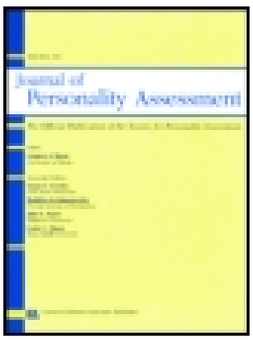

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Cross-Cultural Examination of the Tripartite Model With Children: Data From the Barretstown Studies

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The Positive and Negative Affect Scale for Children (PANAS–C; Laurent et al., 1999) and the Physiological Hyperarousal Scale for Children (PH–C; Laurent, Catanzaro, & Joiner, 1998) were administered to a group of 240 children from European countries to determine their utility in examining the tripartite model of anxiety and depression (L. A. Clark & Watson, 1991) in a cross-cultural sample. Most of the children (n = 196) had been diagnosed with a medical illness; the remainder were siblings of these youngsters (n = 44). Only slight variations were noted in items between this sample and samples from the United States. Despite these minor differences, 3 distinct scales measuring the positive affect, negative affect, and physiological hyperarousal constructs of the tripartite model were identified. These findings illustrate that the PH–PANAS–C provides a

useful measure of the tripartite model in a cross-cultural sample of youth. The findings also demonstrate that the tripartite model is generalizable to a cross-cultural milieu.

Several authors (Dana, 1993; Diaz-Guerrero, & Diaz-Loving, 1990) have highlighted the importance of considering cultural background when assessing personality and symptom constructs, including anxiety and depression. In general, these discussions have focused on the backgrounds of those from different cultural groups within the United States (e.g., African Americans, Asian Americans, etc.). However, it is important to consider how culture might influence the assessment of personality in other countries as well. Almagor and Ben-Porath (1989) presented three objectives in the cross-cultural study of psychological and personality variables: (a) to develop tools for use in different cultures; (b) to evaluate the cross-cultural stability of theoretical concepts; and (c) if cross-cultural stability is established, to conduct cross-cultural comparisons along relevant dimensions. It is recognized that symptom expression may be different across and within ethnic groups, although the literature in this area is limited (Dinges & Cherry, 1995; MacLachlan, 1997). In fact, there is relatively little information concerning the assessment of self-reported mood or emotions across cultures (Church & Lonner, 1998), and that which does exist focuses mainly on adults.

An area that has received a great deal of attention in the personality literature is the nature of the relationship between anxiety and depression (for reviews, see Kendall & Watson, 1989; Maser & Cloninger, 1990). Building on a tradition of factor-analytic work on the structure of affect, L. A. Clark and Watson (1991) proposed a tripartite model to explain this relationship. The tripartite model posits that depression and anxiety share a component of general emotional distress called negative affect (NA). NA refers to a broad general factor of emotional distress that includes moods such as fear, sadness, anger, and guilt (Watson & Clark, 1984; Watson & Tellegen, 1985). Two other aspects of emotion serve to distinguish anxiety and depression. In the tripartite model, anxiety is characterized by elevated levels of physiological hyperarousal (PH). In contrast, depression is characterized by low levels of interest, engagement, and energy called positive affect (PA). The ability to differentiate anxiety and depressive disorders has rested on these aspects of the model. Individuals experiencing anxiety and depression may exhibit similar, elevated scores on measures of NA. However, the distinguishing characteristic is that depressed individuals also score low on measures of PA (Watson, Clark, & Carey, 1988; Watson, Clark, & Tellegen, 1988). Factor-analytic work in normal and clinical samples has provided support for the tripartite model (D. A. Clark, Steer, & Beck, 1994; Jolly, Dyck, Kramer, & Wherry, 1994; Watson et al., 1995). In addition, several investigators have replicated the PA and NA portions of the tripartite model with various cross-cultural samples (Japanese: Watson, Clark, & Tellegen, 1984; Chinese, Croatian, English, Gujarati, and Japanese: Russell, 1983;

Israeli: Almagor & Ben-Porath, 1989; Russian: Balatsky & Diener, 1993; Leon, Kanfer, Hoffman, & Dupre, 1991; Spanish: Joiner, Sandín, Chorot, Lostao, & Marquina, 1997; Sandín et al., 1999; Filipino: Church & Katigbak, 1989; Estonian: Allik & Realo, 1997).

Support for the tripartite model or aspects of the model has also been found in youth samples. For example, Joiner, Catanzaro, and Laurent (1996) used a modified version of the Positive and Negative Affect Schedule (PANAS) and items from traditional self-report measures (i.e., Children's Depression Inventory [CDI]; Kovacs, 1980–1981, 1992, Revised Children's Manifest Anxiety Scale [RCMAS]; Reynolds & Richmond, 1978, 1985) to demonstrate a three-factor model that paralleled the tripartite model among a group of child inpatients ages 8 to 16. More recently, these researchers have developed a modified version of the PANAS for children (PANAS–C; Laurent et al., 1999) and the Physiological Hyperarousal Scale for Children (PH–C; Laurent et al., 1998) to more directly evaluate the utility of the tripartite model for children. These measures are collectively referred to as the PH–PANAS–C. Preliminary findings support the usefulness of these measures among youth in examining the tripartite model. Others also report support for the NA and PA aspects of the model with children (Jolly & Dykman, 1994; Lonigan, Carey, & Finch, 1994).

