Title: Trans Driver Stress scale (TDS-15): Short scale for stress detection in professional drivers.

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Trans Driver Stress scale (TDS-15): Short scale for stress detection in professional drivers.

Background: Professional drivers are susceptible to stress, which places both their own health and road safety at risk. For this reason, the present study aims to create a short Spanish scale from the 59 items on the Bus Driver Risk Index (BDRI; Dorn, Stephen, af Wåhlberg, & Gandolfi, 2010), and to analyse its internal structure, reliability and evidence of validity. **Method:** The participants were 372 Spanish drivers (93.4% male, 6.6% female), obtained by non-probabilistic sampling. The programs SPSS 20.0 and AMOS (5.0) were used. **Results:** The Trans Driver Stress scale (TDS-15) provides a five-factor solution with 15 items, adequate reliability and appropriate evidence of validity. Through a confirmatory factor analysis, the following indicators (NFI = 90, TLI = .92; CFI = .91; RMSEA = .06) were obtained from the AMOS program (5.0) indicating that the five factor model has an acceptable fit. Evidences of validity are also proved with: SSQ-15, MBI-GS, Irritation, MP-9, DII and Trans-18. **Conclusions:** The Trans Driver Stress scale (TDS-15) is a reliable and valid instrument, suitable for use in Spanish to evaluate the stress experienced by professional drivers in the transport industry.

Keywords: Driving stress, transportation, work stress, traffic safety, scale.

Trans Driver Stress (TDS-15): Escala breve para la detección del estrés en conductores profesionales.

Antecedentes: Los conductores profesionales son un colectivo susceptible de padecer estrés, siendo este un riesgo tanto para su salud como para la seguridad viaria, por ese motivo el presente trabajo se plantea como objetivo la creación de una escala breve española a partir de los 59 ítem de la Bus Driver Risk Index (BDRI; Dorn, Stephen, af Wåhlberg y Gandolfi, 2010), así como el análisis de su estructura interna, fiabilidad e indicios de validez. **Método**: Los participantes han sido 372 conductores españoles (93.4 % hombres, 6.6 % mujeres), obtenidos mediante un muestreo no probabilístico. Se han utilizado los programas SPSS 20.0 y AMOS (5.0). **Resultados:** La Trans Driver Stress (TDS-15) arroja una solución de cinco factores con 15 ítems, una fiabilidad adecuada y, además, unas evidencias de validez apropiadas. Mediante análisis factorial confirmatorio, a partir del programa AMOS (5.0), se obtuvieron los siguientes indicadores (NFI=90; TLI= .92; CFI= .91; RMSEA= .06) indicando un ajuste aceptable del modelo de cinco factores. También se presentan indicios de validez con: SSQ-15, MBI-GS, Irritación, MP-9, DII y Trans-18. **Conclusiones:** La Trans Driver Stress (TDS-15), es un instrumento fiable y válido, adecuado para ser usado en español para evaluar el estrés en los conductores profesionales del transporte.

Palabras clave: Estrés en la conducción, transporte, estrés laboral, seguridad de tráfico, escala.

1. Introduction

The United States Department of Labor (USA-USDL, 2017) reports that approximately 475,000 heavy-duty trucks are involved in accidents resulting in 5,360 deaths and 142,000 injuries each year. About 74% of the injured were occupants of other vehicles (usually passenger cars), 3% were pedestrians and 23% were occupants of other heavy trucks. In addition, unsafe actions by car drivers are a contributing factor in about 70% of fatal accidents involving trucks. In Europe, the European Agency for Safety and Health at Work (EU-OSHA, 2011) has produced a report on best practices and recommendations (e.g. the use of motorway rest areas) for the transport sector.

Professional drivers, in addition to having a higher prevalence of psychosocial risks and unsafe behaviour in their jobs, are exposed to an increased risk of death on the road. Intrinsic workplace factors such as time pressure, long working hours and responsibility for passenger safety can lead bus drivers to stress. Apart from the effect of bus driver stress and fatigue on health and well-being at work (Taylor & Dorn 2006) there are also reasons to assume that they can increase the risk of accidents (Greiner, Krause, Ragland, & Fisher, 1998). Professional drivers are considered to be a health risk group due to the high demands of the job, their lack of control over the work rate (Evans, 1994), and physical factors (e.g. vibrations) that are often associated with a high prevalence of diverse pains (INSHT, 2013). Another factor to consider is the hours of driving, European regulations do not allow driving more than four hours in a row. There are studies that show that the general exposure is positively associated with the risk of accident (Al-Balbissi, 2003; Spallek, Turner, Spinks, Bain, & McClure, 2006; Thouez, Gangbè, Bergeron, Bussiere, Rannou, & Bourbeau, 2005). Other studies relate the exposure to the risk of committing traffic infractions (Ameratunga, Hijar, & Norton, 2006; Elias and Shiftan, 2014). Elias, Blank-Gomel, Habib-Matar and Shiftan (2016)

show that occupational characteristics, the corresponding daily activity and travel patterns are useful predictors when committing a traffic infraction.

