Children's Test Anxiety Scale: The French Adaptation of a Short Scale for youth[1]

Le Questionnaire d'anxiété évaluative scolaire (QAES) : l'adaptation française d'une échelle courte destinée aux jeunes

Questionnaire d'anxiété évaluative scolaire (QAES): adaptação francesa de uma escala abreviada destinada a jovens

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Key words: scale adaptation, measure, questionnaire, test anxiety, validation

Instruments used to measure test anxiety in school have generally been validated using English-speaking populations. Moreover, these instruments are often lengthy, making their administration in school settings more complex. Based on the Children's Test Anxiety Scale (CTAS; 2004), this paper develops a French adaptation titled Questionnaire d'anxiété évaluative scolaire (QAES), followed by a short version, the Questionnaire d'anxiété évaluative scolaire-Courte (QAES-C). The psychometric properties of the QAES-C were examined in two complementary studies involving 1,212 and 387 Quebec students, respectively. Exploratory factor analysis (Study 1) and confirmatory factor analysis (Study 2) revealed a structure reflecting the three components of test anxiety (i.e., cognitive, physiological and behavioral). In both studies, these three subscales demonstrated high internal consistency. Overall, the findings suggest that the QAES-C has satisfactory psychometric properties, supporting its use for assessing test anxiety among French-speaking adolescents.

Mots clés : adaptation, anxiété de performance scolaire, mesure, questionnaire, validation

Les instruments de mesure de l'anxiété évaluative scolaire ont généralement été validés à partir de populations anglophones. En outre, ces instruments sont généralement longs, ce qui complexifie leur administration en contexte scolaire. S'appuyant sur la Children's Test Anxiety Scale (CTAS, 2004), une adaptation française intitulée Questionnaire d'anxiété évaluative scolaire (QAES) a d'abord été produite, suivie de sa version courte, le Questionnaire d'anxiété évaluative scolaire-Courte (QAES-C). Deux études complémentaires comprenant respectivement 1 212 and 387 élèves québécois ont examiné les qualités psychométriques du QAES-C. Les résultats d'analyses factorielles exploratoires (étude 1) and confirmatoires (étude 2) ont révélé une structure reflétant les trois composantes de l'anxiété évaluative scolaire (cognitive, physiologique and comportementale). Dans les deux études, ces trois sous-échelles ont révélé une cohérence interne élevée. L'ensemble des résultats suggère que le QAES-C présente des qualités psychométriques satisfaisantes, justifiant son emploi pour mesurer l'anxiété évaluative scolaire vécue par les adolescents francophones.

Author's note: Correspondence concerning this article can be addressed to binette-laporte.floriane@uqam.ca. This article was translated by bilingual members of the research team. The initial translation was conducted by the first author. This was then reviewed and revised by KEC, an author whose primary language is English and who has experience as a translator. IP, who has extensive experience publishing scientific articles in both French and English, assisted with reviewing and finalizing the translated version.

Palavras-chave: adaptação, ansiedade de desempenho escolar, medida, questionário, validação

Os instrumentos de medida da ansiedade avaliativa escolar foram, em geral, validados com base em populações anglófonas. Além disso, estes instrumentos tendem a ser longos, o que dificulta sua aplicação em contextos escolares. Com base na Children's Test Anxiety Scale (CTAS, 2004), foi elaborada uma adaptação francesa intitulada Questionnaire d'anxiété évaluative scolaire (QAES), à qual se seguiu uma versão abreviada, o Questionnaire d'anxiété évaluative scolaire – Courte (QAES-C). Dois estudos complementares, envolvendo respectivamente 1.212 e 387 alunos do Quebec, examinaram as qualidades psicométricas do QAES-C. Os resultados das análises fatoriais exploratórias (estudo 1) e confirmatórias (estudo 2) revelaram uma estrutura que reflete as três componentes da ansiedade de avaliação escolar (isto é, cognitiva, fisiológica e comportamental). Em ambos os estudos, essas três subescalas apresentaram elevada consistência interna. O conjunto dos resultados sugere que o QAES-C possui qualidades psicométricas satisfatórias, o que justifica sua utilização na medição da ansiedade avaliativa escolar vivida por adolescentes francófonos.

Introduction

School test anxiety is a major concern for both educators and researchers in education and psychology. High levels of this form of anxiety, specific to evaluative situations, are associated with negative psychological and academic outcomes for students. Specifically, test anxiety is a negative predictor of academic achievement (Fréchette-Simard et al., 2022; Symes & Putwain, 2020) and students' self-perception (Raymo et al., 2018; Yale-Soulière et al., 2023). It is also associated with higher rates of absenteeism and school dropout (Brière et al., 2017; Weems et al., 2010). Recent studies conducted in Quebec and internationally indicate that up to 40% of students, predominantly girls, experience test anxiety at varying levels (Cassady & Johnson, 2002; Journault et al., 2022; Lowe, 2019; Plante et al., 2022; von der Embse et al., 2021).

Given these concerning findings, clinical and research settings are increasingly focused on intervening with youth experiencing this form of anxiety. In Quebec more specifically, there is a marked interest in the implementation of school-based intervention programs aimed at reducing manifestations of test anxiety, such as the PASTEL program (see

Yale-Soulière et al., 2021) and the HORS-PISTE program (see Centre RBC, 2021). To adequately identify vulnerable students who would benefit from these programs, an effective measure of test anxiety among youth is required (von der Embse et al., 2021). However, existing measurement instruments are often comprehensive and include many items, limiting their feasibility for use with young populations. The time allocated for school-based research projects or specialized psychological screening is often restricted. Moreover, the vast majority of currently available measures have been developed in English, such as the Test Anxiety Inventory (TAI; Spielberger, 1980), the Test Anxiety Inventory for Children and Adolescents (TAICA; 45 items; Lowe et al., 2008), and the Friedben Test Anxiety Scale (FTAS; 23 items; Friedman & Bendas-Jacob, 1997). This poses a challenge, as researchers and practitioners must rely on scales validated with English-speaking populations, for which psychometric properties have not been established among francophone student populations.

