



# Psychometric validation of the French version of the adverse childhood experiences international questionnaire (ACE-IQ)

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## ABSTRACT

**Objective:** Since Dr. Vincent Felitti conducted his seminal work on adverse childhood experiences (ACEs) in the 1980's, a large body of literature has emerged concerning the relation between early life adversity and physical and psychological health outcomes in adulthood. The objective of this study was to assess the psychometric properties of the French version of the Adverse Childhood Experiences International Questionnaire (ACE-IQ). A validated translation of the ACE-IQ will facilitate comparing data in French-speaking countries where this tool is used to measure a dose–response relationship between adverse childhood experiences (ACEs) and health decline in adulthood.

**Method:** The ACE-IQ is a 29-item measure designed to assess exposure to ACEs categorized into three groups: maltreatment (all forms of physical and emotional ill-treatment, sexual abuse, neglect), family dysfunction and violence outside the home. The questionnaire was translated and back-translated according to guidelines and methodology defined by the [World Health Organization, 2011](#) (WHO). A total of 367 participants were recruited to take part in this study. After analyzing descriptive statistics, we assessed the questionnaire's internal structure using principal component factor analysis. Based on classical test theory we calculated internal consistency and test–retest reliability. We then performed an item response theory (IRT) analysis using a partial credit model (PCM) for polytomous data, which was applied to each of the three dimensions of the ACE-IQ.

**Results:** Taken together, our results suggest that while the original three-factor structure was not fully supported, the psychometric properties were good. A high degree of overall internal consistency was demonstrated with an alpha coefficient of 0.80. For the three dimensions of the questionnaire Cronbach's alphas ranged between 0.77 and 0.41. In terms of temporal stability, we observed a good intra-class correlation of 0.79 for the entire questionnaire, with temporal stability for the three dimensions ranging between 0.78 and 0.61. Finally, our IRT analysis revealed discrepancies on certain items for each of the three dimensions, which confirm, and complete findings previously obtained through classical analysis.

**Conclusion:** The French translation of the ACE-IQ has good psychometric properties which make it a reliable and valid measure for assessing ACEs in French-speaking populations, both for research purposes and clinical practice.

Further validation will be necessary, however, to account for different cultural characteristics and perspectives between French speaking countries.

## 1. Introduction

Over the past twenty years, beginning with the seminal work by Dr. Vincent Felitti and colleagues ([Felitti et al., 1998](#)), supported by the

Centers for Disease Control and Prevention (CDC) and Kaiser Permanente Hospital in San Diego, a new field of research has developed in the field of childhood adversity. Today, the widely used term in the scientific literature is adverse childhood experiences, commonly referred to

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as ACEs.

Exposure to adversity in childhood has been shown to have broader impacts on society. In 2021, Hughes et al. conducted a systematic review of the literature and a meta-analysis of the financial and health costs of ACEs in European countries (Hughes et al., 2021). When all countries were considered, it was found that health costs exceeded 1% of national gross domestic product (GDP).

Adverse childhood experiences have also been shown to lead to the development of high-risk behaviors. Compared to youth in the general population, youth in child welfare care are at increased risk for engaging in substance use (Fettes et al., 2013) and delinquency (Grogan-Kaylor et al., 2008). Baglivio et al. (2015) found, when identifying delinquency trajectories, that youth with higher ACE scores were arrested at younger ages and significantly more often as adolescents. In addition, many youth in child welfare care experience a range of ACEs related to substance use, such as living with a substance-abusing parent, and are therefore more likely to use substances themselves (Schuck & Widom, 2001). Research over the past twenty years has largely focused, however, on the relationship between ACEs and adult onset of chronic, mental, and physical disease (Bellis et al., 2019; Hughes et al., 2017; McKay et al., 2022).

Adverse childhood experiences have been defined operationally as “childhood events, varying in severity and often chronic, occurring in a child’s family or social environment that cause harm or distress, thereby disrupting the child’s physical or psychological health and development” (Kalmakis & Chandler, 2014). This definition, while comprehensive, does not fully capture the international dimension of the issue. More recently, Alhwayme, Kalmakis, and Jacelon (2021) argued that the concept of ACEs merited further development by using a wider global perspective to account for socio-demographic and cultural contexts. Building on the work of Kalmakis and Chandler (2014), they proposed the following definition: “ACEs are influenced by diverse cultural, social, environmental, and economic factors that affect individuals’ health worldwide” (Alhwaymel et al., 2021, pp.22).

