The CYRM-12: A Brief Measure of Resilience

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ABSTRACT

OBJECTIVES: This article details the reduction of the Child and Youth Resilience Measure (CYRM) from a 28-item to a 12-item measure. The CYRM-28 is a measure of youth resilience that accounts for cultural and contextual diversity across youth populations. A reduced version of the CYRM is better suited to inclusion in omnibus surveys.

METHODS: Data from two samples of youth from Atlantic Canada are included in the analysis: a) a sample of multiple-service-using youth (n=122; mean age = 18); b) a school-based sample of youth (n=1494; mean age = 15).

RESULTS: Three iterations of an Exploratory Factor Analysis were conducted on data from the first sample of youth to identify items for inclusion in the CYRM-12. In the third analysis, a varimax rotated factor analysis of the 12 items resulted in a four-factor solution, with 10 of the items loading well. Reliability of this grouping of questions is satisfactory (α=0.754). Confirmatory factor analysis was then conducted on the second sample of youth. A satisfactory fit was obtained (χ^2 (51, N=1540) = 255.419, p=0.0001; Adjusted Goodness of Fit Index = 0.960; Comparative Fit Index = 0.957; Root Mean Square Error of Approximation = 0.050). Cronbach's Alpha for the 12 items was also satisfactory (α=0.840).

CONCLUSION: Results show sufficient content validity of the CYRM-12 to merit its use as a screener for resilience processes in the lives of adolescents.

KEY WORDS: Child and Youth Resilience Measure (CYRM); adolescents; adversity; validity; risk; positive development

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Children and youth develop into mature adults depending on the extent of intrinsic assets such as perseverance, efficacy, self-esteem, and active avoidance of risk-taking behaviours, and extrinsic assets such as living in a nurturing environment with supportive parents, having a non-delinquent peer group and experiencing a healthy school climate.[1-3] When faced with adversity and risk, some youth will survive and even thrive while others will succumb to risky and possibly self-destructive behaviour. Those who thrive under adversity (e.g., poverty, maltreatment, loss of a parent) exhibit engagement in processes described as resilience.[4,5] Measurement of resilience can enable identification of modifiable factors that can be used to inform research and policy initiatives to help youth develop the capacity they require to cope with adversity during normative and non-normative developmental transitions.[6]

The complexity of resilience as a construct, however, makes it challenging to measure. Resilience can be defined as an individual's capacity to navigate to health-enhancing resources that nurture individual, relational, and community assets, as well as the capacity of individuals to negotiate with others for these resources to be provided to them in culturally meaningful ways.[7] This socio-ecological definition implies that individual-, peer-, family-, school- and community-level resources protect and promote good outcomes by helping individuals engage in interactive processes within complex, multi-level environments that make it possible for them to avoid potential threats to their development.[8] Positive development, however, is contextual since a youth may thrive under one adverse circumstance but succumb under another.[9] As well, a youth's ability to cope over time may vary,[1,2,10] particularly during growth and development, and when processes associated with resilience interact with specific risk factors associated with culture, ethnoracial status, ability, gender, and socio-economic status.[11]

The 28-item Child and Health Youth Resilience Measure (CYRM)[12,13] was designed to measure youth resilience while accounting for diverse social contexts across numerous cultures. The CYRM-28 is a self-report instrument validated originally with a purposeful sample of 1,451 youth growing up facing diverse forms of adversity in 11 countries (Canada, USA, Colombia, China, India, Russia, Palestine, Israel, Tanzania, the Gambia, and South Africa). Items are rated on a 5-point scale from 1=*does not describe me at all* to 5=*describes me a lot*. Higher scores indicate higher levels of resilience. The final validated CYRM incorporates both cultural homogeneity and heterogeneity in how individuals, families and communities support successful development among youth aged 13-23.[13]

This article details the reduction of the CYRM-28 to a 12-item measure that is better suited for use in omnibus surveys with youth where the full 28-item version of the measure may be unacceptably long. In their recent review of measures of resilience, done before publication of the full validation of the CYRM-28, Windle, Bennet and Noye[14] found 15 published measures (including the CYRM) that captured processes related to resistance to risk impact.

