

Role of Beliefs in Predicting Smoking Behaviour: a Study of Comparative Optimism in Cameroonian Adolescents

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Abstract

The objective of this study was to examine the influence of comparative optimism on the intention to use tobacco among 244 Cameroonian adolescent students. The sample consisted of girls (n=110) and boys (n=134) aged between 14 and 25 in secondary school. Participants were selected using a purposive sampling technique. The study relied primarily on the theory of planned behaviour to highlight the mechanisms that link beliefs to behavioural intentions. Data were collected from a self-administered composite questionnaire consisting of the comparative optimism scale and the risk-taking scale measuring intention to use tobacco inspired by the theory of planned behaviour. The results obtained after correlation analysis and regression showed that the illusion of vulnerability elicits the intention to use tobacco through attitude ($r = -.141, p < 0.05$), descriptive norms ($r = .204, p < 0.01$), and injunctive norms ($r = .132, p < 0.05$). In addition, the illusion of vulnerability also appears as a predictor of the intention to use tobacco. These results confirm the harmful nature of overly optimistic beliefs about protective behaviours. The implications of the optimism bias for perceived vulnerability are discussed in the light of reference theories and from previous work on the effect of optimistic beliefs on protective behaviour.

Keywords: Comparative optimism, intention, smoking, beliefs, planned behavior

1-1. Background of the study

Tobacco use is considered globally as a major public health problem due to its significant morbidity and mortality (World Health Organization [WHO], 2018). Tobacco use is a true pandemic as it affects all segments of the population, including both sexes. Indeed, nearly one billion men (35% of the male population in developed countries and 50% in developing countries) and nearly 250 million women (22% of the female population in developed countries and 9% in developing countries) smoke every day worldwide (World Health Organization [WHO], 2017). The 6th edition of the Tobacco Atlas reveals that 942 million men and 175 million women aged 15 years and over smoke cigarettes every day worldwide (Drope et al., 2018). In fact, all countries in the world are affected by the tobacco epidemic, although there are disparities between geographical areas. The global prevalence of smoking was estimated at 23.7% and 36.1% in 2010 and 2012, respectively. This includes 15% and 24.2% in Africa; 20% and 22.8% in the Americas; 22.4% and 36.2% in the Eastern Mediterranean region; 31.2% and 39% in Europe; 20.1% and 32.1% for the South-East Asia region and 28.5% and 48.5% for the Western Pacific region (Ericksen et al., 2014).

According to Blecher and Ross (2015), Africa represent the greatest threat in terms of projected tobacco use. These projections make this continent the next epicentre of tobacco use. In Cameroon, as in many sub-Saharan African countries (Niger, Congo, Mauritania), tobacco use is fashionable. A recent report (WHO, 2017), indicated that tobacco consumption has increased among men in Cameroon between 2000 and 2016. It evolved as follows: from 8% to 12% between 2000 and 2002 then from 12% to 19% between 2004 and 2006. Between 2006 and 2010, smoking prevalence increased from 19% to 29%, exceeding 30% to reach 34% in 2012 and peaking at 44% in 2015 (WHO, 2017). The situation is not the same for women aged 15 and over, where the prevalence rate remained relatively stable between 2000 and 2016 (1%). Among young people, smoking seems to be taking on worrying proportions. Indeed, a survey conducted in 2014 in schools revealed that 20.7% of the pupils questioned had already experimented with tobacco, 10.1% of them were daily users of tobacco and its products (13.8% of boys and 5.7% of girls), and 7.4% were already addicted to cigarettes.

The spread of smoking has serious consequences that affect not only humans but also the physical and social environment. On the human level, smoking is responsible for a high rate of mortality and morbidity. Tobacco products expose humans to cancer, chronic lung disease and cardiovascular disease (Institut National de la statistique & Ministère de la Santé Publique,

2013). On the environmental level, smoking is a factor that contributes to deforestation, and soil and groundwater pollution.

