Psychometric properties of the French and English versions of the Claustrophobia Questionnaire (CLQ)[☆]

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Abstract

Research suggests that Claustrophobia, defined as the fear of enclosed spaces, may be better conceptualized as two separate, but related fears: (1) the fear of suffocation, and (2) the fear of restriction. The Claustrophobia Questionnaire (CLQ) is a self-report measure designed to assess these two fears. The original English version of the CLQ has demonstrated excellent psychometric properties. The purpose of the present study was to evaluate a French version of the CLQ for use in clinical and research settings and to replicate the psychometric findings of previous investigations of the English CLQ. Language-appropriate versions of the CLQ, as well as self-report measures of phobic, anxious and depressive symptomatology were distributed to undergraduate students at three Montréal, Québec universities. Results show that the CLQ possesses strong psychometric properties in both languages, and that the English and French versions of the CLQ appear to measure identical constructs. These findings are discussed in terms of proposed applications of the CLQ.
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Claustrophobia, defined as the fear of enclosed spaces (APA, 2000), may affect as much as 2–5% of the population (Rachman, 1997). Recently, claustrophobia has been reconceptualized as the fear of what might happen in an enclosed space (Rachman, 1997). Rachman and Taylor (1993) proposed that claustrophobia can be divided into two separate, but related fear components: (1) a fear of suffocation and (2) a fear of restriction. To test this hypothesis, they devised a precursor to the Claustrophobia Questionnaire (CLQ), an early self-report questionnaire specifically assessing claustrophobic symptoms. When subjected to a factor analysis, the best fit for the items was a two-factor solution corresponding to the fear of suffocation and the fear of restriction, and accounting for over half of the variance in fear ratings following five behavioural tests in an undergraduate sample (Rachman & Taylor, 1993). The early version of the CLQ has been used in studies of panic disorder to assess whether fear of suffocation would predict response to a carbon dioxide challenge (McNally & Eke, 1996; Taylor, Rachman, & Radomsky, 1996), and also in studies of patients undergoing magnetic resonance imaging (MRI; McIsaac, Thordarson, Shafran, Rachman, & Poole, 1998), although the psychometric properties of the full CLQ had not yet been fully examined.

A fear of suffocation is frequently present in claustrophobia, and is also common to many people who do not exhibit claustrophobia symptoms (Kirkpatrick, 1984). Although individuals who suffer from claustrophobia often have difficulty identifying the exact nature of their fear when confronted with spending time in an enclosed space, this situation could be easily interpreted as a threat to one's breathing (Radomsky, Rachman, Thordarson, McIsaac, & Teachman, 2001). Furthermore, when this perceived impediment to breathing is combined with an inability to move and/or escape the situation (i.e., restriction) an intense fear may follow (Rachman, 1997). The experience of these two fears and their interaction are integral to an understanding of claustrophobia, although some individuals may suffer from claustrophobia while only reporting one of the two fears. The CLQ was designed to assess these fears separately. Currently, to our knowledge, the CLQ is the only available validated self-report questionnaire which specifically measures these two fear components as outlined by Rachman and Taylor (1993).

To revise, shorten, and evaluate the scale, Radomsky et al. (2001) administered the original items to community adults and undergraduate students, some of whom were identified as a claustrophobic group. The CLQ demonstrated excellent psychometric properties and emerged as a promising measure of claustrophobia symptoms for both clinical and research purposes (Radomsky et al., 2001).

The CLQ has recently been used to test the effectiveness of safety behaviour utilization (SBU) and safety behaviour availability (SBA) in conjunction with exposure therapy in the treatment of claustrophobia (Powers, Smits, & Telch, 2004). Participants diagnosed with claustrophobia were randomly assigned to 1 of 5 different treatment groups: (1) Exposure Only (EO; participants entered an

enclosed space); (2) Exposure with SBU (participants were instructed to use specific safety behaviours while in an enclosed space); (3) Exposure with SBA (participants were made aware of safety behaviours available to them while in an enclosed space, but instructed only to use them if absolutely necessary); (4) Placebo (psychoeducation and relaxation therapy); and (5) Wait List. Participants in the EO group showed significantly greater reductions in scores on both subscales of the CLQ than did participants in any other groups. This corresponded with reductions in measures of peak fear during behavioural approach tests at pre- and post-treatment, indicating that the CLQ is a valid measure for assessing treatment response over time.