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The best-performing measures were all adult-focused. None, Windle et al. note, had included the range of cultural diversity in their development reflected in the CYRM. Most overemphasize individual characteristic without adequately addressing the quality of the social ecology around individuals that provides the trigger for the realization of latent capacity or the development of new coping skills. It is particularly noteworthy that even the best-performing of the measures provided only moderately good validity scores and that most showed a lack of theoretical rationale for their selection of items. Many were developed to measure strengths across an entire population, both those at risk and those not at risk, and are therefore measures of developmental assets rather than resilience. For the most part, the measures are also quite long, frequently with more than 25 items.

METHODS

Two samples of youth were included in the analysis. The first sample of youth consisted of 122 multiple-service-using youth participating in the Pathways to Resilience Study (www.resilienceresearch.org), a cross-sectional, multi-site Atlantic Canadian investigation of youth who use multiple services (child welfare, mental health, juvenile justice, community programs, and special educational supports) and are nominated to the Pathways study by their service providers (see Table 1). Thirty-seven percent of the sample were female and participants were between the ages of 14 and 22 (M = 18 years; SD = 2.017). Data from this sample were used to establish a 12-item version with acceptable validity, using exploratory factor analysis (EFA).

A second sample, drawn from the Survey of Resilience and Risky Behaviours, included 1,574 students from rural and urban public schools in one Atlantic Canadian province, attending grades 7 to 12 and aged between 10 and 18 years (M = 15 years; SD = 1.715); 862 (53%) were girls. Data from this sample were used to conduct a confirmatory factor analysis.

In the Pathways to Resilience study, all youth completed the Pathways to Resilience Youth Measure (PRYM), comprising a battery of validated measures of risk, resilience, service use history, and experiences with caregivers. The CYRM was included. In all instances, the PRYM was administered in a face-to-face interview where each question was read out loud to participants, with explanation of ambiguous terms where necessary and giving participants the option of filling in their responses themselves or having the researcher do it for them. Participants were also given the opportunity to ask for clarification before responding to questions.

In the Survey of Resilience and Risky Behaviours among Youth, all consenting students in class on the day of the survey were administered the Student Drug Use Survey in the Atlantic Provinces (SDUSAP) and the 12-item version of the CYRM developed using EFA on the first sample of youth.

In both studies, Research Ethics Board (REB) approval was obtained from the host institution as well as all participating services and school boards. In all instances, informed consent was obtained in accordance with the requirements of the host organization. For youth nominated to the Pathways to Resilience study through nominating services where the state was acting guardian of the youth, only informed consent from youth was required. In all other instances, active consent of the parent/legal guardian of youth was obtained in addition to that of the youth.

Table 1. Youth Nominations of Sample One by Service Provider

	Frequency	Percent
Community-based service provider	47	38.5
Justice	51	41.8
Education	1	0.8
Child and Family Services	17	13.9
Mental Health and Addictions	6	4.9
Total	122	100.0*

* Percent column does not add to 100% due to rounding.

A multi-step procedure that included review of non-response rates, item variance and EFA with unrotated solutions was conducted repeatedly on the first sample of youth in a process of item reduction. Three iterations of this process were conducted on the first sample of youth, with unrotated EFAs being used in the first two iterations, and varimax rotation during the third iteration. This was followed by a confirmatory factor analysis (CFA) of the remaining 12 items using maximum likelihood estimation and multiple fit indices on a second sample of youth. All analysis was conducted using SPSS (Version 12), PASW Statistics (Version 18) and AMOS (Version 18) for Windows.

RESULTS

In the first iteration of the EFA procedure (n=122), six items were identified as having unacceptably high non-response rates (≥10%; see Table 2). A further five items were then identified for elimination due to their lack of variance (see Table 2). An additional five items with extreme means were also identified for deletion. Using the remaining 12 questions, the Kaiser-Meyer-Olkin (KMO) statistic (.652) indicated adequacy of the sample size, and the Bartlett's test was significant ($p<0.001$) for factor analysis. All 12 items had communality of at least .423 and above. An unrotated solution was used to identify the 10 best-performing items from the original 28-item version of the CYRM (using cut-off values of .45; α=0.780; see Table 3). While there was good statistical justification for these 10 items, they did not address all domains in our conceptual model of resilience as captured by the CYRM-28. Specifically, none of the 10 items captured concepts related to family and culture – prominent dimensions in the CYRM-28. As such, we reviewed data used in the initial analysis in order to identify why these domains may have been excluded from the EFA. Thirteen youth responded to family-oriented questions as not applicable and all 13 indicated that they lived either on their own or with friends. Recognizing the relationship between these youth and the rates of missing data, these cases were removed from the data set and the data were reanalyzed.

