

LA ESCALA DE LA IRA AL CONDUCIR: UN ESTUDIO DE VALIDEZ EN MÉXICO

THE DRIVING ANGER SCALE: A VALIDITY STUDY IN MEXICO

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Resumen

Esta investigación validó en una muestra mexicana ($n = 987$) la Escala de la Ira al Manejar (DAS), un instrumento que mide la ira que surge mientras se opera un vehículo automotor. La estructura original de seis factores del DAS (33 ítems) mostró pobre ajuste en el análisis factorial confirmatorio. El análisis factorial exploratorio arrojó cinco factores válidos (16 ítems) para evaluar la intensidad de la ira cuando el automovilista se expone a estas situaciones: (a) gestos hostiles de otros automovilistas (3 ítems, $\alpha = .82$); (b) presencia de la policía (3 ítems, $\alpha = .73$); (c) conducción ilegal (4 ítems, $\alpha = .72$); (d) obstrucciones de tráfico (3 ítems, $\alpha = .61$) y (e) descortesía (3 ítems, $\alpha = .65$). El Alfa de Cronbach para el DAS total de 16 ítems fue de .85. La correlación test-retest para el DAS total de 16 ítems fue de .72 para nueve semanas.

Palabras clave: Ira, conductas de conducción, detonantes de ira, emociones, validez

Abstract

This study validated in a Mexican sample ($n = 987$) a widely used measure of the anger that emerges while operating a motor vehicle, the Driving Anger Scale (DAS). As a result, the confirmatory factor analysis showed the original six factor structure of the DAS (33 items) did not fit the data.

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Exploratory factor analyses yielded five valid factors (16 items) to assess anger intensity when the driver is exposed to these situations: (a) hostile gestures of other drivers (3 items, $\alpha = .82$); (b) police presence (3 items, $\alpha = .73$); (c) illegal driving (4 items, $\alpha = .72$); (d) traffic obstructions (3 items, $\alpha = .61$); and (e) discourtesy (3 items, $\alpha = .65$). Internal consistency for the 16-item total DAS was acceptable ($\alpha = .85$). The test-retest correlation for the 16-item total DAS was .72 for nine weeks.

Keywords: Anger, anger triggers, driving behavior, emotions, validity

Some individuals experience high levels of anger while driving their cars. High anger intensity is associated with poor ability to control this emotion, which leads to negative consequences. For example, angry/aggressive driving is a risk factor for motor vehicle accidents (National Highway Traffic Safety Administration, 2001). Moreover, angry drivers report more hostile/aggressive thoughts, engaging in aggression and violence against other drivers (Deffenbacher, 2009). Thus, driving anger deserves study, given its actual or potential negative consequences.

The assessment of driving anger is relevant to detect individuals in higher risk of anger, aggression, and risky behavior, which reduce safety for the person and others, and may result in negative emotional, psychological, property, legal, financial, and even lethal consequences (Dorantes-Argandar, Cerda-Macedo, Tortosa-Gil, & Ferrero, 2015).

Moreover, instruments to assess driving anger are necessary to assess psychotherapeutic and prevention programs designed to reduce anger and aggressive, destructive behavior while driving.

Given the problems associated with driving anger, Deffenbacher, Oetting, and Lynch (1994) developed the 33-item Driving Anger Scale. They defined driving anger as a situation or context-bound anger that emerges while operating a motor vehicle (Deffenbacher et al., 1994). The DAS (Deffenbacher et al., 1994) measures six types of situations that trigger anger while driving: (1) hostile gestures, (2) illegal driving, (3) police presence, (4) slow driving, (5) discourtesy, and (6) traffic obstructions. The DAS has been validated in several countries. Sometimes, the six factor model has been replicated (Li, Yao, Jiang, & Li, 2014; McLinton & Dollard, 2010; Sullman, Gras, Cunill, Planes, & Font-Mayolas, 2007; Sullman, Stephens, & Yong, 2014; Yasak & Esiyok, 2009).

However, other studies found three, four and five factors as a valid solution (Björklund, 2008; Lajunen, Parker, & Stradling, 1998; Parker, Lajunen, & Summala, 2002; Sullman, 2006; Sullman, Stephens, & Zaporozhets, under review; Villieux & Delhomme, 2007). With the exception of Sullman and colleagues (under review), the 3-item hostile gestures scale was the unique factor that was retained without modification across studies. Given different findings, methods of data analysis, and possible cultural/national differences, both the number and content of factors for the DAS are not conclusive. The present research, therefore, assessed the DAS factor structure in Mexico, a country not previously studied. Driving anger in this country has also negative consequences (Dorantes-Argandar et al., 2015).