Currently, the CLQ is available in English, Spanish (Valls, Palacios, & Botella, 2003), and Swedish (Carlbring & Söderberg, 2001), and the development of a German version is well underway. The Spanish version of the CLQ demonstrated good psychometric properties in an undergraduate sample. The CLQ's two-factor structure (fear of suffocation and fear of restriction) was confirmed, and the questionnaire was shown to possess high internal consistency and convergent validity, as demonstrated by strong correlations with other measures of anxiety. The purpose of the present study was to produce and validate a French version of the CLQ which would provide researchers and clinicians who work in environments where it would be useful to conduct treatment and/or research in French with a theoretically based and psychometrically sound tool to assess claustrophobia. This is potentially important for researchers and clinicians in the Caribbean, South America, Canada, France, Belgium, Luxembourg, Switzerland, Southeast Asia and Africa, all of which contain significant francophone populations, as well as other areas where francophone communities exist.

For this study, the CLQ was translated from English to French by experts at the Centre de Recherche Fernand-Séguin (Charette, Léveillé, O'Connor, Pélissier, & Trudel, 2003) following many of the recommendations of Vallerand (1989), using the "back-translation" method. First, the English CLQ was translated into French by a group of translators from the Centre de Recherche Fernand-Séguin who were familiar with claustrophobia symptomatology. To ensure that the translation was accurate, a second group of translators who were not familiar with the CLQ translated the new French version back into English. When the two English versions of the measure were compared, they were found to be nearly identical. The few differences between the original English version and the back-translated English version of the CLQ were limited to the use of synonyms (e.g., packed/crowded, tight/narrow) and did not impact upon the meaning of any item.

Language-appropriate versions of the CLQ were then administered to volunteer undergraduate students from Concordia University (English-speaking), l'Université de Montréal and l'Université du Québec à Montréal (French-speaking), along with language-appropriate versions of the Fear Survey Schedule-III (FSS-III; Wolpe & Lang, 1964), the Beck Anxiety Inventory (BAI; Beck,

Epstein, Brown, & Steer, 1988) and the Beck Depression Inventory-II (BDI; Beck, Steer, & Brown, 1996a). To our knowledge, the FSS-III is the only measure available in French which assesses symptoms of claustrophobia (3 items). A subset of participants also completed the questionnaire packages a second time after a delay to examine test-retest reliability. This provided an excellent opportunity to confirm the strong psychometric properties of the CLQ in English, as well as to cross-validate the CLQ in French.

1. Method

1.1. Participants

Participants were recruited from undergraduate classes at Concordia University, l'Université de Montreal, and l'Université du Québec à Montreal (UQAM). Questionnaire packages were completed by 202 English-speaking [mean age = 23.05 (S.D. = 5.21) years, range = 17–50 years, 82.9% female] and 222 French-speaking [mean age = 22.97 (S.D. = 6.33) years, range = 17–69 years, 83.8% female] students.

1.2. Measures

1.2.1. The Claustrophobia Questionnaire (CLQ; Radomsky, Rachman, Thordarson, McIsaac, & Teachman, 2001)

The CLQ includes 26 items that measure two distinct symptom clusters hypothesized to comprise claustrophobia: fear of suffocation (e.g., ''Having a bad cold and finding it difficult to breathe through your nose'') and fear of restriction (e.g., ''In the center of a full row at a cinema''). Respondents are asked to rate the 26 items ranging from 0 to 4 (0 = not at all anxious, 4 = extremely anxious), to indicate how anxious they would feel in each situation. In their analyses, Radomsky et al. found the CLQ to possess very high internal consistency (Cronbach's α = .95), and excellent test-retest reliability (r = .89, P < .001). The CLQ is also characterized by strong convergent and divergent validity as well as excellent predictive validity.

1.2.2. The Fear Survey Schedule-III (FSS-III; Wolpe & Lang, 1964)

The three claustrophobia-related items in the FSS-III were used to assess convergent and divergent validity for the translated version of the CLQ. The FSS-III includes 76 items that ask participants to rate how disturbed they would be by a particular stimulus on a 4-point scale ranging from ''Not at all'' to ''Very much''. The six factors include Animal (9 items, e.g., Mice), Social or interpersonal (17 items, e.g., Speaking in public), Tissue damage, illness and death, and their association (18 items, e.g., Receiving injections), Noises (4 items, e.g., Loud voices), Other classical phobias (16 items, e.g., Being alone),

and Miscellaneous (8 items, e.g., Being in a strange place). The three claustrophobia-related items (crowds, being in an elevator, enclosed places) under the ''other classical phobias'' factor were used in the present analysis to assess the convergent validity of the CLQ. The Animal factor was used to assess divergent validity. The FSS-III was translated into French by Gareau and O'Connor (1991).