Once again, preliminary data from the 28-item version of the CYRM as administered in the Pathways to Resilience Study (n=122) was used in the analysis with the replacement of the 13 youth with 13 demographically matched participants who had answered the family-oriented questions. Again, non-response and variance on the 28 items was explored. No items could be identified for elimination due to non-response. However, six questions were removed due to their lack of variance, and a further six questions were removed due to extreme means (see Table 2). Using the remaining 16 questions, the KMO statistic (.761) again indicated adequacy of the sample size, and the Bartlett's test was significant ($p<0.001$) for factor analysis. While 15 of the 16 remaining items have communality of at least .443 and above (see Table 3), "I have people I look up to" could potentially have been considered for elimination as its communality criterion is .332; the item was however included in

Table 2. Descriptive Statistics for CYRM-12 Version One and Version Two

		Version 1				Version 2			
		N	Mean	Std. Deviation	Missing	N	Mean	Std. Deviation	Missing
1.	I have people I look up to	123	3.63	1.307	0	122	3.77	1.983	0
2.	I cooperate with people around me	123	3.62	.928*	0	122	3.66	.879*	0
3.	Getting an education is important to me	123	3.96	1.162	0	122	3.98	1.178	0
4.	I know how to behave in different social situations	123	4.11†	1.002	0	122	4.18	.936*	0
5.	My caregiver(s) watch me closely	107	2.94†	1.459	16‡	118	3.03	1.461	4
6.	My caregiver(s) know a lot about me	109	3.44	1.410	14‡	121	3.46	1.414	1
7.	If I am hungry, there is enough to eat	118	3.79	1.232	5	122	3.84	1.213	0
8.	I try to finish what I start	123	3.71	1.022	0	122	3.75	.990*	0
9.	Spiritual beliefs are a source of strength for me	122	2.52†	1.300	1	121	2.45†	1.323	1
10.	I am proud of my ethnic background	123	4.12†	1.120	0	122	4.12†	1.154	0
11.	People think that I am fun to be with	123	4.06†	.813*	0	122	4.05	.822*	0
12.	I talk to my caregiver(s) about how I feel	109	2.86†	1.494	14‡	121	2.90†	1.491	1
13.	I am able to solve problems without harming myself or others (for example by using drugs and/or being violent)	122	3.65	1.272	1	121	3.65	1.283	1
14.	I feel supported by my friends	123	3.76	1.064	0	122	3.75	1.103	0
15.	I know where to go in my community to get help	123	3.94	1.189	0	122	3.93	1.179	0
16.	I feel I belong at my school	123	3.21	1.433	0	122	3.38	1.439	0
17.	My caregiver(s) stand(s) by me during difficult times	107	3.51	1.463	16‡	119	3.56	1.459	3
18.	My friends stand by me during difficult times	123	3.84	1.112	0	122	3.84	1.153	0
19.	I am treated fairly in my community	122	3.66	1.218	1	122	3.68	1.201	0
20.	I am given opportunities to show others that I am becoming an adult and can act responsibly	123	4.11†	.857*	0	122	4.11	.855*	0
21.	I am aware of my own strengths	123	3.85	.989*	0	122	3.83	1.042	0
22.	I participate in organized religious activities	122	1.92†	1.289	1	122	1.94†	1.344	0
23.	I think it is important to serve my community	122	3.03	1.304	1	122	2.98†	1.298	0
24.	I feel safe when I am with my caregiver(s)	110	3.62	1.478	13‡	122	3.65	1.454	0
25.	I have opportunities to develop skills that will be useful later in life (like job skills and skills to care for others)	123	3.89	1.115	0	122	3.89	1.122	0
26.	I enjoy my caregiver(s)' cultural and family traditions	104	3.49	1.488	19‡	114	3.50	1.489	8
27.	I enjoy my community's traditions	120	2.99†	1.381	3	119	2.98†	1.402	3
28.	I am proud to be a citizen of Canada	123	4.57†	.967	0	122	4.57	.971*	0

* Items identified for elimination due to lack of variance.
† Items identified for elimination due to extreme means.
‡ Items identified for deletion due to non-response rates.

