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Validation of Driving Cognitions Questionnaire (DCQ) for general Spanish population

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Título: Validación del Cuestionario de Cogniciones en la Conducción (DCQ) en población general Española.

Resumen: El *Driving Cognitions Questionnaire* (DCQ; Ehlers et al., 2007) evalúa las preocupaciones sociales, accidentes y ataques de pánico en los casos de fobia a conducir. Esta fobia tiene una prevalencia entre el 2% y 6%, e inhabilita a la persona para conducir, o causando a menudo una gran ansiedad. Se presenta un estudio sobre las características psicométricas del DCQ adaptado a población española. Han participado 716 personas (55.6% mujeres), de una edad media de 37.7 años, con un rango entre los 18 y 80 años, donde un 41.8% de ellos declararon haber tenido alguna experiencia negativa al conducir. El DCQ ha mostrado una alta fiabilidad por consistencia interna (entre a = .92 y .97), y test-retest (entre r = .73 y .87), y también alta validez convergente con el cuestionario ISAT-3 (entre r = .72 y .80). El análisis factorial exploratorio mostró los tres factores, mientras que el análisis factorial confirmatorio mostró un modelo con dos factores y otro con tres factores. Un punto de corte de 52 indicaría un posible criterio sobre la necesidad de una intervención potencial. Se concluye sobre la utilidad del DCQ para la evaluación de fobia y ansiedad ante la conducción.
Palabras clave: Cuestionario de Cogniciones en la Conducción. DCQ. Validación. Fiabilidad. Fobia a conducir. Amaxofobia. Población española.

Abstract: The *Driving Cognitions Questionnaire* (DCQ; Ehlers et al., 2007) assesses social concerns, accidents, and panic attacks in driving phobia cases. This phobia has a prevalence for 2%- 6%, and impairs the ability to drive, often causing severe anxiety. We present a study on the psychometric properties of the DCQ adapted for the Spanish population. A total of 716 people participated (55.6% women) took part, with a mean age of 37.7 years (range from 18 to 80 years); of these, 41.8% reported some negative driving experiences. The DCQ demonstrated high internal consistency reliability (between α = .92 and .97) and test-retest reliability (r = .73 to .87). It also showed strong convergent validity with the ISAT-3 questionnaire (r = .72 to .80). Exploratory factor analysis revealed three factors, whereas confirmatory factor analysis supported both two and three-factor models. A cut-off score of 52 indicates potential intervention needs as a criterion for considering the needs. We conclude that the DCQ is useful for assessing driving phobia and anxiety.
Keywords: Driving Cognitions Questionnaire. DCQ. Validation. Reliability. Driving phobia. Amaxophobia. Spanish sample.

Introduction

The Driving Cognitions Questionnaire (DCQ; Ehlers et al., 2007) is designed to assess social concerns, traffic accidents, and panic attacks while driving. Driving phobia is classified as a situational-specific phobia according to the American Psychiatric Association (APA) in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed., text rev.; APA, 2024). It is defined as an intense and disproportionate fear or anxiety towards a specific object or situation, characterised by persistent avoidance of any circumstances involving the phobic stimulus.

Specific phobias demonstrate a lifetime prevalence of 7.4% (Wardenaar et al., 2017), with 12-month prevalence rates ranging between 8% and 12% (APA, 2024). They rank among the most common phobias in the general population, with women affected twice as frequently as men (2:1 ratio; APA, 2024; Wardenaar et al., 2017). In Spain specifically, lifetime prevalence stands at 4.8%, with an annual rate of 3.8% (Wardenaar et al., 2017). Specifically, driving phobia (or amaxophobia) has a prevalence rate ranging between 2% and 6%, with the majority of cases being women aged 30 to 40 (Taylor et al., 2000). The estimated mean age of onset for this phobia is 25 years (Antony et al., 1997; Fischer et al., 2020). In a New Zealand sample, fear of driving was reported by up to 52% of participants, with mild anxiety in most cases and moderate-to-severe anxiety in 16% (Taylor, 2018). Individuals with this specific driving phobia experience acute and persistent fear when exposed to driving situations, manifesting in anxiety responses such as tachycardia, tremors, respiratory distress, dizziness, hypertension, restlessness, and hypervigilance (Delgado and López, 2019). These responses must persist for at least six months to meet diagnostic criteria (Fischer, 2020).

The aetiology of this phobia remains incompletely understood. In a seminal study, Taylor and Deane (1999) proposed three primary causative factors: motor vehicle accident experiences, negative driving experiences, or vicarious/informational conditioning. Conversely, some individuals report an inability to identify the origin of their fear or describe having experienced it perpetually (Fischer et al., 2020). Notably, research indicates that individuals who begin driving at later stages of life demonstrate significantly higher susceptibility to developing this phobia compared to those who commence driving during earlier developmental periods (Fischer et al., 2020; Taylor et al., 2007).

