

SPANISH ADAPTATION OF THE DRIVER BEHAVIOUR QUESTIONNAIRE AND COMPARISON WITH OTHER EUROPEAN ADAPTATIONS

(a) Grupo de investigación METRAS



(a) Elena López de Cózar (Elena.Lopez-Decozar@uv.es)
(a) J. Gabriel Molina Ibáñez (Gabriel.Molina@uv.es)
(a) Mauricio Chisvert Perales (Mauri.Chisvert@uv.es)
(b) Josep M^e Aragay Barbany (jmaragay@ub.edu)
(a) Jaime Sanmartín Arce (Jaime.Sanmartin@uv.es)

(b) Departamento de Econometría



Abstract

The primary aim of this paper is to describe the adaptation process of the Driver Behaviour Questionnaire (DBQ) to the Spanish population of drivers for its use in the study of aberrant driving behaviour. The results obtained from the application of the DBQ to a representative sample of 4860 Spanish drivers allowed to achieve the adaptation process of this scale as well as to analyze the similarities and differences with other adaptations of the DBQ. Thus, this study is focused on the comparative analysis, on the one hand, of the consistence of the factorial structure obtained for the Spanish version of the DBQ (SDBQ) and those obtained in other european countries and, on the other hand, of some of the main psychometric criteria (item analysis, reliability, etc.) obtained in these different adaptations of the DBQ.

Introduction

The study of human error in driving vehicles is considered as being one of the main research lines in the traffic and road safety psychology field. The objective is to know the human factor contribution to the accident rate and to detect how the attitudes and the decisions of drivers facing specific traffic risk situations are reflected in inappropriate or “aberrant” behaviours that increase the probability of causing an accident.

In the nineties, several researchers of the University of Manchester (Reason, Manstead, Stradling, Baxter and Campbell, 1990) raised the need to establish a more detailed theoretical framework on driver misbehaviour. For that reason, they developed the Driver Behaviour Questionnaire (DBQ), a worldwide known questionnaire that has been used in a lot of studies and that has allowed to establish a solid structure of the human error in driving (Lapses, Errors, Violations and Aggressive behaviours).

From the versions and adaptations used in countries like Sweden, Great Britain, the Netherlands and Greece the DBQ Spanish version (SDBQ) has been developed, and its application in different stages to several samples of drivers allowed developing a 34-items version, with psychometric characteristics of reliability and validity enabling its application to large-scaled Spanish population samples.

Hereafter we will present some results from the comparison of the SDBQ factorial structure with one of the latest version of the DBQ used in a cross-cultural study carried out in Great Britain, Finland and the Netherlands (Lajunen, Parker y Summala, 2004).

Method

The initial version of the SDBQ questionnaire (75 items) has been set from the translation of 126 items obtained from several international versions, and the content has been adapted to the contextual and normative characteristics of the Spanish population. Several applications on this complete version allowed ruling out the items with deficient psychometric characteristics or having a content not appropriate to the Spanish population in order to get a reduced version with 34 items. The drivers have to evaluate the frequency with which they present particular risk behaviours while driving. Unlike other versions of the questionnaire, the drivers have to answer to the SDBQ on a scale from 0 (never) to 10 (always).

The factorial structure analysis has been carried out from the SDBQ application (through a telephone interview) to a sample of 4860 Spanish drivers.

Just like in comparative studies, the correlation matrix shows that the factors have a high relationship between each other (range = 0.54-0.02), for that reason an oblique rotation of the factor matrix has been applied (oblimin rotation).

Results

The alpha reliability coefficient, calculated for the complete questionnaire, is from 0.91, this indicates the high internal consistency of the instrument regarding the measured feature (unsafe driving behaviours). The item discrimination indexes are also appropriate (rank correlation item-total = 0.26 – 0.59), as no significant improvement of the alpha coefficient is detected if one of the items is suppressed. These results show the convenience of keeping the 34 items from the reliability analysis perspective.

On the other hand, comparing with the results obtained from the cross-cultural study (Lajunen et al., 2004), in the table 1, the classified items depending on the average values obtained from the Spanish sample are shown. The more frequent behaviours in all the populations are basically offences (concretely the ones related with speeding) and lapses, even though the item scaling varies for each case. This way, while in Spain the three more frequent behaviours are the 9, 24 and 11 (Spanish numbering), in the United Kingdom these are the 09, 27 and 26, in Finland the 26, 09 and 27, and in the Netherlands the 09, 26 and 01.