Table 3. Communalities, Factor Loadings* and Cronbach's Alpha Values for Version One and Version Two

		Version 1			Version 2		
		Extraction	Factor Loading	Cronbach's Alpha if Item Deleted	Extraction	Factor Loading	Cronbach's Alpha if Item Deleted
1.	I have people I look up to	.635	.684	.750	.332	.354	–
3.	Getting an education is important to me	.658	.537	.767	.593	.539	.838
5.	My caregiver(s) watch me closely	–	–	–	.629	.558	.837
6.	My caregiver(s) know a lot about me	–	–	–	.671	.725	.821
7.	I eat enough most days	.784	–	–	.623	.426	–
8.	I try to finish what I start	.713	–	–	–	–	–
13.	I solve problems without drugs or alcohol	.423	.470	.775	.583	.360	–
14.	I feel supported by my friends	.764	.731	.746	.710	.577	.837
15.	I know where to go to get help	.606	.466	.773	.618	.494	.846
16.	I feel I belong at my school	.442	.527	.771	.443	.452	.852
17.	My caregiver(s) stand(s) by me during difficult times	–	–	–	.801	.811	.806
18.	My friends stand by me during difficult times	.819	.708	.748	.753	.602	.836
19.	I am treated fairly in my community	.454	.575	.758	.429	.392	–
21.	I am aware of my own strengths	–	–	–	.566	.419	–
23.	I think it is important to serve my community	.458	.573	.762	–	–	–
24.	I feel safe when I am with my caregiver(s)	–	–	–	.818	.794	.807
25.	I have opportunities to develop job skills	.620	.488	.764	.666	.379	–
26.	I enjoy my caregiver(s)' cultural and family traditions	–	–	–	.677	.688	.822

* Extraction method: Principal component analysis.

the analysis. An unrotated factor solution was again used on the remaining 16 items. From this, 10 questions were identified (using cut-off values of .45; α=0.845; see Table 3) for inclusion in the measure.

Two issues became apparent when comparing the two reduced versions of the CYRM. First, the manner in which items loaded on the various factors was noticeably different when replacing the 13 youth who lived on their own or with friends and who indicated that caregiver questions were not relevant to their lives. While inclusion of these youth meant that family or caregiver questions were not included in the analysis, replacing them with 13 similarly matched youth with different constructions of family meant that these questions featured prominently in the factor analysis loadings. Interestingly, the question "I have people to look up to" appears to have replaced the family and caregiver questions for youth who do not identify caregivers in their lives. Second, questions relating to community supports and self-sufficiency featured more prominently in the factor loadings of the first group of youth (i.e., those not identifying caregivers). These questions include, "I am able to solve problems without harming myself or others (for example by using drugs and/or being violent)", "I think it is important to serve my community", "I am treated fairly in my community", and "I have opportunities to develop skills that will be useful later in life (like job skills and skills to care for family)." Conversely, where family questions did feature prominently in the factor

Table 4. Communalities, Factor Loadings*† and Cronbach's Alpha Values for Version Three‡

		Extraction	Component				Cronbach's Alpha if Item Deleted
			1	2	3	4	
1.	I have people I look up to	.996		.525			.759
3.	Getting an education is important to me	.616			.752		.733
6.	My parent(s)/caregiver(s) know a lot about me	.739	.844				.725
8.	I try to finish what I start	.264		.462	.388		.759
13.	I solve problems without harming myself or others (by using drugs and/or being violent)	.528		.608			.744
15.	I know where to go in my community to get help	.275				.803	.740
16.	I feel I belong(ed) at my school	.830			.816		.735
17.	My family will stand by me during difficult times	.820	.885				.714
18.	My friends stand by me during difficult times	.535		.703			.727
19.	I am treated fairly in my community	.549		.744			.736
25.	I have opportunities to develop skills that will be useful later in life	.233				.769	.744
26.	I enjoy my cultural and family traditions	.748	.773				.724

* Extraction method: Principal component analysis.
† Rotation method: Varimax with Kaiser normalization.
‡ Rotation converged in 6 iterations.

