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Feeling of invulnerability and risk-taking among Cameroonian construction workers

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ABSTRACT

This study examined the effect of feelings of invulnerability on risk-taking among Cameroonian construction workers. Our sample consisted of 99 construction workers selected by reasoned choice sampling technique and randomly assigned to three different groups (invulnerability priming (n=33), vulnerability priming (n=33) and neutral priming (n=33)). A questionnaire was used to collect the data. It consisted of the Feeling of Invulnerability Scale, items from the Theory of Planned Behavior used to measure risk-taking at work, and priming texts to differentiate groups. The results indicate that invulnerability to danger and psychological invulnerability lead to risk-taking among Cameroonian construction workers. This study suggests taking into account perceptual biases in general and the feeling of invulnerability in particular in the prevention of accidents among construction workers.

Keywords: feeling of invulnerability, invulnerability to danger, psychological invulnerability, risk-taking at work, construction workers.

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INTRODUCTION

Study Background

Accidents at work, especially those which occur on construction sites, are a major concern for families who now have to take care of their diminished members who are unable to play their social role. It is also a problem for companies which have to recruit again or accept that production takes a hit because of an absence related to an accident at work (Inter-African Conference on Social Welfare [CIPRES], 2013)." It is also the object of special attention for work psychologists and organizations which work to identify the individual psychological dispositions involved in risk-taking in the workplace. Approximately 380,000 workers die each year as a result of workplace accidents and nearly 378 million are victims (Hämäläinen et al., 2017; International Labour Organization [ILO], 2018). Statistics reveal Europe has recorded 13.4% of cases of accidents at work; America, 11.2% and Southeast Asia 10%. In Africa, occupational accidents affect 17.39% of workers from all sectors of activity and 21.1% from the construction sector (Hämäläinen et al., 2017). Those statistics would also be largely underestimated because of the difficulty of collecting them in some countries and in certain activity sectors, notably the mining sector, the agricultural sector and the construction sector (CIPRES, 2013). In Cameroon, the National Social Security Fund (CNPS) recorded 46 cases of accidents in the construction sector in 2017. A global examination of the accident cases listed in 2019 according to the location of injury (hands, feet or head), reveals a worrying situation. Indeed, at the level of the head, we went from 110 accidents in 2017 to 116 cases in 2018. With regard to feet, there were 165 cases in 2017 and 174 cases in 2018. In terms of hands, there were 251 cases in 2017 and 208 cases in 2018 (NCPS, 2019). That distribution of accidents according to the location of injury has led us to focus on personal protective equipment (PPE) (helmet, gloves, safety shoes) whose role is to protect the different parts of the body

against damage in different workplaces in general and in construction sites in particular. This interest in PPE is justified by the fact that non-compliance with this safety measure (non-wearing of PPE) is at the origin of 56% of accidents that occur in this sector of activity (Haslam et al., 2005).

Given lack of statistics on the non-wearing of equipment by workers in all sectors of activity in general and the construction sector in particular, an exploratory survey of workers at 8 construction sites in the city of Yaoundé was carried out. The results of this survey revealed that of the 114 workers surveyed, 39.2% (39) do not wear helmets; 85.9% (98) do not wear gloves and 9.6% (11) do not wear suitable safety footwear when performing a construction task (raising walls, pouring concrete, laying slab, etc.). In such a situation, the consequences of non-compliance with this safety measure affect not only the individual who is the victim of an accident and his family, but also the company which employs him (CIPRES, 2013). At the level of the individual, accidents at work cause physical suffering (disabilities due to the amputation of a part of the body and the decrease in physical capacities), psychological suffering (conduct disorders, alteration of the personality), aesthetic damage (scars, mutilations, burns, deformities of certain limbs, amputations, confinement in a wheelchair and wearing prostheses or orthotics) and disruption of career development (inability to work) (Achache & Hamour, 2015; Couplet, 2017, Depue et al., 2018). At the company level, consequences of accidents at work are generally financial in terms of unforeseen financial burdens, including penalties for delays, additional contributions and additional compensation (CIPRES, 2013).