To effectively fight against the scourge of smoking, Cameroon has put in place a set of regulatory and incentive measures. The regulatory measures are made up of a set of administrative and legal texts that govern activities related to the production, marketing, and consumption of tobacco products. Incentive measures, on the other hand, concern prevention through awareness-raising. The latter is based on the use of influence strategies aimed at encouraging potential clients to turn away from the use of tobacco products. These influencing strategies are conveyed through awareness-raising messages that are stamped on the various tobacco products and that highlight the risks associated with smoking. Despite these measures, we realise that the phenomenon of smoking continues to spread and to cause damage to both humans and the environment. This situation led us to question the motives for this increased risk-taking in terms of tobacco consumption. A psychosocial approach to smoking behaviour has enabled the identification of a number of psychosocial factors associated with the intention to use tobacco. These factors include: attitude (Ganley & Rosario, 2013), risk perception (Plante, 2012), peer pressure (Ra & Cho., 2016), self-esteem (Ariffin, 2016 ; Khosravi et al., 2016), sensation seeking (Roman et al., 2014, Spillane et al., 2012). Without denying the importance of these factors in explaining smoking behaviour, our focus was more on beliefs. Indeed, the literature (Dillard, 2009 ; Mvessomba et al., 2017) pays particular attention to the study of the consequences of beliefs in general, and of the optimism bias in particular on health behaviour. A presentation of the concept of comparative optimism and a brief review of the work linking comparative optimism and risk taking are presented here.

1-2. Comparative optimism (CO)

The CO effect is historically linked to the year 1980. It is the American researcher Weinstein, from Rutgers University in New Jersey, who first highlighted this effect. According to Weinstein (1980), this optimism is first described as unrealistic because it is clear that not all people can have a better future than others. When it is based on a comparison with others, this optimism is called comparative (Harris & Middleton, 1994). The notion of comparative optimism (CO) is central to the analysis of future anticipatory behaviour. The desire to anticipate our future is an inherent concern of human nature. The idea that almost every perception and almost every social judgment involves comparison and that comparison often involves social comparison, has led researchers working on optimism for the self to focus more on how people perceive their future compared to others (Milhabet, 2010). Work that has sought to understand why some individuals overestimate their luck and

minimise their risk compared to others has crystallised around the notion of comparative optimism. This has given rise to a large body of research on comparative judgements. CO is a phenomenon that is essentially based on a social comparison between self and others (Krzeminski, 2015). From this social comparison, it appears that individuals show an optimistic bias for positive events and underestimate negative events (Sharot et al., 2011).

CO is defined as a kind of self-beneficial perception of one's future compared to that of others (Milhabet, 2010). CO is also considered to be the tendency to think that our own chances of experiencing positive events are greater than those of others and, conversely, that the risks of experiencing negative events are less for us than for others (Agostini, 2008). For Adams (2008), CO is defined as expecting to experience fewer unhappy events than others and vice versa for positive events. To measure CO, we usually use two methods, one direct and one indirect (Milhabet, 2010 ; Milhabet et al., 2002). In the so-called direct method, the procedure initiated by Weinstein (1980) and commonly used to assess CO, consists of asking participants to estimate the chances they have in relation to others (their peers) of having to experience a given event. Each participant is asked to make a judgement for him/herself relative to others by indicating whether he or she thinks that he or she is more, equally, or less likely than others to experience a given event in his lifetime (Milhabet et al., 2002). In the indirect method, participants are asked to estimate the probability of an event happening to them and the probability of it happening to another person of the same age and gender. In relation to a question, participants give two answers (on a scale from very unlikely to very likely), one for themselves and one for another person.

To explain the emergence or expression of CO and the reasons for its intra- and inter-individual variations, researchers in this line of research (Agostini, 2008 ; Milhabet, 2010 ; Shepperd et al., 2002) agree on two explanations: cognitive explanations (the positivity bias of individuals, the heuristics of representativeness and availability, and egocentrism) and motivational explanations (the defence against anxiety about a threatening future and the defence of the self-image, see Milhabet et al, 2002 for a review). Factors such as the frequency of events, their controllability, their severity, and the characteristics of the reference target are also some determinants of CO (Krzeminski, 2015).