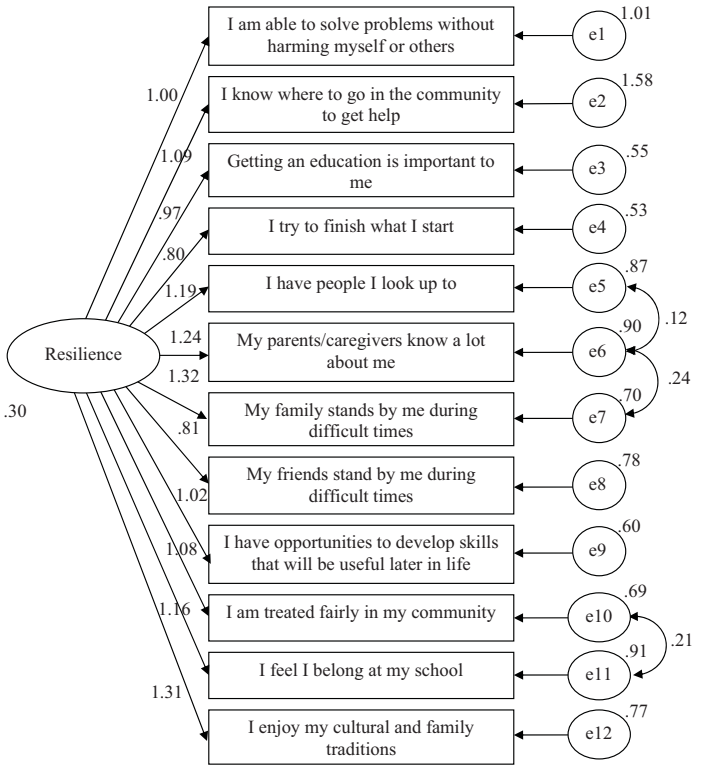
analysis loadings, these community and self-sufficiency questions did not.

Comparing the two versions, it became evident that in order to establish a brief screening measure that would account for all four components of an ecological resilience model and for variations in youth connection to family and culture, a combination of questions from version 1 and version 2 would need to be included. A third version of the measure was therefore constructed containing three questions included in both version 1 and version 2 ("I know where to go to get help"; "Getting an education is important to me"; and "My friends stand by me during difficult times"). "I feel supported by my friends" was not included because it has a high correlation with "My friends stand by me during difficult times" in both version 1 and version 2 (r=.779 and r=.795, respectively; contact the authors for more information regarding these findings). In order to account for variations in connection to family – specifically parents and caregivers – "I have people to look up to", "My parents/caregivers know a lot about me" and "My family will stand by me during difficult times" were included. "My parents/caregivers watch me closely" and "I feel safe when I am with my family" were excluded due to high correlations with "My parents/caregivers know a lot about me" and "My family will stand by me during difficult times". In addition, there were thematic overlaps. Finally, three questions from version 1 were included to measure connection to community: "I think it is important to serve my community", "I have opportunities to develop skills that will be useful later in life (like job skills and skills to care for family)", and "I am treated fairly in my community".

A varimax rotated factor analysis of the 12 items identified for inclusion in the third version resulted in a four-factor solution, with 10 of the items loading well (see Table 4). While communalities on three of the items are very low, they still share at least 23% of the variance with the extracted component. While the reliability of this third grouping (α=0.754) is not as high as in version 2 (α=0.845), it is still satisfactory. Combined with the improved content-validity of the measure, it can be argued that version 3 represents a more sophisticated cross-cultural screener of resilience.

A CFA was then undertaken on the 12-item CYRM ("CYRM-12") using data from the second sample of youth who had participated in the Survey of Resilience and Risky Behaviours among Youth (n=1494). Given the requirement for a brief screener of resilience, the analysis was of a model with a single latent variable structure containing all 12 items. Maximum likelihood estimation was used together with multiple fit indices.

Figure 1. Confirmatory Factor Analysis Model of CYRM-12*



* Reported coefficients differ significantly from 0 (p<0.01).

Modification Indices suggested allowing the variables "I am treated fairly in my community" and "I feel I belong at my school" to co-vary, as well as allowing "I have people I look up to" and "My parents/caregivers know a lot about me", and "My parents/caregivers know a lot about me" and "My family stands by me during difficult times" to co-vary (see Figure 1). Once these changes were made to the model, a satisfactory fit was obtained (χ^2 (51, N=1540) = 255.419, p=0.0001; Adjusted Goodness of Fit Index = 0.960; Comparative Fit Index = 0.957; Root Mean Square Error of Approximation = 0.050). Cronbach's Alpha for the 12 items was also satisfactory (α=0.840).

