Adapting The Driver Behaviour Questionnaire (DBQ) To The Cameroonian Context

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***Abstract*—In Cameroon, road accidents continue to cause deaths, yet there are numerous regulations governing road safety. Problems remain, resulting in the non-availability of indicators that can be used to set quantifiable targets for road traffic accidents (EPSR, 2018). While the vast majority of accidents are related to dangerous road user behaviour (Beaulieu, 2009), it seems appropriate to focus on offences, errors and mistakes in driving. The DBQ (Reason et al., 1990) seems to be the appropriate instrument for this purpose as it assesses the driving behaviour of individuals and thus measures the reported risk behaviour of drivers. 379 participants were selected in the cities of Yaoundé and Dschang, including 240 men and 139 women aged between 18 and 55 years. We administered a version of the DBQ adapted to France comprising five dimensions with a total of 42 items. Two analyses were carried out with the collected data. A first analysis, which is a factorial analysis, resulted in the deletion of 20 items and a new factorial structure of the DBQ with three factors. A second analysis, which is confirmatory, confirmed the results of the exploratory analysis and allowed us to have a robust model that explains the adoption of dangerous behaviours during the driving activity in the Cameroonian context.**

Keywords— DBQ (Driver Behaviour Questionnaire), risk behaviour, road accidents)

I. INTRODUCTION

In Cameroon, from 1994 to 2005, there were about 41041 cases of traffic accidents, including 58,147 injuries and 11488 deaths (Ngoumbe, 2011) [1]. In 2007, 3277 accidents were recorded, resulting in 990 deaths and 4829 injuries, compared to 3739 accidents in 2006 (MINT, 2012) [2]. In 2008, there was an increase in the number of accidents to 3566, resulting in 1157 deaths and 5370 injuries (SED, 2009) [3]. In 2010, the Cameroonian National Gendarmerie noted 3503 accidents resulting in 1258 deaths and 5292 injuries. Overall, Cameroon recorded a total of 116,281 accidents over the period 2008 to 2014, an average of 16,583 accidents per year (a daily average of 46 accidents). In 2015, there were 2895 traffic accidents with 1091 deaths; 2865 accident cases with 1196 deaths in 2016; 2344 accidents with 937 deaths in 2017; 1898 accident cases with 782 deaths in 2018; 1533 accidents with 627 deaths in 2019. 3275 people died as a result of traffic accidents in 2020 in Cameroon (CYSCOM, 2021) [4].

This situation on the number of deaths has pushed the State of Cameroon to take measures capable of making the roads less dangerous for the different types of users. A strong legislation accompanies road safety and is governed by an abundance of regulations through a set of conventional, legislative and regulatory texts, including 9 conventions, 6 laws, 9 decrees, 14 orders, 7 decisions and 6 circulars (MINT, 2021) [2].

The Evaluation of Road Safety Performance in Cameroon (EPSR, 2018) [5] identified a number of safety-related problems in the organizational and operational aspects of road safety data collection and management, regulation, and human, material and financial resources as described in the general context of this thesis.

These difficulties lead to the non-availability of indicators that would enable the Cameroonian State to set quantifiable objectives based on the occurrence of road traffic accidents. The actions to be undertaken must take into account the establishment of the bases for a rational and effective management of road safety actions with, among others, the development of tools to assist in the decision making and management of actions, the reinforcement of the capacities of the actors and the structures to be put in place. Indeed, if the
values of the indicators related to the behaviour of users and the road environment were available, the reduction of the accident causality thresholds related to each aspect should constitute a target and the values of these indicators should be used as a basis for establishing the initial situation. It is therefore necessary to provide decision-makers with real indicators based on viable and reliable statistics, mainly on accident causes, which will serve as a framework for the implementation of even more effective prevention strategies.

Knowledge of the causal network of accidents should make it possible to design more effective prevention programmes. Traffic accidents are complex, contingent and multi-factorial phenomena, so solutions are not exclusive or complete. The behaviour of drivers, the evaluation of prevention programmes, the role of education, etc. are areas that are perceived to be without certainty to date in Cameroon. However, their relevance to improving road safety remains considerable (EPSR, 2018) [5].