To address these limitations, the present study produced a French-translated test-anxiety scale called the *Questionnaire d'anxiété évaluative scolaire* (QAES; test-anxiety questionnaire), and developed a short version, the *Questionnaire d'anxiété évaluative scolaire* – Courte (QAES-C). The study aimed to validate this instrument among francophone adolescents.

Theoretical Framework

Test Anxiety: A Multidimensional Construct

Although the specific dimensions of test anxiety are not universally agreed upon by researchers, scholars generally agree that this form of anxiety is a multidimensional construct (Liebert & Morris, 1967; Robson et al., 2023; Spielberger & Vagg, 1995; Symes & Putwain, 2020; von der Embse et al., 2018). Test anxiety is generally conceptualized as a phenomenon composed of distinct yet interrelated components. Early work in this area identified two primary components: a cognitive component and a physiological component (Liebert & Morris, 1967).

The cognitive component (worry) refers to the presence of thoughts related to fear of failure or to the potential consequences of poor performance (Benson et al., 1992). This component may manifest as fear of failing an exam, even when the student is well prepared (von der Embse et al., 2018). The physiological component (emotionality), in contrast, refers to

tension related to anxiety-provoking evaluative situations and is expressed through bodily reactions to perceived threat (Putwain & Symes, 2012). This component primarily includes bodily symptoms such as increased heart rate (Robson et al., 2023).

Descriptions of these dimensions have evolved considerably since their initial conceptualization by Liebert and Morris (1967). Some researchers now acknowledge that the cognitive component also encompasses cognitive interference, defined as threatening thoughts that interfere with task performance. In other words, students may direct their attention toward managing these negative thoughts rather than toward the task itself, thereby disrupting access to prior learning (Angelidis et al., 2019; von der Embse et al., 2018). Subsequently, Wren and Benson (2004) proposed an additional component: the behavioral component (off-task behavior). This component refers to students' task-irrelevant behaviors during tests, such as focusing on nearby objects or playing with their pencils. This dimension was later expanded to include avoidance and procrastination behaviors (Fréchette-Simard et al., 2023; Putwain, 2008).

Recent studies suggest that the different components of test anxiety are associated with distinct, and sometimes contradictory, outcomes for students' academic achievement and well-being. For instance, some studies report that cognitive manifestations of test anxiety are associated with poor achievement, whereas physiological manifestations are associated with high achievement (Lecours et al., 2025; Roos et al., 2020). Although the specific mechanisms underlying these contradictory findings remain unclear, one possible explanation is that cognitive interference prevents students from concentrating during evaluative situations. In contrast, although physiological manifestations may be disruptive, they may also motivate some students to channel their anxiety toward the task at hand, which could explain better performance. Regardless of the mechanisms behind such seemingly opposing findings, these studies highlight the importance of considering the different components when measuring test anxiety to capture the full complexity of the phenomenon and better understand its consequences for students.

Test Anxiety Measures

Francophone studies on test anxiety mostly rely on scales developed in English, with items often translated in-house. Beaudoin and Desrichard (2009) proposed one of the few short scales validated in French. This

six-item measure, which assesses the cognitive and physiological components of test anxiety at school, was validated with a sample predominantly composed of European francophone university students. More recently, Fenouillet et al. (2023) adapted the Multidimensional Test Anxiety Scale (MTAS; Putwain et al., 2021) for a population of European francophone secondary school students. This 16-item instrument measures four subdimensions of school-related test anxiety: worry, cognitive interference, tension, and physiological manifestations. Although both these scales have the advantage of being brief and multidimensional, neither captures behavioral test anxiety, nor has either French-language scale been validated with Quebec students.

By contrast, measures of test anxiety designed and validated in English for children and adolescents are numerous and generally quite comprehensive. Among the most recognized (see Robson et al., 2023) is the Test Anxiety Inventory (TAI; Spielberger, 1980), a 20-item self-report scale divided into two components. The Test Anxiety Inventory for Children and Adolescents (TAICA; Lowe et al., 2008) is another self-report measure that uses 48 items to assess multiple components of test anxiety, including cognitive interference, physiological symptoms, social humiliation, and worry. While these instruments are widely respected in the research community, recent systematic reviews and meta-analyses have identified the Children's Test Anxiety Scale (CTAS; Wren & Benson, 2004) as the most frequently used scale for measuring test anxiety (Robson et al., 2023; von der Embse et al., 2018). This measure evaluates the three-dimensional model of test anxiety: cognitive, physiological, and behavioral. After developing an initial 50-item version, Wren and Benson (2004) adapted two simplified versions comprising 30 and 25 items, respectively, distributed across the same three dimensions. Although both versions show similar internal consistency indices, the 30-item version is the most frequently used by researchers (Robson et al., 2023; von der Embse et al., 2018).

Accordingly, in the present study, the CTAS was selected to produce a short version adapted to francophone contexts, namely the *Questionnaire d'anxiété évaluative scolaire-Courte* (QAES-C). Three main reasons justify this choice: first, the tool meets criteria for relevance regarding the construct and theoretical dimensions it covers; second, it is a questionnaire widely used in the scientific community; and third, its various versions provide good internal consistency.