Previous studies have linked work-related stress with substance use (Chen & Cunradi, 2008), with driving (Costa, 2012), with individual differences (Desmond & Matthews, 2009), with pain and musculoskeletal symptoms (Lee & Gak, 2014) and with fatigue (Oron-Gilad & Shinar, 2000). There is also good reason to assume that driver stress and fatigue can increase the risk of being involved in a traffic accident (Greiner et al., 1998). Given the need to have a scale in Spanish to detect stress in professional drivers. Adapted items of the scale of the Bus Driver Risk Index (BDRI) of Dorn, Stephen, af Wåhlberg and Gandolfi (2010), which was created initially for bus drivers, so that it can be used in various types of drivers professionals (trucks, buses, taxi and ambulance).

1.1. Effects on driving

Some studies have concluded that solitary work can generate psychosomatic disorders such as stress (Costa, 2012). Work stress affects various aspects of an individual's life, in particular health and the person's perceptions of it because stressful situations induce a physiological response from the body (Peralta, Robles, Navarrete, & Jiménez, 2009).

Other studies have also taken into account safe behaviors because they are the result of a process of social influence (Meliá, 2007), in this way it is considered that safety behaviors contribute to determine the level of real risk that is present in a work activity. In addition, the real risk is determined by the baseline risk inherent in the type of activity (Meliá, 1995).

Musculoskeletal problems in drivers have been associated with inadequate conditions in the workplace by Fernández-D'Pool, Vélez, Brito and D'Pool (2012). Those authors believe that musculoskeletal problems may be related to the risks present in the workplace that also hinder driving: absence of lumbar and head support, non-sliding chairs, environmental conditions, vibration and noise. The results suggest that inadequate workplace conditions and body mass index predispose individuals to musculoskeletal symptoms. There was also a significant negative correlation between work-related stress and sleep quality (Åkerstedt, Knutsson, Westerholm, Theorell, Alfredson, & Kecklund, 2002).

Impulsiveness has also been taken into account because it predisposes individuals to distrust others and to feelings of anger, which in turn facilitate the manifestation of aggressive behaviours (Santana, 2014) that are incompatible with relaxed driving. Some studies have linked impulsiveness and traffic accidents to the search for sensations (Delhomme, Chaurand, & Paran, 2012), to aggressive driving (Dahlen & White, 2006), to speeding in young drivers (Delhomme et al. 2012), to risk perceptions (Machin & Sankey, 2008), to driving attitudes (Ulleberg & Rundmo, 2003) and to reckless driving among bus drivers (Mallia, Lazuras, Violani, & Lucidi, 2015).

The likelihood of developing burnout is strongly influenced by health, type of work, environmental conditions, social relations, roles played, management style, etc. It also has implications for employers in terms of low productivity, absenteeism, etc. Consequently, Peiró (2000) believes that any evaluation of an organization should consider aspects of occupational health and well-being in addition to economic indicators.

1.2. The present study

The 59 items of the Bus Driver Risk Index (BDRI) by Dorn et al. (2010) are used to develop a new Trans Driver Stress scale. The present study then pursues three further objectives: (1) to replicate the resulting scale's CFA with Structural Equation Modelling (hereafter, SEM), (2) to determine the scale's reliability or internal consistency, and (3) to look for evidence of convergent validity.

2. Methods

2.1. Participants.

The participants were 372 Spanish professional drivers from the transport sector (93.4% male, 6.6% female), Passenger transportation 33.3 %, Freight transport 28.0 %, Ambulances drivers 2.4 % and Taxis drivers 36.3 %, the average years of experience was 10.46 (SD=13.05), the mean age was 40.9 years (*SD* = 10.54). Marital status was: married or couple (70.8%), single (21.2%), divorced/separated/widowed (8.0%). The distribution of education level was as follows: had not finished primary education (20.6%), lower secondary school, professional training-II or primary school (21%), upper secondary school, professional training-I or compulsory secondary education diploma (55.2%), University studies (3.2%).