The effectiveness of action and its evaluation are two concerns of road safety policy that have been consistently applied to regulatory action, the mainstay of road prevention (EPSR, 2018) [5]. The regulation of certain risky behaviours and the policy of dissuasion through severe repression then become the main supports of prevention. The objective of dissuasion combines regulations (alcohol, speed, belts, helmets, etc.) with the conditions for their effective implementation by the institutional bodies responsible for enforcing them. With this policy, regulatory action is accompanied by an obligation to achieve results in the short term, i.e. a reduction in the number of road accidents in the short term. All these prevention and road safety measures still leave some grey areas and traffic accidents are not decreasing. Only for the current year 2021, there is an increase in accidents with many victims. The Ministry of Transport reported 40 deaths in three accidents in 24 hours in August (MINT, 2021) [2]. Many road users continue to adopt dangerous behaviour that cannot be measured by the various prevention and road safety actions undertaken by the government and its partners.

The vast majority of accidents are linked to dangerous behaviour by road users (Beaulieu, 2009) [6]. Evaluating reported unsafe driving behaviour is a possible solution for even more effective prevention. The focus of this study is on offences, errors and mistakes in driving,risky or dysfunctional drivers, attitudes and character traits that encourage dangerous driving.

In this study, we chose to use the DBQ (Reason et al., 1990) to assess individuals' driving behaviour and thus measure reported risk-taking behaviour. The DBQ is now widely used to capture different types of maladaptive or aberrant driver behaviour, namely violations, errors and failures. More specifically, Reason et al (1990) [7] divide unsafe behaviour into two classes: violations or deviations and errors. Violations (deviations) refer to deliberate transgressions of social codes or rules. They therefore have a motivational component. Errors are the result of a deficiency in information processing and are related to the individual's cognitive functions. There are three types of errors: mistakes, gaps and slips of the tongue. Mistakes refer to the failure of a planned action to achieve a goal, while lapses and slipses refer to attention or memory failures (Reason et al., 1990) [7]. One of the differences between deviations and errors is whether the behaviour is intentional or not. While errors can be remedied by, for example, better information, the same cannot be said for transgressions, for which it is necessary to change attitudes (Parker et al., 1995 [8]; Reason et al., 1990) [7].

Studies using the DBQ have shown that road accidents are predicted mainly by deviations and errors. Indeed, the deviation factor would be the most important predictor of active and passive accidents (Winter & Dodou, 2010 [9]; Lawton et al., 1997[10]; Parker et al., 1995[8]), whereas in the elderly, it is the error (active accidents) and failure (passive accidents) factors (Parker et al., 2000) [8].

Lawton et al (1997) [10] distinguish between two types of deviations: ordinary deviations or simple deviations, defined as deliberate deviations in conduct that do not have an aggressive purpose, and aggressive deviations, which concern the violation of generally accepted social norms of conduct and refer to aggressive interpersonal violence. Aberg and Rimmo (1998) [11] distinguish three types of errors: dangerous errors (faults), which correspond to the errors of Reason et al. (1990) [7], errors due to inattention (lapses) and errors due to inexperience (gaps), the latter two corresponding to the failures of Reason et al. Furthermore, based on the idea that the aberrant behaviours measured by the DBQ (errors and deviations) are not the only behaviours that drivers use in everyday life, Ozkan and Lajunen (2005) [12] added a scale of positive driving behaviours to the original DBQ. These behaviours, governed by the intention to pay attention to traffic and other road users, can sometimes lead to errors and violations.

The DBQ has been applied in several countries such as Qatar and the United Arab Emirates (Bener et al., 2008) [13], the United States of America (Owsley et al., 2003) [14], China (Xie & Parker, 2002) [15], Australia (Blockey & Hartley, 1995 [16]; Lawton et al, 1997[10]), Sweden (Rimmö & Hakamies-Blomqvist, 2002 [17]; Aberg & Warner, 2008[18]), Greece (Kontogiannis et al., 2002) [19], Holland (Lajunen et al., 1999) [20], France (Obriot-Claudel & Gabaude, 2004) [21], New Zealand (Sullman et al., 2000) [22], Turkey (Ozkan & Lajunen, 2005 [12]), and England (Parker et al., 1995) [8]. The questionnaire does not have a stable, three-factor structure, as originally proposed by Reason et al. (1990) [7], but varies between two and five factors. This variation is mostly due to the cultural specificities of the observed driver population. A series of studies have investigated the cross-cultural nature of the test and, in general, it is observed that the British tend to report three-factor structures, whereas in other driver populations (China, Australia, United Arab Emirates) the structure tends to be different.