It is to stem this situation that Cameroonian authorities and their partners have put in place a set of measures. These range from the ratification of the Conventions of the International Labor Organization (ILO) on safety and health in construction (Convention No 167)

to the organization of congresses and round tables on the one hand, from the creation of inspection brigades in the ten regions to the provision of PPE to workers by employers and the presence of safety messages (compulsory wearing of PPE) at the entrance to construction sites on the other hand. Ministry of Labor and Social Security [MINTSS], 1992; National Labor Observatory [ONT], 2013). These various measures seem to be ineffective in the sense that there are still workers who do not comply with the prescribed safety measures. In view of this finding, it is generally reported that the occurrence of a work accident on construction sites has often been directly or indirectly linked to the behaviors adopted by construction workers (Health and Safety Executive, 2003). However, the development of effective regulations and safety measures to encourage the adoption of preventive and self-protective behaviors must take into account the underlying socio-cognitive processes underlying these behaviors. According to Nguetsa and Kouabenan (2014), two cognitive processes underpin the adoption of protective behaviors: the explanation of accidents (Kouabenan, 1999) and the perception of risks (Kouabenan et al., 2006). In the context of safety behaviors in the construction sector, risk perception has proven to be an important predictor (Arezes & Miguel, 2008).

Risk perception refers to a subjective judgment an individual makes about the risks they face (Low et al., 2018). Some studies show that the perception of risks among workers is a significant predictor of the use of protective equipment (Arezes & Miguel, 2008). Other studies, on the other hand, note that this perception of risks does not always lead the individual to adopt safe behaviors because it can be biased and lead him to distort his risk assessment (Kouabenan, 2006). For Mbaye et al. (2005), the importance of perceptual biases lies in the fact that they make it possible to understand how the individual evaluates the

risky situation with which he is confronted. Among the perceptual biases commonly mentioned, the overconfidence bias, the unrealistic optimism, the illusion of control and the feeling of invulnerability feature prominently (Kouabenan et al., 2006; Van de Leemput & Ophélie, 2008). The feeling of invulnerability is considered to be one of the factors regularly associated with risk taking in the work context (Dorn & Brown, 2003; Dueck, 2013; Mbaye et al., 2005; Mbaye & Kouabenan, 2013).

Feeling of invulnerability

The feeling of invulnerability or the illusion of invulnerability is defined as the fact for certain individuals to believe in their inability to be injured or hurt themselves (Lapsley et al., 1989) or the tendency in certain individuals to believe less exposed to accidents (Kouabenan et al., 2006). These definitions reveal the idea the feeling of invulnerability is a belief developed by an individual leading him to think that even if he happens to do something dangerous in a given situation, he will be likely to get out of it. This situation without being physically injured. The invulnerable individual would be the one who believes that he cannot be hurt, that he is indestructible or that he is able to face danger. Thus, the feeling of invulnerability can be approached from the angle of the belief that individuals develop leading them to perceive themselves as being immune to the harmful consequences of a given situation, accidents or damage of all kinds. This conception of the feeling of invulnerability supports the fact that life history and the absence of negative experiences reinforce the manifestation or at best the development of this feeling (Perloff, 1983; Rumar, 1988; Slovic et al., 1981; Van de Leemput & Ophelia, 2008).

Duggan et al. (2000) identified two dimensions of invulnerability. The first focuses on attitudes towards physical risks (invulnerability to danger) and the second on attitudes towards psychological risks (psychological invulnerability). The measurement of each dimension is made possible by the

invulnerability feeling scale (Duggan et al., 2000; Lapsley, 2003). Recent works (Lapsley & Hill, 2009; Potard, 2015; Potard et al., 2018) showed feeling of invulnerability is a construct with three components: invulnerability in the face of danger, psychological invulnerability and interpersonal invulnerability. However, it is noted that a large number of works have favoured two-component construction to the detriment of three-component construction (Alberts et al., 2007; Duggan et al., 2000; Lapsley & Hill, 2009; Ravert et al., 2009). Also, several works (Alberts et al., 2007; Duggan et al., 2000; Lapsley & Hill, 2009; Ravert et al., 2009) showed that this belief manifests itself more in boys than in girls, at the level of its two dimensions. Similarly, adolescents and young adults are those who are distinguished by higher scores in sense of invulnerability than adults (Elking, 1967; Lapsley, 2003; Potard, 2015). This gap between youth and adults has traditionally been suggested to explain why young people engage more in risky behaviors and take more risks than adults (Arnett, 1992).

