for participants who have strong fatalistic



beliefs, the main cause of accidents is bad luck. Moreover, « whether or not fatalism is invoked to explain accidents can depend on educational level, but even more on how a person relates to accidents. Frequent and repeated exposure to catastrophes and social distress can reinforce such beliefs » (Kouabenan, 2009, p.772).

Turning to religious beliefs, Gyekye and Salminen (2007) found in a study on the explanation of occupational accidents, that workers belonging to the Muslim religion or traditional African religion provide more contextual and external causal explanations than Christians « in a way that seemed to reflect the fatalistic belief that accidents occur inevitably and are beyond human control » (p.409). As in Kouabenan study, they observed that followers of Muslim or African traditional religions adopt higher risk-taking behaviors and have more accidents than Christian participants. However, Norenzayan and Lee (2010) show that regardless of ethnicity, Christians are more fatalistic than non-believers, and regardless of religious membership, Canadians of East Asian origin make more attributions to fate than Canadians of European origin. For the authors, the first result is mediated by belief in God and the second by the causal complexity of the event. Ngueutsa (2012) examined precisely the effect on causal explanations of belief in divine control measured by a scale inspired by Goggin et al. (2007, cited by Ngueutsa, 2012) that ignores any reference to any religious doctrine. He noted that the participants with strong beliefs in divine control provide less controllable external explanations than those with low beliefs in divine control.

Moreover, studies that address the impact of control beliefs on the explanation of accidents lean on the locus of causality. They suggest that control beliefs such as positive illusions promote internal causal explanations. So DeJoy (1989) showed that drivers who allocate accidents to human factors are also those who see themselves as more competent than others. In the same vein, studies on locus of control and naive explanations confirm that individuals who believe they have a personal control over events (internal individuals) are more willing to provide internal explanations for accidents, including when they are themselves victims (Phares & Wilson, 1972; Schiavo, 1973; Sosis, 1974). Schiavo (1973) showed for example that when they analyze a highly unlikely accident for themselves, internal individuals tend to show more defensive and self-protective in their attributions than the external ones, because the possibility that an accident could happen to them is opposed to their belief that they have control over their environment.

Beyond beliefs (fatalistic, religious or control), many studies show that various individual, organizational and socio-cultural factors influence causal explanations provided for accidents.

4. Organizational and socio-cultural determinants of accident explanation.

We retain here two axes of presentation reflecting the variation of the explanations by the role or the status in the organization, the degree of satisfaction and according to the group, cultural or ethnic membership.

4.1. Impact of hierarchical position and group affiliation on causal explanations.

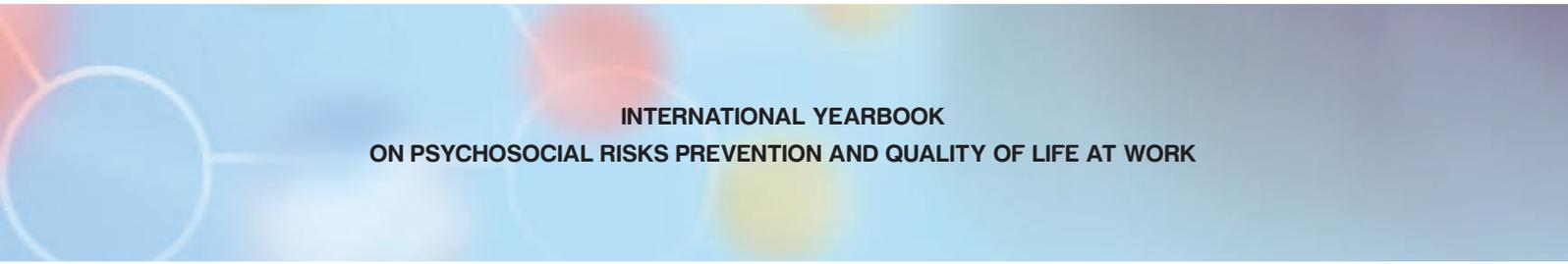
Several studies have established that factors related to the positions of actors (social status or hierarchical position occupied in the organization, integration and satisfaction in the organization, etc.) affect the causal explanations provided for accidents (Kouabenan, 1999, 2002, 2006, 2009; Kouabenan, Gilibert, Médina and Bouzon, 2001, Gyekye, 2010). The largest number of studies relate to the hierarchical position occupied in the organization. Thus, several studies showed that people with a high position in the hierarchy of the organization tend to explain accidents by factors that primarily involve the causal responsibility of subordinates (inattention, failure to comply with security measures, inexperience, etc.), while subordinates tend to attribute them to factors that are primarily related to the organization (time pressure, lack of equipment or poor equipment and facilities, lack of protective means, etc.), to executives or management (lack of training and awareness of security issues, focus on performance, etc.) and bad luck. Such explanations reflect a defensive attribution trend or bias whereby each hierarchical level denies being the cause of the accident and appears to dismiss the causal responsibility on another level. As an illustration, in a first systematic study with 320 workers in French telecommunications, Kouabenan (1985a) found that supervisors assign a great importance to factors attributable to subordinate causal role: inattention, carelessness, inexperience, failure to comply with safety rules. On the contrary, he noted that the subordinates attribute more important causal role to factors falling on the organization and to the management (bad working conditions, defects of the material (or equipment), time pressure, inadequacy of safety instructions, lack of training and sensitization of executives on safety problems, priority granted to the efficiency, etc.), and in factors outside their control, for example bad luck. In two other studies in different sectors of activity (ski, nuclear), Kouabenan et al. (2001) confirmed in a pretty nice way the defensive tendency for members of a given group to make internal attributions incriminating the members of the outgroup and exonerating the members of their group by highlighting this time external explanations. More exactly, when supervisors explain an accident which occurred to a subordinate (outgroup), they call upon more internal factors to the subordinate victim while the subordinates make more external attributions to the victim when he is a subordinate as themselves (ingroup). Similarly, subordinates explaining an accident occurring to a supervisor