Except for the Spanish items 18, 28, 31, 32, 10, 14 and 01, the behaviours are classified according to the same factorial dimensions than for the European studies. In the table 2, we can see the item factorial saturations related with the tetra-factorial structure obtained in all the comparative studies. For a greater clarity in the interpretation of each factor, the weights lower than 0.20 in the Spanish data and the ones lower than 0.40 for the other analysed populations have been omitted. The complexity of some behaviours means that they saturate significantly in some dimensions, even though at a general level, the highest saturations are located in the dimensions from the ones that the several items have been classified, being the structure enough consistent between the populations (the behaviours that are defined poorly in the structure are the ones referred to lapses – errors).

Aggressive violations
 "Ordinary" violations
 Errors
 Lapses

SPANISH VERSION	ENGLISH VERSION	Britons		Finns		Dutch		Spanish	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
09. No hacer caso de los límites de velocidad en la autopista.	28. Disregard the speed limit on a motorway	1.87	1.61	1.55	1.38	1.73	1.38	2.22	2.63
24. Ovidar donde se ha dejado el vehículo en un aparcamiento.	19. Forget where you left your car in a car park	1.16	1.09	0.48	0.75	0.78	0.88	2.13	2.36
11. No darse cuenta de la presencia de nuevas señales de tráfico en una vía por la que se conduce habitualmente.								1.90	2.11
17. Pasar por alto los límites de velocidad a fin de seguir el flujo del tráfico.								1.88	2.38
20. Equivocarse de salida en una rotonda por no haber prestado la atención debida a la señalización.	22. Misread the signs and exit from a roundabout on the wrong road	1.03	0.78	0.93	0.76	0.86	0.71	1.74	1.89
21. Teniendo como objetivo dirigirse a un destino determinado, darse cuenta de repente que se está dirigiendo a otro destino que es más habitual para	2. Intending to drive to destination A, you "wake up" to find yourself on the road to destination B	0.86	0.92	10.02	0.92	0.77	0.84	1.68	2.02
07. Pasarse una salida en una autopista o autovía y verse obligado a dar un								1.67	2.09
03. No valorar correctamente la distancia y velocidad del vehículo que viene de frente al realizar un adelantamiento.	27. Underestimate the speed of an oncoming vehicle when overtaking	0.74	0.70	0.77	0.69	0.64	0.67	1.61	2.63
06. Enfadarse con un conductor y mostrarle su enojo por el medio que sea, por ejemplo, con gestos agresivos.								1.59	2.15
30. Tocar el claxon para expresar su enfado hacia otro usuario de la	7. Sound your horn to indicate your annoyance to another road user	1.06	1.08	0.72	0.99	0.79	0.91	1.50	2.11
18. Dándose cuenta de que el carril por el que se circula desaparece y se junta con otro, no cambiar de carril hasta el último momento.	18. Stay in a motorway lane that you know will be closed ahead until the last minute before forcing your way into the other lane	0.52	0.85	0.34	0.68	0.61	0.81	1.31	1.87
05. Encender sin querer el intermitente en vez del limpia-parabrisas, o viceversa.	12. Switch on one thing, such as the headlights, when you meant to switch on something else, such as the wipers	0.89	0.89	0.85	0.83	0.54	0.71	1.24	1.75
25. Ir a salir de un semáforo que se ha puesto en verde y darse cuenta de repente que se lleva una marcha que no es la apropiada para mover.	15. Attempt to drive away from the traffic lights in third gear	0.69	0.86	0.80	0.81	0.65	0.82	1.23	1.66
04. Circular tan cerca del vehículo de delante que pueda resultar difícil evitar la colisión en caso de una frenada de emergencia.	23. Drive so close to the car in front that it would be difficult to stop in an emergency	0.80	0.86	1.13	0.95	0.66	0.78	1.21	1.95
12. Conduciendo marcha atrás, golpear contra algo que no se había visto.	1. Hit something when reversing that you had not previously seen	0.45	0.62	0.49	0.62	0.65	0.68	1.19	1.65