The fact that the instrument is culturally sensitive and that the items can be interpreted in different modalities according to culture, draws further attention to the importance of detailed knowledge of the population on which the instrument will be applied, but also to the quality of the translation and adaptation.

A study on a Chinese population shows a five-factor structure. In a study of a Chinese population, a five-factor structure was found, errors were distinguished into errors/deviations due to lack of experience and errors due to distracted attention, and deviations were distinguished into aggressive deviations and risky deviations. The fifth factor is a factor specific to the Chinese population, referred to by the authors as intentional deviation, which contains items on inter-vehicle distance and distracted driving

(Shia et al., 2010) [23]. This fact indicates that cultural factors should be taken into account when studying aberrant driving behaviour. The factors identified by the authors are consistent with those identified in the literature: aggressive deviations, habitual deviations, errors, and gaps.

II. Objective of the Study

The original version of the DBQ by Reason et al (1990) has been validated or adapted in several countries such as France, Great Britain, Finland, the Netherlands, China, etc. (ObriotClaudel & Gabaude, 2004 [21]; Lajunen et al, 2004 [20]; Shia et al, 2010[23]). To our knowledge, the validation or adaptation of the tool with an African population in general and Cameroon in particular, has not been published to date. The objective of this study is therefore the adaptation of a Cameroonian version of a new version of the DBQ allowing for the differentiation of deviations, errors and failures.

III. Operational Assumptions

- H1: The structure of the new version of the DBQ should have a maximum of 6 factors and a minimum of 3 factors to remain consistent with older versions;
- H2: The chosen measurement variables and the dimensionality of the scale are in line with the pre-established theory.

IV. Method

In this methodology-related section, we present our research objectives, our hypotheses, our material, our participants, the collection procedures, the statistical tool that allowed us to analyse the data collected, the results obtained from this collection and the discussion.

A. Material The DBQ

The questionnaire we used for this study is the Drivers Behaviour Questionnaire (DBQ). The DBQ is one of the most widely used questionnaires for assessing risk behaviour in traffic (Reason et al., 1990). This instrument measures two different psychological determinants that underlie the occurrence of road accidents. These are referred to as dangerous behaviours and refer mainly to errors and deviations. Errors are operationalised in three modalities, namely slips of the tongue, gaps and mistakes. Deviations are operationalised in two modalities, namely simple deviations and aggressive or unintentional deviations. These concepts have been discussed by Reason et al. (1990) and (Lajunen, 2003; Shi et al., 2010). The DBQ that we administered thus consists of five factors (lapses, gaps, mistakes, simple deviations and aggressive deviations) with a total of 42 items. The slips are measured by 5 items "*Check your speedometer and discover that you are unknowingly travelling faster than the legal limit; Forget where you left your car in a car park"*; the gaps are measured by 7 items "*Poorly plan your route to avoid traffic jams that you could have avoided; Misjudge your crossing interval when turning right and narrowly miss the collision"*; faults are measured by 6 items "Fail *to yield when a bus signals its intention to pull out; Misjudge the speed of the oncoming vehicle when overtaking"*; Simple deviations by 17 items "*Intending to drive to destination A, you end up on road B instead, where the latter is the more usual route; Become impatient with a slow driver in the outside lane and overtake on the inside; Try to overtake without checking your rear-view mirror first, and then let yourself be hooted at by the car behind which has already started its overtaking maneuver*" and aggressive diversions by 8 items "*Lost in your thoughts, you forget that your lights are on full beam until they are flashed by other motorists; Attempting to overtake a vehicle you had not noticed meant its intention to turn left".*First, confirm that you have the correct template for your paper size. This template has been tailored for output on the A4 paper size. If you are using US letter-sized paper, please close this file and download the file "MSW_USltr_format".

