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A FRENCH TRANSLATION OF THE REVISED CHILDHOOD ANXIETY SENSITIVITY INDEX (CASI-R): ITS FACTOR STRUCTURE, RELIABILITY, AND VALIDITY IN A NONCLINICAL SAMPLE OF CHILDREN AGED 12 AND 13 YEARS OLD

Céline Stassart, Isabelle Hansez, Muriel Delvaux, Brigitte Depauw, & Anne-Marie Etienne*
University of Liège

This study (n = 237 Belgian children; mean age = 12.3 years; SD = 0.41) examined the factor structure, reliability, and validity of the French translation of the Revised Childhood Anxiety Sensitivity Index (CASI-R). We obtained a hierarchical factor structure with four lower-order factors – "fear of cognitive dyscontrol," "fear of publicly observable anxiety reactions," "fear of respiratory symptoms," and "fear of cardiovascular symptoms" – loading on a single higher-order factor ("anxiety sensitivity"). The French translation revealed acceptable internal consistency and a good interitem structure. Anxiety sensitivity was connected with the anxiety and depression scales but the correlation between the CASI-R and the depression score was more modest than that between the CASI-R and the trait anxiety score, indicating that the CASI-R is an anxiety scale. Girls reported more fear of anxious feelings than boys. This revised version allows for a more fine-grained assessment of the anxiety sensitivity concept.

Introduction

In 1985, Reiss and McNally introduced the concept of anxiety sensitivity (AS). This concept refers to the fear of anxiety-related bodily sensations due to beliefs that these sensations will lead to catastrophic outcomes such as physical illness, social embarrassment, and mental incapacitation. AS refers to individual differences in what people think would happen to them if they felt anxiety (Reiss & McNally, 1985). For example, heart palpitations seem alarming if someone believes they might have a heart attack; some people panic as soon as they start to tremble or perspire in public because they believe these reactions will make them look ridiculous; for other people,

* Céline Stassart, Muriel Delvaux, Brigitte Depauw, & Anne-Marie Etienne, Health Psychology, Department of Human Systems and Clinical Studies, Faculty of Psychology and Science of Education, University of Liège; Isabelle Hansez, Valorization of Human Resources, Department of Human Systems and Clinical Studies, Faculty of Psychology and Science of Education, University of Liège.
Correspondence concerning this article should be addressed to Céline Stassart, Health Psychology, Department of Human Systems and Clinical Studies, Faculty of Psychology and Science of Education, University of Liège, Boulevard du Rectorat, 3 Bat. B33, 4000 Liège. E-mail: cstassart@ulg.ac.be

"dyscontrol" or difficulty concentrating can be worrying if they think it is a symptom of a serious mental disorder; still others interpret difficulty breathing or pain in the chest as a sign of physical danger. On the other hand, a person with low AS will not perceive these physical feelings as dangerous but simply as unpleasant and/or normal.

Recent studies have found that AS in children and adolescents correlates with several psychopathological measures. First, children with an anxiety disorder had significantly higher AS scores than children without such a disorder (Joiner, Schmidt, Schmidt, Laurent, Catanzaro, Perez et al, 2002; McLaughlin, Stewart, & Taylor, 2007; Muris, Schmidt, Merckelbach, & Schouten, 2001; Vasey, Daleiden, Williams, & Brown, 1995). Second, several studies carried out in child populations suggest that AS contributes to the risk of developing panic symptoms (Eley, Stirling, Ehlers, Gregory, & Clark, 2004; Hale & Calamari, 2006; Muris et al., 2001), social phobia symptoms (Anderson & Hope, 2009; Eley et al., 2004), obsessive-compulsive disorder (Calamari, Hale, Heffelfinger, Janeck, Lau, Weerts et al., 2001), post-traumatic stress symptoms (Kilic, Kilic, & Yilmaz, 2008; Leen-Feldner, Feldner, Reardon, Babson, & Dixon, 2008), and chronic pain (Martin, McGrath, Brown, & Katz, 2007; Tsao, Meldrum, Kim, & Zeltzer, 2007).