(outgroup) tend to significantly make more internal than external attributions to him. Here we found the trend towards defensive attribution described by Shaver (1970) and Shaw and McMartin (1977), particularly a tendency to self-protection or the protection of the image of their group by managers and subordinates. These findings are supported by several other studies. Thus, in two studies with workers from the outdoor work crew division of a large utility company, Hofmann and Stetzer (1998) showed that supervisors tended to make more internal attributions about the causes of work accidents than the workers who tended to blame situational causes for the accident. Similarly, in a study involving 320 Ghanaian industrial workers from mines and factories, Gyekye and Salminen (2004) found that subordinates victims of accidents explain them more by external factors than their supervisors who explain them more by factors internal to the employee. Such a tendency for defensive attribution based on the role or status in the organization is observed with various populations including owners of small businesses in the construction sector and metal industry (Hasle, Kines & Andersen, 2009). Better, Lacroix and Dejoy (1989) showed that supervisors relied on worker effort as a causal factor even when conflicting data were provided (p.97). Along the same lines, by analyzing accidents resulting in principle from several causes that are linked, DeJoy (1987) showed that whatever the chain of causes, supervisors always attribute a greater causal role to causes internal to subordinates, even when the causal data are confusing. Brickman et al. (1975) conclude that depending on the position one holds in the organization, he can during the analysis of an accident reassemble the causal chain until he ultimately identifies the internal causes involving the other hierarchical level.

4.2. Impact of satisfaction and organizational context on the explanation of accidents.

There are also differences in the causal explanations provided for accidents depending on the level of commitment or satisfaction in the organization, membership of a trade union, professional or social status in a hazardous situation (Gyekye, 2010, Gyekye & Salminen, 2006a, Kouabenan, 1999, 2002, Hasle, Kines, et al., 2009). In a study in the French public sector company, Kouabenan (1985a, 1999) showed that the level of integration in the organization as measured by the satisfaction reported, actually introduces bias in the explanation of accidents. In this case, the less employees are satisfied, the more they tend to explain accidents externally by attributing them particularly to factors related to the organization: inadequate safety measures, deficiencies in equipment, lack of awareness among supervisors. Similarly, dissatisfied employees incriminate relatively little carelessness or negligence of subordinate employees. Finally, we can say that the explanations are indicative of certain shortcomings to the extent that dissatisfaction with an organizational element motivates a causal attribution to that element (Kouabenan 1985a



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1999). In the same vein, Gyekye and Salminen (2006a) observed that dissatisfied workers explain the industrial accidents in a more external way than their colleagues satisfied with their work and tend to have a higher involvement in accidents.

Besides, we can note that that accidents severity is a factor which tends to accentuate the defensive explanations, especially in the presence of a strong situational¹ and personal relevance² between those involved in the accident and those explaining it (Kouabenan, 1999, Kouabenan et al. 2001; Shaw & McMartin, 1977). Thus, in a situation with a strong situational relevance, but a low perceived similarity between the victim and the analyst, we observed more internal explanations to the accident victim when it is serious. By cons, in a condition of a strong situational and a strong personal relevance between the victim and the analyst, we noted more external causal explanations when the accident is serious. In both cases, we observe trends to defensive attribution, either towards harm avoidance (first case) or towards blame avoidance (second case) (See Shaw & McMartin, 1977).

However, safety climate appears as a moderating factor of the defensive explanations. Thus, Barao, Silva and Lima (2006) cited by Gonçalves, Silva, Lima and Melia (2008), observed that « workers belonging to companies with stronger positive safety cultures (e.g. with very good safety training and communication) interpreted and explained work accident causes with more complex approach, combining internal and external attributions » (p.999). Better, Hofman and Stetzer (1998) showed that the defensive tendency to external explanations is accentuated when safety climate is bad and attenuated when safety climate is positive. In this case, when safety climate is good, or when the organizational context provides a very open exchange on safety-related issues, it is observed that workers « were more likely to make internal attributions when the evidence in fact implicated the worker » (p.654).