1.2.3. The Beck Depression Inventory-II (BDI; Beck, Steer, & Brown, 1996a)

The BDI was used to assess the degree to which the translated CLQ measures claustrophobic versus depressive symptoms. It is a highly reliable and valid measure of depressive symptoms. The BDI consists of 21 items, each of which contains four statements that vary in symptom intensity. Participants are instructed to circle the statement that best represents how they have been feeling over the last 2 weeks. The French version of the BDI (2nd Edition) has also been made available (Beck, Steer, & Brown, 1996b).

1.2.4. The Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988)

The BAI was used to assess whether the CLQ measures symptoms specific to claustrophobia as opposed to general symptoms of anxiety. Participants are instructed to report, on a 4-point scale (0–3), to what degree they have experienced each symptom in the last week. The BAI consists of 21 items and responses range from ''Not at all'' to ''Severely, I could barely stand it''. Beck et al. reported excellent internal consistency (Cronbach's $\alpha = .92$) and high test-retest reliability over a 1-week period ($r = .75$, $P < .05$).

The French translation of the BAI (Freeston, Ladouceur, Thibodeau, Gagnon, & Rheaume, 1994) reported adequate internal consistency and reliability. The norms were also found to be similar between English and French versions of the BAI.

1.3. Procedure

Participants were asked to take the questionnaire packages home and were instructed to complete them in the language (i.e., English or French) that they speak most often at home. The questionnaires were returned in class the following week or to the Fear and Anxiety Disorders Laboratory at Concordia University. To establish test-retest reliability, 41 of the English-speaking and 40 of the French-speaking participants were contacted by telephone and completed the measures a second time after a mean delay of 30.36 (S.D. = 18.87) days and 24.90 (S.D. = 12.53) days, respectively. There were no differences in scores on any measures at time 1 between participants who completed the measures a second time and those who did not. Participants were offered the opportunity to enter their names in a draw for cash prizes as compensation for their participation. See Table 1 for participants' scores on all measures.

Table 1
Participants' scores on all measures at test and retest in English and French

	Mean	S.D.	Min.	Max.	Max. possible
CLQ (English)					
Time 1 ($n = 180$)	24.64	15.44	0	84	104
Time 2 ($n = 38$)	21.02	14.21	0	68	104
CLQ (French)					
Time 1 ($n = 208$)	25.75	15.84	0	79	104
Time 2 ($n = 38$)	22.76	16.10	2	56	104
Suffocation subscale (English)					
Time 1 ($n = 182$)	9.01	7.17	0	37	56
Time 2 ($n = 40$)	8.33	6.09	0	31	56
Suffocation subscale (French)					
Time 1 ($n = 212$)	8.87	7.09	0	32	56
Time 2 ($n = 39$)	8.23	7.14	0	26	56
Restriction subscale (English)					
Time 1 ($n = 195$)	15.62	9.80	0	47	48
Time 2 ($n = 39$)	12.97	9.20	0	37	48
Restriction subscale (French)					
Time 1 ($n = 213$)	16.93	10.10	0	48	48
Time 2 ($n = 39$)	14.23	9.70	2	41	48
FSS-III claus. items (English)					
Time 1 ($n = 196$)	1.65	1.78	0	7	9
Time 2 ($n = 41$)	1.32	1.44	0	5	9
FSS-III claus. items (French)					
Time 1 ($n = 214$)	1.67	1.88	0	7	9
Time 2 ($n = 40$)	1.53	1.69	0	7	9
BDI (English)					
Time 1 ($n = 185$)	11.22	6.97	0	57	63
Time 2 ($n = 41$)	10.22	8.40	0	39	63
BDI (French)					
Time 1 ($n = 192$)	9.21	8.59	0	56	63
Time 2 ($n = 40$)	8.00	7.11	0	31	63
BAI (English)					
Time 1 ($n = 187$)	11.10	9.65	0	51	63
Time 2 ($n = 40$)	7.28	5.88	0	26	63
BAI (French)					
Time 1 ($n = 214$)	9.46	7.43	0	37	63
Time 2 ($n = 39$)	9.28	7.28	0	31	63

Sample sizes varied per measure because some participants did not complete all items. Data were excluded analysis-wise on a case-by-case basis when one or more items was left blank on a questionnaire.