Driving phobia is typically characterised by exaggerated and irrational fears that do not necessarily impair driving ability, though affected individuals may endure significant anxiety while driving (Costa et al., 2018; Hidalgo-Muñoz et al., 2023). The most commonly feared scenario involves motor vehicle accidents, though additional concerns frequently relate to perceived driving competence. These include apprehensions regarding vehicle control, perceived insufficient driving skills, or criticism from others about one's driving

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performance. Furthermore, specific situational fears are commonly reported, such as high-speed driving, lane changing, bridge crossing, navigating unfamiliar areas, or nighttime driving (Costa et al., 2018; Hidalgo-Muñoz et al., 2023; Taylor & Deane, 2000).

According to Fischer et al. (2020), driving phobia demonstrates significant comorbidity with Post-Traumatic Stress Disorder (PTSD). The condition manifests in approximately 15% of traffic accident survivors, while PTSD following other traumatic events shows a higher prevalence rate of 45%. Notably, driving-related fear within a PTSD context specifically correlates with accident survivors' fears, exhibiting diagnostic characteristics of both conditions (Fischer et al., 2020).

The assessment of driving phobia incorporates multiple measurement instruments. Primarily, structured clinical interviews are employed, including the *Behavioural Interview for Specific Phobias* (Ruiz-García & Valero-Aguayo, 2021) and the *Anxiety and Related Disorders Interview Schedule* (Brown & Barlow, 2014; Bados, 2017). However, the most frequently utilised measures comprise self-report questionnaires, such as: The *Driving Situation Questionnaire* (DSQ; Ehlers, 1990); the *Anxiety Situations in Traffic Inventory* (ISAT; Carbonell et al., 1995); the *Driver Behaviour Questionnaire* (DBQ; Reason et al., 1990); the *Driving and Riding Avoidance Scale* (DRAS; Stewart & Peter, 2004; Spanish adaptation by Ruiz-García & Valero-Aguayo, 2021); the *Driving Behaviour Survey* (DBS; Clapp et al., 2011); the *James Whetstone's Measure of Amaxophobia* (Whetstone et al., 2020); and the most recent development, the *Instrument for Fear of Driving* (IFD; Fischer et al., 2023). For a comprehensive review, see Taylor et al., (2021).

Currently, there remains a paucity of validated instruments specifically designed for assessing driving phobia within Spanish populations. Notably, the *Driving Cognitions Questionnaire* (DCQ; Ehlers et al., 2007) has been employed in clinical studies to evaluate therapeutic outcomes in driving phobia interventions (e.g., Fischer et al., 2021; Ruiz-García & Valero-Aguayo, 2015, 2020, 2025). This comprehensive measure was specifically developed to assess driving-related fears and associated factors. Psychometric analyses from the original English validation studies (Ehlers et al., 2007) examined three distinct clinical samples across different countries: Individuals with driving phobia (N = 69); women experiencing driving-related fear (N = 100); and traffic accident survivors (N = 78). The DCQ demonstrated a consistent three-factor structure across all samples, reflecting cognitive concerns regarding panic symptoms, accident-related fears, and social evaluation anxieties. Additionally, the measure includes a total composite score. All samples showed excellent internal consistency (α = .89-.96) and strong correlations with other driving fear assessments. However, test-retest reliability data were not obtained in these initial validation studies.

The DCQ has been translated and validated in several countries, including two separate Brazilian studies, one with a general population sample (*N* = 187) and another with driving school students (*N* = 200). In the general population study (Santos-Olisan et al., 2015), which maintained the original factor structure, researchers found high internal consistency for panic concerns (α = .89), accident-related worries (α = .91), social concerns (α = .92), and the total scale (α = .96). The second Brazilian study (Oliveira-Gomes et al., 2015) with driving students identified through factor analysis two modified factors: (a) cognitions related to fear of social criticism/lack of traffic control and (b) cognitions concerning fear of traffic accidents, demonstrating strong internal consistency for both subscales (α = .90 and α =. 89 respectively). Item selection was based on factor loadings ≥ .30. These studies established moderate convergent validity between the DCQ and STAI-Trait/State measures. Notably, neither study provided test-retest reliability data, representing a significant gap in the psychometric evaluation of these adaptations.

According to Taylor et al. (2021), the DCQ has demonstrated robust psychometric properties. However, existing research has primarily relied on student and clinical samples, leaving the general population's driving-related fear and anxiety—along with the measure's psychometric characteristics in this group—largely unexplored. Taylor et al. (2021) addressed this gap in a New Zealand general population study (N = 420), reporting Cronbach's alpha coefficients of α = .82 for *social concerns*, α = .87 for *accident- and panic-related concerns*, and α = .93 for the *total scale*. Notably, their confirmatory factor analysis (CFA) of the original scale's items did not successfully replicate the proposed factor structure. Consequently, the authors advocated for a revised two-factor model.