Feeling invulnerable and taking risks at work

Several works (Chan et al., 2010; Dueck, 2013; Mbaye & Kouabenan, 2013; Mbaye et al., 2005; Zheng et al., 2018) investigated the link between feelings of invulnerability and risk-taking in work settings. Some of this work has studied it directly (Mbaye & Kouabenan, 2013; Mbaye et al., 2005) and others indirectly using the components of the theory of planned behavior (attitudes, subjective norms, control of perceived behavior and intention) (Chan et al., 2010; Dueck, 2013; Potard et al., 2018; Zheng et al., 2018).. The results of the first category indicated that the feeling of invulnerability significantly affects the motivation of workers for Feedback from Chemical Accidents and Everyday Life (REX) on the one hand, and constitutes a factor of disengagement from REX practices on the other hand. Thus, when workers perceived themselves as vulnerable to risks, they were motivated to attend work meetings. On the other hand, when they felt invulnerable to the risks,

they were not motivated to take precautions to protect themselves (Mbaye & Kouabenan, 2013).

The second category showed that the feeling of invulnerability affects the intention to engage in risky behavior. Concretely, the work of Chan et al. (2010) indicated that invulnerability to danger had an effect on risk-taking among young Chinese. In this perspective, the more young Chinese felt invulnerable to danger, the more they intended to drive under the influence of alcohol. For Zheng et al. (2018), the feeling of invulnerability is the best predictor of Chinese taxi drivers' intention to transgress parking measures. The results of Dueck's (2013) work revealed that participants with a low perception of invulnerability had more intention of reporting the work situation as dangerous at all levels of fear (low vs. high). In contrast, participants with a high perception of invulnerability intended to report a work situation as unsafe when the level of fear was high. Their results also revealed that participants with a high perception of invulnerability had less intention of reporting a work situation as unsafe when the level of fear was low compared to participants who had a low perception of invulnerability. Potard et al. (2018) for their part noted the fact that young drivers who felt psychologically invulnerable perceived that their family members and peers were in favor of violations of road safety measures. Similarly, those who perceived themselves to be immune to social disapproval found it important for them to drink and drive. In addition, those young people who felt invulnerable to danger not only found it important for them to drink and drive, but also believed that it was easy for them to drink and drive.

Hypothesis

The above arguments support idea that feelings of invulnerability lead to the non-adoption of safety behaviors in various industries. However, since these studies were conducted in a Western context where production systems are sophisticated, they did not focus on the construction sector, which would be one of the

promising sectors in developing countries. It is therefore necessary to study this relationship in the African context, particularly in Cameroon. The present study is part of the same perspective as those presented above and proposes to study the effect of the feeling of invulnerability on a specific behavior: the wearing of PPE among Cameroonian construction workers. In fact, this study postulates that the feeling of invulnerability leads to risk-taking among construction workers. This hypothesis is based on the fact that the feeling of invulnerability is associated with the amount of precautions that workers take to avoid accidents (Mbaye & Kouabenan, 2013).

METHOD

Participants and experimental plan

A total of 99 construction workers from three construction companies (Djemo BTP, INTECG Sarl, CACOCO BTP) took part in this study. They were selected according to the following inclusion criteria: have the status of worker in one of the 3 companies, be present in the site at the time of data collection, be French-speaking

and have an age greater than or equal to 18 years. Based on these criteria, 112 construction workers were selected. They were distributed as follows: 22 workers in the INTEGC site, 33 in the CACOCO-BTP site, 27 in the first Djemo BTP site and 30 in the second Djemo BTP site. The participants thus selected were randomly assigned to one of the experimental conditions. The design of experiment was a mixed plan ($Sl_2^* < A_3 >$), with a repeated measure factor with two modalities: (feeling of invulnerability: invulnerability to danger and psychological invulnerability) and an independent factor with three modalities: priming: invulnerability priming vs. vulnerability priming vs neutral priming.

During the analysis of the questionnaires, non-compliance with the instruction (ticking a method of answers among those proposed) led to the exclusion of 13 participants. As a result of this exclusion, only 99 protocols were retained for statistical processing. Table 1 shows the distribution of participants by socio-demographic characteristics.