The relation between AS and depression in children is less clear than in adults. Mood disorders in children are generally associated with other forms of psychopathologies, particularly anxiety disorders (Dumas, 2007). Weems, Hammond-Laurence, Silverman, and Ferguson (1997) observed that the correlation between the Child Anxiety Sensitivity Index and the Children's Depression Inventory (CDI; Kovacs, 1981) remained significant after neutralisation of the effect of trait anxiety. Conversely, Muris et al. (2001) found that AS in children no longer correlated significantly with depression after the effect of anxiety was controlled for.

The construct of AS has been examined less in children than in adults. Given its role in the etiology and maintenance of anxiety disorders and given the high prevalence of anxiety disorders among youth – 10% (Silverman & Treffers, 2001) – it seems important to have instruments to measure AS. Silverman, Fleisig, Rabian, and Peterson (1991) developed a measure of AS in children and adolescents: the Childhood Anxiety Sensitivity Index (CASI).

The CASI consists of 18 items, 16 of which are identical to those in the adult Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986). The CASI's validity and reliability are satisfactory (Silverman et al., 1991). Several studies (Muris et al., 2001; Silverman, Ginsburg, & Goedhart, 1999; Silverman, Goedhart, Barrett, & Turner, 2003) indicate that AS in children and adolescents can be conceptualised as a hierarchical model with three or four lower-order factors loading on one higher-order factor (anxiety sensitivity). However, the number of factors has been disputed. The problem is that

the CASI, just like its adult version (the ASI), simply contains too few items (18 and 16, respectively) to reliably identify the major factors affecting AS (Cox, Parker, & Swinson, 1996; Muris, 2002; Silverman et al., 1999; Silverman et al., 2003; Taylor & Cox, 1998; van Widenfelt, Siebelink, Goedhart, & Treffers, 2002; Zinbarg, Barlow, & Brown, 1997). In the CASI, two factors appear clearly: fear of physical symptoms (seven items) and fear of mental incapacity (four items) (Silverman et al., 1999). If a distinction is made between the factors "fear of losing control of anxiety symptoms" (five items) and "fear of social evaluation" (two items), this leads to a four-factor model. And if these two factors are considered a single factor, we obtain a three factor model. Several authors (Muris et al., 2001; Silverman et al., 1999) have suggested that the four-factor solution fits the data better than the three-factor model. But some factors have low internal consistency (Silverman et al., 1999; van Widenfelt et al., 2002). For example, in the Silverman et al.'s (1999) study, the internal consistency of the two-item factor "fear of social evaluation" was .55 in the clinical sample and .33 in the nonclinical sample. Using the Spearman-Brown formula (Nunnally, 1978), these authors estimated that, by enlarging this scale to eight items, an internal consistency of above .80 could be reached. A further problem is that some items do not target specific factors: for example, the ASI and CASI item "Unusual body sensations scare me" does not tell us what sensations the person finds unusual or fearsome (Taylor & Cox, 1998). In children, Silverman et al. (2003) suggested that the reliability of the Social Concerns scale could be improved by rewriting and adding some items so as to more clearly tap the fear of showing anxiety or undesirable emotions at school or in general social settings (e.g., "When at school, I am afraid that I may blush or show emotions in another way").

To respond to this problem of reliability in the adult scale, Taylor and Cox (1998) developed an expanded anxiety sensitivity scale, the Revised Anxiety Sensitivity Index (ASI-R), which consists of 36 items. The factor structure of the ASI-R indicated a hierarchical structure with four lower-order factors loading on one higher-order factor: (1) "fear of cardiovascular symptoms," (2) "fear of publicly observable anxiety reactions," (3) "fear of cognitive dyscontrol," and (4) "fear of respiratory symptoms." Later, Muris (2002) developed the Childhood Anxiety Sensitivity Index – Revised (CASI-R), which consists of 31 items, 8 from the CASI and 23 from the ASI-R. Each item refers to one of the four major domains of AS cited above. Muris (2002) investigated the psychometric qualities of the CASI-R. The results show a hierarchical factorial structure with four factors loading on one higher-order factor and good internal consistency: Cronbach's alpha of .93 for the total scale and alphas between .81 and .88 for the factors. The validity of this index is satisfactory. The correlation between the original CASI and the CASI-R

was also measured: r = .93. These results are similar to those of Taylor and Cox (1998).