To date, little if any work has been done to examine the cross-cultural nature of the tripartite model among youth. The purpose of this study was to undertake such a task using data collected from the Barretstown studies. Specifically, the PH–PANAS–C was administered to European children who were attending the therapeutic recreation program at the Barretstown Gang Camp in Ireland to determine whether their responses would be similar to those of youth in the United States. If similar findings were reported, two of the three objectives of cross-cultural research in personality presented by Almagor and Ben-Porath (1989) would be addressed: We would provide an instrument that could be used to assess the tripartite model in different cultures, while further validating the PH–PANAS–C. More generally, we would demonstrate the cross-cultural stability of the tripartite model for youth, a theoretical concept with proven utility in the United States.

METHOD

Participants

Participants were children who were taking part in the program at the Barretstown Gang Camp in Ireland.[1] Barretstown provides an international summer therapeutic

[1]The Barretstown Gang Camp is located in County Kildare, Ireland and is based on the Hole in the Wall Gang Camps in America (interested readers are referred to http://www.barretstowngc.ie or http://

recreation program for European children with life-threatening illnesses and their siblings. Children are referred from hospitals in their home countries, and they attend the program free of charge. Barretstown is a nonprofit organization, and relies on private support to sponsor each child to the program.

The sample consisted of 240 children (mean age = 11.4 years, *SD* = 2.27); 52.5% boys and 47.5% girls. Most of the children (*n* = 196, 81.7%) had been diagnosed with a medical illness; the remainder were siblings of these youngsters (*n* = 44, 18.3%). Of those children who had been diagnosed with a life-threatening illness, 161 (82.1%) had been diagnosed with a form of cancer, 15 (7.7%) had a hematological-related disease, 5 (2.6%) had a renal disease, and 10 (5.1%) had an immunodeficiency. The children represented 16 European countries, with the majority coming from England (*n* = 63, 26.3%) and Ireland (*n* = 59, 24.6%). Twenty children came from Germany (8.3%), 18 from Spain (7.5%), 15 from Hungary (6.3%), 12 from the Czech Republic (5%), and 11 from Poland (4.6%). The sample included 9 youngsters from Sweden (3.8%), 8 from Russia (3.3%), 7 from Iceland (2.9%), 5 from Switzerland (2.1%), and 4 from Cyprus (1.7%). There were 3 children each from Austria (1.3%) and Denmark (1.3%), 2 youngsters from Norway (0.8%), and 1 child from Georgia (0.4%).

Instruments

PANAS–C. The PANAS–C (Laurent, Potter, & Catanzaro, 1994) is a 30-item measure that contains 15 PA and 15 NA items. The PANAS–C consists of a mix of items from the original PANAS (Watson, Clark, & Tellegen, 1988), the PANAS–X Basic Negative Emotions, Basic Positive Emotions, and Other Affective States scales (Watson & Clark, 1991), and items that represented synonyms for some PANAS–X items that Laurent et al. (1994) felt were more easily understood by children. The PANAS–C instructs youngsters to indicate how often they have felt interested, sad, and so on during the "past few weeks" on a 5-point Likert scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*).

Laurent et al. (1999) presented extensive information on the development and validation of the PANAS–C. The authors presented the psychometric properties of the PA and NA scales dividing a sample of 707 youngsters in Grades 4 through 8 into scale development and replication subsamples. Using a combination of reli-

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www.holeinthewallgang.org for descriptions of the programs). Barretstown's mission is to benefit seriously ill European children through an international summer program and through year-round programs to support children with special needs and their families, and the volunteers, health professionals, and policymakers who serve these children. The Barretstown studies are researching children's experiences of the therapeutic recreation program and the ways in which it might benefit them (see Kiernan & MacLachlan, 1999).

ability analyses and factor analytic techniques, modifications were made to the 30-item scale. The resulting scale contained 27 items; a 12-item PA scale and a 15-item NA scale. The coefficient alpha for the 12-item PA scale was .90 and .89 in the scale development and replication subsamples, respectively. Alphas for the 15-item NA scale were .94 and .92 for the two subsamples. Because this study represented the first attempt to use the PANAS–C with a cross-cultural sample, the 30-item version of the scale was used. Laurent et al. (1999) reported a coefficent alpha for the 15-item PA scale of .89 for the scale development sample and .87 in the replication sample.

Preliminary scale validation of the PANAS–C occurred using a general school sample and an unselected inpatient sample (Laurent et al., 1999). The PANAS–C scales demonstrated good convergent and discriminant validity. Laurent et al. (1999) found that the PA scale was negatively correlated with the CDI and only modestly correlated with the Trait Scale from the State Trait Anxiety Inventory for Children (STAIC; Spielberger, 1973) in both samples. This pattern of results was expected based on the tripartite model. In addition, the NA scale was positively correlated with the self-report measures of depression and anxiety. This pattern of results was predicted from the tripartite model. Finally, the intercorrelation of the NA and PA scales of the PANAS–C was similar to that of the PANAS (Watson, Clark, & Tellegen, 1988). In general, findings with the PANAS–C were largely consistent with expectations based on the tripartite model and with the adult literature on the PANAS.