1-3. Comparative optimism and risk taking

The relationship between comparative optimism or optimism bias and risk-taking in general has already been the subject of some research (Delhomme & Meyer, 2000 ; Kouabenan, 2007 ; Mvessomba et al., 2017 ; Nguetsa, 2012). Although the beneficial effects of optimism in general and comparative optimism in particular on health behaviours are fairly well known

(Taylor & Brown, 1988 ; Taylor et al., 2012), few studies have sought to examine its reverse consequences on health behaviours.

Several studies have established a negative link between overly optimistic beliefs and the adoption of risky behaviours (Burger & Burns, 1988 ; Dillard et al., 2009 ; Weinstein et al., 1998). According to Amor and Taylor (1998), three types of consequences can be produced as a result of extremely optimistic or even comparative beliefs: disappointment, disillusionment, and self-endangerment. A study conducted by Burger and Burns (1988) showed that individuals who underestimated their risk of contracting a sexually transmitted disease engaged in more risky behaviours such as unprotected sex, than those who realistically estimated their risk. Dillard et al. (2009) showed in a longitudinal study that optimism, when it became unrealistic, led students to adopt risky behaviours for their health, particularly in terms of alcohol consumption. Other studies (Kouabenan et al., 2007; Nguetsa, 2012 ; Nguetsa & Kouabéna, 2014) have also shown that comparative optimism, as a perceptual bias, causes distortions that lead to insecure behaviours. For Kouabenan et al. (2007), comparative optimism has two sides (a positive and a negative side). Its positive side concerns the fact that it leads to a high level of motivation, reduces anxiety and makes it possible to cope better with illnesses when they are already manifest. The negative side is that it leads to maladaptive behaviours and low motivation to engage in precautionary behaviours. This does not allow the individual to make efforts to protect himself from the risk to which he is exposed. This position is also defended by Nguetsa (2012). According to him, if positive illusions can be beneficial for a patient undergoing therapy, they do not always seem favorable to the adoption of safe behaviours in the face of risks.

Several researches have examined the consequences of optimism bias on smoking behaviour (Arnett, 2000 ; Borrelli et al, 2016 ; Masiero et al., 2015 ; Morell et al, 2015 ; Popova & Halpern-Felsher, 2016). Morell et al. (2015) suggest that adolescents' perceptions of themselves as less physically vulnerable than others predict their future smoking behaviour. Indeed, in a longitudinal study of 228 high school adolescents, they examined the relationship between the illusion of vulnerability and smoking. They concluded that feelings of vulnerability (the tendency to believe that one is less likely to be harmed than others) create positive illusions that lead adolescents to take more risks because they believe that they are less likely to be harmed than their peers. In a similar vein, other studies (Meyer & Delhomme, 2000; Weinstein, 1989) have shown that optimism bias leads to risk denial and the trivialisation of awareness campaigns.

Borrelli et al. (2016) conducted research to investigate the relationship between optimism bias and intention to quit and abstain in a population of adult smokers (n=237). Their results showed that adults who persisted in

smoking were more likely to have an optimism bias about the risk of smoking-related diseases. Their perception of risk was low compared to their peers and they perceived fewer benefits from quitting (Borrelli et al., 2016). A study by Masiero et al. (2015) aimed to examine the relationship between optimism bias and smoking habits in a population of 633 participants consisting of smokers, ex-smokers and non-smokers. These researchers showed that the optimism bias developed by people who think they have a low probability of having a health problem compared to others, initiates tobacco use in non-smokers, reinforces and maintains tobacco use in smokers and increases their duration of use over the course of their life. These authors believe that people who are subject to such a bias are actually putting themselves at risk without knowing it because of distortions in risk assessment that lead them to underestimate the risks and overestimate their ability to control and tolerate the risk. Masiero et al.' (2017) work on comparative optimism suggests that this belief is a barrier to the adoption of preventive behaviours and fuels smoking behaviour by hindering the effectiveness of smoking cessation for example. CO would therefore lead individuals to perceive themselves as invulnerable and therefore to ignore the risks associated with smoking. The studies on the link between comparative optimism and tobacco consumption mentioned above reveal the perverse side of comparative optimism. Indeed, when it is unrealistic, comparative optimism can lead to the adoption of unwise or even dangerous behaviours such as smoking.