The main aim of our study was to examine the psychometric properties of the French translation of the CASI-R. First, the study examined the factor analytic structure of the CASI-R in a large sample of children. Consistent with the results of Muris (2002), we hypothesised that the French translation of the CASI-R would consist of four replicable factors assessing fears of respiratory, cardiovascular, publicly observable, and cognitive dyscontrol anxiety symptoms. Second, the reliability (internal consistency) and validity of the CASI-R were investigated. More specifically, relationships between the CASI-R and the trait anxiety version of the State-Trait Anxiety Inventory for Children (STAIC; Spielberger, Edwards, Lushene, Montuori, & Platsek, 1973) and the Children's Depression Inventory (CDI; Kovacs, 1981) were examined. It was hypothesised that CASI-R scores would correlate moderately (r in the .60 or .70 range) with trait anxiety (Muris, 2002; Muris et al., 2001; van Widenfelt et al., 2002), and that the scores would correlate less significantly with depression after the effect of anxiety was controlled for (Muris, 2002; Muris et al., 2001). Third, the effect of gender was investigated. We hypothesised that girls would score higher than boys for AS (Muris, 2002; van Widenfelt et al., 2002; Walsh, Stewart, McLaughlin, & Comeau, 2004).

Method

Participants

The sample was recruited from eight regular primary and secondary schools in the area of Liège, Belgium. The sample comprised 237 children (113 boys and 124 girls), aged between 12 and 13 years old (mean = 12.3 years, SD = .41). Almost all of the sample was of Belgian origin (90%).

Procedure

The approval of the schools and written informed consent from the parents were obtained before the children participated in the study. Children's participation was voluntary and anonymous. The questionnaires were completed by the children in a group classroom setting. One research assistant was present throughout to provide assistance if needed and to ensure confidential and independent responses.

Measures

Childhood Anxiety Sensitivity Index, revised version (CASI-R; Muris, 2002)

The CASI-R consists of 31 items and measures AS in children. As we have seen, this test can be conceptualised as a hierarchical construct with four lower-order factors – "fear of cardiovascular symptoms," "fear of publicly observable anxiety reactions," "fear of cognitive dyscontrol," and "fear of respiratory symptoms" – loading on a single higher-order factor ("anxiety sensitivity") (Muris, 2002). Children and adolescents respond to each item using a 3-point response scale: 1 = none, 2 = some, or 3 = a lot. A total AS score can be calculated by summing the ratings for all items. Scores range from 31 to 93, with higher scores indicating higher levels of AS. The internal consistency of the CASI-R is good (Cronbach's alpha = .93): Cronbach's alphas for the separate dimensions of AS range from .81 to .88 (Muris, 2002).

In order to achieve linguistic equivalence for the CASI-R (the only instrument not already translated into French), the questionnaire was translated from English to French, using a back-translation approach (Brislin, 1980). One bilingual translator who was also a native speaker or culturally informed individual translated the original English version into French. Another bilingual speaker independently translated the translated questionnaire back into English. To ensure that the translated items were grammatically and colloquially appropriate, differences between the original and back-translated versions were discussed and resolved by joint agreement of both translators.

State-Trait Anxiety Inventory for Children (STAIC; Spielberger et al., 1973; translated by Turgeon & Chartrand, 2003a)

The trait version of the STAIC contains 20 items that measure chronic symptoms of anxiety. The child/adolescent is asked to rate the frequency with which he or she experiences anxiety symptoms such as "I am scared," "I feel troubled," and "I get a funny feeling in my stomach" using a 3-point response scale: 1 = almost never, 2 = sometimes, and 3 = often. A total trait anxiety score can be calculated by summing the ratings for all items. The detailed instructions, normative data, and various reliability, validity, internal consistency and concurrent validity parameters for this scale are summarised by Spielberger et al. (1973) for the English version and by Turgeon and Chartrand (2003a) for the French version.