B. Participants and procedure

In order to obtain the largest and most diverse sample possible in terms of age and gender, we collected data in person in the cities of Dschang and Yaoundé. The surveys were conducted individually, after informed consent from the participants. The interviews were completely anonymous, with individuals identified only by the day and time of the end of the interview.

The questionnaire consisted of 42 items and the time taken to complete it was estimated to be 10 to 15 minutes maximum. On the first page of instructions, the purpose of the study was presented. Participants were then asked to complete the 42 randomised items that make up a version of the DBQ. Only the results of participants with an all-capacity B licence (light vehicle) were retained. Participants with a licence other than the licence were not considered in this study. The sample was thus composed of 379 participants, including 49 men and 25 women, aged between 18 and 25 years; 121 men and 77 women aged between 25 and 50 years; and 70 men and 37 women aged over 50 years.

Table 1 : Numbers by gender and age group

		Age			Total
		18-25 **years**	25-50 **years**	Plus de 50 **years**	
Gender	man	49	121	70	240
	woman	25	77	37	139
Total		74	198	107	379

C. *Statistical analysis*

For the validation of the DBQ, we conducted two analyses. The first analysis is exploratory through principal component analyses with Varimax rotation, which are completed by homogeneity tests by calculating Cronbach's alpha. In a second analysis, we carry out the confirmatory analysis with the factors retained from the first analysis to confirm the robustness of the model.

V. **Results**

In this section on results, we have proceeded with two separate analyses. The first is exploratory and the second confirmatory.

A. **Exploratory analysis**

In order to explore the factor structure of the DBQ, principal component analyses (PCA) with orthogonal varimax rotation were performed on all 42 scale items. After each rotation, only items with a factor weight ≥ .4 were retained. In total, we needed four rotations to have a scale structure where the factor weight of all items was ≥ .4. In the first rotation, we had a structure with 7 factors whose eigenvalues were greater than 1 and explained 53.384% of the variance. We had 8 items with good indices but which contributed to the formation of more than one axis. Two items were also removed from the analysis because their factorial weight was less than 0.4. These were one gap item and one aggressive deviation item. In the second rotation, 5 factors with eigenvalues greater than 1 explained 51.171% of the variance. Six items, although presenting good indices, were removed from the analysis because they contributed to the formation of more than one axis. These were 2 slip items, 1 gap item, 1 mistake item and 6 simple deviation items. 1 slip item was removed from the analysis because its factor weight was less than 0.4. In the third rotation, 5 factors with eigenvalues greater than 1 explained 51.179% of the variance. Two items were removed from the analysis because they contributed to the formation of more than one axis despite the good indices. These were a fault item and a simple deviation item.

In the fourth rotation, 4 factors whose eigenvalues are greater than 1 and explain 53.934% of the variance. One item was removed from the analysis because its factor weight was less than 0.4; it is an aggressive deviations item. In the fifth rotation, we had a structure with three factors explaining 51.323% of the variance and all remaining items showed good indices. We completed the exploratory analysis after these five rotations. The Kaiser-Meyer-Olkin measure of sampling precision yielded a KMO value =0.943; an approximate Chi-square= 2842.188 with a significance of p=0.00. Table 6 presents the total explained variance of the factors.

Table 2 : *Total variance explained*

Component	**Initial eigenvalues**			**Sum of squares of the factors used for the rotation**		
	Total	% of variance	% **Cumulative**	Total	% of variance	% **Cumulative**
1	8,667	39,395	39,395	4,868	22,128	22,128
2	1,396	6,344	45,740	4,587	20,849	42,977
3	1,228	5,583	51,323	1,836	8,346	51,323
4	,934	4,245	55,568			
5	,830	3,772	59,339			
6	,810	3,682	63,022			
7	,768	3,490	66,512			
8	,698	3,172	69,685			
9	,667	3,033	72,718			
10	,618	2,810	75,528			
11	,598	2,716	78,244			
12	,581	2,640	80,884			
13	,557	2,530	83,414			
14	,537	2,442	85,856			
15	,489	2,222	88,078			
16	,453	2,058	90,136			
17	,432	1,961	92,098			
18	,403	1,831	93,929			
19	,373	1,694	95,623			
20	,341	1,552	97,175			
21	,332	1,508	98,683			
22	,290	1,317	100,000			
Méthode d'extraction : Analyse en composantes principales.						