2. Results

2.1. Internal consistency

The English and French versions of the CLQ total score demonstrated excellent internal consistency (Cronbach's α = .92 and .93, respectively). Similarly, the suffocation and restriction subscales each demonstrated good internal consistency in both English (Cronbach's α = .84 and .90, respectively) and French (Cronbach's α = .84 and .91, respectively).

2.2. Test-retest reliability

Test-retest reliability was assessed via Pearson's correlations between scores on the CLQ at time 1 and 2 for the subset of participants who completed the questionnaire packages after a mean delay of 30.36 (S.D. = 18.87) days for English participants and 24.90 (S.D. = 12.53) days for French participants. There were no significant differences in CLQ scores at time 1 between those who later completed retest questionnaires and those who did not. The English and French versions of the CLQ demonstrated excellent test-retest reliability as indicated by strong and identical correlations (r = .88, $P < .001$) for English and French participants. Furthermore, the suffocation and restriction subscales each exhibited excellent test-retest reliability in both English (r = .86, $P < .001$ and .89, $P < .001$, respectively) and French (r = .90, $P < .001$, and .80, $P < .001$, respectively).

2.3. Factor structure

A confirmatory factor analysis was used to examine the previously reported factor structure of the CLQ in English and French. As described above, the CLQ was designed to assess two theoretical constructs that are believed to be important to claustrophobia, fear of suffocation and fear of restriction. In the model, it was predicted that the 14 suffocation items would load onto a suffocation factor and the 12 restriction items would load onto a restriction factor. It was also anticipated that the suffocation and restriction factors would significantly correlate with each other.

Maximum likelihood estimations were used to examine the theoretical factor structure of the CLQ in the English and French samples separately. Following recommendations by Tabachnick and Fidell (2001), a good fit was defined as a model that resulted in a small χ^2 (e.g., a ratio of the χ^2 value to its degrees of freedom of less than 2), a comparative fit index larger than .95, and a root mean square error of approximation (RMSEA) smaller than approximately .06. In the English sample, the proposed two-factor structure did not initially fit the data, $\chi^2(292) = 732.74$, $P < .001$, CFI = .92, RMSEA = .09. A poor fit was also initially observed in the French sample, $\chi^2(298) = 991.25$, $P < .001$, CFI = .89,

RMSEA = .10. In both samples, good fitting models were achieved by allowing some items to load onto both factors, and by allowing some items to covary. For example, the fit of the model improved in both French and English when the suffocation item 12, ''In a crowded train which stops between stations,'' was allowed to load onto both factors, and when restriction items 9, ''Standing in the middle of the 3rd row at a packed concert realizing that you will be unable to leave until the end'', and 10, ''In the centre of a full row at a cinema,'' were allowed to covary. Once these adjustments were made, a confirmatory factor analysis indicated a good fit in both English ($\chi^2(285) = 522.37$, $P < .001$, CFI = .96, RMSEA = .06) and French ($\chi^2(289) = 514.20$, $P < .001$, CFI = .96, RMSEA = .06). This suggests that the originally observed poor fit of the CLQ to the theoretical dual construct model of claustrophobia may be due to redundant items and items that are related to both the suffocation and restriction factors.

2.4. Convergent validity

Convergent validity of the CLQ was assessed using the three items of the FSS-III which measure symptoms of claustrophobia. Strong and significant correlations between the CLQ and these FSS-III claustrophobia items in both English ($r = .65$, $P < .001$) and French ($r = .66$, $P < .001$) indicate that the CLQ exhibits very good convergent validity in both languages (see Table 2).

2.5. Divergent validity

Divergent validity was assessed by comparing the strength of the CLQ-FSS-III (Claustrophobia items) correlations to correlations between the CLQ and the Animal Fear subscale of the FSS-III, as well as the BAI and the BDI (see Table 2). Results confirm that the CLQ demonstrates good divergent validity as indicated by significantly stronger correlations (in both English and French) between the CLQ and claustrophobia items of the FSS-III than between the CLQ and the FSS-III Animal Fear subscale ($t(173) = 4.47$, $P < .001$ and $t(203) = 5.53$, $P < .001$, respectively), BAI ($t(170) = 6.39$, $P < .001$ and $t(202) = 6.17$, $P < .001$, respectively) and BDI ($t(169) = 7.30$, $P < .001$ and $t(181) = 4.49$, $P < .001$, respectively).