Children's Depression Inventory (CDI; Kovacs, 1981; translated by Mack & Morr, 1982)

The CDI is a 27-item self-report measure designed to assess cognitive, behavioural, and affective symptoms of depression. Children and adolescents

respond to each item using a 3-point response scale: the child must choose one statement that best describes him or her. CDI scores can range from 0 to 54, with higher scores reflecting more depressive symptoms. The internal consistency of the CDI is good (Saylor, Finch, Spirito, & Bennett, 1984). In a study of 470 children and adolescents aged between 8 and 14, Saint-Laurent (1990) reported that the CDI's French translation has an adequate Cronbach's alpha (.92) and test-retest reliability (r = .70). The analysis of the validity of the scale appeared satisfactory (Mack & Morr, 1982).

Statistical analysis

To examine the structure of the French translation of the CASI-R, confirmatory factor analyses (CFA) were conducted with LISREL 8.80 (Jöreskog & Sörbom, 2006). CFA compares the covariance matrix obtained from the data with a covariance matrix implied by the theoretical factor model. This model states how latent, unobservable constructs are measured by manifest, observable variables, and how these latent constructs are linked with each other. Thus, CFA (also called "structural equation modelling") gives an evaluation of how well the theoretical model fits the original data: the smaller the discrepancy between the two matrices, the better the fit. Robust Maximum Likelihood (RML) estimation, the most commonly used estimation method in CFA (Marsh, Hau, Balla, & Grayson, 1998), was applied to the covariance matrices. Several goodness-of-fit indices produced by LISREL were used in this study: (1) chi-square divided by degrees of freedom (this value should be smaller than 5 to be acceptable but ideally smaller than 2; the lower the value, the better the fit); (2) Standardised Root Mean Square Residual (SRMR; values < .05 are indicative of acceptable fit; the lower the value, the better the fit); (3) Root Mean Square Error of Approximation (RMSEA; values < .05 are indicative of good fit, between .05 and .08 of reasonable fit, between .08 and .10 of mediocre fit, and > .10 of poor fit; the lower the value, the better the fit); (4) Non-Normed Fit Index (NNFI; values > .97 are indicative of good fit and between .95 and .97 of reasonable fit; the higher the value, the better the fit); (5) Comparative Fit Index (CFI; values > .97 are indicative of good fit and between .97 and .95 of reasonable fit; the higher the value, the better the fit); (6) Goodness-of-Fit Index (GFI; values > .95 are indicative of good fit and between .95 and .90 of reasonable fit; the higher the value, the better the fit); (7) Adjusted Goodness-of-Fit Index (AGFI; values > .90 are indicative of good fit and between .90 and .85 of reasonable fit; the higher the value, the better the fit). The Expected Cross-Validation Index (ECVI) and Akaike's Information Criterion (AIC) were used to compare models. The model that has the lowest ECVI and AIC index can be considered as the best model. (For

the cut-off values of several goodness-of-fit indices, see Diamantopoulos & Siguaw, 2000.)

The factorial structure of the CASI-R presented by Muris (2002) was used as the basic model in our own factorial analysis. This model is composed of a hierarchical factor structure with four lower-order factors – "fear of cognitive dyscontrol" (items 10, 18, 21, 23, 24, and 30), "fear of publicly observable anxiety reactions" (items 2, 8, 9, 11, 17, 22, 26, and 31), "fear of respiratory symptoms" (items 3, 4, 5, 6, 13, 19, and 28) and "fear of cardiovascular symptoms" (items 1, 7, 12, 14, 15, 16, 20, 25, 27, and 29) – loading on a single higher-order factor (anxiety sensitivity).

STATISTICA 9 (StatSoft, 2010) software was used to compute descriptive statistics, correlations, and t-tests. The criterion of $\alpha = .05$ was used.

Results

Factor analyses

Several models were tested: a one-factor model (Model 1), a four-factor model (Model 2), and a four-factor model with one higher-order factor (Model 3). Additionally, the statistical analyses suggested different modifications to decrease the chi-square. One modification drew our attention: to add a path to item 15 and the "fear of publicly observable anxiety reactions" factor. Two additional models were then tested: a four-factor model (Model 2b) and a four-factor model with one higher-order factor (Model 3b), with item 15 (placed initially in factor 4 "fear of cardiovascular symptoms") moved to factor 2 "fear of publicly observable anxiety reactions". For analyses in which two or more competing models were tested, the relative goodness of fit was tested in several ways. If the models were nested, the c2 difference test was used. As well, and for the non-nested models, the ECVI and AIC values were used. Goodness-of-fit indices for the five models tested are presented in Table 1.