4.3. Effect of the cultural or ethnic membership on the explanation of accidents.

The explanations provided for accidents may also vary according to the culture or ethnic identity. Examples of differential sensitivity to the explanations and in particular to the fundamental attribution error according to culture are reported by several authors (Bierbrauer, 1992; Kouabenan, 2001; Morris & Peng, 1994). It seems that the tendency

1 The situational relevance refers to the probability that the accident could befall the analyst as well

2 The personal relevance is the perceived similarity between the stimulus person described in the accident and the person who is explaining the accident (gender, appearance, beliefs, values, etc.)



to favour dispositional explanations at the expense of situational explanations is more prevalent in individualist cultures than in collectivist cultures, especially for the explanation of social events (Morris & Peng, 1994) and for adults for whom the reference to the roles and group norms is clear. Morris and Peng (1994) showed that Chinese (collectivist) are less subject to the «fundamental attribution error»³ than American (individualistic), but only for the explanation of social events and not for physical events. In the same vein, Hewstone (1994), « observed that adults who came from non-occidental cultures generally accorded less importance to dispositional explanations than did adults from American or European cultures » (cited by Kouabenan, 2009, p.772). For their part, Choi, Dalal, Kim-Prieto and Park (2003) note that Koreans make more external attributions than Americans because they take into account more information than Americans.

However, despite the interest that culture represents for naive explanations, there is little research examining the relationship between the system of cultural values and beliefs and accidents explanation. Nevertheless, we can cite some examples. We can nevertheless quote some examples. Wang and McKilip (1978) ask Chinese students, American students and U.S. citizens residing in small towns, to explain an accident in which the driver involved is, either an American who knocks down a Chinese, or a Chinese driver who knocks down an American. The assignment of responsibility appears to be based on ethnic identity for Chinese American students and residents of small towns, but not for American students. Bias towards in-group favouritism is observed for the two ethnic groups.

In a comparative analysis in the field of occupational accidents, Gyekye (2006) showed that Ghanaian workers (collectivist culture) make more contextual explanations than Finnish employees (individualistic culture) who provide more internal and dispositional explanations. The strong tendency to provide external or situational explanations in collectivist cultures may be explained either by the desire to protect the cultural group to which one feels connected (Bierbrauer, 1992), or by the desire to preserve social harmony which is a stabilizing factor of the group. Indeed, when an individual is stigmatized and devalued, his family and his group membership are also affected in the eyes of society (Gyekye, 2006). This trend can also be explained by an implicit theory which assesses behavior from a mental representation based primarily on contextual information (Gyekye, 2006, Morris & Peng, 1994), or « a more holistic conception of the person as being situated in a broad social context » and a view of dispositions as being more malleable (Choi, Nisbett, & Norenzayan, 1999, p.47).

³ The fundamental attribution error refers to the fact that people generally tend to attribute the causes of events to the individuals involved in them, and tend to neglect the causal importance of situational factors.

5. Individual determinants of accidents explanation.

This point will be illustrated by examples of studies on the effect of socio-demographic variables (age, gender) and accident experience on causal explanations.

5.1. Gender and accidents explanation.

Studies on the role of gender in the explanation of behavior and accidents have sometimes resulted in contradictory results. Some concluded that there was an influence of gender on causal explanations, and others did not find this effect. It seems that the works which do not find the effect of gender on the causal explanations (Shaw and McMartin, 1977; Taylor and Kleinke, 1992) did not take into account the lack of relevance of the situation for the participants because the sexual identity treats only the perceived personal similarity with the stimulus-person. Shaw and McMartin (1977) argued for example that gender does not influence the explanations unless the personal and situational relevance are differentiated for both sexes. In a study taking into account the relevance of the task for the participants, Whitehead and Hall (1984) found that women attribute more causal responsibility than men to an individual involved in an accident during the execution of a feminine occupation while men and women attribute much responsibility to the individual engaged in a masculine job. In a second experiment, the authors obtain a net effect of sex going in the direction of a defensive attribution based on situational and personal relevance between the actor and the person who explains the accident. In this case, women consider the behavior of the actors involved in the accident and engaged in a feminine occupation as being more reliable and secure than do men, while men consider the behavior of the actor in a masculine task as more reliable than do women. Likewise, in a study on the explanation of occupational accidents by young workers, Breslin et al. (2007) noted that « whereas the females emphasized how their complaints were actively disregarded by their superiors, males (and some females in male-dominated work settings) described how they stifled their complaints in order to appear mature among their () co-workers » (p.782). There are many examples in the field of traffic that confirm the idea advanced by Walster (1966), namely that women attribute more responsibility to the stimulus person (male) when the consequences of the accident become severe, which is not the case for men (cf. Kouabenan, 1999). A more subtle result is however obtained by Kouabenan et al. (2001) in a study of employees of the French national Electricity and Gas Company. These authors showed that the causal attributions of male supervisors were more internal when the accident was serious while women executives provided less internal attributions to the subordinate victim when the accident was



serious. They believe that this may be due to certain empathy for the victims. It is also possible that independently of the fact that the described accident could a priori involved a man as well as a woman, that the work of the victim has been considered by the women as typically male and that the situational relevance of the accident-stimulus was perceived as low for the female participants. Additional studies are needed to further clarify the role of gender on the naive explanations of accidents.