This research had four goals. First, it tested whether the original DAS structure with six types of anger triggering situations replicates in the Mexican sample. Because it did not replicate (see Results), then the second goal was to explore the underlying constructs the DAS measures in the Mexican sample. Third, it assessed discriminant validity. Finally, it explored the internal consistency (Cronbach's Alpha) and the test-retest reliability.

Method

Participants

Two samples of private university students participated. Sample 1 ($n = 987$; 487 men and 500 women) served to validate the Driving Anger Scale. Sample 2 ($n = 219$; 135 men and 84 women) explored the test-retest reliability for nine weeks. Means of age and standard deviations were, respectively, 21.24 (2.66), and 19.31 (1.87) for each sample. This research was approved by institutional review processes.

Instruments

Driving Anger Scale (DAS). The 33-item DAS (Deffenbacher et al., 1994) measures the anger intensity from 1 (*not at all*) to 5 (*very much*) in response to different aspects of driving: (1) the 3-item hostile gestures scale ($\alpha = .87$), for example, "Another driver yells at you about your driving"; (2) the 4-item illegal driving scale ($\alpha = .80$), for example, "Someone is weaving in and out of traffic"; (3) the 4-item police presence scale ($\alpha = .79$), for example, "You pass a radar speed trap"; (4) the 6-item slow driving scale ($\alpha = .81$), for example,

“Someone is slow in parking and holding up traffic”; (5) the 9-item discourtesy scale ($\alpha = .81$), for example, “Someone is driving right up on your back bumper”; and (6) the 7-item traffic obstructions scale ($\alpha = .78$), for example, “You are stuck in a traffic jam.” Internal consistency of the 33-item DAS is .90 (Deffenbacher et al., 1994).

The Multicultural Latin American Inventory of Anger Expression and Hostility (ML-STAXI). The ML-STAXI has 44 items to assess anger experience and expression (Alcázar, Deffenbacher, & Byrne, 2011). The 10-item State Anger Scale ($\alpha = .82$) identifies the presence of anger at the moment of answering the inventory (e.g., “I am furious”). The 10-item Trait Anger Scale ($\alpha = .86$) measures anger proneness across time and situation (e.g., “I am a hotheaded person”). The ML-STAXI also measures anger expression and control with four scales (Alcázar et al., 2011). The 5-item Anger-out Scale ($\alpha = .70$) describes actions or behaviors that show to others that one is angry (e.g., “If somebody bothers me, I tell him/her how I feel”). The 6-item Anger-in Scale ($\alpha = .65$) measures anger suppression or the extent to which the person feels anger but does not show it (e.g., “I harbor grudges that I do not say to anyone”). The 7-item Anger Control-out Scale ($\alpha = .72$) assesses the efforts to control one’s behavior when angry (e.g., I control the way I react”), whereas the 6-item Anger Control-in Scale ($\alpha = .86$) assesses the attempts to reduce the anger arousal (e.g., “I try something relaxing to calm down”).

Procedure

The DAS was translated from English to Spanish by two Mexican professional translators. Both lived in United States and their current job in Mexico is to do simultaneous translation and translation of documents. The lack of agreement in some words and phrases was solved through rewording items to improve comprehension for Mexican participants. A group of 20 drivers from a private university completed the translated DAS with the instruction to report any aspect that was not clear. Participants understood the items, but not the instructions to answer the DAS. In particular, the link between the items and the answer choices was not clear, which made difficult to understand what the participants had to do with each item to select one of the answer choices. The first author and the participants talked about the solution of including the phrase “Extent to which it makes you angry or it provokes you” above the answer choices (see Appendix).

Participants agreed with adding such phrase to clarify the connection between the items and the answer choices. The final administration included the modification; no problems emerged. Two native English speakers who lived in the U.S. most of their lives, but lived in Mexico for the last 8-10 years back-translated the DAS items from Spanish to English. The back-translated DAS kept equivalent words and meanings to the original.