2.2. Instruments

The Bus Driver Risk Index (BDRI; Dorn et al., 2010). This scale was translated into Spanish using the translation and back-translation method (Hambleton, Merenda, & Spielberger, 2005, Muñiz, & Bartram, 2007) and in a similar way to that described by Balluerka, Gorostiaga, Alonso and Haranburu (2007). The English version consists of a set of 59 items distributed into six subscales: "Factor 1. Fatigue Proneness" (11 items,

Cronbach’s alpha = .92; example, "1. I am less centered or aware of what is happening around me"). "Factor 2. Hazard Monitoring"; (14 items, Cronbach’s alpha = .87; example, "2. When I drive, I tend to be alert to possible risks). "Factor 3. Relaxed driving" (9 items, Cronbach’s alpha = .85; example, "3. I find it easy to relax when I finish working"). "Factor 4. Patient driving (12 items, Cronbach’s alpha = .82; example, "5. I do not get nervous when driving behind a slow vehicle "), "Factor 5. Anxious driving" (6 items, Cronbach’s alpha = .71; example, "4. I am disturbed by the idea of having an accident"), and "Factor 6. Thrill seeking" (7 items, Cronbach’s alpha = .70; example, "6. I like the feeling of accelerating quickly"). The Likert scale is 6 points (From 1-*Strongly disagree* to 6-*Strongly agree*).

The Dickman's Impulsivity Inventory (DII; Dickman, 1990), in its Spanish version (Chico, Tous, Lorenzo-Seva, & Vigil-Colet, 2003), consists of 23 items and 2 subscales and the response format is dichotomous (1 = *true* / 0 = *false*). "Factor 1. Functional impulsivity", evaluates the type of impulsivity that helps individuals to adapt to unexpected situations that require a rapid response. It consists of 11 items (Cronbach’s alpha = .77) (e.g. "5. Most of the time I can focus on my work quickly". And "Factor 2. Dysfunctional impulsivity" refers to the type of impulsivity that can be harmful. It consists of 12 items (Cronbach’s alpha = .76). e.g. "2. I often say the first thing that occurs to me without thinking much earlier".

The Trans-18 scale (TRANS-18; Boada-Grau, Sánchez-García, Prizmic-Kuzmica, & Vigil-Colet, 2012) detects safe behaviors (personal and in the vehicle) and psychophysiological disorders and comprises 18 items (3 subscales) and an evaluation scale of 5 points. "Factor 1. Psychophysiological disorders" of the driver (6 items, Cronbach’s alpha = .81) refers to those aspects that the driver may suffer such as anxiety, stress or digestive, depressive, musculoskeletal and hypertension disorders (e.g.

"11. My work has caused me some depression disorder"). "Factor 2. Personal safety behaviors" (6 items, Cronbach's alpha = .80) assesses the extent to which the driver avoids driving after drinking alcoholic beverages, eats copiously, does not eat and / or drink while driving, and does not smok or talk on the cell phone while driving (e.g. "7. I avoid smoking while driving and I do not have the cigar in my hand"). "Factor 3. Vehicle-related safety behaviors" (6 items, Cronbach's alpha = .70), this assesses aspects such as whether the driver uses work gloves to carry out work activities, knows how to operate the extinguishers, pays attention to his/her driving and rests the required hours (e.g. "3. I use work gloves when handling and loading freight, changing a wheel, etc.").

The Musculoskeletal Problems scale (MP-9; Robb & Mansfield, 2007), in the Spanish version adapted by Robert-Sentís (2016), evaluates musculoskeletal problems and vibrations and consists of 9 items and a bifactorial structure. "F1. Musculoskeletal aspects" refer to the muscles and skeleton (e.g. shoulders), (4 items, Cronbach's alpha = .72). "F2. Limbs" refers to the arms and legs and parts thereof (e.g. knees). The comfort of the seat is assessed by the driver's perception of vibrations. The lumbar support adjustment (5 items, Cronbach's alpha = .70) is answered with a five-point Likert scale (1. *Never* to 5. Alw*ays*).

The Groningen Sleep Scale (SSQ-15; Meijman, Thunnissen, & de Vries-Griever, 1990), in the Spanish version adapted by Robert-Sentís (2016), evaluates the subjective quality of sleep in terms of the general quality of sleep, lack of sleep, sleeping difficulty, problems with sleeping and not resting. The English version consists of 15 items and its structure is unifactorial (Cronbach's alpha = .90). The six-point answers (1. *Strongly disagree* to 6. *Strongly agree*) are anchored to items such as "1. Last night I slept deeply."

The Burnout scale (MBI-GS; Salanova, Schaufeli, Llorens, Peiró, & Grau, 2000) evaluates burnout and comprises 15 items (3 subscales). The subscale for "Exhaustion (Cronbach's alpha = .87)" comprises 5 items (example: "6. I am 'burned out' by work"), the one for "Cynicism (Cronbach's alpha = .85)" comprises 5 items (e.g. "9. I have lost enthusiasm for my work") and that of "Professional effectiveness (Cronbach's alpha = .78)" comprises 6 items (e.g. "12. I have achieved many valuable things in this position"). The scale has Likert responses of 7 points ranging from 0. *Never / None* to 6. *Always / Every day*.