5.2. Age and accidents explanation.

Research on the effect of age on naive explanations is relatively few. They reproduce the trend to defensive attributions observed in previous studies on other variables such as gender. Namely that people of a certain age think that accidents are mainly due to people of other age groups, and that they are more equipped to deal with dangerous situations. That implies a better sense of control from their part.

The most numerous examples of the effect of age on accidents explanation, however, are found in the area of road accidents (Kouabenan, 1999). It seems that assignments of causal responsibility intensify as and when the age of the stimulus-person increases (Shaver, 1970). Shaver (1970) observed, however, that although individuals attributed more responsibility to the alleged perpetrator of the accident when he was older, they were more lenient when he was the same age or younger than them. For the author, such an explanation may be more a reflection of a cultural norm translating a legal and moral tradition which consists in considering that an elderly person has to show himself more responsible than the fact of a bias of self-protection. However, in other studies (Sheehy & Chapman, 1986 quoted by Kouabenan, 1999), it seems that children are legally and socially disadvantaged when they are involved in accidents with adults, because they are subject to a greater attribution of responsibility and a low credibility.

Gyekye (2010) reported studies in industrial context which show that older subordinates explain accidents by external causes than do their younger colleagues. Similarly, older supervisors tend to explain the accidents by external and unpredictable causes while their younger colleagues explain them much more by organizational causes. Along the same lines, Melia, Chisvert and Pardo (2001), cited by Niza, Sila, and Lima (2008) showed that older workers were more likely to attribute the accident to external factors while younger workers tend to refer internal attributions.

5.3. Involvement in the accident and causal explanations.

It is observed that the victims and witnesses of the accident explain them differently and particularly in a defensive way. In a field study with 150 French telecommunications officers, including 99 victims and 51 witnesses of accidents, Kouabenan (1985b) observed that the victims explain them more by external factors beyond their control or their causal role while the witnesses explain accidents more by factors within the causal role of the victim (Kouabenan, 1985b). A similar result was found in several other studies which showed that generally speaking, the experience of an accident leads to defensive external explanations (Gonçalves et al., 2008, Niza et al., 2008, Kouabenan, 1985b, Salminen 2002, 1992). Thus, in a study involving 209 employees including 73 victims of serious accidents, 65 colleagues of the victim and 71 foremen, Salminen (1992) found as Kouabenan (1985b), that accidents victims attributed them more to external factors, while their colleagues and supervisors attribute them to factors internal to the victims; foremen trying to minimize their own responsibility by emphasizing the non-compliance with work procedures by victims, denying that they may tolerate risk-taking, and highlighting the good organization of safety practices in the company. Furthermore, following interviews with 56 victims of accidents of various sectors (services, health, industry), Niza et al. (2008) found that the experience of an accident leads to defensive explanations («focused on causes external to workers») and defensive definitions of the accident (« highlighting the sudden nature of accidents and organisational weakness ») (p.959). In addition, in a study with 117 witnesses of industrial accidents, Gyekye and Salminen (2006b) showed « that co-workers (witnesses) who had some perception of situational and/or personal relevance with the accident victims attributed less responsibility to the accident victims than did their counterparts who had no perception of relevance » (p.157). Always in accordance with the criteria of relevance and the trend towards defensive attributions (Shaver, 1970), we note that the relatives of the victim (parents, friends, or acquaintances), typically provide explanations that reflect their empathy for the victim, in particular explanations more external than internal (Winkel & Denkers, 1995). Finally, Gonçalves et al. (2008) found that the number of accidents suffered is positively related to external causal explanations and unsafe behaviors among employees of an industrial enterprise and a research and development firm. On the contrary, they are negatively related to internal explanations. In fact, the more the individuals are involved in accidents, the more they tend to believe that they are caused by factors beyond their control and to engage in unsafe behaviors. For these authors, although some research suggests that the experience of accident led to more cautionary behaviors (Kouabenan 2002, Laughery & Vaubel 1989 cited by Gonçalves et al, 2008), it seems really more difficult to predict safe behaviors than unsafe behaviors.