The DCQ has also undergone validation in German, where it was designated as the *DCQ-R* by the authors (Heider et al., 2018) to reflect minor modifications introduced during translation. The study employed two distinct samples: a general population cohort (*N* = 843) and a clinical sample (*N* = 98). Exploratory factor analysis reaffirmed the original three-factor structure, while confirmatory factor analysis supported a well-fitting bifactorial model. The German adaptation demonstrated strong psychometric properties, with reliability coefficients ranging from α = .86 to .89, alongside robust validity evidence.

In Spain, Ruiz-Cabello (2018) administered an *ad hoc* translation of the DCQ to a sample of 300 drivers to examine the explanatory and predictive value of anxiety sensitivity in the development of driving-related fear and phobia. The study maintained the original scale structure and demonstrated excellent internal consistency: α = .95 for the total scale, α = .91 for panic-related concerns, α = .88 for accident-related fears, and α = .88 for social concerns.

Given the paucity of validated instruments for assessing driving-related difficulties and phobias in Spanish populations, this instrumental study examines the Driving Cognitions Questionnaire (DCQ). The primary objective is to evaluate the psychometric properties of the DCQ within a Spanish sample. Specific aims include: (a) examining its fac-

tor structure through confirmatory analysis; (b) assessing internal consistency reliability; (c) determining temporal stability via test-retest methods; (d) establishing convergent and discriminant validity; (e) developing clinical cut-off scores to differentiate between clinical and non-clinical cases; and (f) investigating potential associations between sociodemographic variables and driving-related fear/phobia.

Method

Participants

The study included 716 participants (399 women [55.6%] and 317 men [44.4%]), with a mean age of 37.73 years (*SD* = 14.89; range: 18-80 years). Of the total sample, 122 participants (17%) reported receiving some form of treatment - specifically 13.5% medical treatment, 1.0% psychiatric treatment, and 2.5% psychological treatment. Additionally, 42 participants (5.9%) reported having a diagnosed psychological disorder (including anxiety disorders, post-traumatic stress disorder, obsessive-compulsive disorder, adjustment disorder, stress reactions, and depression). Within the general sample, 299 participants (41.8%) acknowledged experiencing negative driving-related events, while 25 (3.5%) had undergone specific treatment for driving phobia. For the purposes of statistical analysis, participants meeting clinical criteria were excluded to maintain sample homogeneity. Furthermore, to facilitate data interpretation, age was categorised into 10-year intervals. Complete demographic characteristics are presented in Table 1.

For the test-retest reliability assessment, a subsample of 16 participants was evaluated, comprising 14 women (87.5%) and 2 men (12.5%). The mean age of this subsample was 25.60 years (*SD* = 7.40), with an age range of 21 to 46 years. Only one participant (6.3%) reported having a psychological disorder (specifically, an eating disorder), while none indicated receiving any form of treatment. Within this group, 7 individuals (43.8%) acknowledged experiencing negative driving-related incidents, though none had undergone specific treatment for driving phobia.

Table 1
Sociodemographic characteristics of the sample (N = 716).

Age	***N***	**%**
18 to 28 years	256	35.8
29 to 39 years	127	17.7
40 to 50 years	149	20.8
51 to 61 years	157	21.9
More than 61 years	27	3.8
Gender		
Men	317	44.3
Women	399	55.7
Marital status		
Single	338	47.2
Married-Cohabiting	310	43.3
Separated-Divorces	38	5.3
Widower	7	1.0
As a couple	23	3.2
Occupation		
Home	42	5.9
Unemployment	36	5.0
Student	219	30.6
Worker	354	49.4
Self-employed	40	5.6
Retired	19	2.7
Studying and working	6	0.8
Study level		
None	4	0.6
Primary	44	6.1
Secondary	48	6.7
Haigh school	103	14.4
Vocational	157	21.9
University	295	41.2
Postgraduate	65	9.1
Residence		
Parent-family	214	29.9
Self-family	359	50.1
Shared housing	96	13.4
Alone	45	6.3
Other	2	0.3

Treatment	***N***	**%**
None	594	83.0
Medical	97	13.5
Psyquiatric	7	1.0
Psychological	18	2.5
Disorders		
No	674	94.1
Yes	42	5.9
Treatment for driving phobia		
No	691	96.5
Yes	25	3.5
Negative experiences		
No	417	58.2
Yes	299	41.8
Frecuency driving		
Every day	324	45.3
Several times a week	180	25.1
Several times a month	94	13.1
Several times a year	34	4.7
Once a year	8	1.1
More than a year without driving	71	9.9
Years of driving license		
1 year or less	134	18.7
2 to 5 years	121	16.9
6 to 10 years	65	9.1
11 to 20 years	125	17.5
21 to 30 years	142	19.8
More than 30 years	125	17.5

Instruments

The study employed a sociodemographic questionnaire alongside the validated Spanish versions of the *Driving Cognitions Questionnaire* (DCQ) and *Inventory of Anxiety-provoking Traffic Situations* (ISAT-3) to establish concurrent validity.