PH–C. The PH–C (Laurent et al., 1998) is an 18-item measure designed to assess PH, defined as bodily manifestations of autonomic arousal (L. A. Clark & Watson, 1991). Criteria for anxiety disorders found in the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM–IV*; American Psychiatric Association, 1994) and existing self-report measures of anxiety, such as the STAIC, the RCMAS and the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988; Beck & Steer, 1993) were consulted to generate items referring specifically to physiological aspects of anxiety. Example items include, “sweaty hands,” “choking feelings,” “numbness (like foot falling asleep),” “heart pounding,” and “can’t catch breath.” Youths indicate on a 5-point scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*) how often they felt or experienced symptoms during the last 2 weeks.

Laurent et al. (1998) presented preliminary reliability and validity data on 245 school children in Grades 4 through 12. Corrected item-total correlations for the 18 items ranged from .37 to .66 with a coefficient alpha of .87. With regard to initial validity data, all items load as predicted in a three-factor solution for PA, NA, and PH. In addition, correlations between the NA and PH scales (.57) and PA and PH scales (–.17) were consistent with predictions based on the tripartite model.

Procedure

Data were collected as part of a larger study researching children's experiences of the therapeutic recreation program in the Barretstown Gang Camp in Ireland and the ways in which it might benefit them (Kiernan & MacLachlan, 1999). An information leaflet describing the purpose and nature of the Barretstown studies was sent to the hospitals that the children coming to Barretstown attended in their home countries and through which they had been referred to Barretstown. This leaflet enlisted the support of the Barretstown liaison coordinators in the hospitals should families being asked to participate in the studies have any questions.

A cover letter describing the purpose and nature of the studies, the questionnaire containing the PH–PANAS–C, and postage paid return envelopes were sent to families 2 weeks before their child came to Barretstown. The letter informed parents that their decision to allow their child to complete the questionnaire was entirely voluntary. It advised parents that if their child needed help reading and understanding any of the questions, to help their child, but not to influence his or her choice of responses. The questionnaire contained a section that explained to children the purpose of the studies and outlined that their decision to participate was voluntary and in no way affected their coming to Barretstown. It assured children of the anonymity and confidentiality of their responses. Families used the postage paid return envelopes to send completed questionnaires to us before their child came to Barretstown.

Translation of the PH–PANAS–C. Cross-cultural equivalence is important to achieve for measures used for comparisons of characteristics and behaviors across cultural and ethnic boundaries (Hui & Triandsis, 1985). Although conceptual and item equivalence cannot be assured by accurate translation, they are more likely. Numerous methods have been proposed for translating material into different languages, while preserving the same ideas across linguistic boundaries. These methods include the bilingual committee approach, back translation, decentering, and pretests (Brislin, 1970, 1976, 1980). However, where the difficulty of the material to be translated is high, the quality of translation may be enhanced by using a group of people who combine linguistic and psychological expertise, rather than adopting a translation–back-translation approach (de Vijver & Hambleton, 1996). As such, for the translation of the PH–PANAS–C, an "expert panel" of advisors comprising clinical, health, and research psychologists, and a professional translation agency were consulted.

Based on the recommendations of the expert panel, some changes were made to the PH–PANAS–C to ensure its clarity and appropriateness for a European sample of children. Two of the words on the NA scale were changed, but their meaning preserved. The word *jittery* was changed to *jumpy* and the word *blue* to *downhearted* (a substituted word taken from the PANAS–X). On the original

PH–PANAS–C scales children are required to indicate to what extent they have felt *interested* (PA), *sad* (NA), experienced *sweaty hands* (PH), and so on during the "past few weeks" on a 5-point Likert scale. The format of the Likert scale was changed slightly from the response options of *very slightly or not at all*, *a little*, *moderately*, *quite a bit*, and *extremely* to the options *never*, *a little*, *sometimes*, *a lot*, and *always*, respectively.

The PH–PANAS–C was translated into the necessary European languages: Icelandic, Norwegian, Swedish, Danish, Spanish, German, Polish, Hungarian, Czech, Russian, and Georgian through the translation agency. After being translated into these languages, the PH–PANAS–C was proofread for accuracy through the same translation agency. The translators in the agency were all native speakers of the target languages concerned and were accredited members of the Irish Translators Association or the Institute of Translators and Interpreters of London. Any issues arising, such as questions about meaning or disagreement between translators doing the initial translation and those doing proofreading, were resolved through discussion with the first author.

RESULTS

The statistical procedures used by Laurent et al. (1999) in the development of the PANAS–C and the PH–C (Laurent et al., 1998) were employed in this study to examine the psychometric properties of the PH–PANAS–C.[2] First, corrected item-total correlations were generated for the 15-item PA and NA scales and the 18-item PH scale (see Table 1). Using the guidelines provided by Nunnally and Bernstein (1994), an item was considered "weak" if it had a corrected item-total correlation less than .30. For the PA scale, the items *alert*, *excited*, *calm*, and *fearless* failed to meet the item-total correlation criterion. On the NA scale, the items *jumpy* and *mad* had corrected item-total correlations that were less than .30. Several items on the PH scale did not meet the criterion of an item-total correlation greater than or equal to .30; *tingling*, *blushing*, *stomach ache*, *dizzy*, *sweating when not hot*, *feeling of choking*, and *cannot sit still*. Potentially, some or all of these items might be eliminated from their respective scales. However, before doing so, further analyses were conducted.