The results of the CFA indicated that all fit indices for the various models were satisfactory. A χ^2 difference test indicated that, compared to Model 1, Models 2, 2b, 3, and 3b showed a better fit: $\Delta df = 6$, $p < .01$ for Model 2, $\Delta df = 6$, $p < .01$ for Model 2b, $\Delta df = 2$, $p < .01$ for Model 3, $\Delta df = 2$, $p < .01$ for Model 3b. When the first-order models (Models 2 and 2b) were compared to the second-order models (Models 3 and 3b), a χ^2 difference test indicated no significant difference: $\Delta df = 2$, $p =$ NS for Model 2 in comparison to Model 3 and $\Delta df = 2$, $p =$ NS for Model 2b in comparison to Model 3b. The χ^2 difference test could not be used for the comparison between Model 2 and Model 2b and between Model 3 and Model 3b because the models were not nested. However, when fit indices were considered, Model 3b (the four-factor model

Table 1

Goodness-of-Fit Indices for the Five Models Tested

Model	χ2	df	χ2/df	RMSEA	NNFI	CFI	SRMR	GFI	AGFI	ECVI	AIC
Model 1: One factor	433.57	434	1.00	.06	.82	.84	.06	.89	.87	3.76	888.02
Model 2: Four factors	372.92	428	.87	.04	.90	.91	.05	.91	.89	3.19	751.55
Model 2b: Four factors with item 15 moved into factor 2	359.35	428	.84	.04	.91	.92	.05	.91	.89	3.07	724.22
Model 3: Four factors, one higher-order factor	373.66	430	.87	.04	.90	.91	.05	.91	.89	3.16	745.76
Model 3b: Four factors, one higher-order factor, with item 15 moved into factor 2	359.67	430	.84	.03	.92	.92	.05	.91	.90	3.05	720.81

Note. $n = 237$.

with one higher-order factor and with item 15 – *Scares me when feel tingling or prickling sensations in hands* – moved to the "fear of publicly observable anxiety reactions" factor) was the best solution and provided the best fit to the data. This model had the lowest RMSEA, AIC, and ECVI values and the highest NNFI and AGFI values.

The completely standardised factor loadings of the CASI-R items were all significant (Table 2) and greater than to .30 (salient loading; Gorsuch, 1983).

Table 2

Completely Standardised Factor Loadings of French CASI-R Items

Items	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1: *Fear of cognitive dyscontrol*				
21. When trouble thinking clearly, worry something wrong with me	.50			
23. When mind goes blank, worry something terribly wrong with me	.47			
18. When thoughts speed up, worry might go crazy	.46			
24. When cannot keep mind on schoolwork, worry might go crazy	.40			
10. When feel strange, worry might go crazy	.35			
30. Scares me when cannot keep mind on task	.34			
Factor 2: Fear of publicly observable anxiety reactions				
17. When sweat in the presence of others, people think negatively of me		.51		
9. Worry other people notice my anxiety		.49		
31. Important not to appear nervous		.44		
2. When tremble in the presence of others, fear what people think of me		.44		
11. Scares me when blush in front of people		.42		
26. Scares me when feel like throwing up		.42		
15. Scares me when feel tingling or prickling sensations in hands		.35		
22. Think would be horrible to faint in public		.32		
8. Believe would be awful to vomit in public		.32		
Factor 3: Fear of respiratory symptoms				
19. When throat feels tight, scared could choke to death			.53	
3. When feel like not getting enough air, scared might suffocate			.46	
28. Scares me when short of breath			.46	
4. When chest feels tight, scared cannot breathe properly			.42	
6. Scares me when have feeling of choking			.41	
5. When breathing irregular, fear something bad will happen			.40	
13. When trouble swallowing, worry could choke			.31	
Factor 4: Fear of cardiovascular symptoms				
27. When heart beats fast, worry something wrong				.61
7. When pain in chest, worry going to have heart attack				.48
25. Scares me when heart beats fast				.45

Table 2

Completely Standardised Factor Loadings of French CASI-R Items (Continued)

Items	Factor 1	Factor 2	Factor 3	Factor 4
20. When face feels numb, worry might be stroke				.43
16. When dizzy, worry something wrong with brain				.41
12. When strong pain in stomach, worry could be cancer				.40
1. When head pounding, worry could have a stroke				.39
14. When heart skips a beat, worry something seriously wrong				.38
29. When stomach upset, worry might be seriously ill				.36
Loadings of factors on higher-order factor	.89	.68	.79	.96

Note. $n = 237$. All factor loadings are significant at $p < .05$.