The *ad hoc sociodemographic instrument* collected comprehensive data including age, gender, occupation, residential location, educational attainment, current treatment modalities (medical, psychological or psychiatric), clinical diagnoses, history of specific treatment for driving phobia, negative driving experiences, driving licence tenure, and habitual driving frequency (complete sample characteristics are presented in Table 1).

The *Driving Cognitions Questionnaire* (DCQ; Ehlers et al., 2007; Spanish adaptation by Ruiz-García & Valero-Aguayo, 2021) comprises 20 items rated on a 5-point Likert scale (0 = never to 4 = always), organised into three subscales: panic-related concerns, accident-related worries, and social evaluation anxieties, plus a global total score. Original validation studies demonstrated excellent internal consistency (subscales α = .89 - .93; total scale α = .96), strong convergent validity with other driving-related measures, and robust discriminative capacity between clinical and non-clinical populations.

The *Inventory of Anxiety-provoking Traffic Situations* (ISAT-3; Carbonell et al., 1995) contains 32 items using a 7-point Likert scale (1 = not at all to 7 = extremely), distributed across four subscales: self-evaluation and external assessment, criticism and aggression, external obstacles and traffic delays, and authority evaluation, in addition to a total score. Psychometric analyses revealed high internal consistency (total scale α = .91; subscales α = .73 - .85) and excellent test-retest

reliability after two months (total scale r = .91; subscales r = .73 - .85), indicating strong temporal stability of measurements.

Procedure

The adaptation of the DCQ followed established test adaptation guidelines (Hambleton, 2005; ITC, 2021), commencing with a forward translation into Spanish conducted by two study authors. An independent bilingual translator with subject-matter expertise subsequently performed back-translation. Two expert researchers then reviewed discrepancies between versions to refine the final translation (Ruiz-García & Valero-Aguayo, 2021). The study received ethical approval from the *Human Research Ethics Committee of the University of Córdoba* (Spain; Ref. CEIH-22-23) and adheres to both the *American Psychological Association*'s ethical standards and the *Declaration of Helsinki* (WMA, 2013).

Participants were recruited through non-probability sampling using snowball sampling methodology. The recruitment strategy employed a dual approach: firstly, university students were instructed to identify and recruit five individuals aged over 30 years (in addition to themselves), with explicit instructions to prioritise male participants followed by female participants (provided they reported no driving-related fear or phobia). This methodology, following Demerouti and Rispens (2014), was designed to enhance sample heterogeneity across key demographic variables including gender, age and educational attainment. Participants reporting negative driving experiences or driving-related fear/phobia were specifically identified and recorded. Secondly, social media platforms were utilised to disseminate the questionnaire battery. All participants received identical instructions and individualised access to the web-based survey platform. The online information portal included detailed informed consent procedures emphasising voluntary participation, anonymous data processing, and confidentiality of personal information. In strict compliance with data protection regulations, the web-based system did not collect or store IP addresses, cookies, email addresses, geographical data, or any personally identifiable information.

The questionnaire battery and all study-related data, including participation consent and ethical/legal documentation, were collected through a *Google Forms* platform. The initial survey page provided comprehensive information about the study objectives, voluntary participation terms, and data anonymity guarantees. Upon consenting, participants progressed to subsequent pages requesting non-identifiable sociodemographic information, followed by the standardised questionnaire items (presented without instrument names). The complete procedure required approximately 15 minutes to complete. All responses were securely recorded in a password-protected *Excel* file with encoded identifiers.

For the test-retest reliability assessment of response stability, the research team recruited participants from their professional and personal networks. These individuals received the questionnaire link via email, followed by a reminder notification after 15 days. Only participants who completed both administrations, with a minimum 15-day interval between responses, were included in the final test-retest analysis.

Data analysis

The statistical analyses were conducted using *Jamovi 2.3* (2020) an open-source software package employed for Confirmatory Factor Analysis (CFA) and the computation of reliability and validity indices. Complementary CFA analyses were performed using *Rstudio* (2020).

A comprehensive examination of full measurement invariance was conducted for the DCQ scores. Full invariance was operationally defined as demonstrating: (1) equivalent factor structures across groups, (2) identical factor loadings, (3) equivalent measurement errors, (4) uniform intercepts, and (5) consistent variances and covariances between the compared groups (male vs. female participants). All invariance constraints were implemented simultaneously to test full measurement invariance between each group pairing.

The analyses employed the diagonally weighted least squares (DWLS) estimation method, calculated from the polychoric correlation matrix. Model fit was assessed using multiple indices: the Root-Mean-Square Error of Approximation (RMSEA), Tucker-Lewis Index (TLI), and Comparative Fit Index (CFI). Model comparisons were evaluated through chi-square difference tests ($\Delta\chi^2$) and CFI differentials.

Internal consistency reliability was estimated using both Cronbach's alpha and McDonald's omega coefficients, with values $\geq .70$ considered acceptable for scale reliability.