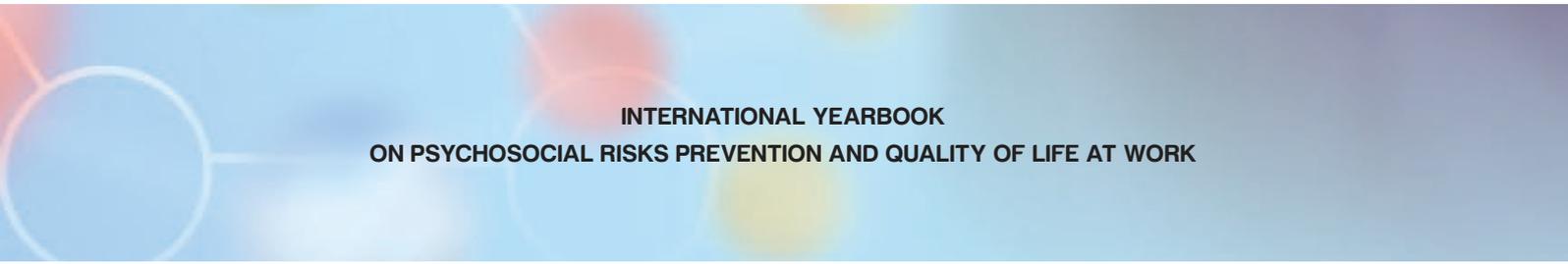


6. As a conclusion: application prospects.

Naive explanations, expert explanations: a necessary complement to better assess the causes of accidents and act more effectively for prevention.

As one might guess, the study of naive causal explanations of accidents has important applications with regard to prevention. Indeed, not only are these explanations likely to influence the behavior of their authors vis-à-vis safety but also they can influence decisions and prevention strategies and adherence or non-adherence of operators to preventive programs. This approach complements advantageously the assessment and intervention process by the expert. Its practical interest can be illustrated by this sentence of Slovic et al. (1981): «Subjective judgements, whether by experts or lay people, are a major component in any risk assessment. If such judgements are faulty, risk management efforts are likely to be misdirected» (p. 17). Indeed, any preventive action relies on relevant and consistent assessment of the causes of accidents. This assessment of accidents causes may refer to objective causes such as may describe experts, but must also take into account the subjective assessment of the causes by employees and those directly facing risks. Like the safety specialists, the worker or employee, the business owner, the supervisor, the engineer-designer of a production system, etc., far from being passive in the face of the accidents they experience or observe, almost always make, implicitly or explicitly, causal inferences. « These causal inferences, in turn, broadly determine the actions that are taken or not taken to correct hazards and prevent injuries » (DeJoy, 1994, p.3). DeJoy (1994) even believe that « in a very real sense actions to manage safety derive more from attributions than from actual causes » (p 3).

The few examples provided in this chapter show however that the naive causal explanations provided for accidents very often comprise biases, generally of defensive nature, insofar as they relate to external factors ascribable to the intervention of others, or situational elements or fate, in particular when the person who explains the accident, is, in a certain way, involved. They are on the other hand internal or related to the victim or the protagonists of the accident when the person who explains the accident is not directly concerned or is emotionally far away from the protagonists (Kouabenan, 1999; Kouabenan and al., 2001; Gyekye & Salminen, 2006b). The knowledge of these biases, whatever their origin (cf. Kouabenan, 1999), is of great benefit to understand the attitudes and behaviors vis-à-vis safety but also safety expertise and diagnosis as well as for prevention and for risk communication.



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Better understanding the attitudes and behaviors towards safety.

Regarding the *attitudes and behaviors towards safety*, it may be noted that the biases in the naive explanations of accidents can help to understand why in some circumstances, for example, basic precautions at first sight have not been taken, why in others objectively dangerous behaviors were adopted, sometimes consciously and why in still others, avoidance actions or less risky course of action were not undertaken. Indeed, certain forms of defensive external explanations can lead their authors to indifference, even to passivity in front of the risk and a negligence of the safety measures. For example, a worker who believes that accidents are due to fate or uncontrollable external factors may tend not to actively engage in prevention programs. Similarly, the fact that managers or employers explain accidents by factors internal to subordinates, may lead them to overshadow in prevention policies, external factors such as working conditions, time constraints, the various pressures of production or the need to be competitive, the hardship of work, the deficiencies in equipment and working tools and protective equipment. For example, several studies (Lacroix and Dejoy, 1989; Kouabenan, 1999, p.208) showed that the internal explanations that make supervisors or executives generally lead them to take punitive measures or education acts firstly directed towards the workers or the employees, but few corrective actions on the level of the work conditions or the sensitizing of the executives, elements which can however prove to be obstacles with regard to safety.

Increasing the objectivity and consistency of the expertise and safety diagnosis.

Explanations may also *illuminate the expertise and safety diagnosis*. Indeed, the analysis of an accident is not neutral and has issues both in terms of moral, economic and / or financial responsibility. Because of these challenges, one tends very often to confuse at the time of the explanation of the accident, the search for causes with the search for the culprit, an approach likely to activate defensive reactions. However the naive explanations, especially if they are defensive, may generate a conflict between the various stakeholders concerned with the situation of accident on not only the causes considered to be relevant, but also on the nature of the preventive measures which could be regarded as most suitable. In order to protect himself, everyone might be tempted to challenge or justify a cause identified if he perceives that it falls within its or her role and responsibility or as involving someone close to him. This can result in a deterioration of the social climate and risk communication, which is a process unfavourable to safety. Consequently, it is appropriate prior to any operation of collective analysis or explanation of the accident, to well clarify the objective of the analysis. It is especially important to exonerate by privileging the objective of prevention