[2]Patient and sibling scores were compared on the PA (patient $M = 42.04$, $SD = 7.12$; sibling $M = 40.78$, $SD = 7.32$), NA (patient $M = 22.18$, $SD = 6.69$; sibling $M = 20.72$, $SD = 6.02$), and PH (patient $M = 14.78$, $SD = 5.11$; sibling $M = 14.16$, $SD = 4.45$) scales; youngsters in these groups were from England and Ireland. Analyses revealed no statistically significant differences on any of the scales: PA: $t(1, 120) = 0.92$, $p = .36$; NA: $t(1, 120) = 1.22$, $p = .22$; PH: $t(1, 120) = 0.70$, $p = .49$. Therefore, the patient and sibling scores were combined in the analyses. Lack of differences between the groups was not unexpected. Research suggests that siblings of youngsters with chronic illness often experience, or are at-risk for experiencing, the same emotional distress as their ill sibling (e.g., Hallahan & Kauffman, 1997; Stawski, Auerbach, Barasch, Lerner, & Zimin, 1997; Williams, 1997).

TABLE 1
Item-Total Correlation and Principal Axis Factoring Analyses (Oblique Rotation) for the PA and NA Scales of the PANAS–C and the Physiological Hyperarousal Scale for Children

Scale	*Item-Total Correlations*	*Unrotated*	*Factors*					
			1	*2*	*3*	*4*	*5*	*6*
PA								
Interested	.39	.46	.31	–.53	.01	.14		
Alert	.20	.22	.18	–.03	.09	.42		
Excited	.22	.30	.09	–.56	–.04	–.03		
Happy	.51	.63	.55	–.57	.16	.22		
Strong	.43	.48	.34	–.18	–.26	.66		
Energetic	.45	.57	.46	–.32	–.70	.23		
Calm	.15	.18	.12	–.22	–.06	.02		
Cheerful	.52	.63	.63	–.39	.10	.31		
Active	.50	.59	.64	–.21	–.31	.27		
Proud	.37	.42	.23	–.45	.07	.38		
Joyful	.46	.57	.53	–.39	–.16	.19		
Fearless	.13	.13	.17	.16	–.15	.33		
Delighted	.50	.59	.47	–.51	–.08	.27		
Daring	.32	.37	.45	.01	–.13	.31		
Lively	.48	.60	.69	–.17	–.23	.27		
Alpha	.75							
Eigenvalue			3.43	.92	.57	.53		
NA								
Sad	.54	.60	.48	.10	.44	.57		
Frightened	.52	.60	.70	.05	.25	.43		
Ashamed	.47	.53	.42	.25	.49	.32		
Upset	.55	.60	.48	.25	.50	.43		
Nervous	.44	.49	.45	.08	.18	.52		
Guilty	.42	.48	.29	.13	.79	.20		
Scared	.58	.68	.81	.15	.31	.39		
Miserable	.58	.61	.46	.34	.47	.48		
Jumpy	.27	.29	.23	.06	.26	.24		
Afraid	.49	.55	.59	.18	.31	.33		
Lonely	.45	.51	.46	.28	.26	.38		
Mad	.24	.26	.04	.26	.34	.25		
Disgusted	.42	.55	.25	.99	.27	.39		
Downhearted	.54	.59	.32	.33	.36	.72		
Gloomy	.42	.47	.29	.29	.16	.61		
Alpha	.83							
Eigenvalue			4.26	.96	.72	.55		
PH								
Dry mouth	.49	.53	.40	–.36	–.32	.23	–.30	.26
Sweaty hands	.33	.39	.01	–.21	–.35	.50	–.36	.06

(continued)

TABLE 1 (Continued)

Scale	Item-Total Correlations	Unrotated	Factors 1	2	3	4	5	6
Tingling	.26	.32	.03	–.13	–.46	.18	–.17	.27
Blushing	.22	.32	.14	–.04	–.15	.81	–.07	.18
Shaky	.39	.49	.25	–.23	–.16	.25	–.39	.54
Stomach ache	.20	.33	.08	–.94	–.06	.02	–.04	.02
Cold flashes	.53	.54	.25	–.48	–.20	.23	–.42	.33
Dizzy	.28	.39	.26	–.09	–.30	.15	–.18	.49
Heart pounding	.37	.51	.32	–.13	–.32	.37	–.47	.18
Sweating when not hot	.25	.38	.23	–.13	–.07	.08	–.60	.14
Cannott catch breath	.35	.48	.52	–.13	–.27	.13	–.30	.23
Feeling of choking	.25	.34	.52	–.11	–.10	.05	–.14	.16
Hot flashes	.32	.45	.12	–.16	–.21	.16	–.59	.37
Numbness	.32	.49	.34	–.09	–.88	.18	–.11	.11
Pain in chest	.44	.50	.46	–.36	–.21	.09	–.43	.06
Feel like throwing up	.49	.54	.53	–.46	–.19	.04	–.25	.36
Tight muscles	.41	.48	.38	–.24	–.31	.27	–.32	.12
Cannot sit still	.22	.29	.33	–.08	–.16	.22	–.12	.10
Alpha	.68							
Eigenvalue			3.48	1.19	.87	.84	.58	.42

Note. PA = positive affect; NA = negative affect; PANAS–C = Positive and Negative Affect Scale for Children; Unrotated = unrotated factor matrix. The structure matrix is provided for each scale.