Table 2.1 *Distribution of participants by socio-demographic characteristics*

Year of experience	N	%	level of education	N	%	age	N	%
0-1	26	26, 3	Primary	9	9, 1	18-30	69	69, 7
2-5	49	49, 5	Secondary	46	46, 5	31-40	23	23, 2
6-10	24	24, 2	Academic	44	44, 4	41-50	7	7, 1
Total	99	100%		99	100%		99	100%

In terms of the number of years of experience, Table 1 shows that 26.3% (26) of participants have between 0 and 1 year of experience, 49.5% (49) have between 2 and 5 years of experience and 24.2% (24) have between 6 and 10 years of experience. As regards the level of education, it appears that 9.1% of the participants (9) have a primary level of education, 46.5% (46) have a secondary level of education and 44.4% (44) have a university level of education. With regard

to age, it appears that 69.7% of the participants in our sample are between 18 and 30 years old, 23.2% between 31 and 40 years old and 7.1% between 41 and 50 years old.

Study variables and specific hypothesis

Two variables are related in this study. The independent variable that refers to the feeling of invulnerability. This variable has two modalities: invulnerability to danger and psychological invulnerability (Duggan et al., 2000). The

dependent variable is risk-taking in the construction sector. It was operationalized from the theory of planned behavior of Ajzen (1991). This theory states that behavioral intent is the best predictor of behavior; and it itself is influenced by three important constructs: attitude toward behavior, subjective norms, and perceived behavioral control. However, there is a possibility that attitudes, subjective norms, and perceived behavioral control directly affect behavior (Van Laere, 2018). In addition, subjective norms have been subdivided into descriptive norms and injunctive norms as advocated by Ajzen and Fishbein (1980) and Palat (2013). Thus, we use attitude (Att), injunctive norms (NI), descriptive norms (ND) and perceived behavioral control (CCP) to study risk-taking. Similarly, three behaviors related to the wearing of PPE are retained: wearing of gloves, wearing of helmets, wearing of safety shoes. In this sense, the dependent variable in this study was operationalized as follows: attitudes towards the wearing of PPE: they have as indicators the wearing of gloves, the wearing of helmets and the wearing of safety shoes; descriptive norms for the wearing of PPE: its indicators relate to the wearing of gloves, the wearing of helmets and the wearing of safety shoes; injunctive norms relating to the wearing of PPE: its indicators are the wearing of gloves, the wearing of helmets and the wearing of safety shoes; perceived behavioral control related to the wearing of PPE with indicators of wearing gloves, wearing helmets and wearing safety shoes.

The operationalization of the variables allowed the formulation of eight specific hypothesis. They were stated as follows:

- Invulnerability to danger leads to unfavorable attitudes towards the wearing of PPE among Cameroonian construction workers;
- Invulnerability to danger leads to negative descriptive norms relating to the wearing of PPE among Cameroonian construction workers;

- Invulnerability to danger leads to negative injunctive norms relating to the wearing of PPE among Cameroonian construction workers;
- Invulnerability to danger leads to a low perceived behavioral control related to the wearing of PPE among Cameroonian construction workers.
- Psychological invulnerability leads to unfavorable attitudes towards the wearing of PPE among Cameroonian construction workers;
- Psychological invulnerability leads to negative descriptive norms relating to the wearing of PPE among Cameroonian construction workers;
- Psychological invulnerability leads to negative injunctive norms relating to the wearing of PPE among Cameroonian construction workers;
- Psychological invulnerability leads to a low perceived behavioral control related to the wearing of PPE among Cameroonian construction workers.

Data collection tool

Data were collected using a questionnaire consisting of the Feeling of Invulnerability Scale, items inspired by the theory of planned behavior, and priming texts for the experimental groups.

Invulnerability Feeling Scale

Feelings of invulnerability were measured by the Adolescent Invulnerability Scale (AIS) developed by Duggan et al. (2000). This scale is composed of 20 items divided into two dimensions: invulnerability to danger and psychological invulnerability. The French version of Potard's AIS (2015) was used to avoid translation errors. In the Cameroonian context, this two-factor scale has given acceptable metrological qualities ($\alpha = .83$) in the field of road safety (Ngha Essomba, 2017; Nguedong et al., 2021). Participants were asked to position themselves on a Likert-type response device ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The scale is as follows: the subscale

invulnerability to danger includes 12 items (example of items: *I have little chance of being injured in an accident, I have little chance of being injured if I do something dangerous, taking safety measures is much more important for others than for me*). The psychological invulnerability subscale consists of 8 items (example item: *the opinions of other people do not bother me, my feelings are easily hurt*). Analysis of the internal coherence index (α) yielded a satisfactory Cronbach alpha value for both dimensions ($\alpha=.73$ for the danger invulnerability subscale and $\alpha=.72$ for the psychological invulnerability subscale).