Aim of This Research

The aim of this research is to evaluate the psychometric properties of the QAES-C. To this end, we conducted two complementary studies with separate samples of Quebec students, which allowed us to both develop the QAES-C (Study 1) and confirm its psychometric properties with a new sample (Study 2). In the first study, the original English version of the CTAS (30 items; Wren & Benson, 2004) was translated into French, resulting in the QAES, and the psychometric properties of this long version were examined. Subsequently, the QAES-C, a short French-adapted version of the QAES, was developed to evaluate its psychometric properties both with the initial sample and with a new sample collected for the second study.

Study 1

This study first aimed to examine the psychometric properties of a French version of the CTAS (Wren & Benson, 2004), the QAES, a 30-item instrument divided into three components: cognitive, physiological, and behavioral. Based on this examination, the study also aimed to develop the QAES-C, a short, adapted version of the instrument in French, and to evaluate its psychometric properties for assessing test anxiety in adolescents.

Methods

Participants

Participants in this study were recruited from a larger project initiated in the fall of 2019 (prior to the COVID-19 pandemic) aimed at evaluating the role of parents in academic and social adjustment at the end of secondary school and during the transition to postsecondary education. While the original project included both parents and students, the present study focuses solely on the students. The sample comprised 1,212 students (Mage = 16.68 years; 48.8% boys, 50.3% girls, and 0.7% identifying with another gender category) recruited from 48 fifth-year secondary school classes across five private and five public francophone schools. These schools, located in the Greater Montreal metropolitan area (Quebec, Canada), are attended by students from diverse socioeconomic and cultural backgrounds (54.8% identified as white, and 77.1% were born in Quebec).

Procedure

To comply with ethical standards for research involving minor participants, only students who had obtained written parental consent (92%) took part in the project. These students completed a questionnaire in class during school hours to assess the various variables under study, including test anxiety. A member of the research team read the questionnaire aloud while the students completed it. Overall, data collection lasted between 35 and 45 minutes, including explanations provided by a research team member. Less than 10 minutes of this total time were devoted to the long version (30 items) of the QAES. At the end of the project, participants received a $5 reward in the form of a class budget. The research ethics committee of the authors' affiliated university reviewed and approved the project.

Measures

Among the measures included in the questionnaire completed by the students, 30 items assessed test anxiety using a French version of the CTAS (Wren & Benson, 2004), namely the QAES. The CTAS items are divided into three subscales to represent the different components of test anxiety. The first subscale includes 13 items measuring the cognitive component, that is, the thoughts and worries associated with this form of anxiety. The second subscale comprises nine items assessing the physiological component of test anxiety, reflecting autonomic nervous system responses to perceived threat, such as sweating or increased heart rate. The final subscale contains eight items evaluating the behavioral component, reflected in off-task behaviors exhibited by students in evaluative contexts.

For each item across the three subscales, participants responded using a four-point scale ranging from 1 (almost never) to 4 (almost always). To provide context, each item was preceded by the words: "When I take tests..." The three subscales were previously validated with American students aged 8 to 12 years and demonstrated satisfactory internal consistency.

The back-translation procedure was applied to the original English version of this questionnaire (see Appendix A) following the method proposed by Koller et al. (2012). For maximum fidelity, a small group of bilingual researchers, native in either English or French, and specializing in test anxiety translated the questionnaire. However, to ensure that all items were clearly understood in French and that their meaning remained equivalent to the English version, some items required adaptation. For example, item 26, "My belly feels funny," was translated as "*J'ai de drôles de sensations au ventre*."

Analyses

To determine whether the subscales assess distinct components (cognitive, physiological, and behavioral), we examined the factor structure of all study items. First, we conducted exploratory factor analyses using principal axis factoring with direct Oblimin rotation in SPSS (IBM Corp., 2017), as recommended when correlations between factors are expected (Field, 2018; Tabachnick et al., 2019). Although both exploratory factor analysis and principal component analysis are commonly used to examine the factor structure of data, exploratory analyses were chosen for this study. These analyses employ a factor extraction method based on the shared variance among the variables under study (Gaskin & Happell, 2014; Henson & Roberts, 2006). This method also assumes the existence of underlying latent factors, which allows for a more accurate determination of the number of factors to retain (Garrido et al., 2013). Based on the results obtained, the five items with the highest loadings for each component were selected to develop the short version of the instrument, the QAES-C.

To examine internal consistency, reliability analyses were conducted separately for each component of the instrument. Two series of analyses were performed to assess the internal consistency of the subscales for both the long and short versions of the questionnaire. Although it is difficult to define a precise threshold indicating adequate internal consistency (Huart, 2006), Béland et al. (2017) suggest that a value equal to or greater than .70 reflects satisfactory reliability. While McDonald's omega coefficient (ω) and Cronbach's alpha (α) are interpreted similarly (i.e., the closer the value is to 1, the more reliable the measure is considered), ω offers more flexible conditions of use than α, which is particularly suitable for the complexity of educational research (Bourque et al., 2019). Finally, correlations between the different subscales were examined to verify the interdependence of the various components of the test anxiety construct.

Results

Factor structure

The results of the exploratory factor analysis with Oblimin rotation revealed three factors, corresponding to the three components of school-related test anxiety, as identified in the original 30-item version of the CTAS. Table 1 below presents the factor loadings obtained.