Results

Confirmatory Factor Analysis

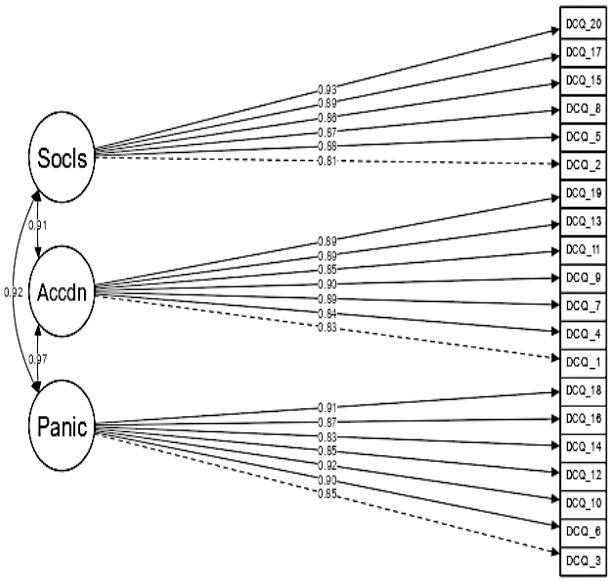
The confirmatory factor analysis (CFA) results, presented in Table 2, demonstrate that the three-factor model provides the optimal fit to the data. All fit indices meet established criteria for good model fit, with RMSEA values $\leq .08$ and both CFI and TLI (goodness-of-fit indices) exceeding .95 in all cases. Statistically significant differences were found between: (1) the one-factor and three-factor models ($\Delta\chi^2 = 987.58$, $\Delta df = 8$; $p < .01$), (2) the three-factor and two-factor models ($\Delta\chi^2 = 12.41$, $\Delta df = 2$; $p < .01$), and (3) the three-factor and bi-factor models ($\Delta\chi^2 = 843.89$, $\Delta df = 5$; $p < .01$). Figure 1 displays the factor structure of the three-factor model, which demonstrated superior fit compared to alternative configurations.

Table 2
Confirmatory factor analysis (N = 673) and multigroup analysis (DWLS procedure, polycentric correlation matrices): men = 304, women = 369.

Group/Model	$\chi 2$	gl	RMSEA (CI 90%)	CFI	TLI
Base model DQ	72084.06	190			
DCQ 1 factor	1281.06	170	.096 (.092–.102)	.95	.95
DCQ 2 factors	306.43	169	.037 (.032–.043)	.99	.99
DCQ 3 factors	294.02	167	.033 (.027–.039)	.99	.99
DCQ bi-factor	1137.91	162	.092 (.087–.097)	.99	.99
DCQ 3 H-M Configural	341.14	334	.013 (.001–.024)	.99	.99
DCQ 3 H-M Metric	365.06	351	.013 (.001–.024)	.99	.99
DCQ 3 H-M Scalar	365.08	348	.028 (.020–.035)	.99	.99
DCQ 3 H-M Residual	365.08	348	.028 (.020–.035)	.99	.99

Note: * χ^2 Satorra-Bentler

Figure 1
Factor structure of the three-factor model of the DCQ.



Factorial invariance

Furthermore, all fit indices indicate that this model demonstrates reasonable goodness-of-fit across the studied groups. The CFI index for the single-group model (i.e., total sample) was equivalent to the CFI values obtained in the multi-group analysis. Following established criteria by Cheung and Rensvold (2002), these results support full measurement invariance of the DCQ scores between male and female participants, encompassing configural, metric (factor loadings), scalar (intercepts), and residual (error variances and covariances) invariance levels. The observed differentials of ΔCFI = -.01 and ΔRMSEA = .01 fall within traditional thresholds for invariance determination.

Latent mean differences

To examine sex-based group differences, males were designated as the reference group (means fixed at zero). Critical ratios (CR) were computed to determine whether sex differences were statistically significant from zero, with CR values exceeding ±1.96 indicating significantly higher or lower means in the comparison group relative to the reference group.

Results revealed significantly elevated phobia levels among women compared to men across all scales: *panic* (CR = -7.03), *accidents* (CR = -8.49), *social* (CR = -9.25), and Total score (CR = -7.94). The effect sizes for these differences were moderate in magnitude (Cohen's *d* ranging from 0.54 to 0.72).

Analysis of factor-item relationships (standardized lambda coefficients, see Table 3) demonstrated that all items loaded strongly on their respective factors, with standardized factor loadings exceeding .50.

Table 3
Means and standard deviation for each of the items (range 0-4), and factor loading for the 3-factor model of each DCQ item.