DISCUSSION

Increasingly, definitions of resilience emphasize processes that occur at multiple systemic levels, with individual, relational, community and cultural factors interacting to produce positive developmental outcomes among populations facing significant adversity.[15] Screening for the most likely individual and contextual capacities that predict positive outcomes has not been possible due to a lack of validated measures that have demonstrated sufficient internal and external validity. Both the CYRM-28 and the briefer CYRM-12 address this gap in the research. Based on two separate samples, one at high risk, the other a population-based sample of school children, the CYRM-12 demonstrates sufficient validity to merit its use as a screener for key resilience characteristics among youth. While the full CYRM-28 provides a more comprehensive understanding of the multiple dimensions of resilience,[13] the 12-item version is well designed for inclusion in larger omnibus studies or smaller clinical trials where researchers seek to document the capacity of adolescents and their social ecologies. This in fact follows a practice seen with many instruments where, for administration in settings with limited resources, brief versions have been developed. For example, the original 93-item Conners Parent Rating Scale for behaviour problems in children[16] was reduced to a 10-item version[17] and the 16-item Kutcher Adolescent Depression Scale was reduced to 6 items.[18]

A strength of the CYRM-12 is that it has been validated on two distinct groups of youth. The first sample is comprised of youth exposed to adversity who have accessed some type of health or community service. One would expect measures designed to capture adversity and resilience to perform well in a sample where exposure to adversity is common. The second is a school-based sample with no attempt to sample based on adversity or access to care. Rates of adversity, mental health conditions, assets and resilience in this sample should be typical of the general population of North American youth since the schools, while not randomly selected, are typical of schools in the province of Nova Scotia. That the confirmatory factor analysis demonstrated good performance of an instrument developed in a clinical sample supports the use of the CYRM-12 in both clinical and non-clinical settings.

Further study will examine whether the CYRM-12 has the potential to inform studies of resilience and risk where the focus is on screening for processes that predict resistance to problem behaviours and other coping strategies. Further study is required, however, to investigate whether the CYRM-12 is appropriate for use with other youth populations across cultures and contexts internationally. While the overall age range in this analysis is 10 to 22, validation of the measure was only conducted on youth aged 10 to 18. Future studies should include a broader age range. A program of research is continuing to investigate these questions.

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RÉSUMÉ

OBJECTIFS : Cet article traite de la réduction de l'indicateur CYRM (*Child and Youth Resilience Measure*) de 28 à 12 éléments. Le CYRM-28 est un indicateur de la résilience des jeunes qui tient compte de la diversité culturelle et contextuelle dans les populations de jeunes. La version réduite du CYRM est plus susceptible d'être incluse dans les enquêtes omnibus.

MÉTHODE : Notre analyse englobe les données de deux échantillons de jeunes du Canada atlantique : a) un échantillon de jeunes utilisant plusieurs services (n=122; âge moyen = 18 ans) et b) un échantillon de jeunes en milieu scolaire (n=1 494; âge moyen = 15 ans).

RÉSULTATS : Trois itérations d'une analyse factorielle exploratoire ont été menées sur les données du premier échantillon de jeunes afin de repérer les éléments à inclure dans le CYRM-12. La troisième, une analyse factorielle des 12 éléments avec rotation Varimax, a donné une solution à quatre facteurs avec 10 éléments se chargeant bien. La fiabilité de ce groupe de questions est satisfaisante (α=0,754). Nous avons ensuite mené une analyse factorielle confirmatoire sur le second échantillon de jeunes. Nous avons obtenu un ajustement satisfaisant (χ^2 (51, N=1 540) = 255,419, p=0,0001; Indice de qualité de l'ajustement = 0,960; Indice comparatif d'ajustement = 0,957; Erreur moyenne quadratique d'approximation = 0,050). Le coefficient alpha de Cronbach pour les 12 éléments était également satisfaisant (α=0,840).

CONCLUSION : Les résultats font état d'une validité de contenu suffisante pour que le CYRM-12 soit utilisé comme « crible » des processus de résilience dans la vie des adolescents.

MOTS CLÉS : *Child and Youth Resilience Measure* (CYRM); adolescent; adversité; validité; risque; développement positif