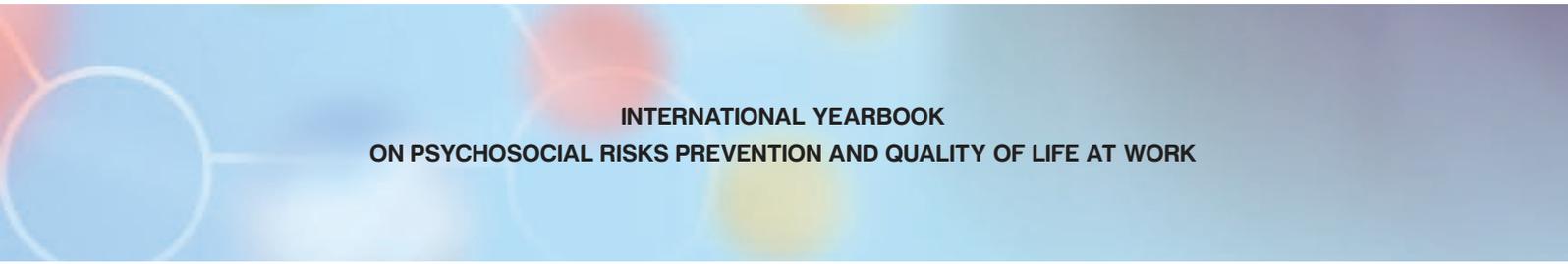
to the detriment of the responsabilisation and repression, and to create a climate which supports confidence and participation.

It is also advisable to take care of the quality of the data collected for safety expertise. Indeed, to understand an accident, one often resorts to a collection of testimonies from the victims and various actors of the situation of the accident or their direct line managers. But given the various possible biases, one can fear distortions in these data (attempt of survalorisation or dissimulation of certain facts with an aim of self-protection or protection of a colleague or a close relation). Therefore, it is necessary to be capable to identify and combat biases likely to lead to concealment of facts or overstatement of others, for the sake of objectivity and effectiveness. Knowing these biases also invites to be attentive with the exploitation of the data which one obtains on the accidents and with their sources, but also to ensure that when collecting data « to diversify as possible information sources, to recut the information, to design supports of reports of accidents which go in the sense of the most exhaustive and objective collection on the circumstances of the accident and which avoids any temptation of interpretation, to value what goes in the direction of an effective prevention of a similar accident, etc. « (Kouabenan, 2006, p. 250).

Lastly, one must encourage a participative approach in the operations of accidents analysis by associating people from various professional and hierarchical backgrounds. Of course in the very hierarchical organizations, it is not easy to make collaborate people of various hierarchical levels, but that comprises unquestionable advantages. The confrontation of causal analyses coming from various sources, not only contributes to inform about possible biases or divergences during the analysis of an accident, but also provides an interesting lighting on the causal complexity of the accidents. Indeed, by allowing employees to confront in a contradictory way, their own causal analyses with causal analyses coming from various sources, we awaken in them critical thinking and enable them gradually to understand the diversity of factors involved in the occurrence of an accident.

Taking the heat out of risk communication and better target preventive actions.

Finally, the approach of the naive explanation of accidents is very promising for *prevention and risk communication*. Indeed, one of the conditions for the success of prevention programs is the adherence of the operators concerned by them and their willingness to implement them. This adherence depends on their perception of the accuracy and relevance of the causal analyzes that underlie these preventive measures. Such a perception is facilitated if their



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causal beliefs are included in these analyzes. What matters is not so much the intrinsic effectiveness of prevention measures; what matters is that those who are in charge of implementing them believe they are. This does not mean that the intrinsic quality of preventive measures is not important. It means that the perceived relevance of these measures to the people who are the recipients is crucial for their actual and efficient implementation. It is difficult to assess the effectiveness of a measure that is not applied or is without conviction. This perceived relevance is further enhanced by associating the workers or laypeople not only to the causal analysis of accidents, but also to the definition of prevention. We have shown in a pharmaceutical company that the participation of workers to the safety diagnosis and definition of prevention can positively contribute to the design of ergonomic adjustments more consistent and more accepted (Kouabenan, Dubois and Bouverot, 2003). This participation not only helps to enrich preventive measures, but also to stimulate workers greater motivation to implement them because best understood.

In addition, the taking into account of the naive explanations can *improve the information and communication systems* around the analysis and prevention of accidents. The confrontation of points of view allows clarifying the different perceptions of accident causation, to remove ambiguities, to enhance the credibility and representativeness of information, to dissipate fears and alleviate conflicts. An awareness of bias and their origins, for example during safety training, allows stakeholders in the analysis and prevention of accidents to understand the different points of view and be more willing to integrate the viewpoint of others. By involving employees or stakeholders not specialists in the analysis of accidents that affect them it stimulates not only their power of control, but also it helps their understanding of safety measures and thus their greater adherence.