Scale of risk-taking at work inspired by the Theory of Planned Behavior

This part of our questionnaire consists of items formulated from the dimensions of Ajzen's (1991) Theory of Planned Behavior to measure risk-taking in the construction sector. Its elaboration followed the various recommendations made by Ajzen (2010; 2011). We have therefore formulated for each dimension (attitudes, injunctive and descriptive norms, perceived behavioral control) the items related to the three indicators of PPE wearing (wearing gloves, wearing safety shoes and wearing a helmet). The answers given by the participants on these items were based on a Likert-type response device ranging from 1(*strongly disagree*) to 5(*strongly agree*). These different responses provided information on the level of risk-taking of each participant. Attitudes towards wearing PPE were measured from 6 items (example items: *for me, it is important to wear gloves during work; for me, it is important to wear the helmet during work; for me, it is important to wear safety shoes during work*). Subjective norms were measured by 9 items including 6 for injunctive norms (example item: *my colleagues think I should wear gloves during work*) and 3 for descriptive standards (example item: *most of my colleagues wear helmets during work*). The perceived behavioral control was measured by 6 items (example of items: *faced with an unforeseen work situation, it would be*

easy for me to wear the helmet even if I am under pressure). Analysis of the internal coherence index (α) yielded a satisfactory Cronbach alpha value for the four dimensions ($\alpha=.71$ for the attitude dimension; $\alpha=.72$ for the descriptive norms dimension; $\alpha=.71$ for the injunctive norms dimension and $\alpha=.72$ for the perceived behavioral control dimension).

Priming tasks

This part of the questionnaire served as a basis for experimental manipulation. Two texts served as a priming stimulus for each of the experimental groups (experimental group 1, experimental group 2). The first text used to activate invulnerability was inserted into the questionnaire that was administered to participants in experimental group 1. The second was used to activate the vulnerability. It was included in the questionnaire administered to participants in experimental group 2. No text was proposed to the control group since the responses of the participants in this group were the reference. The various texts presented were prepared by the authors themselves using data from the CNPS and ILO reports.

For experimental group 1 in which the feeling of invulnerability was activated, the priming text was worded as follows: *"An expert in the construction sector stated that construction workers, by their skill, their mastery of the trade, their ability to cope with shocks of any kind are safe from unfortunate events such as work accidents. Moreover, a recent report by the CNPS (2018) went in the same direction by revealing that only farmers, workers in the food industry, workers in the metallurgical industry and mine workers are more exposed to the risk of accidents."*

For experimental group 2 in which the feeling of vulnerability was activated, the priming text was worded as follows: *"An International Labour Organization (ILO) report published in 2018 reveals that Yaoundé, the capital of Cameroon, is one of the cities in the world where construction workers are most affected by accidents, mainly because of the dangerous*

nature of the construction sites in which they work. With an accident rate of 63% or on average one new accident every day. This means that one in five construction workers living in this city has already had an accident and that if nothing is done, a large number of workers in this sector will be forced to give up their jobs because of a disability in the short or medium term."

Procedure

Data from this study was collected in July 2021. It was carried out over several days because it was necessary to take into account the different sites and the opportune moment during which the workers were available to fill in the questionnaires. Participants were selected based on the inclusion criteria. After this selection, each selected participant drew a number (1, 2 or 3) written on a pink paper and depending on the number drawn, a questionnaire was assigned to him as well as an underhand and a pencil. Participants who had

drawn number 1 received the questionnaire whose priming text activated the feeling of invulnerability (Experimental Group 1), those who had drawn number 2 received the questionnaire whose priming text activated the feeling of vulnerability (experimental group 2) and those who had drawn number 3 obtained a questionnaire without a priming text (control group). The questionnaire was administered as a group. Participants were asked to fill it out immediately where they were, adopting the position they found comfortable (standing or sitting) and without communicating with each other. Participants in the experimental groups were instructed to carefully read the introductory note and priming texts. For the participants in the control group, it was necessary to read the introductory note and complete the questionnaire directly.