Questionnaires were administered during class to groups of 8-25 students. Teachers were present at least during the reading of the instructions. Instructions clarified that the study was anonymous (except for the test-retest samples) and participation was voluntary. No student refused participation.

Results

A Confirmatory Factor Analysis (CFA) assessed whether the original six-factor solution found by Deffenbacher and colleagues (1994) replicated on Sample 1 ($n = 987$). We used the robust maximum likelihood methods of EQS 6.1 (Bentler, 1995) because multivariate kurtosis normalized estimate was 52.25 (> 3.00), revealing non-normality of data (Bentler, 2004). Model fit was assessed by: (1) the χ^2 and the Satorra-Bentler χ^2 scaled statistic (S-B χ^2) where nonsignificant values indicate good fit, although this statistic is highly sensitive to sample size such that a good fitting model may have a significant χ^2 ; (2) the comparative fit index (CFI) and (3) the robust comparative fit index (RCFI) where values above .95 are considered good (Hu & Bentler, 1999); (4) the standardized root mean square residual (SRMR), where values below .08 are good (Hu & Bentler, 1999); and (5) the root mean square error of approximation (RMSEA) where values below .08 are acceptable (Brown & Cudeck, 1993). As a result, χ^2 and S-B χ^2 (df s = 480) = 2329.02 and 1962.58 were significant ($ps < .001$), although this is not unexpected in large samples. The SRMR and the RMSEA (.069 and .062) indicated good fit, but the CFI and the RCFI (.809 and .828) revealed poor fit. Therefore, the original six factor structure (Deffenbacher et al., 1994) did not fit the Mexican sample.

Given the results for the CFA, we used a series of Exploratory Factor Analyses (EFA) on Sample 1 to identify a better model of the latent constructs underlying in the Mexican sample.

We used the principal axis method and oblique (promax) rotation (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Nunally & Bernstein, 1995). Items were kept when they covered these criteria: (1) items had to load .40 or above on the factor; (2) the item could not load higher than .30 on another factor; and (3) the item conceptually fits the factor.

The EFAs lead to a satisfactory 16-item, five-factor solution, accounting for 64.76% of the variance (Table 1).

Table 1.

Exploratory Factor Analysis of the DAS on Sample 1

Items	F1	F2	F3	F4	F5
27. Someone yells at you about your driving.	.87				
21. Someone makes an obscene gesture toward you about your driving.	.82				
24. Someone honks at you about your driving.	.64				
16. You pass a radar speed trap.		.74			
11. You see a police car watching traffic from a hidden position.		.71			
23. A police car is driving in traffic close to you.		.68			
2. Someone is driving too fast for the road conditions.			.78		
25. Someone is driving way over the speed limit.			.70		
6. Someone is weaving in and out of traffic.			.48		
13. Someone runs a red light or stop sign.			.43		
31. A truck kicks up sand or gravel on the car you are driving.				.81	
30. You are behind a vehicle that is smoking badly or giving off diesel fumes.				.65	
32. You are behind a large truck and cannot see around it.				.54	
8. Someone cuts in and takes the parking spot you have been waiting for.					.69
20. Someone pulls right in front of you when there is no one behind you.					.57
17. Someone speeds up when you try to pass them.					.49
Eigen values	5.00	1.85	1.33	1.14	1.02
Variance accounted for	31.27	11.56	8.35	7.15	6.42

Note. Values below .29 were omitted in the table

The factors reflected hostile gestures (F1; 3 items), police presence (F2; 3 items), illegal driving (F3; 4 items), traffic obstructions (F4; 3 items), and discourtesy (F5; 3 items). A slow driving factor did not emerge in the final solution. The five factors in the Mexican sample were similar to five of the six scales of the original DAS.

As a further step, we assessed the 16-item five-factor solution. This was useful to test cross-validation, that is, whether the model found has good fit on other samples. Samples A ($n = 494$) and B ($n = 493$) emerged from the full, first sample ($n = 987$), which was randomly divided in two halves. The other two were the samples of the test-retest study ($n = 219$), specifically, from the first and second administration of the DAS. As a result, the five-factor model did not reach the desired standards (Table 2). However, the five-factor model showed better fit statistics overall, compared to the fit obtained in the first CFA with the total 33-item DAS.