Table 2 presents the results of the total variance explained. From this table we can read that only three factors have an eigenvalue greater than 1 and explain 51.323% of the variance. The first factor represents 22.128% of the explained variance, the second factor 20.849% and the third factor 8.346%. We now look at the items selected on each of the factors.

Table 3 : *Component matrix after rotation*

	Composante		
	1	2	3
Ne pas remarquer un piéton qui sort de derrière un autobus ou un véhicule stationné jusqu'à ce qu'il soit presque trop tard	,769		
Perdu dans ses pensées ou distrait, vous ne remarquez pas le piéton qui attend à un passage piéton	,702		
Tenter de s'éloigner des feux de circulation en troisième vitesse	,701		
Conduire délibérément dans le mauvais sens dans une rue déserte à sens unique	,662		
Tenter de dépasser un véhicule que vous n'aviez pas remarqué qui signalait un virage à gauche ou à droite	,649		
Participer à des «courses» non officielles avec d'autres automobilistes	,640		
Oublier l'expiration de votre taxe routière / assurance et découvrir que vous conduisez illégalement	,629		
Perdu dans vos pensées, vous oubliez que vos lumières sont en plein phare jusqu'à ce qu'elles soient «flashées» par d'autres automobilistes	,552		
Irriter par le comportement d'un autre conducteur, vous le poursuivez avec l'intention de lui montrer votre mécontentement	,497		
Freiner trop rapidement sur une route glissante et / ou tourner dans le mauvais sens en cas de dérapage		,707	
Manquer votre sortie sur une autoroute et devez faire un long détour		,684	
Cogner quelque chose que vous n'aviez pas vue auparavant lors d'une marche arrière		,680	
Coincer derrière un véhicule lent sur une autoroute à deux voies, vous êtes poussé par la frustration à essayer de doubler dans des circonstances risquées		,652	
Évaluer mal votre intervalle de croisement lorsque vous tournez à droite et manquez de peu la collision		,639	
Prendre la mauvaise voie au rond-point ou à l'approche d'un carrefour		,598	
. Mauvaise évaluation de la vitesse du véhicule venant en sens inverse lors d'un dépassement		,575	
Dépasser un véhicule lent sur la voie intérieure d'une autoroute		,530	
Tenter sa chance et croiser des lumières qui sont devenues rouges		,500	
Dans l'intention de vous rendre en voiture à la destination A et vous vous surprenez d'être dans la destination B car cette dernière est votre destination la plus habituelle		,498	
Vérifier votre compteur de vitesse et découvrez que vous avez dépassez la limite de vitesse autorisée sans le savoir			,721
Tenter de déplacer la voiture sans avoir mis le contact au préalable			,695
Ne pas remarquer les piétons qui traversent en tournant dans une rue secondaire à partir d'une route principale			,545

Table 3 represents the component matrix after rotation. In accordance with Table 7, it indicates that effectively 3 factors were retained after factor extraction. We can observe the different items that contribute to the formation of each axis. The first axis, which is made up of deviations, explains 51.323% of the variance and is made up of 9 items including 1 gap, 3 simple deviations and 5 aggressive deviations. The items saturating on this axis all have in common the intentional nature of the dangerous behaviour, and seem to characterize the deliberate transgression of the Highway Code. But they also characterise behaviours that do not have an aggressive purpose due to a lack of attention on the part of the individual. The saturating behaviours on axis 1 therefore measure aggressive deviations and simple deviations according to the classification of aberrant behaviours by Reason et al. (1990) [7] and inattention errors according to the classification by Aberg and Rimmo (1998) [11]. We decided to call this factor deviations because it combines simple and aggressive deviations. The second axis, which is made up of faults, explains 20.849% of the variance and is composed of 10 items, including 2 gaps, 3 faults and 5 simple deviations. The items saturating on this axis have in common an unintentional character of the dangerous behaviour during the driving activity of the low dangerous behaviour which seems to be caused by a lack of experience of the individual's driving activity. They are made up of both shortcomings, faults and weak deviations according to the classification of Reason et al. (1990) [7]. We call this factor faults.