In addition to item-total correlations, separate factor analyses were conducted for the PA and NA scales of the PANAS–C and the PH–C. Each scale was subjected to a common factor analysis (i.e., principal axis factoring [PAF]). Guided by the recommendations of Gorsuch (1997) and the approach employed by Laurent et al. (1999), an oblique rotation was used in the factor analysis and the structure matrix was examined to determine the relationship of each item to the factor. Absolute values greater than or equal to .40 were considered significant in interpretation.

PA Scale

Table 1 presents the loadings for the factors that emerged on the PA scale. An examination of the unrotated first factor revealed that three items (*alert*, *calm*, and *fearless*) had modest loadings. The PAF with oblique rotation resulted in four factors, although the third and fourth factors would be considered "trivial" factors according to Gorsuch (1997) because there were less than three items on the factor with an absolute value of .40 or greater. A closer examination revealed that the items *calm* and *fearless* did not achieve a significant factor loading on any of the factors, consistent with their low loadings on the unrotated first factor. The only item with a significant

loading on the third factor was energetic, which also loaded on the first factor. The items *alert* and *strong* had their highest loadings on the fourth factor.

In light of low item-total correlations and factor loadings, it was decided to exclude the items *calm, fearless,* and *alert.* Although excited had a significant loading on the second factor, its low item-total correlation led to the decision to exclude this item also. Because the item *strong* had a respectable item-total correlation and a significant loading on the unrotated factor, it was decided to retain this item for subsequent analyses.

Consistent with the suggestion of Floyd and Widaman (1995) and the approach used by Laurent et al. (1999), the 11 remaining PA items were then subjected to a second PAF, and a second alpha coefficient was computed. As expected, item-total correlations continued to exceed the .30 criterion (range = .32 to .55), and the alpha was .79. The second PAF with the 11-item PA scale is presented in Table 2. The PAF revealed a two-factor solution. Several items experienced significant cross-loadings on the two factors that resulted from the oblique rotation. In fact, the factor correlation of .64 was of the magnitude that it provided a "very strong reason" to suggest that the two factors be replaced with one (Nunnally & Bernstein, 1994, p. 501).

In addition, the Schmid–Leiman transformation procedure (Gorsuch, 1983) was employed to better understand the nature of the relationship between the two factors. The Schmid–Leiman transformation estimates the parameters of any higher order factor as well as orthogonalizes the higher order and first order or primary factors. The results from the Schmid–Leiman procedure, presented in Table 2, suggest a strong higher order factor representing PA. Two modest primary factors remained that were consistent with the Pleasantness and Aroused–Activated factors reported by Laurent et al. (1999). In fact, our findings and conclusions parallel those of Laurent et al. (1999). Although the results of the Schmid–Leiman transformation support a hierarchical structure, in general, the cumulative data suggested that the PA scale was most parsimoniously viewed as unidimensional. In other words, the use of a total score from the PA scale would be more appropriate than subscale scores based on the primary factors.

NA Scale

A PAF with oblique rotation also was conducted for the NA scale (see Table 1). All items had robust loadings on the first unrotated factor with the exception of the items *mad* and *jumpy*. Nevertheless, the PAF with oblique rotation resulted in four factors. However, six items (i.e., *sad, frightened, ashamed, upset, nervous,* and *afraid*) had significant loadings across two or more factors, and one factor contained only one item (*disgusted*).

After examining the corrected item-total correlations and the results of the factor analysis, the items *mad* and *jumpy* were excluded. Although the item *disgusted*

TABLE 2
Principal Axis Factoring (Oblique Rotation) and Schmid–Leiman Analyses for the 11-Item PA Scale

	PAF			*Primary*	
PA Scale	*Factor 1*	*Factor 2*	*Higher Order*	*Factor 1*	*Factor 2*
Interested	.49	.31	.39	.30	–.01
Happy	.70	.40	.53	.45	–.05
Strong	.36	.43	.38	.09	.20
Energetic	.38	.62	.49	.02	.39
Cheerful	.65	.48	.55	.35	.07
Active	.43	.70	.55	–.01	.43
Proud	.45	.27	.35	.28	.02
Joyful	.55	.50	.51	.24	.15
Delighted	.61	.42	.50	.34	.04
Daring	.26	.43	.34	–.02	.27
Lively	.43	.60	.50	.05	.33
Eigenvalue	3.13	.57	2.42	.68	.59
% of variance	28.5	5.2	22.0	6.2	5.4

Note. The structure matrix is provided for the Principal Axis Factoring (PAF). The Schmid–Leiman procedure uses the pattern matrix as the basis for calculations. PA = positive affect.

loaded on a trivial factor, its item-total correlation and loading on the first unrotated factor suggested it should be retained in subsequent analyses.

The 13 remaining NA items were then subjected to a second PAF and a second alpha coefficient was computed. The item-total correlations continued to exceed the .30 criterion (range = .38 to .60) and the alpha coefficient was .85. The second PAF with the 13-item NA scale is presented in Table 3. The PAF revealed a three-factor solution. As was the case with the initial PAF, several items experienced significant cross-loadings on several factors that resulted from the oblique rotation. The factor correlations were as follows: Factor 1 – Factor 2 = .53; Factor 1 – Factor 3 = .50; Factor 2 – Factor 3 = .37.