It is clear from this research that the nature of the relationship between comparative optimism and protective behaviour remains unclear. This is because some of this research has found that optimism bias has beneficial effects on protective behaviour (Taylor & Brown, 1988 ; Taylor et al., 2012), while other research has failed to replicate these findings and in some cases has found the opposite Morisset, Terrade and Somat (2010). A critical review of the literature linking CO and smoking behaviour highlights the paucity of such studies in the African context in general, and Cameroon in particular. The use of beliefs to explain complex phenomena has been highlighted in several studies (Kouabenan, 2007 ; Mvessomba et al., 2017). In view of these theoretical considerations, this study aims to investigate the influence of comparative optimism on the intention to use tobacco among Cameroonian adolescents.

Several theories are regularly used to explain and predict risk-taking in different domains (health belief model, protective motivation theory, theory of reasoned action and theory of planned behaviour). With regard to risk taking related to tobacco use, the theory of planned behaviour has been widely used. Theoretical considerations relating to the theory of planned behaviour suggest that behavioural intention is determined by three factors which are attitude, subjective norms and behavioural control (Ajzen, 2012). With reference to the

work on comparative optimism which has shown that overly optimistic tendencies lead to the adoption of dangerous behaviours in some individuals (Dillard, 2009), we put forward the general hypothesis that comparative optimism drives the intention to use tobacco among Cameroonian adolescents. This general hypothesis has given rise to four specific hypotheses. Operationally, we expect that the illusion of vulnerability will lead to favourable attitudes towards tobacco use (H1). In addition, we hypothesize that the illusion of vulnerability will elicit a perception of descriptive norms favourable to smoking (H2). We also expect the illusion of vulnerability will elicit a perception of injunctive norms favourable to tobacco consumption (H3). Furthermore, we also hypothesize that the illusion of vulnerability will elicit a high perception of control over smoking behaviour (H4).

1-5. MATERIALS AND METHODS

1-5-1. Participants and procedure

For this study, 244 non-smoking Cameroonian adolescents in upper secondary education, consisting of girls (n=110) and boys (n=134), aged between 14 and 25 years were recruited in the city of Yaounde in two schools: the Ngoa-Ekelle high school and the National Institute of Youth and Sports (NIYS). Those from the Ngoa-Ekelle high school were preparing for entrance examinations to Cameroonian high schools, while those from the NIYS were taking part in the "Sports, Leisure, Holidays" activities that are organised during each holiday period. To select the participants for our study, we used the purposive sampling technique. This technique allowed us to work with participants who met pre-defined criteria. Only those between the age of 14 and 25 and those with at least a first level of education and no more than a bachelor's degree were included in the sample.

1-5-2. Measures

Comparative Optimism

Comparative optimism is considered as an independent variable of this study. It was measured using the direct elicitation method by five items. Example of item: The probability for me, compared to a peer of the same age and sex as me, of getting lung cancer by smoking is ($\alpha = 0.862$, $k=5$).

Intention to use tobacco

The intention to use tobacco was the dependant variable of this study. It was measured through the behavioural intention scale inspired by the theory of planned behaviour (15 items). This theory states that behavioural intention is a function of three important constructs: attitude towards the behaviour, subjective norms and perceived behavioural control. We will therefore measure the intention to smoke through the different constructs of the theory

of planned behaviour. Subjective norms will be measure by distinguishing descriptive norms and injunctive norms as recommended by Mvessomba et al. (2017).

Four items measuring attitude towards smoking. Example of item: For me, starting to smoke in the next three months will not be pleasant ($\alpha = 0.70$, $k=4$). Seven items were used to measure subjective norms including three for descriptive norms. Example item: most of my friends smoke and four items were used to measure injunctive norms. Example of item: My friends would approve of me starting to smoke in the next three months ($\alpha = 0.714$, $k=07$ items), one item was used to measure intention directly. Example of item: I intend to start smoking cigarettes in the next three months. Three items were used to measure perceived behavioural control: Example of item: (If I decided to, it would be easy for me to start smoking cigarettes in the next three months ($\alpha = 0.64$, $k=4$).