Table 1
Factor Structure of the Long French Version of the CTAS

Items	Description	Components		
		Cogn.	Beha.	Phys.
1	**J'ai peur d'échouer.**	**0.757**	-0.097	0.061
2	**Je pense à ce qui se passera si j'échoue.**	**0.750**	-0.052	-0.015
3	**Je pense que j'aurai une mauvaise note.**	**0.651**	0.071	0.011
4	**Je me demande si je vais obtenir la note de passage.**	**0.650**	0.136	-0.130
5	**Je pense que la plupart de mes réponses sont fausses.**	**0.636**	0.110	-0.009
6	Je pense à quel point mon examen se passe mal.	**0.600**	0.094	0.100
7	J'ai peur de faire quelque chose de mal.	**0.520**	-0.123	0.255
8	Je m'inquiète à propos de la difficulté de l'examen.	**0.492**	-0.053	0.226
9	Je m'inquiète à propos de ce que mes parents vont dire.	**0.472**	-0.050	0.033
10	Je pense que j'aurais dû étudier davantage.	**0.463**	0.170	-0.129
11	Je me demande si mes réponses sont exactes.	**0.331**	0.030	0.184
12	Je pense à la note que j'obtiendrai.	**0.289**	-0.027	0.128
13	**Je regarde autour de la classe.**	0.058	**0.800**	-0.105
14	**Je regarde les autres personnes.**	0.032	**0.760**	-0.088
15	**Je joue avec mon crayon.**	-0.060	**0.620**	0.050
16	**J'ai du mal à rester immobile.**	0.047	**0.615**	0.086
17	**Je fixe.**	0.052	**0.580**	0.044
18	Je tape mes pieds.	-0.048	**0.538**	0.105
19	Je regarde le temps qu'il me reste.	0.170	**0.280**	0.108
20	*C'est difficile pour moi de me remémorer les réponses.	**0.231**	0.251	0.037
21	J'essaie de terminer rapidement.	0.011	0.228	0.129
22	**Mon visage devient chaud.**	-0.084	0.035	**0.741**
23	**Mon cœur bat vite.**	0.135	-0.016	**0.720**
24	**Mes mains tremblent.**	0.020	0.063	**0.674**
25	**J'ai chaud.**	-0.037	0.151	**0.637**
26	**J'ai de drôles de sensations au ventre.**	0.063	0.013	**0.611**
27	J'ai peur.	0.307	-0.126	**0.634**
28	J'ai mal à la tête.	0.026	0.058	**0.594**
29	Je suis nerveux.	0.319	-0.090	**0.578**
30	Je dois me diriger vers la salle de bain.	-0.019	0.073	**0.344**

Note. Labels in bold indicate items retained in the short version. Factor loadings in the expected component are in bold. Cogn. = Cognitive. Beha. = Behavioural. Phys. = Physiological. * = removed item.

The results revealed a structure very similar to that of the original English version. Indeed, only a few items had loadings below the commonly accepted threshold of .40, and all items loaded most strongly on their expected component except for Item 20, "It is hard for me to remember answers." This item was therefore removed from the French adaptation of the scale, as in the original version it belonged to the cognitive component rather than the behavioural component. Based on these results, the five items with the highest factor loadings, highlighted in bold in Table 1, were selected to create a short version of the instrument. Consequently, the QAES-C comprises 15 items, equally distributed across the three components in terms of item count.

Internal Consistency

Table 2 below presents the internal consistency coefficients for each subscale of the long version of the questionnaire (QAES) and the QAES-C. As shown, the omega values indicate high internal consistency, with values exceeding the recommended thresholds. Moreover, although internal consistency values are slightly lower for the short version than for the long version, they remain above the established thresholds.

Table 2

Mean (Standard Deviation) and Internal Consistency of the Translated Subscales

	QAES		QAES-C		Correlations	
Components	**M (S.D.)**	**Omega (No. Items)**	**M (S.D.)**	**Omega (No. Items)**	**Phys**	**Beha.**
Cognitive	2.49 (0.60)	0.87 (12)*	2.27 (0.75)	0.83 (5)	0.35	0.54
Physiological	2.37 (0.69)	0.87 (9)	2.29 (0.82)	0.83 (5)	-	0.29
Behavioural	1.63 (0.64)	0.80 (8)	1.72 (0.73)	0.80 (5)		-

Note. Beha. = Behavioural. Phys. = Physiological. * = indicates that one of the items was removed from this component. Omega for the cognitive component without item removal (13 items): $\omega = 0.87$.

Correlations Between Subscales

As reported in Table 2, the subscales are moderately to strongly correlated with one another, suggesting that they are interdependent.

Study 2

In a separate sample, Study 2 aimed to examine the psychometric properties of the three subscales (cognitive, behavioural, and physiological) of the QAES-C, the 15-item short version of the adapted instrument. This study therefore reassessed both the internal consistency and the factor structure of the QAES-C.

Methods

Participants

Data for the present study were collected as part of a project aimed at better understanding the factors involved in the quality of the school experience and academic success of secondary school students. Data collection took place in the fall of 2023. Again, since participants were minors, only students who had obtained written parental consent were allowed to take part in the project. The sample for the present study included 387 students in grades 7 to 11: 45.2% boys, 51.9% girls, and 2.9% identifying with another gender category; 73.2% identified as white and 90.2% were born in Quebec. The students attended a private secondary school located in the Greater Montreal metropolitan area (Quebec, Canada).

Procedure

The questionnaire, which included various variables, was administered using the online platform Qualtrics. Students used their laptops to complete the questionnaire over approximately 45 minutes, under supervision by their teacher. About five minutes of this time were devoted to the QAES-C. Teachers were provided with instructions to ensure the smooth administration of data collection. No incentives were provided to the participants. The research ethics committee of the authors' affiliated university reviewed and approved the project (certificate no. 2023-5079).

Measures

Among the measures included in the questionnaire completed by the students, 15 items comprised the QAES-C, the short French-adapted version of the CTAS (Wren & Benson, 2004). The specific items are presented in Table 1. As in Study 1, participants responded using a four-point scale ranging from 1 (almost never) to 4 (almost always), and all items were preceded by the words: "When I take tests..."