Table 2.
Confirmatory factor analyses for subsamples

Statistics	Sample A	Sample B	Test-retest Sample ($n = 219$)	
	$n = 494$	$n = 493$	Administration One	Administration Two
Normal X^2	261.02	293.06	209.87	172.68
Satorra-Bentler X^2	225.06	253.94	181.33	141.38
CFI	.925	.906	.915	.918
Robust CFI	.935	.918	.927	.939
SRMR	.059	.064	.084	.082
RMSEA	.061	.059	.069	.062
with 90% CI	.051-.070	.050-.067	.053-.083	.039-.081

Note. Degrees of freedom were 94 for the four samples, with p 's < .001.

The correlations between the DAS subscales were positive and moderate, suggesting subscales are related, although they measure different aspects of driving anger (Table 3). With regard to discriminant validity, the correlations between the DAS and the ML-STAXI subscales were generally small to medium, below .39 (Table 4). Scores below .50 lead to assume discriminant validity (Gregory, 2011). Therefore, the DAS measured a specific construct, not present in the ML-STAXI.

Table 3.

Correlations of DAS Scales, Total Score, and ML-STAXI Measures on Sample 1

Measures	1	2	3	4	5	6
1. DAS, Hostile gestures	--					
2. DAS, Police presence	.37					
3. DAS, Illegal driving	.41	.38				
4. DAS, Traffic obstructions	.41	.25	.40			
5. DAS, Discourtesy	.37	.19	.36	.45		
6. Total DAS	.74	.63	.75	.69	.65	
7. State anger	.18	.28	.17	.06	.09	.22
8. Trait anger	.31	.25	.19	.24	.31	.38
9. Control-in	-.10	-.19	-.10	.00	-.05	-.13
10. Control-out	-.20	-.28	-.14	-.10	-.13	-.25
11. Anger-out	.22	.18	.12	.15	.21	.27
12. Anger-in	.22	.16	.14	.19	.23	.25
<i>Means</i>	3.03	2.27	2.93	3.22	3.58	3.00
<i>Standard deviations</i>	1.08	0.95	0.85	0.89	0.83	0.64

Note. $r > .07, p < .05$; $r > .09, p < .01$; $r > .11, p < .001$.

Then, we explored internal consistency on Samples 1 and 2 (Table 4). The long Mexican version with 16 items had internal consistency (Cronbach's Alpha) between .85 and .88. About the temporal stability, the nine-week (Sample 2) test-retest correlation was acceptable for the 16-item DAS ($r = .72$).

However, test-retest correlations were generally lower for the subscales, with the following scores: (a) .76 for hostile gestures; (b) .58 for police presence; (c) .57 for illegal driving; (d) .55 for traffic obstructions; and (e) .64 for discourtesy.

Table 4.

Cronbach's Alphas of the Driving Anger Scale (DAS) for two Mexican samples

Scale	Sample 1	Sample 2
	($n = 987$)	($n = 219$)
		9-weeks test-retest
Hostile gestures	.82	.88-.84
Illegal driving	.72	.74-.83
Police presence	.73	.82-.79
Discourtesy	.65	.72-.79
Traffic obstructions	.61	.68-.68
Total 16-item DAS	.85	.86-.88

Discussion

This study developed a 16-item, five-factor version of the DAS from the original 33 items of the DAS (Deffenbacher et al., 1994). The Mexican version has the following strengths: (1) the short measure (16 items) replicated five of the original six factors; (2) factors possessed adequate internal consistency and test-retest reliability; and (3) the DAS was not highly related to general anger and its expression, supporting the specificity of measuring anger in the context of driving, rather than being subsumed as an aspect of general anger (discriminant validity). The Mexican version of the DAS appears to be a sound instrument from which to begin exploring the relationship of driving anger to other important driving-related phenomena and populations in Mexico.

Findings have implications for theory and research. First, Mexican researchers now have available a valid instrument to assess driving anger, which contributes to the screening and detection of persons with high anger while driving. Usually, individuals with driving anger problems are those in the upper quartile of the DAS (Deffenbacher, Filetti, Richards, Lynch, & Oetting, 2003). These individuals are often more aggressive, impulsive, and get angry easily in both, driving and non-driving situations (Deffenbacher et al., 2003). In this research, the upper quartile is above the score of 56 for men, and 55 for woman, based on the sample of 987 participants. The 16-item DAS Mexican version may be useful for counselors and researchers as one of the aspects in treatment planning and evaluation related to anger problems.