1-6. RESULTS

The data from this study are analysed in two stages. First, correlations are examined in order to explore the links between the different variables. Secondly, regressions are applied to examine the explanatory weight of each of the modalities of the illusion of vulnerability on the variability of the intention to use tobacco.

Table 1. Correlation between the modalities of comparative optimism and those of the intention to use tobacco

	1	2	3	4	5	6
Attitude						
Descriptives Norms	,166**					
injunctives Norms	,270**	,540**				
Percieved Behavioral control	,042	,369**	,383**			
IVRPhy	-,092	,194**	,095	,029		
IVRPsy	-,185**	,177**	,161*	,021	,672**	

Note. IVRPhy = Illusion of vulnerability associated with psychological impacts; IVRPsy = Illusion of vulnerability associated with physical impacts

Table 1 presents the correlation matrix obtained by crossing the illusion of vulnerability and its modalities (illusion of vulnerability associated with psychological repercussions and illusion of vulnerability associated with physical repercussions) with the intention to use tobacco. With regard to attitude towards the desire to smoke, the results show that the illusion of

vulnerability is negatively and weakly correlated with the attitude towards the desire to smoke ($r = -.141, p < .05$). This result means that the less vulnerable an adolescent feels to the risks associated with smoking compared to his or her peers, the more likely he or she is to develop a favourable attitude towards the desire to smoke. A detailed examination of these results reveals a weak negative correlation between the illusion of vulnerability associated with the psychological consequences of smoking and the attitude towards the desire to smoke ($r = -.185, p < .05$). This means that the more an adolescent believes that he is less likely to contract a disease related to tobacco use that affects mental health, the more likely he is to develop a favourable attitude towards the desire to smoke.

With regard to descriptive norms, the results show a weak and direct link between the illusion of vulnerability and descriptive norms ($r = 0.204, p < .01$). In concrete terms, this means that the more an adolescent believes that he is less vulnerable to the risks associated with

smoking compared to his peers, the more likely he is to believe that his environment is favourable to smoking behaviour. The correlations between the indicators of the illusion of vulnerability and the descriptive norms reveal a weak and direct link between the illusion of vulnerability associated with psychological repercussions and the descriptive norms ($r = 0.177, p < .01$). This result suggests that the more an individual believes that he is less likely to develop a smoking-related disease that impacts psychological health, the more likely he is to believe that smoking is fashionable in the community. Furthermore, the illusion of vulnerability associated with physical impact is also weakly and positively correlated with descriptive norms ($r = 0.194, p < .01$). This association suggests that when an adolescent believes that he is less at risk of contracting a disease whose repercussions impact his physical health, he will tend to believe that his entourage is favourable to cigarette consumption.

With regard to injunctive norms, the results show that the illusion of vulnerability is positively and weakly correlated with injunctive norms ($r = .132, p < .05$). According to these results, the more an adolescent believes that he is less vulnerable to the risks associated with smoking compared to his peers, the more likely he is to believe that those around him approve of the smoking behaviour. The correlations resulting from the cross-tabulation between the modalities of the illusion of vulnerability and the descriptive norms show that the illusion of vulnerability associated with psychological repercussions is positively and weakly correlated with the injunctive norms ($r = 0.161, p < .05$). According to this result, the more a person believes that she is less at risk of contracting a disease related to tobacco consumption whose repercussions impact mental health, the more likely she

will believe that those around her approve of cigarette consumption. The correlation analyses conducted here were followed by regression analyses to identify the best predictors of the modality of intention to smoke.