The Irritation Scale (Mohr, 1986; Mohr, Müller, Rigotti, Aycan, & Tschan, 2006), adapted to Spanish by Merino et al. (2006). This scale has 8 items and 2 subscales. The first subscale is called "Factor 1. Emotional Irritation" (5 items, Cronbach's alpha = .86, e.g. "6. I get angry easily"); The second is called "Factor 2. Cognitive irritation" (3 items, Cronbach's alpha = .87 e.g."4. Even on vacation sometimes I cannot stop thinking about work problems"). The scale has Likert responses of 7 points (from 1. *Strongly disagree* to 6. *Strongly agree*).

Other data such as age, seat comfort, seat suspension, adjustable lumbar support for the driver's seat and the number of hours of driving were also collected.

2.3. Procedure

The sample was obtained by non-probabilistic sampling (Hernández, Fernández, & Baptista, 2000), also called accidental-random sampling (Kerlinger, 2001). For the data collection, a previous telephone contact was made with the director of several transport companies and the most opportune time was agreed to access the drivers.
A booklet was made that included all the questionnaires to be used and the instructions in order to complete all the questionnaires. A psychologist was responsible for the data

collection in the same company and that no questionnaire had lost data. The response rate was 80% and corresponds to those drivers who voluntarily agreed to participate in the study.

2.4. Data Analysis.

The AMOS Program (Analysis of Moment Structures) (5.0) analyses latent structures and creates structural equations (SEM). It makes it easy to specify, estimate, evaluate and present a model in an intuitive diagram that shows the possible relationships between variables so that they can be tested and their validity confirmed. It enables a step diagram to be made and modelled, thus providing an immediate result. This program was applied to the 59 items. The SPSS 20.0 program was used to calculate the reliability and to find evidence of convergent validity. Signals of validity were calculated using Pearson correlation coefficients between the sub-factors of the scales (SSQ-15, MBI-GS, Irritation, MP-9, DII and Trans-18) and the Trans Driver Stress Scale (TDS-15).

3. Results

By applying confirmatory factor analysis (AFC) to the 59 items of Dorn et al. (2010), we proved the suitability of the six-factor structure from the English original. The following indicators of goodness of fit were used: NFI (Normed Fit Index), TLI (Tucker-Lewis Index), CFI (Comparative Fit Index) and RMSEA (Root Mean Square Error of Approximation).

For the cut-off points in the adjustment indices of the structural models, there is some unanimity in the fact that values equal to or higher than .90 in the TLI and IFC are acceptable and are considered excellent when they exceed the value of .95 (Lévy-

Mangin & Varela-Mallou, 2006). RMSEA is considered acceptable when it is less than .08 and excellent when it is equal to or less than .05 (Bentler, 1990; Hu & Bentler, 1999; Fan & Sivo, 2007). Figure 1 shows the following indicators (NFI = 90, TLI = .92; CFI = .91; RMSEA = .06) that were obtained for a five factor model. These indicate that the model has an acceptable fit because all indices gave values that were considered acceptable.

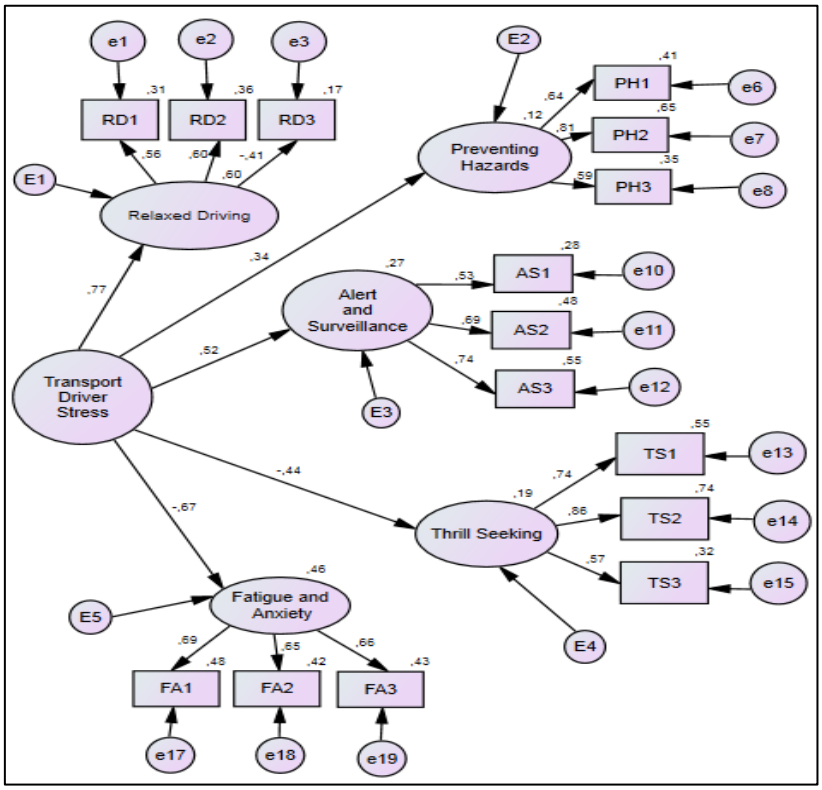

Figure 1. TDS-15 Short Scale: Confirmatory Factor Analysis (CFA) of the five-factor solution in Spanish and with fifteen items (NFI = 90, TLI = .92, CFI = .91, RMSEA = .06).