The third axis, which consists of slips, explains 8.346% of the variance and is composed of two slips and one aggressive deviation. The items saturating on this axis clearly show that low danger behaviours are unintentional and refer to attention or memory defects (Reason et al., 1990) [7].

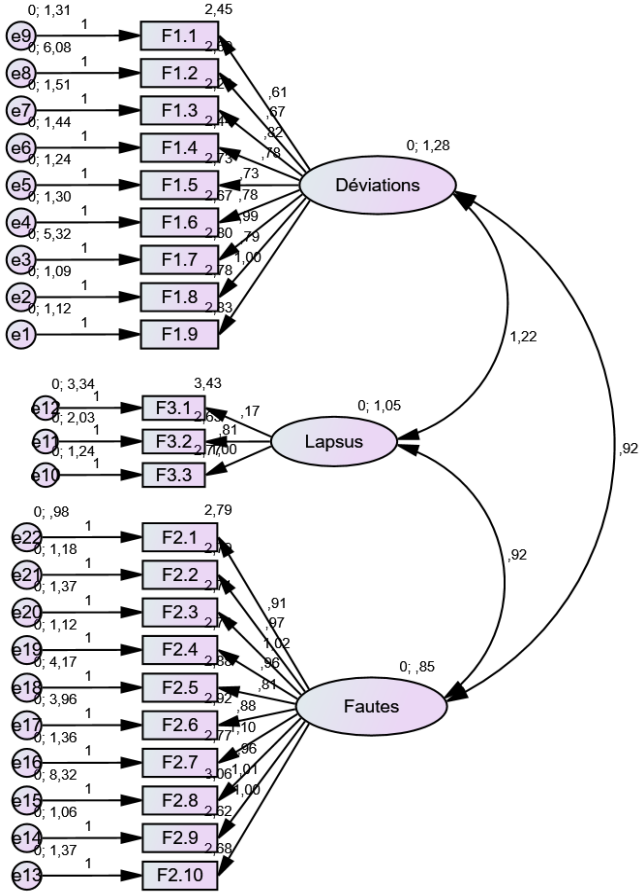
After deleting the 20 problematic items, the 22 items of the driving behaviour scale are divided, following a new PCA with Varimax rotation, into 3 axes explaining 51.323% of the variance. Cronbach's alphas were calculated for each subscale. For the deviations scale we have a Cronbach's alpha value= 0.812; for the mistakes scale we have a Cronbach's alpha value= 0.886 and for the slips scale we have a Cronbach's alpha value= 0.645. All these Cronbach's alpha indices show that our factors all have good internal consistency. We now move on to the second analysis which is the confirmatory analysis through

the structural equations to confirm the robustness of the model obtained after factor extraction.

B. Confirmatory analysis

We now turn to the second analysis, which aims to verify whether the chosen measurement variables and the dimensionality of the scale are in line with the pre-established theory (Reason et al., 1990). Concerning the confirmatory analysis, we hypothesise that the choice of items and the number of factors to be included in the model are made on the basis of the previous theories and the exploratory analysis made above. To start the analysis, we first drew the model on the AMOS software.

Figure : 1 : Confirmatory analysis



Chi-square = 432,546; Degrees of freedom = 206; p =, 000; RMSEA=, 054

We validate our structural model against the indicators which are less sensitive to sample sizes and model complexities. The Chi-square measures the difference between the observed covariance matrix and the covariance matrix predicted by the model. This means that the Chi-square measures the fit between the proposed theoretical model and the collected data. In this confirmatory analysis, we have a Chi-square value=432.546 with a significance level of p= .000. The RMSEA or Root Mean Square of Approximation must have a value ≤0.1. In this study, the RMSEA= .054. These results clearly suggest that the original DBQ model of Reason et al. (1990) is in line with the model we arrived at in this study. The results obtained confirmed those of the exploratory analysis and allowed us to have a robust model that explains the adoption of dangerous behaviours during the driving activity in the Cameroonian context. We now turn to the discussion of these results.