Table 2. Regression of the dimensions of the vulnerability illusion against the modalities of the intention to use tobacco

R=,182 ; R Square =,033 ; Adjusted R Square =,025 Standard error of the estimate =1,07175 ; F=4,129 ; P=,017 (A)						
R=,204 ; R Square =,042 ; Adjusted R Square =,034 ; Standard error of the estimate =,85664 ; F=5,232 ; p=,006 (B)						
R=,162 ; R Square=,026 ; Adjusted R Square =,018 ; Standard error of the estimate =,83838 ; F=3,229 ; p=,041 (C)						
	Model	Unstandardized Coefficients	Standard error	Bêta standardized Coefficients	T	P
	(Constant)	1,857	,188		9,881	,000
Attitude (A)	IV physical repercussions	-,046	,075	-,052	,613	,540
	IV psychological repercussions	,189	,076	,213	2,491	,013
Descriptives Norms (B)	(Constant)	1,510	,150		10,053	,000
	IV physical repercussions	,098	,060	,138	1,620	,107
	IV psychological repercussions	,060	,061	,084	,985	,326
Injunctives Norms (C)	(Constant)	1,314	,147		8,936	,000
	IV physical repercussions	-,016	,059	-,023	-,273	,785
	IV psychological repercussions	,122	,059	,176	2,055	,041

Note. A= Regression of illusion of vulnerability dimensions against attitude; B= Regression of illusion of vulnerability dimensions against descriptive norms; C= Regression of illusion of vulnerability dimensions against injunctive norms

Table 2 highlights the regressions of the dimensions of the vulnerability illusion against the modalities of the intention to use tobacco.

With regard to the regression model of the dimensions of the illusion of vulnerability against attitude, the results show that the model is significant ($F=4.129$; $p=.017$) and explains 3.3% of the variance in attitude ($R^2=.033$). These results also reveal that the illusion of vulnerability associated with psychological events is a significant predictor of attitude towards the desire to smoke ($F=.213$; $p=.013$). In terms of the regression model of the modalities of the illusion of vulnerability against the descriptive norms, the results suggest that the proposed prediction model is significant ($F=.232$; $p=.006$) and explains 4.2% of the variance in the descriptive norms for smoking ($R^2=.042$). An examination of the different predictors in this model shows that only the illusion of vulnerability associated with risks with psychological repercussions is a predictor of descriptive norms for smoking ($F=.985$; $p=.036$). With regard to the regression model of the modalities of the illusion of vulnerability against the injunctive norms, the results show that the proposed prediction model is significant ($F=3.229$; $p=.041$) and explains 2.6% of the variance of the injunctive norms with regard to smoking among the participants ($R^2=.026$). An examination of the different predictors in this model shows that the illusion of vulnerability associated with risks with psychological repercussions is a predictor of the perception of explicit social norms ($F=.176$; $p=.041$).

Discussion and conclusion

The objective of this study was to examine the influence of comparative optimism on the intention to use tobacco among Cameroonian adolescents. The results obtained confirm the hypothesis of an influence of optimism bias on the intention to smoke. Based on the theory of planned behaviour, we showed that the intention to smoke is determined by attitude towards smoking, descriptive norms and injunctive norms regarding smoking. With regard to attitude, the vulnerability illusion associated with comparative optimism is attractive to the desire to use tobacco when it is favourable. This illusion of vulnerability is more influential on attitude when it relates to events that have a psychological impact on the individual.

When referring to the health belief model (Champion & Skinner, 2008) several explanatory possibilities are available. This theory states that an individual's risk behaviour is determined by a set of risk beliefs that predict why a person will engage in a behaviour to prevent, test for or control a disease. It is the adherence or non-adherence to these beliefs that leads to the adoption or non-adoption of a behaviour. Before acting, the individual will assess his vulnerability and the perceived seriousness of the problem he or she faces. It is the assessment of the threat that will determine their decision to act on the prevention behaviour or not. In the context of smoking, adolescents will assess their risk of contracting a disease such as hypertension with psychological consequences (addiction for example) and the perceived severity (serious

consequences) of that disease if they were to contract it. Those who think they are less likely to get it and that it will be less serious for them compared to their peers are the ones who will develop favourable attitudes towards smoking in the future. The intention to use tobacco will therefore depend on these attitudes. Attitude appears here to be a determinant of smoking behaviour in that it predicts the intention to smoke or not. These results are in line with the work done by Mohammadpoorasl et al. (2012). In a study examining factors influencing smoking intention among Iranian adolescents, these authors showed that having a positive attitude (favourable attitude) towards smoking was strongly associated with the intention to start smoking in the near future.