The first factor is called Relaxed Driving (RD; Cronbach's alpha = .70). It refers to the distension or tension that the driver has while driving, before or after. It consists of 3 items (numbers: 1, 6 and 11), which come from the English original: Factor 3 Relaxed Driving (RD), 9 items and a Cronbach's alpha of .85.

The second factor is called Preventing Hazards (PH; Cronbach's alpha = .71). It indicates the effort that is made while driving and the possible dangers that can be found while driving on a highway. It consists of 3 items (numbers: 2, 7 and 12). Items 2 and 12 come from Hazard Monitoring (HM; Factor 2, English) and item 7 from Thrill Seeking (TS; Factor 6, English).

The third factor is Alertness and Surveillance (AS; Cronbach's alpha = .70). It refers to the ease of relaxing while driving or after. It consists of 3 items (numbers: 3, 8 and 11). The items come from Hazard Monitoring (HM; Factor 2, English) which in the original consisted of 15 items and a Cronbach's alpha of .87.

The fourth factor, Thrill Seeking (TS; Cronbach's alpha = .76), alludes to the way of driving (risky vs. prudent). It is organized with 3 items (numbers: 4, 9 and 14), the items come from factor 6, in the English original, which has the same name and 7 items and an Cronbach's alpha of .70.

The fifth factor, Fatigue and Anxiety (FA; Cronbach's alpha = .70) indicates the fatigue and nervousness that driving causes to professional drivers. It consists of 3 items (numbers 5, 10 and 15), the items come from the factor Fatigue Proneness (FP, Factor 1) with 11 items in the English original and a Cronbach's alpha of .92.

Table 1 shows the mean, standard deviation, the reliability coefficients, the confidence intervals and the correlations among the five factors of the TDS-15. The reliability of the scale ranges from .70 to .76. The Spanish version presents four positive correlations ranging from .10 to .29 between the five factors. In addition we observe six negative correlations ranging from -36 to -07. The original by Dorn et al. (2010) does not provide correlations between factors.

Table 1.
TDS-15 Short Scale: *Descriptive statistics, reliability, confidence intervals and correlations between the five factors.*

	F1	F2	F3	F4	F5
Mean	9.98	15.92	14.54	6.91	7.36
SD	3.86	2.51	3.13	3.32	3.41
Reliability	.70	.71	.70	.76	.70
Confidence Intervals	.63-.74	.64-.75	.64-.74	.71-.80	.64-.75
F1. Relaxed Driving (RD)	--	--	--	--	--
F2. Preventing Hazards (PH)	.10*	--	--	--	--
F3. Alertness and Surveillance (AS)	.17**	,29**	--	--	--
F4. Thrill Seeking (TS)	-,28**	-,07	-,15**	--	--
F5. Fatigue and Anxiety (FA)	-,36**	-,18**	-,17**	,22**	--

** $p < .01$; * $p < .05$
Factors (F1.-Relaxed Driving; F2.- Prevention Hazard; F3.-Alert and Surveillance; F4.- Thrill Seeking ; F5.-Fatigue and Anxiety)

Signals of validity were calculated using Pearson correlation coefficients between the sub-factors of the scales (SSQ-15, MBI-GS, Irritation, MP-9, DII and Trans-18) and Trans Driver Stress Scale (TDS-15). External correlates were also used. Table 3 shows the correlations between the five factors of the TDS-15 and the different correlates and instruments. The external correlates used are associated with several factors both directly and inversely. Thus, "Relaxed driving (F1)" is directly associated with nine correlates and negatively with fifteen correlates. On the other hand, the "Hazard prevention (F2)", is positively related to four correlates and in a negative way with seven contrast variables. Also, "Alert and surveillance (F3)", is positively related to six correlates and inversely with two variables. "Search for emotions" (F4) is linked to nine positive correlates and inversely to six contrast variables. "Fatigue and anxiety (F5)" is associated with twelve correlates directly and with three variables negatively.

Table 2.
TDS-15 Short Scale: correlations between the five factors, external criteria and contrast scales (SSQ-15, MBI-GS, Irritation, MP-9, DII and Trans-18).