The intercorrelations between the subscales derived from the factor structure and the correlations between these subscales and the total CASI-R score are shown in Table 3. All the correlations are significant: between .40 and .62 for the intercorrelations between the factors and between .73 and .81 for the correlations between factors and the total CASI-R score.

Reliability (internal consistency)

The CASI-R's reliability was assessed using Cronbach's alpha. The Cronbach's alphas for the whole scale and for the factors were between .87 and .62 with a mean interitem correlation between .18 and .28 (Table 3). The results suggested that the French translation of the CASI-R had acceptable internal consistency and a good interitem structure.

The reliability of the other questionnaires was also acceptable: a Cronbach's alpha of .85 for the STAIC and .83 for the CDI, with a mean interitem correlation of .23 for the STAIC and .16 for the CDI.

Descriptive analyses of the CASI-R

Descriptive statistics for several variables are presented in Table 3. In accordance with our hypothesis, significant gender differences were found for the CASI-R ($t(235) = 4.47$, $p < .001$) and for the factors other than factor 1 "fear of cognitive dyscontrol": factor 2 "fear of publicly observable anxiety reactions" ($t(235) = 4.01$, $p < .001$), factor 3 "fear of respiratory symptoms" ($t(235) = 4.16$, $p < .001$), and factor 4 "fear of cardiovascular symptoms" ($t(235) = 3.38$, $p < .001$), with higher means for girls. Significant gender differences were also found for the STAIC ($t(235) = 5.49$, $p < .001$), with higher means for girls, but not for the CDI ($t(235) = 1.80$, NS).

Table 3

Cronbach's Alpha (α), Means (Standard Deviations), and Intercorrelations between the Total CASI-R Score, Its Factors and the STAIC and CDI

		Means (SD)						Intercorrelations – CASI-R				
	α	**Total (*n* = 237)**		**Boys (*n* = 113)**		**Girls (*n* = 124)**		**Total**	**Factor 1**	**Factor 2**	**Factor 3**	**Factor 4**
CASI-R												
Total score	.87	45.5	(8.2)	43.1	(7.2)	47.7	(8.4)	-				
Fear of cognitive dyscontrol (Factor 1)	.62	7.8	(1.8)	7.6	(1.8)	8.4	(1.8)	.73	-			
Fear of publicly observable anxiety reactions (Factor 2)	.75	15.1	(3.4)	14.2	(3.3)	15.9	(3.3)	.80	.48	-		
Fear of respiratory symptoms (Factor 3)	.73	11.2	(2.7)	10.5	(2.2)	11.9	(2.9)	.77	.40	.43	-	
Fear of cardiovascular symptoms (Factor 4)	.73	11.4	(2.5)	10.8	(2.0)	11.9	(2.8)	.81	.62	.47	.54	-
STAIC	.85	34.2	(7.1)	31.7	(6.3)	36.5	(7.1)	.61	.40	.49	.56	.43
CDI	.83	9.9	(6.1)	9.2	(6.4)	10.6	(5.7)	.32	.22	.26	.26	.23

Note. CASI-R = Revised Childhood Anxiety Sensitivity Index; STAIC = State-Trait Anxiety Inventory for Children; CDI = Children's Depression Inventory.
All correlations are significant at $p < .001$.

Convergent and discriminant validity of the CASI-R

The CASI-R had a significant positive correlation with the STAIC and the CDI. All correlations are shown in Table 3. The correlation between the CASI-R total score and the depression score was significantly smaller than that between the CASI-R and the trait anxiety score ($p < .001$).