27. Pensando en otras cosas, entrar en una rotonda circulando por un carril inadecuado teniendo en cuenta la salida que se debería coger.	4. Get into the wrong lane approaching a roundabout or a junction	1.45	0.82	1.27	0.74	1.01	0.74	1.16	1.62
13. Hacer un cambio de sentido pisando una línea continua o en otro sitio en que no está permitido.								1.10	1.69
02. Ir a más velocidad de la permitida a altas horas de la noche o de								1.09	2.03
15. No darse cuenta de la presencia de peatones cruzando, al girar hacia una calle desde una vía principal.	6. Fail to notice that pedestrians are crossing when turning into a side street from a main road	0.44	0.61	0.72	0.72	0.67	0.88	1.06	1.55
26. Circular superando los límites de velocidad en una zona residencial	11. Disregard the speed limit on a residential road	1.38	1.21	2.04	1.32	1.40	1.17	1.04	1.80
29. Después de conducir durante un rato, darse cuenta que no tiene un claro recuerdo del camino recorrido y lo que ha sucedido durante el	26. Realise that you have no clear recollection of the road along which you have just been travelling	1.17	1.03	1.14	0.99	1.03	0.92	0.97	1.72
28. En una cola de vehículos que están girando a la derecha para incorporarse a una carretera principal, estar tan pendiente de los vehículos que se aproximan por la izquierda, que casi se colisiona con el de delante.	5. Queuing to turn left onto a main road, you pay such close attention to the main stream of traffic that you nearly hit the car in front	0.63	0.71	0.56	0.69	0.52	0.65	0.90	1.49
31. Al realizar un giro, estar a punto de colisionar con una bicicleta o ciclomotor que ha aparecido a nuestro lado.	13. On turning left nearly hit a cyclist who has come up on your inside	0.31	0.55	0.22	0.47	0.47	0.57	0.87	1.45
32. No ver una señal de "Ceda el Paso" y estar a punto de colisionar con otro vehículo que tenía preferencia.	14. Miss "Give Way" signs and narrowly avoid colliding with traffic having right of way	0.24	0.47	0.21	0.49	0.39	0.60	0.87	1.35
10. Ir 'sacando el morro' en una intersección hasta que el conductor que viene y tiene preferencia, no tiene más remedio que parar y dejarle pasar.	10. Pull out of a junction so far that the driver with right of way has to stop and let you out	0.82	0.99	0.29	0.54	0.52	0.70	0.82	1.47
19. No mirar el retrovisor al incorporarse a la circulación, cambiar de carril,	8. Fail to check your rear-view mirror before pulling out, changing lanes, etc.	0.71	0.82	0.77	0.78	1.21	1.75	0.71	1.93
33. Cruzar una intersección a pesar de haber visto que el semáforo se ha	24. Cross a junction knowing that the traffic lights have already turned	0.78	0.84	0.86	0.87	0.47	0.67	0.59	1.28
34. Conducir aun sabiendo que puede estar por encima del límite legal de								0.54	1.36
14. Intentar adelantar a un vehículo sin darse cuenta de que éste estaba señalizando su intención de girar a la izquierda.	16. Attempt to overtake someone that you had not noticed to be signalling a right turn	0.24	0.47	0.23	0.49	0.37	0.57	0.53	1.12
22. Tener manía a un tipo particular de usuario de la vía y ponerle de manifiesto su antipatía u hostilidad del modo que sea.	25. Become angered by a certain type of a driver and indicate your hostility by whatever means you can	0.85	0.96	0.41	0.77	0.56	0.77	0.53	1.33
23. Pegarse mucho al vehículo de delante para indicarle que vaya más rápido o se aparte.								0.47	1.22
01. Acelerar bruscamente a la salida de un semáforo con el fin de 'lucirse'.	21. Race away from traffic lights with the intention of beating the driver next	0.99	1.15	1.07	1.16	1.36	1.15	0.43	1.23
16. Enfadado por la acción de otro conductor, perseguirle con la intención de 'cantarle las cuarenta'.	17. Become angered by another driver and give chase with the intention of giving him/her a piece of your mind	0.20	0.59	0.46	0.82	0.11	0.40	0.32	1.08
08. 'Picarse' y hacer 'carreras' con otros conductores.								0.20	0.83
ELIMINATED	20. Overtake a slow driver on the inside	0.70	0.95	0.22	0.59	0.79	0.95		
ELIMINATED	9. Brake too quickly on a slippery road or steer the wrong way in a skid	0.68	0.70	0.57	0.68	0.71	0.73		