		F1	F2	F3	F4	F5
Socio-Demographic	Age (years).	.22**	.00	.20**	-.29**	-.01
	Number of children	.22**	-.08	.02	-.12*	-.02
	Distance from workplace to the place where you live (Km)	-.17*	-.04	-.07	-.07	.05
	Seniority as transport driver (years).	.18**	.05	.16*	-.14**	-.08
External Correlates	How many days did you feel tired or had no energy during the last week?	-.20**	.00	.00	.27**	.38**
	How many times did you feel tired or lacking energy for more than 3 hours on any day of the last week?	-.13**	-.08	.03	.15**	.28**
	How many times did you feel so tired to the point that you had to force yourself to do things during the last week?	-.15**	-.07	.04	.06	.23**
	Number of partners with whom you interact.	-.00	-.19*	-.09	.06	.08
	How many breakdowns have you had?	-.04	-.05	-.13*	.04	.00
	Number of minutes you are sitting when you work.	-.14**	.01	-.06	.08	.05
	How many hours do you work a week?	-.01	.08	-.10	.03	-.02
	How many route modifications must you make due to manifestations, accidents, collapses, etc.?	-.08	-.05	.13*	.07	.07
	How many days have you been to work while being sick?	-.11*	-.06	.02	.09	.11*
	In general for your work vehicles, the comfort of your seat (driver's seat) is ...	.19**	.15**	.06	-.10	-.15*
	In general for the vehicles of your work, the suspension of your seat (driver's seat) is ...	.23**	.15*	.07	-.10	-.07
	In general for the vehicles of your job, the adjustable lumbar support of the driver's seat is ...	.16**	.15*	.05	-.17**	-.10
SSQ-15	Sleep Quality	-.13**	-.07	,00	.17**	.23**
MBI-GS	F1.-Exhaustion	-.39**	-.13**	.08	.30**	.43**
	F2.-Cynicism	-.31**	-.21**	-.32**	.25**	.41**
	F3.-Personal effectiveness	.15*	.30**	.20**	-.05	-.13**
Irritation	F1.-Emotional	-.38**	-.11**	-.01	.25**	.34**
	F2.-Cognitive	-.25**	-.12**	.03	.15**	.25**
MP-9	F1.-Body	-.21**	-.13*	.01	.08	.28**
	F2.-Limbs	-.18**	-.11*	.00	.09	.21**
Trans-18	F1.- Psychophysiological disorders.	-.16*	-.07	.06	.11	.33**
	F2.-Personal safety behaviors.	.34**	.08	.21**	-.24**	-.16**
	F3.-Vehicle-related safety behaviors.	.23**	.10	.12*	-.17**	-.09
DII	F1.-Functional	-.11	-.06	-.05	.19**	-,01
	F2.-Dysfunctional	-.25**	.04	-.08	.17**	.10

** $p < .01$; * $p < .05$
F1.-Relaxed Driving (RD); F2.-Preventing Hazards (PH); F3.-Alert and Surveillance (AS); F4.-Thrill Seeking (TS); F5.-Fatigue and Anxiety (FA).

The items of the scale are shown in Table 3, which includes aspects like items, mean, standard deviation, item-total correlations, skewness and kurtosis.

4. Discussion.

The first objective (to replicate the resulting structure's CFA with SEM) is not fulfilled since it shows a result of 5 factors, instead of the 6 presented in the English version (Dorn et al., 2010), thus reducing the number of items from 59 to 15. This is corroborated by the indices obtained since they present a good fit (NFI = 90, TLI = .92, CFI = .91, RMSEA = .06).

The second objective of determining the scale's reliability or internal consistency is fully confirmed because the results show adequate reliability. The reliability of the scale ranges from .70 to .76, and the overall reliability of the scale is .72.

The third objective (to look for evidence of convergent validity) was also fulfilled. The existing correlations can be observed to be directly and inversely associated with both with the different correlates and the instruments used. The scale has good indications of validity with the SSQ-15, MBI-GS, Irritation, MP-9, DII and Trans-18 scales, and are associated with several factors both directly and inversely. "Relaxed driving (F1)" was positively associated with age (r=.22, p <.05) , number of children (r=.22, p <.05) , Seniority as transport driver (r=.18, p <.05), comfort of your seat (r=.19, p <.05), the suspension of your seat (r=.23, p <.05), the adjustable lumbar support (r=.16, p <.05), Personal effectiveness (r=.15, p <.01), Personal safety behaviors (r=.34, p <.05), Vehicle-related safety behaviors (r=.23, p <.05) and negatively with fifteen correlates: Distance from workplace to the place where you live (r=-.17, p <.05), days did you feel tired or had no energy during the last week (r=-.20, p <.01), times did you feel tired or lacking energy for more than 3 hours on any day (r=-