Analysis

To examine the factor structure of the subscales, we conducted an exploratory factor analysis with direct Oblimin rotation using SPSS version 29. Based on the results of this analysis, a confirmatory factor analysis was conducted using MPlus (Muthén & Muthén, 2015) to assess the correspondence between the sample data and the three components of the QAES-C. Since the intraclass correlations were negligible (all below .05, except for two with values of .051 and .056) and the design effect was low, below the threshold of 2 (Lai & Kwok, 2015), non-nested analyses were conducted. Appendix B presents a copy of the script used for this analysis.

As recommended by Muthén & Muthén (2015), several fit indices were examined based on established thresholds: the chi-square test ($p > .05$) and its ratio to the degrees of freedom ($\chi 2/df \leq 3$), the root mean square error of approximation (RMSEA < .08), the comparative fit index (CFI > .95), and the Tucker-Lewis Index (TLI > .95; Marsh et al., 2005).

Results

Internal Consistency

The reliability statistics for each subscale (cognitive: $\omega = .89$; physiological: $\omega = .87$; behavioral: $\omega = .86$) indicated that the scale's internal consistency was quite strong.

Exploratory Factor Analyses

The results revealed three components corresponding to each of the measured dimensions of test anxiety. Table 3 below presents the factor loadings of each item for the three components.

As expected, the QAES-C items are distributed according to the structure of the original questionnaire, with high loadings on their expected component.

Confirmatory Factor Analysis

The examined indices indicate a good fit of the model to the data: $\chi^2(87) = 254.912$, $p < .001$; $\chi^2/df = 2.93$; CFI = 0.936; TLI = 0.923; RMSEA = .071 (90% CI [.061; .081]). The results suggest that the three subscales adequately represent the construct of test anxiety. Moreover, the three dimensions are highly intercorrelated, indicating that they are interconnected and jointly contribute to explaining the overall construct of test anxiety in adolescent students.

Table 3
Factor Structure of the QAES: Final 15-Item Version

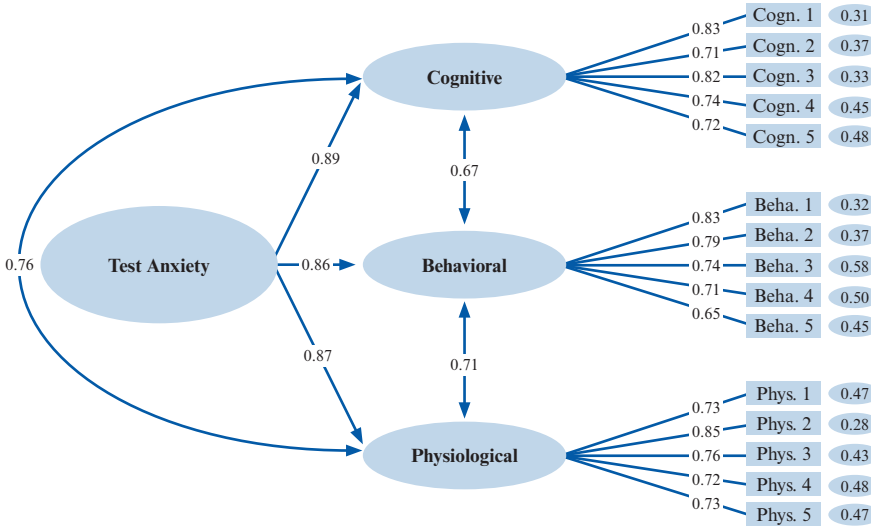
	Labels	M (SD)	Components		
			Cogn.	Beha.	Phys.
1	J'ai peur d'échouer.	2.35 (1.05)	**0.840**	0.006	0.029
2	Je pense à ce qui se passera si j'échoue.	2.26 (1.05)	**0.741**	-0.072	0.202
3	Je pense que j'aurai une mauvaise note.	2.26 (0.94)	**0.802**	0.033	0.060
4	Je me demande si je vais obtenir la note de passage.	2.13 (1.01)	**0.901**	-0.018	-0.113
5	Je pense que la plupart de mes réponses sont fausses.	2.13 (0.96)	**0.736**	0.096	-0.015
6	Je regarde autour de la classe.	2.66 (1.00)	0.082	**0.870**	-0.084
7	Je regarde les autres personnes.	2.45 (1.04)	0.039	**0.879**	-0.088
8	Je joue avec mon crayon.	2.62 (1.03)	-0.104	**0.791**	0.046
9	J'ai du mal à rester immobile.	2.29 (1.12)	0.051	**0.578**	0.245
10	Je fixe.	2.16 (1.02)	0.109	**0.589**	0.202
11	Mon visage devient chaud.	1.71 (0.97)	-0.038	-0.089	**0.926**
12	Mon cœur bat vite.	2.11 (1.03)	0.244	0.092	**0.632**
13	Mes mains tremblent.	1.81 (1.01)	0.018	0.169	**0.694**
14	J'ai chaud.	1.90 (0.99)	-0.008	-0.008	**0.831**
15	J'ai de drôles de sensations au ventre.	1.93 (0.99)	0.148	0.147	**0.569**

Note. Factor loadings in the expected component are in bold; Cogn. = Cognitive. Beha. = Behavioral. Phys. = Physiological.

Discussion

By conducting two complementary studies, we aimed to evaluate the psychometric properties of the QAES-C, a short French-adapted scale designed to measure test anxiety in adolescents. The factor structure of the instrument was consistent with the three measured components of test anxiety, and the internal consistency of the subscales was good. Overall, these results demonstrate the theoretical validity and reliability of the QAES-C, supporting its relevance for use in further research with French-speaking adolescents.