Partial correlations between AS, trait anxiety, and depression were calculated. Two conclusions can be drawn from this analysis. First, after controlling for the depression variable, AS was still correlated with trait anxiety ($r = .55$, $p < .001$). Second, after controlling for the trait anxiety variable, the correlation between AS and depression disappeared ($r = –.04$, NS). Our hypothesis is thus confirmed: there was a moderate correlation (r in the .50 or .70 range) between trait anxiety and the CASI-R after controlling for depression and no correlation between depression and the CASI-R after the effect of anxiety was controlled for.

Discussion

The first aim of our study was to examine the factor analytic structure of the French translation of the CASI-R. The results indicated that AS in Belgian children aged 12 and 13 years old, as measured by the CASI-R, can best be conceptualised as a hierarchical factor structure with four lower-order factors – "fear of cognitive dyscontrol," "fear of publicly observable anxiety reactions," "fear of respiratory symptoms," and "fear of cardiovascular symptoms" – loading on a single higher-order factor, anxiety sensitivity. This structure is similar to those reported by Muris (2002) and by several other authors (e.g., Deacon, Abramowitz, Woods, & Tolin, 2003; Taylor & Cox, 1998) for the revised version of the anxiety sensitivity measure for adults (ASI-R). With regard to the composition of these factors, we obtained the same arrangement of items as Muris (2002) did, except for item 15 – "Scares me when feel tingling or prickling sensations in hands". For Muris, this item loaded on factor 4 "fear of cardiovascular symptoms," but in this study, the assignment of item 15 to factor 2 "fear of publicly observable anxiety reactions" allowed a good reduction of the chi-square and an optimal factor structure. The French translation of this item does not appear to be a problem. But the interpretation of this item may differ from one population to another. Cottraux (2007) suggests that different results in French and American populations could result from the translation of the face value of questions, rather than an adaptation of the questionnaires. Moreover, Weems, Hayward, Killen, and Taylor (2002) suggest that differences in family culture and social culture lead to different interpretations of anxiety symptoms and their consequences. The Belgian children in this study interpreted this item as indicating

fear that their tingling or prickling sensations could be perceived publicly rather than interpreting them as signs of a cardiovascular problem. These tingling or prickling sensations may be dreaded because they involve a movement such as trembling of the hands and this movement can be perceived publicly. Moreover, a child's medical knowledge is unlikely to be developed enough to perceive a tingling sensation or shaking hands as a sign of heart problems. In this case, the child will not focus on the gravity of the symptom but rather on its visibility.

As regards reliability, the current data show that the internal consistency of the CASI-R was acceptable for the total scale, as well as for some dimensions of AS, but not for factor 1 "fear of cognitive dyscontrol," which had a low Cronbach's alpha. However, although the indices are reasonable, they are lower than those obtained by Muris. The overall factor structure is similar, but something has clearly been "lost in translation". In English, various words may be used to describe disease, whereas there is only one in French (Bruchon-Schweitzer, 2002). This makes translation more difficult. Next, the validity of the CASI-R was examined. The results indicated that the translation's convergent validity is acceptable. However, that issue is not fully resolved, because not all the validity ratings were investigated in this study.

Like other studies, our results show that girls report significantly more fear of anxious feelings than boys (e.g., Muris, 2002; Walsh et al., 2004). The effect of gender was also observed for the various factors, except for factor 1 "fear of cognitive dyscontrol". Thus, and consistently with previous findings, girls reported greater fear of anxiety-related social concerns (factors 2 and 4; e.g., Walsh et al., 2004) and fear of physical symptoms (factors 3 and 4); boys and girls feared cognitive dyscontrol equally (e.g., Deacon, Valentiner, Gutierrez, & Blacker, 2002; Muris, 2002). Muris, Meesters, and Knoops (2005) explain this gender effect as resulting from different parenting practices for boys and girls and a greater willingness among girls to speak of their fears. Indeed, Ollendick, Yang, Dong, Xia, and Lin (1995) showed that social roles are learned in different ways by girls and boys, who are encouraged to develop typically female or male attitudes. In agreement with development theories of sexual roles, the expression of emotions and fears is tolerated and encouraged in girls but not among boys (Golombok & Fivush, 1994), which explained the higher scores obtained by girls. These observations could have implications for anxiety disorder prevention: there is a gender difference in the relative risk for various anxiety disorders. Moreover, it would be interesting to examine a possible gender effect in the factorial structure of the CASI-R; this could not be done in this study because it would have required a larger sample.