Table 1: Means and standard deviations of the DBQ answers in the Spanish, British, Finnish and Dutch data (descendant order by spanish means). The clasification of the items (aggressive or "ordinary" violations, errors and lapses) is presented by colours. Spanish responses are on a ten-point scale, whereas British, Finnish and Dutch responses are on six-point scale.

	Factor 1				Factor 2				Factor 3				Factor 4			
	SP	UK	FIN	NL	SP	UK	FIN	NL	SP	UK	FIN	NL	SP	UK	FIN	NL
Aggressive violations																
21. Racing away from traffic lights (1)	0,47	0,47	0,50			0,63	0,56	0,49								
17. Angry, giving chase (16)	0,74	0,63	0,69	0,53												
25. Angry, indicating hostility (22)	0,53	0,69	0,74	0,80		0,43										
7. Annoyed, sounding your horn (30)	0,42	0,67	0,65	0,63												
Enfadarse y hacer gestos (6)	0,42				0,21											
Picarse y hacer carreras (8)	0,70															
Pegarse al de delante para que corra más (23)	0,50				0,24											
"Ordinary" violations																
23. Close following (4)					0,48	0,51	0,59	0,45	0,32							
28. Speeding on motorway (9)			0,44		0,72	0,74	0,71	0,80	0,22							
11. Speeding on residential road (26)			0,43		0,65	0,67	0,76	0,68								
24. Shooting lights (33)	0,34		0,43		0,23	0,53	0,48			0,41						
20. Overtaking on the inside (ELIMINATED)			0,44	0,40		0,55		0,46								
Más velocidad por la noche (2)					0,66											
Cambiar de sentido pisando línea continua (13)					0,34							0,28				
Exceder la velocidad al seguir el flujo del tráfico (17)					0,71											
Conducir habiendo bebido (34)	0,34				0,30											
Errors																
27. Misjudge an overtaking gap (3)									0,80	0,51	0,48	0,48		0,42	0,46	0,43
6. Not noticing pedestrians crossing (15)									0,21	0,56	0,59	0,50	0,49			
8. Not checking mirror (19)									0,78		0,43					
9. Braking too quickly on slippery (ELIMINATED)										0,43	0,46	0,47			0,41	
Lapses																
12. Going for the wrong switch (5)													0,63	0,48	0,51	
10. Forcing someone to give way (10)	0,21					0,47					0,48		0,33			
1. Hitting something when reversing (12)													0,62			
16. Overtaking a right turner (14)	0,32									0,52	0,54	0,51	0,39			
18. Forcing your way into the other lane (18)			0,50		0,25	0,51		0,54					0,33			
22. Taking wrong exit from roundabout (20)										0,43	0,42		0,60	0,47	0,52	0,53
2. Taking more usual route by error (21)													0,59	0,41	0,48	0,42
19. Forgetting where the car is in a car park (24)													0,62	0,52	0,43	0,54
15. Driving away in third gear (25)										0,42			0,64	0,38	0,50	
4. Wrong lane at roundabout/junction (27)													0,57	0,40	0,49	
5. Insufficient attention to vehicle ahead (28)										0,49	0,47	0,52	0,54			
26. No recollection of road travelled (29)													0,47	0,52	0,45	0,57
13. Failing to notice a cyclist (31)										0,57	0,50	0,59	0,52			
14. Not noticing "Give Way" sign (32)										0,62	0,60	0,65	0,55			
Pasarse una salida de la autopista (7)													0,56			
No ver señales nuevas en vía habitual (11)					0,29								0,51			

(In red) Number of the spanish item version

Table 2: Results of the exploratory factor analysis with oblimin rotation for Spanish, English, Finns and Dutch

Conclusions

The appropriate psychometric characteristics of the Spanish Driver Behaviour Questionnaire (SDBQ), regarding its reliability and validity, and its consistency with the results obtained in others European contexts, have allowed the development of a measurement instrument able to evaluate Spanish drivers risk behaviours. These ones may have a comparative reference (regarding the group they belong to according to the age and the sex) of their risk level in the different aspects of human error as a driver and consequently allow to establish intervention measures adapted to the specific problematic that features the person.

Nowadays, the SDBQ is being applied online at the RACC website (www.racc.es), aiming to explore new application methods that allow to bring this instrument near to the main population in order to be able to evaluate itself in a fast, efficient and easy way as well as to get advices and recommendations on the way to improve or solve its limitations.

Acknowledgements

This research was supported by the grants of the Spanish Ministry of Science and Technology (DIRIVE project, Ref: BSO2002-00276) and the RACC Automobile Club (ACCES and ACCES-II projects)

References

Lajunen, T., Parker, D., Summala, H. (2004) The Manchester Driver Behaviour Questionnaire: a cross-cultural study. *Accident Analysis and Prevention*, 36, 231-238

López de Cózar, E., Molina, J. G., Sanmartín, J., Ballestar, M.L., Tormo, M.T. y Chisvert, M. (2004) ACCCES-I: Traducción, aplicación y análisis de la adaptación inicial del DBQ. Principales resultados del estudio. Informe técnico ACCCES/0404F.

López de Cózar, E., Molina, J. G. y Sanmartín, J. (2005) ACCCES-II: Aplicación y baremación del Cuestionario de Comportamientos en la Conducción (Driver Behaviour Questionnaire) para el estudio del error humano en la conducción de vehículos en la población española. Principales resultados del estudio. Informe técnico ACCCES-II/F.

Reason, J.T., Manstead, A.S.R., Stradling, S.G., Baxter, J.S. and Campbell, K. (1990) Errors and violations on the road: a real distinction? *Ergonomics*, 33, pp. 1315-1332.