Figure 1
Confirmatory Factor Analysis (n = 387)



A Structure Reflecting the Multidimensional Nature of Test Anxiety in French-Speaking Adolescents

The exploratory and confirmatory factor analyses revealed that the items of the French version of the instrument (Study 1) and the short version (Study 2) grouped into three factors corresponding to the physiological, behavioral, and cognitive components of test anxiety. These findings suggest that test anxiety in school is multidimensional, comprising three complementary but distinct components. Overall, these results are consistent with theoretical conceptions of test anxiety, which posit that this form of anxiety has multiple facets that must be considered to capture its complexity (Robson et al., 2023; von der Embse et al., 2018; Wren & Benson, 2004).

The three components identified in Studies 1 and 2 were also consistent with the results obtained by Wren and Benson (2004) using the original English version of the instrument, with one exception. In our study, the item "It is hard for me to remember answers," originally designed to measure cognitive test anxiety, loaded with the behavioral component instead.

This unexpected result may reflect an overlap between behavioral and cognitive manifestations that accompany difficulties in recalling answers during school assessments, or a different interpretation of the translated item compared to its original version (see Wren & Benson, 2004). In any case, this item was removed from the French adaptation of the scale.

Furthermore, once the QAES-C items were selected, Study 2 confirmed the expected factor structure in a new sample, again supporting the multidimensional nature of test anxiety experienced in the classroom. In addition, the internal consistency of the subscales was high, providing evidence for the reliability of the proposed instrument.

Scientific and Educational Implications

Overall, our two studies support the validity and reliability of the new short scale developed to measure test anxiety in French-speaking adolescents. Once available to the scientific community, this instrument, which demonstrates strong psychometric properties, can be used for further research in the field. Moreover, because the QAES distinguishes three components of test anxiety, it will allow researchers to differentiate the role of these distinct dimensions in students' school experiences. Researchers will be able to use separate scores for each component, for example, to compare the influence of the different components of test anxiety on outcomes such as academic performance or well-being.

The QAES-C will also be highly useful to practitioners. This new tool addresses a clear need for instruments with a short administration time (approximately five minutes), particularly for measuring all three dimensions of test anxiety in younger populations (von der Embse et al., 2018). Furthermore, the scale can be used to monitor changes in students' levels of anxiety, for instance, as a pre- and post-assessment tool in the context of interventions. Additionally, qualitatively comparing the scores obtained on the different subscales for an individual student will help to better define their profile (e.g., higher levels on the cognitive, physiological, or behavioral component), which can then guide targeted interventions for one or more components. For example, organizational and time-management interventions to help students better prepare for assessments are likely to have the most impact on the behavioral component, whereas relaxation techniques and cognitive reappraisal strategies could be more suitable for addressing

the cognitive component. Thus, our scale will better equip schools to provide students reporting high levels of test anxiety with relevant tools to reduce their anxiety and support them in reaching their full potential.

Strengths and Limitations of the Study and Directions for Future Research

Despite the psychometric strengths of the QAES-C, this study has some limitations that should be acknowledged. First, the results can not be automatically generalized to younger student populations, including primary school students. Indeed, the first study included only fifth-year secondary students, and the second study relied on a sample of students from grades 7 to 11 attending a private school. Therefore, the findings are difficult to generalize to elementary school students. Although the original English version of the scale was validated with children aged 8 to 12 (Wren & Benson, 2004), future research is needed to validate the QAES-C for use with primary school students from diverse educational settings.

Additionally, the QAES-C does not provide cutoff scores that would allow the identification of different levels of test anxiety, some of which could potentially be harmful to students. While test anxiety is not necessarily detrimental for all students who experience it (Lecours et al., 2025; Plante et al., 2022), it would be useful to complement the QAES-C with thresholds that distinguish low, moderate, or high levels of test anxiety, for example. Such thresholds could be used for empirical investigation into the circumstances in which test anxiety becomes harmful to students, or on the contrary, the conditions under which this phenomenon can serve as a positive driver of performance (Jamieson et al., 2016).

Despite these limitations, the QAES-C is a validated, brief option for assessing school-related test anxiety in French-speaking adolescents. Moreover, it allows for the evaluation of the multidimensional nature of the construct in secondary school students, which constitutes an important contribution.

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REFERENCES

Angelidis, A., Solis, E., Lautenbach, F., van der Does, W. & Putman, P. (2019). I'm going to fail! Acute cognitive performance anxiety increases threat-interference and impairs WM performance. *PloS One*, *14*(2), e0210824. https://doi.org/1.1371/journal.pone.0210824

Beaudoin, M.et Desrichard, O. (2009). Validation of a Short French State Test Worry and Emotionality Scale. *Revue internationale de psychologie sociale*, *22*, 79-105.

Béland, S., Cousineau, D. & Loye, N. (2017). Utiliser le coefficient omega de McDonald à la place de l'alpha de Cronbach [Using Macdonald's omega instead of Cronbach alpha]. *McGill Journal of Education*, *52*(3), 791–804. https:// doi.org/1.7202/1050915ar

Benson, J., Moulin-Julian, M., Schwarzer, C., Seipp, B. & El-Zahhar, N. (1992). Cross validation of a revised test anxiety scale using multi-national samples. Dans K. A. Hagvet and T. B. Johnsen (dir.), *Advances in Test Anxiety Research*, vol. 7. p. 62–83. Swets and Zeitlinger.