Second, among the situations that produce anger in drivers, the factor replicated in ten of eleven studies is hostile gestures (Björklund, 2008; Lajunen et al., 1998; Li et al., 2014; McLinton & Dollard, 2010; Parker et al., 2002; Sullman, 2006; Sullman et al., 2007, 2014; Villieux & Delhomme, 2007; Yasak & Esiyok, 2009). This factor was also retained in the present study. Unlike other factors, hostile gestures imply direct expressions of disapproval toward others, which is aversive or unpleasant. Berkowitz's theory suggests that unpleasant events may lead to negative affect, and negative affect leads to anger (Berkowitz, 1993). A theoretical implication is that hostile gestures might be aversive and invariant across cultures, at least in contexts of driving.

The finding is relevant because it strengthens generalization of knowledge about a specific stimulus (i.e., hostile gestures) that may trigger anger in drivers.

The present study retained five constructs from the original DAS. The sixth factor (slow driving) did not emerge in the final EFA solution. Two perspectives may help to understand these results. First, since our findings maintained most of the original factors, just like other studies (Björklund, 2008; Lajunen et al., 1998; Li et al., 2014; McLinton & Dollard, 2010; Parker et al., 2002; Sullman, 2006; Sullman et al., 2007, 2014; Villieux & Delhomme, 2007; Yasak & Esyok, 2009), it is possible to consider anger triggers in drivers as universal to some extent. There are more similarities than differences across countries/studies in the situations that provoke anger in drivers. Second, the slow-driving factor did not emerge because the factor loadings were lower than the loadings of other items, revealing the slow-driving items could not form a construct. Sociocultural aspects may explain it. For example, some of the slow-driving items (Someone is slow in parking and holding up traffic; A slow vehicle on a mountain road will not pull over and let people by) are not frequent complaints of Mexican drivers; then, their potential as anger triggers are weak. Moreover, Mexican pedestrians do not work with the rule of crossing the street on the corners (item: A pedestrian walks slowly across the middle of the street, slowing you); in practice, they may cross at any point of the street (it is “normal”) and, therefore, the item is not a trigger of high anger. Taken together, the result was a 16-item five-factor valid DAS; unlike the original DAS, where the sixth factor is slow-driving.

This research is limited by its reliance on self-report. But internal states like anger are often assessed by self-report, and the current research links into that literature. Sometimes, the written answers may not correspond completely with actual behaviors and emotions.

Future research employing other methodologies, such as collateral informants that know the driver and how s/he reacts when angry or real time physiological recordings, will provide complementary information.

In conclusion, the 16-item DAS, Mexican version, is a valid and reliable scale to assess driving anger.

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Appendix

Translation and Rewording of the Answer Choices for the Driving Anger Scale

	Grado en que te enoja o te provoca				
	Nada	Casi nada	Algo	Mucho	Muchísimo
27. Alguien te grita por tu forma de manejar.	()	()	()	()	()
21. Alguien te hace un gesto obsceno sobre la forma como manejas.	()	()	()	()	()
24. Alguien te toca el claxon por la forma en que manejas.	()	()	()	()	()
16. Pasas por un radar detector de alta velocidad.	()	()	()	()	()
11. Ves a una patrulla de tránsito oculta, vigilando el tráfico.	()	()	()	()	()
23. Una patrulla de tránsito va manejando cerca de ti.	()	()	()	()	()
2. Alguien maneja demasiado rápido, dadas las condiciones del camino.	()	()	()	()	()
25. Alguien va manejando con exceso de velocidad.	()	()	()	()	()
6. Alguien va zigzagueando, metiéndose y saliéndose del carril.	()	()	()	()	()
13. Alguien se pasa el semáforo en rojo o el letrero de alto.	()	()	()	()	()
31. Un camión te salpica con arena o grava en el carro que vas manejando.	()	()	()	()	()
30. Te encuentras detrás de un vehículo que está echando mucho humo o despidiendo olor a diésel.	()	()	()	()	()
32. Estás detrás de un tráiler que no te deja ver.	()	()	()	()	()
8. Alguien se mete en el lugar de estacionamiento que estabas esperando.	()	()	()	()	()
20. Alguien invade el único carril que hay en la calle, se detiene y no te deja pasar.	()	()	()	()	()
17. Alguien acelera cuando tratas de rebasarlo.	()	()	()	()	()