When we look at the relations between the CASI-R and the other scales, we find that it had a stronger relationship with the anxiety scale (STAIC) than

with the CDI. Regarding anxiety in both adults (e.g., Taylor & Cox, 1998) and children (e.g., Muris, 2002; Muris et al., 2001; Silverman et al., 1991), it is clear that AS and trait anxiety are intercorrelated (in the present study: $r = .61$, $p < .001$). From a theoretical point of view, this observation is not surprising because the CASI-R is an anxiety scale. But, researchers agree that the two constructs are conceptually different (e.g., Taylor, 1995). We can define anxiety as a *general* tendency to intolerance of uncertainty in response to certain stimuli, while AS is the more *specific* tendency to fear one's own anxiety sensations. If a person suffers from trait anxiety and responds excessively to threatening stimuli, by definition, that person will not be worried by his or her own anxiety symptoms unless he or she also suffers from anxiety sensitivity (McNally, 1989).

And regarding depression, our study also found a significant correlation between the CASI-R and depression. However, when we controlled for the level of trait anxiety, the correlation between AS and depression was clearly attenuated and no longer statistically significant. This result had been observed in other studies (Joiner et al., 2002; Muris, 2002; Muris et al., 2001) and provides evidence that AS scores relate to anxiety but not depression. In their study, Joiner et al. (2002) showed that anxiety sensitivity scores were related to depression only because depression was related to anxiety. AS is not a mood disorder but rather a fear of the feeling of anxiety in specific situations.

Among children, AS has been demonstrated to be an important risk factor for the development of anxiety disorders (Joiner et al., 2002). Additionally, several authors (McLaughlin et al., 2007; Rector, Szacun-Shimizu, & Leybman, 2007) noted that specific AS factors were correlated in different ways with the development of various anxiety disorders and depression disorders: for example, people with social phobia have higher scores for the "fear of publicly observable anxiety reactions" factor. In comparison to the CASI, the CASI-R provides additional important information on the specific factors of AS (Muris, 2002). Clinicians could use this scale, and more specifically its scores for the different factors, to get a more specific idea of the different disorders for which children are at high risk. Consequently, the CASI-R could be used as both a preventive and a clinical scale. According to Muris (2002) on children and to Taylor and Cox (1998) on adults, researchers and clinicians who want only a "global" score for AS can use the CASI or ASI. And when a more fine-grained assessment of AS is desired, the revised versions of these anxiety sensitivity measures (CASI-R for children and ASI-R for adults) can be used (Muris, 2002).

This study presented several limitations. First, the sample is too limited regarding size and age (12 to 13 years). One cannot assume that the results generalise across age ranges on the basis of this sample. However, this age

group is interesting because it corresponds to the transition to middle school. This transition is commonly regarded as a period of stress, and has been associated with changes in anxiety and other psychological problems (Grills-Taquechela, Nortona, & Ollendick, 2010). Second, the validity evaluation is also somewhat limited in terms of the number and types of measures. The incremental validity of the CASI-R over other commonly used anxiety measure has yet to be demonstrated. Examples of measures that it would be interesting to incorporate into future investigations of the validity of the CASI-R include the Multidimensional Anxiety Scale for Children (MASC; Turgeon, Chartrand, Robaey, & Gauthier, 2006) and the Revised Children's Manifest Anxiety Scale (RCMAS; Turgeon & Chartrand, 2003b). And thirdly, the CASI-R's reliability in this study is limited to internal consistency. Given that AS is generally described as a stable concept, it would be interesting to evaluate the test-retest reliability.

In conclusion, the present data provide further support for the relevance of anxiety sensitivity in a Belgian sample. The CASI-R can be conceptualised as having a factor structure with four lower-order factors loading on a single higher-order factor. This version has acceptable psychometric qualities: its reliability and validity are reasonable. However, additional studies are needed to further validate the French version of the CASI-R, and we encourage researchers to continue along these lines.

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