.13, *p* <.01), times did you feel so tired to the point that you had to force yourself to do things (*r*=-.15, *p* <.01), days have you been to work while being sick (*r*=-.11, *p* <.05), number of minutes you are sitting when you work (*r*=-.14, *p* <.01), Sleep Quality (*r*=-.13, *p* <.01), exhaustion (*r*=-.39, *p* <.01), cynicism (*r*=-.31, *p* <.01), emotional irritation (*r*=-.38, *p* <.01), cognitive irritation (*r*=-.25, *p* <.01), body (*r*=-.21, *p* <.01) and limbs (*r*=-.18, *p* <.01), psychophysiological disorders (*r*=-.16, *p* <.05) and dysfunctional impulsivity (*r*=-.25, *p* <.01). On the other hand, the "Preventings Hazards (F2)", is positively related to four correlates: In general for your work vehicles, the comfort of your seat (driver's seat) is ... *(r*=.15, *p* <.01), the suspension of the seat *(r*=.15, *p* <.05), the adjustable lumbar support of the driver's seat *(r*=.15, *p* <.05) and personal effectiveness *(r*=.30, *p* <.01), and in a negative way with seven contrast variables: Number of partners with whom you interact (*r*=-.19, *p* <.05), exhaustion (*r*=-.13, *p* <.01), cynicism (*r*=-.21, *p* <.01), emotional irritation (*r*=-.11, *p* <.01), cognitive irritation (*r*=-.12, *p* <.01), body (*r*=-.13, *p* <.05) and limbs (*r*=-.11, *p* <.05). Also, "Alert and surveillance (F3)", is positively related to six correlates: age *(r*=.20, *p* <.01), seniority as transport driver (years). *(r*=.16, *p* <.05), number of route modifications *(r*=.13, *p* <.05), personal effectiveness *(r*=.20, *p* <.01), personal safety behaviors *(r*=.21, *p* <.01), vehicle-related safety behaviors *(r*=.12, *p* <.05) and inversely with two variables: number of breakdowns (*r*=-.13, *p* <.05) and cynicism (*r*=-.32, *p* <.01). "Thrill Seeking (F4)" is linked to nine positive correlates: days did you feel tired or had no energy (*r*=.27, *p* <.01), times did you feel tired or lacking energy for more than 3 hours on any day (*r*=.15, *p* <.01), Sleep Quality (*r*=.17, *p* <.01), Exhaustion (*r*=.30, *p* <.01), Cynicism (*r*=.25, *p* <.01), Emotional Irritation (*r*=.25, *p* <.01), Cognitive Irritation (*r*=.15, *p* <.01), Functional impulsivity (*r*=.19, *p* <.01), Dysfunctional impulsivity (*r*=.17, *p* <.01), and inversely to six contrast variables: Age (*r*=-.29, *p* <.01),

number of children (*r*=-.12, *p* <.05), seniority as transport driver (years) (*r*=-.14, *p* <.01), kind of adjustable lumbar support (*r*=-.17, *p* <.01), personal safety behaviors. (*r*=-.24, *p* <.01), vehicle-related safety behaviors (*r*=-.17, *p* <.01). "Fatigue and anxiety (F5)" is associated with twelve correlates directly: days did you feel tired or had no energy *(r*=.38, *p* <.01), times did you feel tired or lacking energy for more than 3 hours on any day *(r*=.28, *p* <.01), times did you feel so tired to the point that you had to force yourself to do things *(r*=.23, *p* <.01), days have you been to work while being sick *(r*=.11, *p* <.05), Sleep Quality *(r*=.23, *p* <.01), Exhaustion *(r*=.43, *p* <.01), Cynicism *(r*=.41, *p* <.01), Emotional Irritation *(r*=.34, *p* <.01), Cognitive Irritation *(r*=.25, *p* <.01), Body *(r*=.28, *p* <.01), Limbs *(r*=.21, *p* <.01) and Psychophysiological disorders *(r*=.33, *p* <.01), and with three variables negatively: comfort of your seat (*r*=-.15, *p* <.05), Personal effectiveness (*r*=-.13, *p* <.01) and Personal safety behaviors. (*r*=-.16, *p* <.01). Regarding the hours of exposure, it was found that a negative correlation exists between the number of minutes that the professional driver is working and the relaxing driving (Factor 1). This supports those who show that there is a positive correlation between the length of exposition and the risk of committing traffic infractions (Ameratunga et al., 2006; Elias and Shiftan, 2014) and with the risk of an accident (Al-Balbissi, 2003; Spallek et al., 2006; Thouez et al., 2005).