Results

Invulnerability to danger and risk-taking among construction workers

Table 3.1 *Comparison of the averages obtained on the dimensions of TPB related to the wearing of PPE measuring risk-taking as a function of invulnerability to danger*

	Min	Max	Averages	E-T	Ddl	F	p
GEXP1	1.0	5.0	2.54	0.483	2	30,538	,000
ATT GEXP2	1.0	5.0	3.16	0.481	42		
GC	1.0	5.0	3.69	0.458	44		
GEXP1	1.0	5.0	2.60	0.402	2	37,817	,000
NI GEXP2	1.0	5.0	4.03	0.543	42		
GC	1.0	5.0	3.86	0.700	44		
GEXP1	1.0	5.0	3.15	0.868	2	7,167	,002
ND GEXP2	1.0	5.0	4.19	0.591	42		
GC	1.0	5.0	3.60	1.041	44		
GEXP1	1.0	5.0	2.58	0.528	2	22,267	,000
CCP GEXP2	1.0	5.0	3.56	0.389	42		
GC	1.0	5.0	2.99	0.445	44		

Note. Ddl= degree of freedom; ATT= attitude; NI= injunctive standards; ND= descriptive standards; CCP= perceived behavioral control; $p<.05$; GEX1=experimental group 1; GEXP2= experimental group 2; GC=control group

The results presented in Table 2 generally indicate that invulnerability to danger leads to risk-taking among construction workers. Specifically, there is a significant difference in attitudes towards wearing PPE ($F_{(2,42)}=30.53$; $p=,000$); injunctive standards for wearing PPE ($F_{(2,42)}=37.81$; $p=,000$); descriptive standards for the wearing of PPE ($F_{(2,42)}=7.16$; $p=,002$) and perceived behavioral control related to wearing PPE ($F_{(2,42)}=22.26$; $p=,000$). This means participants in a situation of invulnerability to danger ($M=2.54$; $ET=0.483$) find that it is less important for them to wear PPE (gloves, helmet, safety shoes) compared to those in vulnerable situations to danger ($M=3.16$; $SD=0.481$) and the control group ($M=3.69$; $SD=0.458$).

Also, participants in a situation of invulnerability to danger ($M=2.60$; $SD=0.402$) feel that people

who are important to them (colleagues and employers) are less approve of wearing PPE compared to those who are vulnerable to danger ($M=4.03$; $SD=0.543$) and those in the control group ($M=3.86$; $SD=0.700$). Similarly, they tended to conform to the implicit influence of their colleagues who do not always wear these PPE ($M=3.15$; $SD=0.868$) compared to the other two situations ($M=4.19$; $SD=0.591$; $M=3.60$; $SD=1.041$). In addition, they perceived it is difficult for them to wear gloves, helmets and safety shoes when performing a construction task ($M=2.58$; $SD=0.528$) compared to participants in vulnerable situations to danger ($M=3.56$; $SD=0.389$) and those in the control group ($M=2.99$; $SD=0.445$).

Psychological invulnerability and risk-taking among construction workers

Table 3.2 Comparison of the averages obtained on the dimensions of TPB related to the wearing of PPE measuring risk-taking as a function of psychological invulnerability

	Min	Max	Averages	E-T	Ddl	F	P
GEXP1	1.0	5.0	2.50	0.512	2	23,489	,000
ATT GEXP2	1.0	5.0	3.48	0.477	53		
GC	1.0	5.0	3.34	0.604	55		
GEXP1	1.0	5.0	2.85	0.848	2	17,545	,000
NI GEXP2	1.0	5.0	3.93	0.512	53		
GC	1.0	5.0	3.81	0.709	55		
GEXP1	1.0	5.0	3.26	0.841	2	2,753	,070
ND GEXP2	1.0	5.0	3.71	0.598	53		
GC	1.0	5.0	3.73	0.870	55		
GEXP1	1.0	5.0	2.42	0.674	2	15,749	,000
CCP GEXP2	1.0	5.0	3.35	0.423	53		
GC	1.0	5.0	2.79	0.759	55		