Table 2
Pearson's correlations between the CLQ and other measures in English and French

	FSS-III (Claustrophobia)	FSS-III (Animal)	BAI	BDI
CLQ (English)	.65[**]	.40[**]	.32[**]	.17[*]
CLQ (French)	.66[**]	.43[**]	.37[**]	.48[**]

[*] $P < .03$.
[**] $P < .001$.

2.6. Normative data

Participants' scores on the CLQ and its subscales in the present study (see Table 1) resembled those reported in the adult non-clinical sample in the original validation article (Radomsky et al., 2001). In the current study, English-speaking participants scored slightly, but significantly higher than did French-speaking participants on the BDI ($t(375) = 2.16$, $P < .05$). The CLQ scores of English- and French-speaking participants did not differ ($t(386) = 0.70$, *ns*). Moreover, French- and English-speaking participants' scores did not differ significantly on any other measures.

3. Discussion

Results from the current study provide support for the reliability and validity of both the English and French versions of the CLQ and for their use in clinical and research settings. The strong psychometric properties of the English version of the CLQ were confirmed and the French CLQ was found to possess good to excellent internal consistency, test-retest reliability, and convergent and divergent validity. Furthermore, the psychometric properties of the French CLQ were virtually identical to those exhibited by the English version. While a confirmatory factor analysis initially showed a poor fit with the original two-factor structure of the scale (in both languages), it later showed a good fit after a number of adjustments were made to how some items were entered into the model.

These results are consistent with previous demonstrations of the CLQ's excellent psychometric properties in English and support its use in a variety of applications. In addition to high convergent validity shown by strong correlations with the FSS-III (claustrophobia items), excellent divergent validity shown by significantly weaker correlations with other symptom measures (e.g., BAI, BDI) indicates its specificity. In addition to the scale's high internal consistency, a few new features of its properties were elucidated by the current study. The original validation of the CLQ showed excellent test-retest reliability over a 2-week period (Radomsky et al., 2001), and this is now complemented by the new finding of equally strong (if not stronger) test-retest reliability over a 3–4 weeks period of time. We hope that this finding of scale durability over a longer time period will support the use of the scale in outcome- and treatment-related research on claustrophobia in line with the recent claustrophobia treatment study investigating safety behaviour conducted by Powers et al. (2004).

While there was support for the two-factor structure of the CLQ (corresponding to the two subscales of the measure assessing fears of suffocation and restriction), an initial confirmatory factor analysis did not show a good fit with this structure. It would be surprising that the two-factor solution for the CLQ demonstrated first by Rachman and Taylor (1993) and later by Radomsky et al. (2001) and by Valls et al. (2003) was simply no longer present in an English-

speaking sample and not detectable in a French-speaking sample. Rather than bringing the two component fears of claustrophobia (fear of suffocation and fear of restriction) into question, this finding likely results from a number of factors. Firstly, the two subscales of the CLQ are significantly correlated with each other. This was evident in the development of the CLQ and presents statistical challenges to procedures like confirmatory factor analysis as they can be oversensitive to residual sources of variation. Similarly, some items in one subscale appear to be related to the other subscale. This reflects the fact that there are some situations relevant to claustrophobia which consists of aspects involving both restriction of movement and poor air supply/air quality. Finally, some of the items were shown by the current analyses to be statistically redundant. This is consistent with the very high internal consistency of the scale but does not necessarily support another reduction of the number of items in the CLQ. Statistical redundancy is not equivalent to clinical redundancy and it is valuable to maintain several possibly overlapping items to assess some of the idiosyncrasy inherent in many, if not all, anxiety disorders.

While there are certainly limitations to the current study, including the non-clinical nature of the participants and the small but significant difference in BDI scores between English- and French-speaking participants, the findings support the use of the new scale with francophone participants. The scale is relatively brief and easy to score. We encourage the use of the CLQ in future studies that assess treatment mechanisms and outcomes, as well as aspects of psychopathology for investigations of claustrophobia, panic disorder, dental phobia, fears of flying and medical procedures. Now that the scale has been validated in a number of languages, the CLQ can also be used in cross-cultural investigations that assess epidemiology across a broader population, as well as cultural and other aspects of claustrophobia and related problems.

Acknowledgments

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