In conclusion, the different analyses have provided evidence of the existence of a pentafactorial structure while showing adequate statistical indices (Tabachnick & Fidell, 2007). The TDS-15 is an instrument for assessing the stress experienced by professional drivers on the road. It is designed to be an instrument that can be applied and interpreted quickly and is easy to understand. Likewise, its five subscales allow an independent evaluation of each other. As far as applicability is concerned, since the

scale has good psychometric properties, the results provide important practical information about work stress that can be used in the strategic management of human resources to improve the occupational health of workers in this sector. It also allows prevention professionals to obtain reliable data for assessments based on scientific evidence.

As limitations to this study we find that in the population studied the number of women who drive professionally is very small, so it would be convenient to conduct a study in a sample with more representation of the female gender.

Appendix

Table 3.

TDS-15 Short Scale: Original scale, mean, standard deviation, corrected item-total correlation, skewness and kurtosis.

Items	(a)	(b)	(c)	(d)	(e)	(f)
1. No me pongo nervioso/a al conducir detrás de un vehículo lento. [original English, 35. It does not annoy me to drive behind a slow moving vehicle.] (Relaxed Driving, RD1)	4.Patient Driving	3.93	1.59	.50	-.29	-1.06
6. No me disgusto cuando los semáforos cambian a rojo justo cuando me estoy acercando. [original English, 38. I do not get annoyed when the traffic lights change to red as I approach them.] (Relaxed Driving, RD2)	4.Patient Driving	3.99	1.55	.49	-.40	-.83
11. Me disgusta que en el último minuto me digan que tengo que hacer un turno o una ruta que no esperaba. [original English, 40. It upsets me when I get told at the last minute to do a shift or route that I was not expecting.] (Relaxed Driving, RD3) (Reversed)	4.Patient Driving	2.05	1.66	.52	.40	-.96
2. Confío en mi capacidad para evitar un accidente. [original English, 18. I feel confident in my ability to avoid an accident.] (Preventing Hazards, PH1)	2.Hazard Monitoring	5.12	1.06	.49	-1.71	3.54
7. Es mejor llegar tarde que tener un accidente. [original English, 59. It is better to be late than to have an accident.] (Preventing Hazards, PH2)	6.Thrill Seeking	5.58	.93	.60	-2.76	8.09
12. Como conductor de un vehículo de transporte, es importante aprender de los errores propios. [original English, 22. As a bus driver it is important to learn from my mistakes.] (Preventing Hazards, PH3)	2.Hazard Monitoring	5.22	1.14	.51	-1.83	3.07
3. Me esfuerzo en estar alerta sobre posibles riesgos incluso cuando no es estrictamente necesario. [original English, 13. I try very hard to look out for hazards even when it's not strictly necessary] (Alertness and Surveillance, AS1)	2.Hazard Monitoring	4.53	1.42	.52	-.94	.05
8. Intento predecir qué harán los demás vehículos en la carretera o en la calle. [original English, 14. I try and predict what other people on the road are going to do.] (Alertness and Surveillance, AS2)	2.Hazard Monitoring	4.97	1.29	.53	-1.46	1.55
13. Siempre vigilo los coches aparcados por si alguien sale de ellos, o por si hay peatones tras ellos. [original English, 15. I always keep an eye on parked cars in case somebody gets out of them, or there are pedestrians behind them.] (Alertness and Surveillance, AS3)	2.Hazard Monitoring	5.04	1.25	.52	-1.47	1.65
4. Me gusta la sensación de acelerar con rapidez. [original English, 53. I enjoy the sensation of accelerating rapidly.] (Thrill Seeking, TS1)	6.Thrill Seeking	2.87	1.57	.64	.38	-.97
9. Me apasiona conducir rápido. [original English, 54. I get a thrill out of driving fast.](Thrill Seeking, TS2)	6.Thrill Seeking	2.53	1.41	.68	.69	-.35
14. Me gusta tomar las curvas cerradas a alta velocidad con el vehículo de transporte. [original English, 55. I enjoy cornering at high speed in the bus.] (Thrill Seeking, TS3)	6.Thrill Seeking	1.51	1.01	.51	2.43	6.11
5. Estoy menos centrado/a o consciente de lo que pasa a mi alrededor. [original English, 1. Less focused/ aware of what is going on around me.] (Fatigue and Anxiety, FA1)	1.Fatigue Proneness	2.55	1.53	.50	.76	-.52
10. Me siento más adormilado /a o somnoliento /a. [original English, 3. More drowsy or sleepy.](Fatigue and Anxiety, FA2)	1.Fatigue Proneness	2.22	1.33	.51	.93	-.01
15. Me siento más incómodo/a físicamente. [original English, 5. More uncomfortable physically.] (Fatigue and Anxiety, FA3)	1.Fatigue Proneness	2.58	1.48	.53	.64	-.64

(a) Original English factor; (b) Mean (M); (c) Standard Deviation (SD); (d) Corrected item/total correlation (r_{jx}); (e) Skewness (Sk) and (f) Kurtosis (Kr).

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