Note. Ddl= degree of freedom; ATT= attitude; NI= injunctive standards; ND= descriptive standards; CCP= perceived behavioral control; $p<.05$; GEX1=experimental group 1; GEXP2= experimental group 2; GC=control group

The results presented in Table 3 also show that psychological invulnerability leads to risk-taking among construction workers. This result was observed in terms of attitudes towards wearing PPE ($F_{(2,53)}=23.48$; $p=,000$); injunctive standards

for wearing PPE ($F_{(2,53)}=17.54$; $p=,000$) and perceived behavioral control related to wearing PPE ($F_{(2,53)}=15.74$; $p=,000$). This means that participants in situations of psychological invulnerability ($M=2.50$; $ET=0.512$) find that it is

less important for them to wear PPE (gloves, helmet, safety shoes) compared to those in situations of psychological vulnerability ($M=3.48$; $SD=0.477$) and those in the control group ($M=3.34$; $SD=0.604$). When participants are in a situation of psychological invulnerability ($M=2.85$; $SD=0.848$), they feel that people important to them (colleagues and employers) are less approve of wearing PPE compared to those in situations of psychological vulnerability ($M=3.93$; $SD=0.512$) and those in the control group ($M=3.81$; $SD=0.709$). Participants who feel psychologically invulnerable ($M=2.42$; $SD=0.674$) felt that it was difficult for them to wear gloves, helmets and safety shoes when performing a construction task compared to participants in situations of psychological vulnerability ($M=3.35$; $SD=0.423$) and those in the control group ($M=2.79$; $SD=0.759$).

DISCUSSION AND CONCLUSION

The aim of this work was to investigate the effect of feelings of invulnerability on risk-taking among construction workers. The results obtained from Cameroonian construction workers are in line with our hypotheses. It appears participants in situations of invulnerability (in the face of danger and psychological) develop fewer favourable attitudes towards wearing PPE, feel that people important to them (colleagues) are less approve of wearing PPE when performing a construction task and find it easy for them to perform a task without wearing it compared to participants in the other two situations. These results are in line with those obtained by some authors (Chan et al., 2010; Dueck, 2013; Mbaye & Kouabenan, 2013; Zheng et al., 2018). They establish that, the feeling of invulnerability leads to non-compliance with safety measures and promotes engagement in risky behaviors in general and in the work context in particular. In this perspective, the individual who feels invulnerable in his workplace, is inclined to take fewer safety precautions to protect himself from possible damage to which he is exposed. This trend is observed among construction workers who, despite the dangerous nature of their profession,

tend to neglect the use of PPE to protect the parts of the body most exposed (head, hands and feet) from accidents.

An explanation for these results is given by TPB, which foresees a relationship between the feeling of invulnerability and its components (attitudes, subjective norms and perceived behavioral control). Indeed, Ajzen (1987) believes individual variables indirectly affect intentions and behavior through attitudes, subjective norms, and perceived control of behavior. Thus, for Potard et al. (2018), the feeling of invulnerability through its dimensions (invulnerability to danger and psychological invulnerability) affects young people's attitudes, their subjective norms and the perceived control of their behavior towards compliance with safety rules. It is this same trend that was observed in the group where invulnerability was activated. For example, participants in this group found that it is not important for them to use gloves, helmets and safety shoes to protect themselves when performing construction tasks.

Ultimately, the results of this study are mostly consistent with the literature on the effect of feelings of invulnerability on the adoption of risky behaviours at work. This seems to be due to the fact that the feeling of invulnerability gives the individual who develops it, the belief that he can not hurt himself and that he is able to face danger. In such a situation, the individual who feels invulnerable overestimates his own abilities to cope with the danger and underestimates the magnitude of the consequences that may arise from his encounter with the danger in question.

The results of this study seem to us worthy of interest for the construction sector where there are permanent dangers that can directly affect the worker and indirectly his family, his company and the State. This study highlights the importance of taking into account the individual's beliefs in his relationship with established security measures. In addition, it presents another way of approaching safety on construction sites in developing countries in

general and in Cameroon in particular. Thus, to set up effective prevention strategies, the various actors involved in the prevention of accidents in the workplace in general, and those of the Building and Public Works (BTP) in particular must take into account the beliefs of individuals, such as the feeling of invulnerability which, bias the treatment of information relating to risk.

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