Bourque, J., Doucet, D., LeBlanc, J., Dupuis, J. & Nadeau, J. (2019). L'alpha de Cronbach est l'un des pires estimateurs de la consistance interne: une étude de simulation [Cronbach's alpha is one of the worst estimators of internal consistency: a simulation study]. *Revue Des Sciences de L'éducation*, *45*(2), 78–99. https://doi.org/1.7202/1067534ar

Brière, F., Pascal, S., Dupéré, V., Castellanos-Ryan, N., Allard, F, Yale-Soulière, G. & Janosz, N. (2017). Depressive and anxious symptoms and the risk of secondary school non-completion. *The British Journal of Psychiatry*, *211*(3), 163-168. https://doi.org/1.1192/bjp.bp.117.201418

Cassady, J. C. & Johnson, R. E. (2002). Cognitive test anxiety and academic performance. *Contemporary Educational Psychology*, *27*, 270–295. https://doi.org/1.1006/ceps.2001.1094

Centre RBC d'expertise universitaire en santé mentale. (2021). *HORS-PISTE au secondaire*. http://sante-mentale-jeunesse.usherbrooke.ca/hors-piste/programme-secondaire/

Fenouillet, F., Prokofieva, V., Lorant, S., Masson, J. & Putwain, D. W. (2023). French Study of multidimensional test anxiety scale in relation to performance, age, and gender. *Journal of Psychoeducational Assessment*, *41*(7), 828-834. https://doi.org/1.1177/0734282923118687

Field, A. P. (2018). *Discovering statistics using IBM® SPSS® statistics* (5e éd.). SAGE.
Fréchette-Simard, C., Plante, I., Duchesne, S. & Chaffee, K. E. (2022). The Mediating

Role of Test Anxiety in the Evolution of Motivation and Achievement of Students Transitioning from Elementary to High School. *Contemporary Educational Psychology*, *71*. https://doi.org/1.1016/j.cedpsych.2022.102116

Fréchette-Simard, C., Plante, I., Duchesne, S. & Chaffee, K. (2023). A Latent Growth Analysis of Individual Factors Predicting Test Anxiety During the Transition from Elementary to Secondary School, *The Journal of Early Adolescence*, *43*(3), 235-293. https://doi.org/1.1177/02724316221104198

Friedman, I. A. & Bendas-Jacob, O. (1997). Measuring perceived test anxiety in adolescents: A self-report scale. *Educational and Psychological Measurement*, *57*(6), 1035–1046. https://doi.org/1.1177/0013164497057006012

Garrido, L. E., Abad, F. J. & Ponsoda, V. (2013). A new look at Horn's parallel analysis with ordinal variables. *Psychological Methods*, *18*(4), 454–474. https://doi.org/1.1037/a0030005

Gaskin, C. J. & Happell, B. (2014). On exploratory factor analysis: A review of recent evidence, an assessment of current practice, and recommendations for future use. I*nternational Journal of Nursing Studies*, *51*(3), 511–521. https://doi.org/1.1016/j.ijnurstu.2013.1.005

Henson, R. K. & Roberts, J. K. (2006). Use of Exploratory Factor Analysis in Published Research: Common Errors and Some Comment on Improved Practice. *Educational and Psychological Measurement*, *66*(3), 393–416.

Huart, T. (2006). Développement and validation d'un questionnaire multicomponentiel de motivation scolaire [Development and validation of a multidimensional academic motivation scale]. *Mesure and Évaluation en Éducation*, *29*(2), 63–97. https://doi.org/1.7202/1086729ar

IBM Corp. (2017). *IBM SPSS Statistics for Windows*, Version 25.. IBM Corp. Jamieson, J. P., Peters, B. J., Greenwood, E. J. & Altose, A. J. (2016). Reappraising Stress Arousal Improves Performance and Reduces Evaluation Anxiety in Classroom Exam Situations. *Social Psychological and Personality Science*, *7*(6), 579-587. https://doi.org/1.1177/1948550616644656

Journault, A.-A., Plante, I., Charbonneau, S., Sauvageau, C., Longpré, C., Giguère, C.-É., Labonté, C., Roger, K., Cernik, R., Chaffee, K. E., Dumont, L., Labelle, R. & Lupien, S. J. (2022). Using latent profile analysis to uncover the combined role of anxiety sensitivity and test anxiety in students' state anxiety. *Frontiers in Psychology*, *13*. https://www.frontiersin.org/articles/1.3389/fpsyg.2022.1035494

Koller, M., Kantzer, V., Mear, I., Zarzar, K., Martin, M., Greimel, E., Bottomley, A., Arnott, M. & Kuliś, D. (2012). The process of reconciliation: evaluation of guidelines for translating quality-of-life questionnaires. *Expert Review of Pharmacoeconomics & Outcomes Research*, *12*(2), 189-197. https://doi.org/1.1586/erp.11.102

Lai, M. H & Kwok, O. M. (2015). Examining the rule of thumb of not using multilevel modeling: The "design effect smaller than two" rule. *The Journal of Experimental Education*, *83*(3), 423-438. https://doi.org/1.1080/00220973.2014.907229

Lecours, V., Plante, I., & Chaffee, K. E. (2025). Understanding the contrasting relations between perfectionism, school achievement, and internalising behaviours: The mediating role of test anxiety. *Educational Psychology*, *45*(9), 1070–1092. https://doi.org/1.1080/0144341.2025.2549855

Liebert, R. M. & Morris, L. W. (1967). Cognitive and emotional components of test anxiety: A distinction and some initial data. *Psychological Reports*, *20*(3), 975-978. https://doi.org/1.2466/pr.1967.2.3.975

Lowe, P. (2019). Expression and Level of Test Anxiety in a Sample of Elementary Students. *Canadian Center of Science and Education*, *12*(3), 1-9. https://doi.org/1.5539/ies.v12n3p1

Lowe, P. A., Lee, S. W., Witteborg, K. M., Prichard, K. W., Luhr, M. E., Cullinan, C. M., Mildren, B. A., Raad, J. M., Cornelius, R. A. & Janik, M. (2008). The Test Anxiety Inventory for Children and Adolescents (TAICA): Examination of the Psychometric Properties of a New Multidimensional Measure of Test Anxiety among Elementary and Secondary School Students. *Journal of Psychoeducational Assessment*, *26*(3), 215–23. https://doi.org/1.1177/0734282907303760

Marsh, H. W., Hau, K.-T. & Grayson, D. (2005). Goodness of Fit in Structural Equation Models. Dans A. Maydeu-Olivares and J. J. McArdle (dir.), *Contemporary psychometrics: A festschrift for Roderick P. McDonald* (p. 275-340). Lawrence Erlbaum Associates Publishers.