The landmark Adverse Childhood Experiences (ACE) study by Felitti et al. (1998) was the first large-scale study to document the contribution of early-life stress and trauma to the leading and actual causes of death in the US (including ischemic heart disease, all cancers, stroke, chronic bronchitis or emphysema, diabetes, hepatitis or jaundice, skeletal fractures) and self-perceived health status. Findings from this study also emphasized the importance of this dose–response relationship in terms of risk factors related to high-risk health behaviors such as smoking, severe obesity, physical inactivity, depressed mood, suicide attempts, alcohol and drug abuse, high promiscuity (>50 lifetime sexual partners) with history of sexually transmitted diseases. In other words, the more adverse childhood experiences a person has, the greater the risk of developing health problems in adulthood. The literature in this area has largely focused on the “cumulative risk model”, clearly indicating that individuals exposed to multiple forms of ACEs are at even greater risk of adverse health effects (dose–response relationship). This applies to all forms of ACEs that deregulate the neurophysiological stress response in relation to many diseases in adulthood, in which stress plays a role, particularly with respect to disruptions in stress physiology (Danese & McEwen, 2012; Hakamata et al., 2022; Seeman et al., 2010). It is now increasingly clear that exposure to multiple forms of adversity in childhood affects the nervous, endocrine, and immune systems of both children and adults, meaning that they can cause significant biological changes and affect the physiological response to stress in adults (Essex et al., 2013; Hakamata et al., 2022; Herzog & Schmahl, 2018; McGowan et al., 2009; Powell et al., 2013).

The scientific community seized on these findings to better understand potential links between the experience of ACEs, the development of risk factors and the occurrence of health problems in adulthood (Bergen et al., 2004; Felitti et al., 1998; Fergusson & Mullen, 1999; van der Feltz-Cornelis et al., 2019). Today, there is a burgeoning literature exploring the association between childhood adversity and increased

risk of negative health outcomes in adulthood such as cancer (Holman et al., 2016; Ports et al., 2019; Steel et al., 2020), asthma (Exley et al., 2015), diabetes (Huang et al., 2015), chronic pain (Nelson et al., 2017), cardiovascular disease (Bellis et al., 2015); Campbell et al., 2016), and anxiety and depressive disorders (Merrick et al., 2017).

In the early 2000’s, the World Health Organization (WHO) embarked on a global initiative to assess the occurrence of ACEs around the world. An initial health survey aimed at better understanding ACEs would facilitate comparing data across multiple countries and cultures. This would be developed to what is now known as the Adverse Childhood Experiences International Questionnaire (ACE-IQ). The approach not only stimulated research on the prevalence and consequences of ACEs but provided public health and other entities a tool to gauge the scope of the problem, identify high-risk groups and monitor the effects of prevention programs and policies worldwide (World Health Organization, 2009, 2011a, 2011b). The ACE-IQ consists of 29 items that assess 13 childhood adversity experiences categorized into three principal groups: maltreatment (all forms of physical and emotional ill-treatment, sexual abuse, neglect), family dysfunction and violence outside the home. The ACE-IQ was designed to be administered to individuals 18 years of age and older.

The ACE-IQ has been validated in numerous countries since its development. The original scale has been validated among adult samples in the United States (Ford et al., 2014), China (Ho et al., 2019), South Africa (Kidman et al., 2019), Nigeria (Kazeem, 2015), or Brazil (Portuguese version: Pereira & Viana, 2021).

Different studies have focused on validating specific psychometric properties of the ACE-IQ. A study led by Kazeem (2015) reported satisfactory internal consistency for a sample population of Nigerian prisoners. A second study involving young adults in Hong Kong (Ho et al., 2019) reported the test–retest reliability coefficient of 0.90 for the scale. Yet the ACE-IQ showed only moderate predictive validity in a sample of adolescents living in rural Malawi as well in a second sample of individuals diagnosed with anxiety and depressive disorders (Kidman et al., 2019). The issue of factorial structure of the original ACE-IQ has also been examined. Kazeem (2015) investigated the psychometric validity of the ACE-IQ based on the six subscales of the questionnaire but were unable to confirm its factorial structure. Kidman et al. (2019) proposed a three-factor solution (household disruption, abuse, neglect) but found construct validity unsatisfactory for measuring the original six subdomains of the ACE-IQ.