Because of the robust loadings on the unrotated first factor and significant loadings across factors, the Schmid–Leiman transformation procedure (Gorsuch, 1983) was employed to determine whether the NA scale had a hierarchical structure. The results from the Schmid–Leiman procedure, presented in Table 3, suggest a strong higher order factor representing NA. Three modest primary factors remained that can be described as Fear (*frightened, scared*), Dejected (*downhearted, gloomy*), and Remorse (*ashamed, guilty*). As was the case with the PA scale, the results of the Schmid–Leiman transformation support a hierarchical structure. However, also similar to the PA scale, the cumulative data suggested that the NA scale was best viewed as unidimensional. In other words, the use of a

TABLE 3
Principal Axis Factoring (Oblique Rotation) and Schmid–Leiman Analyses for the 13-Item NA Scale

	PAF				*Primary*		
NA Scale	*Factor 1*	*Factor 2*	*Factor 3*	*Higher Order*	*Factor 1*	*Factor 2*	*Factor 3*
Sad	.52	.47	.47	.52	.15	.18	.20
Frightened	.72	.34	.36	.59	.41	–.05	.01
Ashamed	.39	.33	.62	.44	.04	.06	.46
Upset	.48	.41	.57	.51	.11	.11	.34
Nervous	.52	.43	.19	.46	.25	.18	–.10
Guilty	.31	.18	.60	.35	.02	–.05	.49
Scared	.77	.36	.45	.64	.42	–.06	.08
Miserable	.46	.50	.55	.51	.07	.22	.30
Afraid	.59	.32	.40	.52	.29	.00	.11
Lonely	.46	.41	.35	.45	.16	.17	.10
Disgusted	.28	.50	.36	.36	–.04	.35	.19
Downhearted	.41	.69	.35	.48	.01	.49	.09
Gloomy	.38	.67	.14	.41	.06	.53	–.13
Eigenvalue	4.05	.65	.55	3.08	.56	.81	.80
% of variance	31.1	5.0	4.2	23.7	4.3	6.2	6.1

Note. The structure matrix is provided for the Principal Axis Factoring (PAF). The Schmid–Leiman procedure uses the pattern matrix as the basis for calculations. NA = negative affect.

total score from the NA scale would be more appropriate than subscale scores based on the primary factors.

PH Scale

As was done with the PANAS–C scales, the PH–C was subjected to PAF with oblique rotation. Table 1 presents the loadings for the unrotated solution. A majority of items had acceptable loadings on the unrotated first factor. Those items that had corrected item-total correlations less than .30 had lower loadings on this factor, as did the item *sweaty hands.* The oblique rotation revealed six factors, three of which were composed of only two items and would be considered trivial using Gorsuch's (1997) criteria. Three items had significant cross-loadings on two factors (i.e., *cold flashes, pain in chest, feel like throwing up*).

Because of the multiple factors resulting from the PAF, and the fact that some items had significant cross-loadings, considering items to eliminate from the scale was more challenging. This task was also challenging because less is known about the PH–C. On the basis of the corrected item-total correlations, seven items were eliminated (*tingling, blushing, stomach ache, dizzy, sweating when not hot, feeling*

of choking, cannot sit still); three of these items (*tingling, blushing, dizzy*) clearly loaded on trivial factors.

Corrected item-total correlations were calculated for the remaining 11 items. One item, *sweaty hands,* obtained an item-total correlation that fell below the .30 criterion; this item also had a lower loading on the unrotated first factor. Therefore, the item *sweaty hands* was eliminated and the remaining 10 items were then subjected to a second PAF and coefficient alpha was computed. The corrected item-total correlations for the 10 items exceeded the .30 criterion (range = .35 to .47); the alpha was .75. The second PAF with the 10-item PH scale is presented in Table 4. The PAF revealed a two-factor solution. The factor correlation of .50 was of the magnitude that would lead one to consider the option of replacing the two factors with one (Nunnally & Bernstein, 1994).

The Schmid–Leiman transformation procedure (Gorsuch, 1983) was employed to determine whether the PH–C had a hierarchical structure. The results from the Schmid–Leiman procedure, presented in Table 4, suggest a higher order factor representing PH. Two modest primary factors remained that were difficult to label because there were no clear demarcating characteristics. The cumulative data suggested that the PH scale was best viewed as unidimensional, and that the total score from the scale would be more appropriate to use than subscale scores based on the primary factors.

TABLE 4
Principal Axis Factoring (Oblique Rotation) and Schmid–Leiman Analyses for the 10-Item PH Scale

	PAF			*Primary*	
PH Scale	*Factor 1*	*Factor 2*	*Higher Order*	*Factor 1*	*Factor 2*
Dry mouth	.54	.38	.43	.33	.11
Shaky	.30	.62	.43	–.01	.44
Cold flashes	.39	.52	.43	.12	.31
Heart pounding	.41	.42	.39	.19	.21
Cannot catch breath	.54	.29	.39	.38	.01
Hot flashes	.26	.54	.38	–.01	.39
Numbness	.55	.12	.31	.46	–.15
Pain in chest	.45	.34	.37	.26	.11
Feel like throwing up	.51	.36	.41	.31	.11
Tight muscles	.51	.34	.40	.32	.08
Eigenvalue	2.39	.52	1.57	.79	.55
% of variance	23.9	5.2	15.7	7.9	5.5

Note. The structure matrix is provided for the Principal Axis Factoring (PAF). The Schmid–Leiman procedure uses the pattern matrix as the basis for calculations. PH = physiological hyperarousal.