VI. Discussion and conclusion

The objective of this study was to adapt a version of the DBQ (Reason et al., 1990) [7] on a Cameroonian population in order to have a tool that would allow a fine understanding of driving behaviours by differentiating the types of behaviour. The objective was also to have a tool that would allow, within the framework of this thesis work, to understand risky driving behaviour. This study made it possible to adapt the DBQ scales to a large Cameroonian population and to differentiate their main types of driving behaviour. We obtained a reliable scale of self-reported behaviour based on the different existing versions of the DBQ. From the original 42 items, a tool with 22 items was produced. More precisely, we obtain a factorial structure in 3 factors which are deviations, mistakes and lapses. These results seem to confirm Reason et al's (1990) [7] classification of aberrant driving behaviour by highlighting the distinction between errors and deviations observed in several DBQ studies (Aberg & Rimmö, 1998 [11]; Blockey & Hartley, 1995[16]; Parker et al., 1995[8]; Reason et al., 1990 [7]; Xie & Parker, 2002[15]), notably in the French validation of the DBQ used on elderly people Obriot-Claudel & Gabaude, 2004[21]). While deviations are positively associated with accidents and constitute risky behaviour, these behaviours are distinguished by their intentionality (Parker et al., 1995) [8]. Deviations refer to deliberate transgressions of legal and/or social rules, i.e. intentional behaviour with a motivational component. Errors (mistakes and slips of the tongue), on the other hand, correspond to deviations from the planned action to achieve a goal and thus refer to an unintentional difference between the action and the socially constructed behaviour (Parker et al., 1995) [8]. Furthermore, in line with the work of Lawton et al (1997) [10] and what has been observed in English, Finnish or German populations (Lajunen et al., 2004[20]), the present study does not differentiate between deviations (aggressive and simple). In this study, we have errors that are differentiated into two types of errors (mistakes and slips of the tongue) which are not in line with the work of Aberg and Rimmö (1998) [11]. However, the fact that some items referring to simple deviations saturate on several axes indicates that the distinction between the two types of deviations is not always clear.

We now have a tool for measuring driving behaviours, validated on a Cameroonian population of all-round drivers, which allows us to gain a more detailed understanding of the accidental risk behaviours of Cameroonian drivers and which could prove useful, for example, in studying the relationships between these different types of behaviour and the individual characteristics of individuals and risk factors. More specifically, we obtain a tool for measuring

risky driving behaviour. Slips of the tongue and gaps, which are errors of inattention and inexperience, are generally not very dangerous and, most of the time, only have consequences for the person who made them (Reason et al., 1990) [7]. We focus on deviation behaviour. Many studies show the predictive effect of deviations or transgressions on accidents. In a study on the predictive power of accidents by reported deviations or transgressions measured by the DBQ, De Winter and Dodou (2010) [9] confirmed their predictive power. The transgression factor is even a more important predictor of involvement in an accident than exposure, age or sex (Parker et al., 1995) [8]. Although errors are not necessarily intentional (Parker et al., 1995) [8], they can still be objectively dangerous. Accidents in the elderly are strongly predicted by the tendency to make serious errors (active accidents) and inattentional errors (passive accidents) Parker et al., 2000) [8]. Accidents involving women are also often associated with errors of judgement (Storie, 1977) [26]. Dangerous errors thus correspond to our definition of risky driving behaviour, namely objectively dangerous behaviour. In line with previous studies on the validation or adaptation of the DBQ, several authors have been able to demonstrate that individual variables such as age, gender or driving experience predict road crash involvement (Parker et al., 2000[8]; Storie, 1977[24]). In addition to individual variables, perceptual mechanisms also predict accidents. For Surry (1969) [25], perceptual, cognitive and motor response levels in individuals contribute to the construction of accident risk. This idea is supported by several authors who cite variables related to perceptual mechanisms interacting with individual variables to explain the occurrence of accidents (Svenson, 1978[28]), hence the need to verify the interaction links between certain individual variables and perceptual mechanisms on accidentality.

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