Items DCQ	*M (SD)*	lambda
Factor 1: Panic		
3. I will be unable to catch my breath	0.54 (0.94)	.85
6. I will tremble and not be able to steer	0.75 (1.11)	.90
10. I will not be able to think clearly	0.84 (1.13)	.92
12. I will be trapped	0.61 (0.98)	.85
14. I will be stranded	0.55 (0.94)	.83
16. May heart will stop beating	0.39 (0.82)	.87
18. I will not be able to move	0.60 (0.98)	.91
Factor 2: Accidents		
1. I will not be able to react fast enough	1.26 (1.16)	.83
4. I cannot control whether other cars will hit me	1.04 (1.15)	.85
7. I will be injured	0.73 (1.05)	.89
9. I will injure someone	0.77 (1.10)	.90
11. I will die in an accident	0.76 (1.07)	.85
13. I will be causing an accident	0.93 (1.13)	.89
19. People riding with me will be hurt	0.69 (1.04)	.89
Factor 3: Social		
2. People I care about will criticize me	1.05 (1.14)	81
5. Other people will notice that I am anxious	0.97 (1.17)	.88
8. People will think I am a bad driver	0.95 (1.18)	.87
15. I will hold up traffic and people will be angry	1.00 (1.20)	.86
17. People will laugh at me	0.76 (1.11)	.89
20. I will lose control of myself and will act stupidly or dangerously	0.74 (1.09)	.93

Reliability

The reliability analyses demonstrated excellent internal consistency across all measures, with Cronbach's alpha (α) and McDonald's omega coefficients ranging from .92 to .97 for all subscales and the full DCQ. Furthermore, test-retest reliability estimates, though derived from a smaller subsample, showed good temporal stability with coefficients between .73 and .87 across all scales. All reliability indices reached statistical significance ($p < .05$). Complete reliability data, including both internal consistency and test-retest coefficients for the total scale and all subscales, are presented in Table 4.

Table 4
Reliability results for internal consistency and test-retest for the DCQ total and subscales.

Test/Scale	*M (SD)*	*a* Cronbach	*ω* McDonald	*r* Test-retest
DCQ total	15.95 (17.29)	.97	.97	.87 ***
Panic	4.28 (5.78)	.93	.93	.73 **
Accidents	6.18 (6.51)	.93	.93	.75 ***
Social	5.48 (5.92)	.92	.93	.86 ***

Note = * $p < .05$, ** $p < 01$, *** $p < .001$

Convergent validity

The convergent validity analysis with the ISAT-3 questionnaire (Table 5) revealed strong correlations (r = .72 to .80) between the DCQ total score and ISAT-3 scales. When examining scale-level associations, the panic and accident-related subscales of the DCQ showed moderately strong to strong correlations (r = .64 to .71) with ISAT-3 scales, while the social concerns subscale demonstrated particularly robust associations (r = .72 to .78) with ISAT-3 measures.

Table 5
Convergent validity results of the DCQ with the ISAT-3.

Scales	External Evaluation	Criticism Aggression	External Constraints	Authority Evaluation	ISAT-3 Total
DCQ total	.81***	.73***	.73***	.72***	.78***
Panic	.76***	.63***	.67***	.65***	.70***
Accidents	.78***	.70***	.69***	.69***	.76***
Social	.75***	.75***	.72***	.72***	.77***

Note: $p < .05$, ** $p < 01$, *** $p < .001$

An analysis of DCQ item scores, ranked by frequency, revealed that items related to accident-related concerns and social evaluation anxieties consistently received the highest ratings, while panic-related items showed comparatively lower scores. Based on this distribution, a clinical cut-off score of 51 points (range: 0 - 80) was established for the total scale, with scores exceeding this threshold indicating potential driving phobia.

Subsequent analyses examined DCQ score variations across sociodemographic variables. Participants reporting negative driving experiences demonstrated significantly higher DCQ scores (M = 21.80, SD = 19.08) compared to those without such experiences (M = 12.05, SD = 14.77) [$t(671)$ = -7.45, $p < .001$, d = .59], representing a medium effect size. Driving frequency analysis showed an inverse relationship with DCQ scores - as driving frequency decreased, phobia indicators increased (see Table 6). Notably, occasional drivers (several times annually) showed elevated means (range: 26.87-40.50), daily drivers exhibited substantially lower scores (M = 9.58), and 9.73% of the sample reported complete driving avoidance

To determine whether these differences were statistically significant, a one-way ANOVA was conducted, yielding significant results [$F(5, 662) = 31.14$, $p < .001$, $\omega^2 = .18$]. Post-hoc analyses revealed statistically significant differences between the group who drove daily and all other groups, as well as between those who drove several times per week and other groups. However, no significant differences were found between individuals who drove several times per month, several times per year, once per year, or those who had not driven for over a year (see Table 7).

When examining driving licence tenure as a variable, DCQ scores exhibited a non-linear inverse relationship with years since obtaining a licence (Table 6). Specifically, those with less than one year of driving experience showed a mean score of 23.70, while those with over 20 or 30 years of experience obtained mean scores of 12.83 and 7.66, respectively (Table 6).

A subsequent ANOVA confirmed statistically significant differences between groups [$F(5, 663) = 12.95$, $p < .001$, $\omega^2 = .08$]. Post-hoc tests indicated significant differences between drivers with one year or less of experience and those with 21 or more years of experience. Additionally, significant differences emerged between groups with 2-20 years of experience and those who obtained their licence over 30 years ago. No other between-group differences reached statistical significance (Table 8).