Muthén, L. K. & Muthén, B. O. (2015). *Mplus for Windows 7. 31*. Author.

Plante, I., Lecours, V., Lapointe, R., Chaffee, K. E. & Fréchette-Simard, C. (2022). Relations Between Prior School Performance and Later Test Anxiety During the Transition to Secondary School, *British Journal of Educational Psychology*, *92*(3),1068-1085. https://doi.org/1.1111/bjep.12488

Putwain, D. W. (2008). Deconstructing test anxiety. *Emotional and Behavioural Difficulties*, *13*(2), 141-155. https://doi.org/1.1080/13632750802027713

Putwain, D. W. & Symes, W. (2012). Achievement goals as mediators of the relationship between competence beliefs and test anxiety. *British Journal of Educational Psychology*, *82*(2), 207-224. https://doi.org/1.1111/j.2044-8279.2011.02021.x

Putwain, D. W., von der Embse, N. P., Rainbird, E. C. & West, G. (2021). The development and validation of a new multidimensional test anxiety scale (MTAS). *European Journal of Psychological Assessment*, *37*(3), 236-246. https://doi.org/1.1027/1015-5759/a000604

Raymo, L. A., Somers, C. L. & Partridge, R. T. (2018). Adolescent Test Anxiety: An Examination of Intraindividual and Contextual Predictors. *School Mental Health*, *11*(3), 562-577. https://doi.org/1.1007/s12310-018-09302-0

Robson, D. A., Johnstone, S. J., Putwain, D. W. & Howard, S. (2023). Test anxiety in primary school children: A 20-year systematic review and meta-analysis. *Journal of School Psychology*, *98*, 39-6. https://doi.org/1.1016/j.jsp.2023.02.003

Roos, A.-L., Goetz, T., Voracek, M., Krannich, M., Bieg, M., Jarrell, A. & Pekrun, R. (2020). Test Anxiety and Physiological Arousal: A Systematic Review and Meta-Analysis. *Educational Psychology Review*, *33*(2), 579-618. https://doi.org/1.1007/s10648-020-09543-z

Soucisse, M. M. & Heins, M.-P. (2021). L'anxiété de performance à l'enfance and à l'adolescence: état des connaissances cliniques and scientifiques [Performance anxiety in childhood and adolescence: Current clinical and scientific knowledge]. *Revue Québécoise de Psychologie*, *42*(3), 43-73. https://doi.org/1.7202/1084579ar

Spielberger, C. D. (1980). *Preliminary professional manual for the test anxiety inventory*. Consulting Psychologists Press.

Spielberger, C. D. & Vagg, R. P. (1995). Test anxiety: A transactional process model. Dans C. D. Speilberger and P. R. Vagg (dir.), *Test anxiety: Theory, assessment and treatment* (p. 3-14). Taylor & Francis.

Symes, W. & Putwain, D. W. (2020). The four Ws of test anxiety: What is it, why is it important, where does it come from, and what can be done about it? *Psychologica*, *63*(2), 31-52. https://doi.org/1.14195/1647-8606_63-2_2

Tabachnick, B. G., Fidell, L. S. & Ullman, J. B. (2019). *Using multivariate statistics (7e éd.)*. Pearson.

von der Embse, N., Jester, D., Roy, D. & Post, J. (2018). Test anxiety effects, predictors, and correlates: A 30-year meta-analytic review. *Journal of Affective Disorders*, *227*, 483-493. https://doi.org/1.1016/j.jad.2017.11.048

von der Embse, N. P., Putwain, D. W. & Francis, G. (2021). Interpretation and use of the Multidimensional Test Anxiety Scale (MTAS). *School Psychology*, *36*(2), 86. https://doi.org/1.1037/spq0000427

Weems, C. F., Scott, B. G., Taylor, L. K., Cannon, M. F., Romano, D. M., Perry, A. M. & Triplett, V. (2010). Test anxiety prevention and intervention programs in schools: Program development and rationale. *School Mental Health*, *2*, 62-71. https://doi.org/1.1007/s12310-010-9032-7

Wren, D. G. & Benson, J. (2004). Measuring test anxiety in children: Scale development and internal construct validation. *Anxiety, Stress, & Coping*, *17*(3), 227-24. https://doi.org/1.1080/10615800412331292606

Yale-Soulière, G., Comeau Audigé, J., Lemieux, M., Turgeon, L., Binette-Laporte, F., Campeau, G., Goulet, M. & Stan, S. (2021). *Ready-to-use PASTEL toolkit*. Boscoville.

Yale-Soulière, G., Turgeon, L., N. Brière, F., Alawie, F., Imbeault, A., Morizot, J. & Janosz, M. (2023). Impact de l'anxiété d'évaluation sur le fonctionnement scolaire and psychologique des adolescents [Impact of test anxiety on the academic and psychological functioning of adolescents]. *Revue de psychoéducation*, *52*(1), 136-157. https:// doi.org/1.7202/1099291ar