Analysis Requesting a Three-Factor Solution

Finally, a PAF with an oblique rotation was conducted with the 34 items retained from the PH–PANAS–C. The item selection procedures used and the theoretical underpinnings provided by the tripartite model favored three components emerging from the factor analysis. Therefore, the analysis was done specifying a three-factor solution. If three factors in fact emerged, information about the discriminative power of the PH–PANAS–C would be obtained. This is an important practical step if this measure is to be consistent with the tripartite model. In fact, three distinct factors did emerge (see Table 5), with correlations that attested to the uniqueness of the relation among the factors: Factor 1 (NA) – Factor 2 (PH) = .25, Factor 1 (NA) – Factor 3 (PA) = –.33, and Factor 2 (PH) – Factor 3 (PA) = .02. The correlations are only slightly different when computed using the sum of items on each scale to derive scores: NA – PH = .21, NA – PA = –.28, PH – PA = .07. Because of the criteria used in item selection, these results were expected. Information in Table 5, therefore, should be viewed as descriptive of the final scales, rather than as an independent test of any hypothesis. Also for descriptive purposes, we have included the means and standard deviations for the three scales by country and for the total sample in Table 6.

DISCUSSION

The tripartite model of anxiety and depression (L. A. Clark & Watson, 1991) and measures based on this model (e.g., Watson, Clark, & Tellegen, 1988; Watson et al., 1995) have demonstrated their utility in the adult literature. Although not as extensive, the child literature has also supported the utility of the model (Joiner et al., 1996; Jolly & Dykman, 1994; Lonigan et al., 1994). However, many of the child studies examining the model have used traditional self-report measures of anxiety and depression because few child measures related to the tripartite model exist. The PH–PANAS–C represents a measure that has direct correlates to the tripartite model. Research is emerging that has demonstrated the utility of the PANAS–C in measuring the PA and NA components of the tripartite model in school and inpatient samples (Crook, Beaver, & Bell, 1998; Laurent et al., 1999). Preliminary evidence also supports the use of the PH–C as a measure of the PH component of the model in a school sample (Laurent et al., 1998). The findings from this study highlight the properties of the PH–PANAS–C with a cross-cultural sample of youth. In addition to the cross-cultural focus, this sample differed from previous groups that had completed the PH–PANAS–C in its representation of youth who have been diagnosed with a life-threatening illness and their siblings.

The findings from this study were similar to those reported by Laurent et al. (1999). The PANAS–C yielded items that composed meaningful PA and NA scales with sound psychometric characteristics. The correlation between these scales, us-

TABLE 5
Principal Axis Factoring Analyses (Oblique Rotation) Requesting a Three-Factor Solution for the 34-Item PH–PANAS–C Scales

	Factor 1	*Factor 2*	*Factor 3*
Interested	–.04	.01	.48
Happy	–.24	.08	.56
Strong	–.20	–.07	.43
Energetic	–.17	–.06	.55
Cheerful	–.26	.04	.61
Active	–.26	–.03	.61
Proud	–.08	.02	.38
Joyful	–.27	.05	.60
Delighted	–.19	.08	.58
Daring	–.21	–.07	.37
Lively	–.31	.04	.64
Sad	.62	.07	–.31
Frightened	.60	.08	–.30
Ashamed	.57	.04	–.10
Upset	.58	.09	–.20
Nervous	.48	.21	–.21
Guilty	.43	.18	–.03
Scared	.63	.13	–.33
Miserable	.62	.16	–.28
Afraid	.55	.15	–.35
Lonely	.50	.10	–.33
Disgusted	.46	.25	–.03
Downhearted	.58	.24	–.15
Gloomy	.48	.24	–.27
Dry mouth	.14	.51	–.03
Shaky	.21	.52	–.02
Cold flashes	.09	.54	–.01
Heart pounding	.18	.39	.08
Cannot catch breath	.17	.44	–.07
Hot flashes	.04	.38	.09
Numbness	.04	.30	.06
Pain in chest	.14	.47	–.06
Feel like throwing up	.27	.52	–.14
Tight muscles	.06	.52	.06

Note. The structure matrix is provided. PH–PANAS–C = Physiological Hyperarousal Scale for Children and Positive and Negative Affect Scale for Children.

TABLE 6
Means and Standard Deviations for the PA and NA Scales of the PANAS–C and the Physiological Hyperarousal Scale for Children by Country

	PA		*NA*		*PH*	
Country	*M*	*SD*	*M*	*SD*	*M*	*SD*
England (*n* = 63)	40.79	6.70	22.75	6.72	14.65	5.02
Ireland (*n* = 59)	42.44	7.66	20.48	6.03	14.47	4.75
Germany (*n* = 20)	41.40	4.97	25.02	6.30	14.95	3.94
Spain (*n* = 18)	45.53	6.88	18.53	4.90	13.53	2.94
Hungary (*n* = 15)	41.60	4.27	26.40	3.79	15.93	3.97
Czech Republic (*n* = 12)	40.58	5.09	25.08	5.43	15.42	3.37
Poland (*n* = 11)	44.64	6.44	20.82	4.81	13.00	3.29
Sweden (*n* = 9)	40.89	5.84	24.11	6.79	15.89	4.40
Russia (*n* = 8)	42.88	7.02	17.88	4.67	13.43	3.05
Iceland (*n* = 7)	38.86	6.54	24.71	8.38	11.33	1.37
Switzerland (*n* = 5)	41.80	6.53	29.00	3.24	18.60	10.24
Cyprus (*n* = 4)	39.75	7.68	23.50	8.06	16.50	4.93
Austria (*n* = 3)	43.33	6.81	29.33	8.14	11.33	1.15
Denmark (*n* = 3)	38.33	11.02	17.33	3.51	16.33	7.77
Norway (*n* = 2)	45.00	7.07	19.50	0.71	14.50	2.12
Georgia (*n* = 1)	36.00	—	31.00	—	14.00	—
Total Sample (*N* = 240)	41.84	6.67	22.46	6.44	14.55	4.64