Table 6
Descriptive data on car use and years of driving licence of participants.

Frequency of car use	N	%	*M*	*SD*
Daily	307	45.96	9.58	12.27
Several times a week	171	25.60	15.49	15.99
Several times a month	87	13.02	22.77	17.93
Several times a year	32	4.79	26.88	21.06
One a year	6	0.90	40.50	22.77
Not driving for more than a year	65	9.73	30.63	20.93
Years of driving license				
1 year or less	128	18.71	23.70	18.51
2 to 5 years	113	16.89	17.51	16.72
6 to 10 years	59	9.07	17.37	14.75
11 to 20 years	115	17.45	17.25	18.94
21 to 30 years	135	18.83	12.83	15.88
More than 30 years	119	17.50	7.67	12.96

Table 7
Post-hoc test results for the frequency of car use

		Mean difference	*t*	*p Tukey*
Daily	Several times a week	-5.906	-4.192	< .001
	Several times a month	-13.190	-6.448	< .001
	Several times a year	-17.295	-4.565	< .001
	One a year	-30.920	-3.317	.019
	Not driving for more than a year	-21.051	-7.829	< .001
Several times a week	Several times a month	-7.285	-3.198	.020
	Several times a year	-11.390	-2.906	.032
	One a year	-25.010	-2.808	.041
	Not driving for more than a year	-15.145	-5.277	< .001
Several times a month	Several times a year	-4.105	-0.979	.922
	One a year	-17.730	-1.868	.499
	Not driving for more than a year	-7.861	-2.434	.153
Several times a year	One a year	-13.630	-1.361	.748
	Not driving for more than a year	-3.756	-0.827	.961
One a year	Not driving for more than a year	9.869	1.023	.894

Table 8
Post-hoc test results for years of driving license.

		Mean difference	*t*	*p* Tukey
1 year or less	2 to 5 years	6.190	2.728	.074
	6 to 10 years	6.330	2.509	.128
	11 to 20 years	6.541	2.679	.083
	21 to 30 years	10.873	5.101	< .001
	More than 30 years	16.039	7.934	< .001
2 to 5 years	6 to 10 years	0.140	0.056	1.000
	11 to 20 years	0.261	0.110	1.000
	21 to 30 years	4.684	2.248	.220
	More than 30 years	9.849	4.998	< .001
6 to 10 years	11 to 20 years	0.121	0.046	1.000
	21 to 30 years	4.543	1.927	.391
	More than 30 years	9.709	4.300	< .001
11 to 20 years	21 to 30 years	4.423	1.980	.357
	More than 30 years	9.588	4.505	< .001
21 to 30 years	More than 30 years	5.166	2.853	.063

Discussion and Conclusions

The present study aimed to examine the psychometric properties and confirm the factor structure of the Spanish adaptation of the Driving Cognitions Questionnaire (DCQ). The adaptation process followed established test adaptation guidelines (Hambleton, 2005; ITC, 2016), involving forward translation by two study authors, back-translation by an independent bilingual translator with subject-matter expertise, and resolution of discrepancies by two expert researchers (Ruiz-García & Valero-Aguayo, 2021).

The results demonstrate strong psychometric properties for the Spanish DCQ, with excellent internal consistency for both the total scale (α = .97) and subscales (α = .92 to .93). These findings align with previous validation studies, including the original English version (α = .96; Ehlers et al., 2007), Brazilian adaptations (α = .96, Santos-Olisan et al., 2015; α = .89 – .90, Oliveira-Gomes et al., 2015), a New Zealand sample (α = .93; Taylor et al., 2021), a German adaptation (α = .86– .89; Heider et al., 2018), and a prior Spanish study (α = .95; Ruiz-Cabello, 2018).

The mean scores and standard deviations for each DCQ item, ranked by anxiety level in descending order, closely align with findings from Taylor et al. (2021), demonstrating higher scores for accident-related concerns, followed by social concerns, with panic-related items consistently yielding the lowest scores.

Statistical analyses revealed significant gender differences, with women exhibiting substantially higher driving-related fear scores than men. These findings corroborate existing epidemiological data on gender disparities in specific phobias generally (APA, 2024; Ruiz-García & Valero-Aguayo, 2021; Wardenaar et al., 2017) and driving phobia specifically (APA, 2024; Fort et al., 2023; Ruiz-García & Valero-Aguayo, 2021; Taylor et al., 2011; Taylor, 2018; Wardenaar et al., 2017). However, some studies have failed to replicate these gender differences (Ruiz-Cabello, 2018; Oliveira-Gomes et al., 2015), suggesting potential cultural or methodological moderators in this relationship.