The relationship between ACEs and depression and anxiety disorders have been extensively studied and continue to be highlighted in the literature. Higher numbers of ACEs have been shown to be associated with a greater risk of developing depressive disorders during childhood, adolescence and especially in adulthood (Chapman et al., 2004). Furthermore, Chapman and colleagues (2004) note that, among the ACEs studied, emotional abuse shows the strongest association with long-term depressive symptoms. As for anxiety disorders, the effects of ACEs on their development and evolution appear similar to those of depressive disorders. In this respect, it appears that physical and sexual violence as well as intra-family violence during childhood are closely linked to the development of a subsequent anxiety disorder (De Venter et al., 2013). Early sexual abuse is also associated with higher rates of generalized anxiety disorder, social anxiety disorder, and panic disorder (Cogle et al., 2010), as well as the development of specific phobia or agoraphobia (Fergusson et al., 1996). Given the mechanisms by which ACEs can lead to physiological and psychosocial dysfunction in response to new stressors (Lovallo, 2013), it is not surprising that ACEs contribute to the development of anxiety, hypervigilance, and permanent worry.

It has been shown very clearly that addressing early-life adversity is essential because of how it negatively affects health outcomes in adulthood. However, for targeted detection and effective prevention, it is equally important to establish a common tool that can capture exposure to ACEs at the national and international level. Therefore, the main objective of this article is to propose a validation of the French version of

the Adverse Childhood Experiences International Questionnaire (ACE-IQ). A second objective is to study the relationship between the different dimensions of the ACE-IQ and the participants' level of anxiety and depression.

## 2. Material and method

### 2.1. Presentation of the adverse childhood experiences international questionnaire - ACE-IQ

The ACE-IQ is a 29-item measure that assesses exposure to 3 domains of childhood adversities by grouping 13 ACE sub-dimensions (World Health Organization, 2009, 2011a, 2011b): **childhood maltreatment** consisting of 5 sub-dimensions, **family dysfunction** also consisting of 5 sub-dimensions, and **violence outside the home** consisting of 3 sub-dimensions (see Table 1):

(a) **Childhood maltreatment** includes *emotional neglect* (2 items, P1-P2); *physical neglect* (3 items, P3 to P5); *emotional abuse* (2 items, A1-A2); *physical abuse* (2 items, A3-A4); and *sexual abuse* (4 items, A5 to A8).

(b) **Family dysfunction** includes *living with a substance abuser* (1 item, F1); *living with a mentally ill or suicidal household member* (1 item, F2); *living with a household member who has been incarcerated* (1 item, F3); *parental death, separation, or divorce* (2 items, F4-F5); and *domestic violence* (3 items, F6 to F8).

(c) **Violence outside the home** includes *bullying* (1 item, V1); *witnessed community violence* (3 items, V4-V6); and *exposure to war/collective violence* (4 items, V7-V10).

Participants are asked to respond to the items based on their experiences during the first 18 years of their lives. Response options for each item can be assessed on a dichotomous (i.e., yes/no; for items F1 through F5), or 5-point Likert scale ranging from "always" to "never" (for items P1 and P2): Always; Most of the time; Sometimes; Rarely; Never, or a 4-point Likert scale ranging from "many times" to "never" (for all other items): Many times; A few times; Once; Never. The ACE-IQ measures exposure to 13 categories of ACEs represented by the 13 sub-dimensions. Exposure to a category of ACEs requires a positive response

**Table 1**  
Sample characteristics.

Variables	Total N = 367 (%)
Gender	
Female	273 (78,2%)
Male	76 (21,8%)
Age (mean ± sd)	37,1 ± 14,0
Highest level of education	
Primary school	0 (0%)
Secondary/High school	9 (2,5%)
BAC / BAC level	75 (21%)
DEUG / BTS / DUT	53 (15%)
Bachelor's degree	99 (28%)
Maîtrise / Master 1	37 (10%)
DESS / DEA / Master 2	80 (22%)
Doctorate	6 (1,7%)
Employment status	
Farmers, farm workers	1 (0,3%)
Craftsmen, shopkeepers, company managers d'entreprise	20 (5,5%)
Executive and higher intellectual professions	87 (24%)
Technicians, associate professionals	28 (7,7%)
Employees	103 (28%)
Skilled workers	5 (1,4%)
Retired	18 (5,0%)
Others with no professional activity	101 (28%)
Marital status	
Single	165 (47%)
Married	103 (30%)
Civil union	35 (10%)
Divorced	29 (8,3%)
Separated	10 (2,9%)
Widowed	6 (1,7%)