Lastly, we observed that the naive causal explanations provided differ according to different individual, groupal, professional or organizational identities. This observation prompts to avoid programs and prevention messages too general to move towards strategies that take into account the beliefs, culture and specificities of each target population or organization. In other words, it is advisable to design programs and targeted messages of prevention and to take into account the socio-cognitive functioning and culture of the targeted people and organizations. Of course this «tailored» approach is highly time consuming and expensive but it seems more effective than general or «ready-to-wear» (readymade) measures that sometimes leave many people indifferent.



References.

- Bierbrauer, G. (1992). Reaction to violation of normative standards: A cross-cultural analysis of shame and guilt. *International Journal of Psychology, 27*, 181-193
- Breslin, F.C., Polzer, J., MacEachen, E., Morrongiello, B., & Shannon, H. (2007). Workplace injury or «part of the job»? Towards a gendered understanding of injuries and complaints among young workers. *Social Science and Medicine, 64*, 782-793.
- Brickman, P., Ryan, K., & Wortman (1975). Causal chains: Attribution of responsibility as a function of immediate and prior causes. *Journal of Personality and Social Psychology, 32*, 1060-1067.
- Choi, I., Dalal, R., Kim-Prieto, R., & Park, H. (2003). Culture and Judgment of Causal Relevance. *Journal of Personality and Social Psychology, 84*(1), 46-59.
- Choi, I., Nisbett, R., & Norenzayan, A. (1999). Causal attribution across cultures: Variation and universality. *Journal of Personality and Social Psychology, 125*, 47-63.
- Dejoy, D.M. (1987). Supervisor attributions and responses for multicausal workplace accidents. *Journal of Occupational Accidents, 9*, 213-223.
- Dejoy, D.M. (1989). The optimism bias and traffic accident: Risk perception. *Accident Analysis and Prevention, 21*, 4, 333-340.
- Dejoy, D.M. (1994). Managing safety in the workplace: An attribution theory analysis and model. *Journal of Safety Research, 25*, 3-17
- Flynn, J., Slovic, P., & Mertz, C.K. (1993). Decidedly different: Expert and public views of risks from a radioactive waste repository. *Risk Analysis, 13*, 643-648

**INTERNATIONAL YEARBOOK
ON PSYCHOSOCIAL RISKS PREVENTION AND QUALITY OF LIFE AT WORK**

Flynn, J., Slovic, P., & Mertz, C.K. (1994). Gender, race, and perception of environmental health risk. *Risk Analysis*, 12, 161-176.

Goguelin, P. (1996). *La prévention des risques professionnels*. Que sais-je ? (No. 3082) Paris: Presses Universitaires de France.

Gonçalves, S. M. P., Da Silva, S. A., Lima, M. L., & Melia, J. L. (2008). The impact of work accidents experience on causal attribution and work behaviour. *Safety Science*, 46, 992-1001.

Gyekye, A. S., & Salminen, S. (2004) Causal attribution of Ghanaian industrial workers for accident occurrence. *Journal of Applied Social Psychology*, 34, 11, 2324_2342.

Gyekye, A. S., & Salminen, S. (2006a). Making sense of industrial accidents: The role of job satisfaction. *Journal of Social Sciences*, 2(4), 127-134.

Gyekye, A. S., & Salminen, S. (2006b). The self-defensive attribution hypothesis in the work environment; Co-workers' perspectives. *Safety Science*, 44, 1257-168.

Gyekye, A. S., & Salminen, S. (2007). Religious beliefs and workers' responsibility attributions for industrial accidents. *Journal for the Study of Religion*, 20, 73-86.

Gyekye, S. A. (2010). Occupational safety management: The role of causal attribution. *International Journal of Psychology*, 45 (6), 405-416.

Gyekye, S.A. (2006). Workers' perception of workplace safety: An African perspective. *International Journal of Occupational Safety & Ergonomics (JOSE)*, 12(1): 31-42

Hasle, P., Kines, P., & Andersen, L.P. (2009). Small enterprise owners' accident causation attribution and prevention. *Safety Science*; 47(1):9-19

Heider, F. (1958). *The psychology of interpersonal relations*. New York : Wiley



Hewstone, M. (1993). Représentations sociales et causalité. In D. Jodelet (1993), *Les Représentations Sociales* (pp. 253-274). Paris : Presses Universitaires de France.

Hewstone, M. (1994). Societal attribution: collective beliefs and the explanation of social events. In M. Hewstone, *Causal Attribution. From Cognitive Processes to Collective Beliefs* (205-236). Oxford : Blackwell, 3rd edition

Hofmann, D., & Stetzer, A. (1998). The role of safety climate and communication in accident interpretation: Implications for learning from negative events. *Academy of Management Journal*, 41, 644-657

Kouabenan, D. R. (1998). Beliefs and the Perception of Risks and Accidents. *Society for Risk Analysis*, 18(3), 243-252.

Kouabenan, D.R. (1985a). L'analyse des attributions causales. *Le Travail Humain*, 48, 1-17.