Regarding negative driving experiences, participants who reported adverse incidents (either directly experienced or witnessed) exhibited significantly greater driving-related fear and phobic responses compared to those without such experiences. Analysis of driving frequency revealed an inverse relationship with anxiety levels: increased vehicle use correlated with reduced driving-related concerns. Similarly, individuals with longer driving license tenure demonstrated lower fear levels than novice drivers. These findings support the theoretical proposition (Fischer et al., 2020; Fort et al., 2023; Taylor et al., 2000) that driving anxiety is influenced by three key factors: (1) duration of licensure, (2) cumulative driving experience (with greater exposure associated with decreased anxiety), and (3) history of aversive driving incidents. However, future research should quantitatively examine the dose-response relationship between specific negative experiences (e.g., near-misses, accidents, or problematic driving situations) and subsequent phobia development to clarify these associations.

The reliability analysis demonstrates that this instrument possesses adequate psychometric robustness for assessing driving-related anxiety in Spanish populations. The test-retest reliability analysis, conducted with a 15-day interval, yielded strong temporal stability for the total score (r = .87). Similarly high reliability coefficients were observed across all subscales (ranging from r = .73 to .86). Notably, existing validation studies of the DCQ have not consistently reported test-retest reliability data, making these findings particularly valuable for establishing the measure's temporal stability in clinical and research applications.

The current study identified two factorial structures demonstrating adequate model fit. First, a two-factor solution combining accident/panic-related concerns and social concerns, consistent with previous findings by Oliveira-Gomes et al. (2015) and Taylor et al. (2021). However, the optimal solution emerged as a three-factor model, aligning with both the original factor structure (Ehlers et al., 2007) and subsequent validations (Heider et al., 2018; Ruiz-Cabello, 2018; Santos-Olisan et al., 2015).While both models showed comparable fit indices, the three-factor solution proved theoretically superior for several reasons: (1) it demonstrated marginally better RMSEA values than the two-factor alternative, (2) maintained stronger content validity with the original theoretical framework, and (3) preserved clinically meaningful distinctions between anxiety dimensions - despite Taylor et al.'s (2021) statistical support for a two-factor solution, they retained the three-factor model for theoretical coherence. The bi-factor model showed similar fit to the unidimensional solution but inferior to both two- and three-factor structures, further justifying adoption of the theoretically-grounded three-factor model consistent with foundational studies. This decision reflects both statistical considerations and the instrument's established clinical utility

in distinguishing distinct anxiety domains relevant to driving phobia assessment.

Furthermore, factorial invariance testing confirmed that the factor structure remained consistent across genders, demonstrating the model's robustness despite potential score differences between male and female respondents. This finding supports the use of the DCQ for sex-based comparative studies in driving-related anxiety research.

Regarding validity, the DCQ showed significant correlations with the ISAT-3, an established measure of driving phobia previously validated in Spanish populations. The instruments exhibited strong convergent validity, with particularly high correlations between total scores and corresponding subscales, further substantiating the DCQ's construct validity for assessing driving-related anxiety dimensions.

Several limitations of the current study warrant consideration. First, the research was unable to include a more substantial clinical sample of individuals with formally diagnosed driving phobia or those undergoing treatment for this condition. The inclusion of direct behavioural avoidance measures (e.g., using the Fear Questionnaire) and self-reported driving ability assessments would have provided valuable additional data to examine potential relationships with DCQ scores and driving frequency patterns (Taylor et al., 2008). Furthermore, the study would have benefited from incorporating measures of non-driving specific phobias to establish stronger discriminant validity evidence, alongside implementing random sampling methods to enhance result generalizability - though snowball sampling remains methodologically appropriate given the inherent challenges in accessing this clinical population. Finally, greater sociodemographic homogeneity across variables such as marital status, occupation, educational level, and treatment types would have strengthened the generalizability of findings. These methodological considerations should be addressed in future applications and validations of the DCQ.

Notwithstanding these limitations, the current study demonstrates that the DCQ represents a valid and clinically useful instrument for the detection and diagnosis of driving phobia-related difficulties. The establishment of a total scale cut-off score of ≥51 points, indicative of significant driving-related difficulties in our sample, aligns with previous findings by Ehlers et al. (2007). These results provide a foundation for cross-cultural developmental research, particularly in Spanish-speaking populations. Future studies should prioritise the recruitment of larger clinical samples to enhance the representation of individuals with driving phobia within Spanish populations, thereby strengthening the instrument's diagnostic utility and generalisability.

In summary, the current study provides robust psychometric evidence supporting the Spanish adaptation of the Driving Cognitions Questionnaire (DCQ), with findings consistent with the original English validation studies. These results confirm the DCQ as a reliable and valid instrument for assessing driving-related fear and phobia. The questionnaire demonstrates strong convergent validity with the ISAT-3 while offering practical advantages of brevity and ease of administration compared to other validated measures in Spanish populations. Furthermore, the DCQ shows particular utility as a pre-post treatment evaluation tool for monitoring therapeutic outcomes in driving phobia interventions, as evidenced by previous clinical studies (Fischer et al., 2021; Ruiz-García & Valero-Aguayo, 2015, 2020, 2025).

Complementary information

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