Note. Countries are listed in descending order by the number of participants. PA = positive affect; NA = negative affect; PANAS–C = Positive and Negative Affect Scale for Children; PH = physiological hyperarousal.

ing the sum of items on each scale to derive a total PA and a total NA scale score, was –.28. This correlation falls within the range reported by others using the PANAS–C (–.39, Crook et al., 1998; –.36 school, –.16 inpatient, Laurent et al. 1999). It is also consistent with scale intercorrelations reported for the adult PANAS (Watson, Clark, & Tellegen, 1988; Watson & Clark, 1991). Most important, we were able to demonstrate that the PH–PANAS–C scales reacted as predicted by the tripartite model. In other words, the items from the three scales loaded on three factors in ways that would be expected. Also, the factor correlations were in the directions predicted by the model. In addition, the magnitude of the correlations were modest, which was also consistent with the tripartite model, and suggests that the three scales were measuring different constructs. Together, these findings indicate that the PH–PANAS–C can be used with a cross-cultural sample of children to measure the unique constructs that comprise the tripartite model.

Although the similarities with previous results are remarkable, we also note differences. The PA and NA scales derived with this sample were slightly different from those reported by Laurent et al. (1999). Both Laurent et al. (1999) and this study eliminated the items *alert* and *fearless* from the PA scale. However, Laurent et al.

(1999) also eliminated the item *daring*, which we retained, whereas we eliminated the items *calm* and *excited*, which Laurent et al. (1999) retained. As a result, Laurent et al. (1999) used a 12-item PA scale, and we used an 11-item scale. With regard to the NA scale, we eliminated two items, *mad* and *jumpy* (our replacement for the item *jittery*), resulting in a 13-item scale; Laurent et al. (1999) retained all 15 NA items. Laurent et al. (1998) only provided preliminary data regarding the PH–C, so it is difficult to compare our findings with theirs. All 18 items were retained in their sample of school children, but we kept only 10 items from the scale. Perhaps our sample of youth was more sensitive to items that had to do with physical symptoms because of their experiences with illness. Although differences in the number of items exist between the PH–C in this study and the PH–C described by Laurent et al. (1998), both versions performed consistent with predictions based on the tripartite model in the factor analyses that included the NA and PA scales.

The fact that there were differences in the items retained in the Laurent et al. (1999) study and in our study was not entirely unexpected. A similar situation exists in the adult literature on the cross-cultural replicability of a two-factor model of positive and negative mood. Almagor and Ben-Porath (1989) found that some items on the Mood Checklist (as cited in Zevon & Tellegen, 1982), a precusor of the PANAS, differed for an Israeli sample when compared to a sample from the United States. It is interesting to note that two items that preformed differently for the Israeli and U.S. adult samples were *excited* and *calm*, two words that were different for our sample of youth from Europe and the United States. Also, some of the items that performed differently in our study than in the Laurent et al. (1999) study (e.g., *jumpy, mad*) were items whose translation into various languages were more difficult. The fact that multiple translations of the measures with their inevitable variations were employed may have contributed to the lower alphas reported in this study than in the Laurent et al. (1999) study.

It is also worth noting that our study is not a pure test of the cross-cultural nature of the tripartite model. To test the cross-cultural comparability of the tripartite model directly, future investigators will need to employ samples from both the United States and Europe simultaneously. Nonetheless, that our findings were similar to those reported by Laurent et al. (1999) is particularly striking given the diverse representation of European countries in our sample and the large number of languages into which the measures were translated. In addition to demonstrating that the tripartite model has cross-cultural utility, this is the first known study that suggests that the model is generalizable to a sample of youngsters with life-threatening illnesses and their siblings.

To our knowledge, this is the first study to examine the tripartite model with a sample of European children. Although development and evaluation of measures based on the tripartite model and suitable for use with children continues, the results reported here, together with previous work, indicate that the PH–PANAS–C holds considerable promise for assessing anxiety and depression

in children. The information in Table 6 concerning the performance of children from different countries is provided for comparison purposes. With the exception of children from England and Ireland, there was modest representation of other European countries. Nevertheless, the similarity in the pattern of scores across countries and the robustness of the results of analyses suggest that the 34-item PH–PANAS–C can be used with a multi-European sample. We encourage those interested in the measurement of anxiety and depression in youngsters to replicate our work. The true utility of the PH–PANAS–C as a cross-cultural measure of the tripartite model of anxiety and depression will not be determined until researchers and clinicians extend our work with large and diverse (e.g., school, outpatient, psychiatric inpatient) samples of youth from Europe, in general, or from their specific countries.

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