Kouabenan, D.R. (1985b). Degree of involvement in an accident and causal attributions. *Journal of Occupational Accidents*, 7, 187-194.

Kouabenan, D.R. (1999). *Explication naïve de l'accident et prévention*. Paris: Presses Universitaires de France.

Kouabenan, D.R. (2001). Culture, perception des risques et explication des accidents. *Bulletin de Psychologie*, 54 (3), 327-342

Kouabenan, D.R. (2002). Occupation, driving experience, and risk and accident perception. *Journal of Risk Research*, 5 (1), 49-68.

Kouabenan, D.R. (2006). Des croyances aux comportements de protection □ 1ère partie: quels apports des études sur l'explication spontanée des accidents au diagnostic de sécurité et aux actions de prévention? In D.R Kouabenan, B. Cadet D., Hermand, M.T., Muñoz Sastre (Éds), *Psychologie du risque: Identifier, évaluer, prévenir* (241-258). Bruxelles: De Boeck.

Kouabenan, D.R. (2009). Role of beliefs in accident and risk analysis and prevention. *Safety Science*, 47, 767-776.

INTERNATIONAL YEARBOOK
ON PSYCHOSOCIAL RISKS PREVENTION AND QUALITY OF LIFE AT WORK

Kouabenan, D.R., Dubois, M. & Bouverot, A. (2003c). L'analyse naïve au service de l'expertise et de l'aménagement ergonomiques : application à la mise en conformité sécurité de machines-outils. *Psychologie du Travail et des Organisations*, 9, 1-2, 45-67.

Kouabenan, D.R., Gilibert, D., Medina, M., & Bouzon, F. (2001). Hierarchical position, gender, accident severity and causal attributions. *Journal of Applied Social Psychology*, 31(3), 553-575.

Lacroix, D.V., & Dejoy, D.M. (1989). Causal attributions to effort and supervisory response to workplace accidents. *Journal of Occupational Accidents*, 11, 97-109.

Morris, M.W., & Peng, K. (1994). Culture and cause: American and Chinese attributions for social and physical events. *Journal of Personality and Social Psychology*, 67, 949-971.

Ngueutsa, R. (2012). Croyances et comportements de sécurité des usagers et agents du trafic routier : une étude des perceptions et de l'explication naïve des accidents de la route au Cameroun. Thèse de doctorat, Université de Grenoble 2, France.

Niza, C., Sila, S., & Lima, M.L. (2008). Occupational accident experience: Association with workers' accident explanations and definition. *Safety Science*, 46, 959-971.

Norenzayan, A., & Lee, A. (2010). It was meant to happen: Explaining cultural variations in fate attribution. *Journal of Personality and Social Psychology*, 98 (5), 702-720.

Peltzer, K., & Renner, W. (2003). Superstition, risk-taking and risk perception of accidents among South African taxi drivers. *Accident Analysis and Prevention*, 35, 619-623.

Phares, E.J., & Wilson, K.G. (1972). Responsibility attribution: Role of outcome severity, situational ambiguity and internal-external control. *Journal of Personality*, 40, 392-406.

Prince-Embury, S., & Rooney, J.F. (1987). Perception of control and faith in Experts among residents in the vicinity of Three Mile Island. *Journal of Applied Social Psychology*, 17, 953- 968.



- Salminen, S. (1992). Defensive attribution hypothesis and serious occupational accidents. *Psychological Reports*, 70, 1195-1199.
- Schiavo, R.S. (1973). Locus of control and judgements about another's accident. *Psychological Reports*, 32, 483-488.
- Shaffer, L.S. (1984). Fatalism as an animistic attribution process. *The Journal of Mind and Behavior*, 5, 351- 362.
- Shaver, K.G. (1970). Defensive attribution: Effects of severity and relevance on the responsibility assigned for an accident. *Journal of Personality and Social Psychology*, 14, 101-113.
- Shaw, J.I., & McMartin, J.A. (1977). Personal and situational determinants of attribution of responsibility for an accident. *Human Relations*, 30, 95-107
- Slovic, P., Fischhoff, B., & Lichtenstein, S. (1981). Perceived risk: Psychological factors and social implications. *Proceedings of The Royal Society of London*, 376(1764), 17-34.
- Sosis, R. (1974). Internal-external control and the perception of responsibility of another for an accident. *Journal of Personality and Social Psychology*, 30, 393-399.
- Taylor, C., & Kleinke, C.L. (1992). Effects of severity of accidents, history of drunk driving, intent, and remorse on judgements of a drunk driver. *Journal of Applied Social Psychology*, 22, 1641-1655.
- Walster, E. (1966). Assignment of responsibility for an accident. *Journal of Personality and Social Psychology*, 3, 73-79.
- Wang, G., & McKilip, J. (1978). Ethnic identification and judgements of an accident. *Personality and Social Psychology Bulletin*, 4, 296-299.
- Whitehead III, G.I., & Hall, A.E. (1984). Sex differences in the assignment of responsibility for an accident. *Sex Roles*, 11, 787-798.