With regard to descriptive norms, the results obtained show that the illusion of vulnerability influences the intention to use tobacco through a favourable perception of descriptive norms regarding tobacco use. The results of this study show that optimistic adolescents perceive that the majority of significant people in their environment use tobacco. This perception is likely to influence them to use tobacco because of conformist pressures. An explanation of these results can be made by referring to the theory of planned behaviour. Indeed, this theory postulates that behavioural intention and, by ricochet, the behaviour itself, can be predicted by normative beliefs considered as the perception of the influence of the entourage with regard to the fact of adopt or not a specific behaviour. The individual's behaviour would therefore be strongly influenced by external elements, in general, and peers in particular. The work of several researchers is in line with this logic (Benzinovic & Malatestinic, 2009; Kpomezouen et al., 2015). Those researches have shown that smoking behaviour is the result of social influence.

With regard to injunctive norms, the results showed that when they are favourable, the illusion of vulnerability elicits the intention to use tobacco among Cameroonian adolescents. With reference to the theory of planned behaviour, a plausible explanation for this result is that implicit pressure from significant others affects the individual's beliefs. This theory postulates that behaviour is determined by a set of factors that are themselves derived from beliefs. In relation to smoking behaviour, the TCP indicates that the adoption of this behaviour is determined by the individual's evaluation of the consequences of the behaviour he or she will adopt. Faced with risks with psychological repercussions such as hypertension and addiction, the individual who believes that these risks are minimisable insofar as it is his peers who are more exposed will be more suggestible than the individual who believes that the risks incurred will have serious consequences for his physical and mental health. We also note that the perception of vulnerability, when it comes to risks with psychological repercussions, leads individuals to adhere more to the influence of significant others. This is not the case when it

concerns risks with physical repercussions (cancer or lung infection). The explanation that can be given for this result is that adolescents who intend to use tobacco through their adherence to explicit norms regarding tobacco use think that risks with psychological repercussions are less severe than risks with physical repercussions. This way of thinking is probably due to the idea that these adolescents have of the images about the consequences of smoking in awareness campaigns (for example the broadcasting of images of smokers with throat cancer, mouth cancer).

In terms of perceived behavioural control, the lack of relationship observed between the illusion of vulnerability and this modality of the intention to smoke could be explained by the fact that smoking behaviour is most often beyond voluntary control, especially among individuals who already have some psychological dependence on cigarettes. On the other hand, these results could also be explained by the fact that the decision to start smoking requires resources and the existence of an opportunity to perform the desired behaviour. Thus, if adolescents do not perceive the existence of opportunities or resources (money to buy cigarettes for example) to carry out the desired behaviour, their intention will disappear due to the absence of facilitating conditions and resources (Ajzen, 2012). The optimism bias does not always seem to lead to negative behaviour.

Although the results we have arrived at offer a perspective on the explanation of smoking behaviour, this study has some limitations. The fact that other variables, such as socio-demographic variables, also influence the intention to smoke reduces the significance of these results. In fact, these so-called secondary variables in this study have considerable explanatory weight in the explanation of smoking behaviour.

A first limitation of this study is linked to the fact that it deals with a sensitive behaviour. This probably induced a social desirability bias among the participants, leading them to give incorrect answers. A second limitation of this study is related to the methodological approach used. This approach is likely to account for some of the weaknesses of this work, particularly in terms of the results. Firstly, the sample size was not large enough ($n=244$). Also, the population would certainly have allowed the study to gain internal validity if it had had a population of adolescent smokers as was the case in most previous studies (Borrelli et al, 2016 ; Masiero et al, 2015; Morell et al, 2015; Popova & Halpern-Felsher, 2016) , Third, the fact that this study is correlational in nature calls for caution in interpreting the results as a causal relationship was not established between comparative optimism and intention to use tobacco. Further studies are needed to corroborate the results obtained.

Conflict of interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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