to at least one of the items in the sub-dimension. Thus, the sub-score for each ACE subdimension determines whether the participant is "exposed" or "not exposed" to that category of ACEs. Next, the total number of ACE categories to which the participant has been "exposed" is summed to create an ACE score ranging from 0 to 13. The developers of the original scale proposed two scoring algorithms. The first being the binary scoring system that uses the lowest threshold (no or never) to identify ACEs. A second scoring method measures the frequency of adverse events or incidents. For our purposes here we chose to rely on the frequency measures proposed by the ACE-IQ except for the principal component analysis, for which we relied on binary scores for ACEs.

### 2.2. Other assessments

Socio-demographic variables were also collected such as age, gender, education level, employment status, and marital status.

We also asked subjects to fill out the Hospital Anxiety Depression Scale (HADS) questionnaire (Bocéréan & Dupret, 2014; Razavi et al., 1989; Zigmond & Snaith, 1983). This Hospital Anxiety and Depression Scale assesses the level of anxiety in 7 items (e.g., "I'm restless and can't keep still") and the level of depression in 7 items (e.g., "I feel like I'm functioning in slow motion"), ranging from 0 to 3. The scores obtained for each item are added together (after recoding the items to be reversed). A score greater than or equal to 10 indicates a definite level of anxiety or depression.

### 2.3. Translation of the ACE-IQ scale

The ACE-IQ was translated from English to French by a professional translator and back-translated by a bilingual member of our team who is also a psychologist. The first step of the project was to translate the ACE-IQ questionnaire into French in compliance with WHO translation and back-translation methodology (World Health Organization, n.d.).

The methodology used for the translation and adaptation of the ACE-IQ is the "back translation-forward translation" methodology, according to the recommendations of the COSMIN group (Consensus-based Standards for the selection of health Measurement Instruments) and Guillemin et al (1993).

This is a six-step translation process:

#### 1 Forward translation.

This step was carried out by two translators, with knowledge of English-speaking culture, but whose mother tongue was French. One of the two translators was familiar with the terminology of the domains covered by the ACE-IQ questionnaire while the other was naive to these concepts.

#### 2. "Back" Translation.

In this step, the instrument was translated into English by three independent translators, whose native language was English and who had no prior knowledge of the instrument and concepts.

#### 3 Verification of the translation.

A bilingual (English and French) expert committee consisting of two psychology professors and a psychology doctoral student familiar with family violence and mental health research was then tasked with identifying and resolving any inadequate phrases/concepts in the translation, as well as any inconsistencies between the proposed translation and previous existing or comparable versions of the instrument, if any. A fully translated version of the questionnaire was the result of this process. Comments were compiled and shared among all team members.

#### 4 Pre-test and cognitive interview.

This expert panel consisting of two mental health researchers, four clinical psychologists who work regularly with vulnerable families and who were not part of the validation team were asked to evaluate the relevance and appropriateness of each translated question. Each item in the questionnaire was rated on a 4-point Likert scale, ranging from 4 - highly relevant, 3 - quite relevant, 2 - somewhat relevant, to 1 - not relevant. This allowed us to propose the French version (in appendix) of

**Table 2**  
Raw scores for the ACE-IQ scale.

Dimensions (range)	Sub-dimension (number of items / category)	Raw scores				Binary scoring N = 367 (%)		Alpha Cronbach (binary scoring variables)	Alpha Cronbach (frequency variables)
		n	mean ± sd	min-max	Item name	Yes	No		
ACEs (0 to 13)		367	3.32 (2.53)	0; 11				0.8	0.73
<b>Child maltreatment (0 to 5)</b>	<i>Mean score of the dimension</i>	367	1.46 (1.39)	0; 5				0.77	0.50
	Emotional abuse (2 items: A1-A2)	347	0.38 (0.49)	0; 1	A1	131 (37.6%)	217 (32.4%)		
					A2	41 (11.8%)	307 (88.2%)		
	Physical abuse (2 items: A3-A4)	347	0.22 (0.42)	0; 1	A3	77 (22.1%)	272 (77.9%)		
					A4	21 (6%)	327 (94%)		
	Sexual abuse (4 items: A5-A8)	345	0.34 (0.48)	0; 1	A5	99 (28.9%)	244 (71.1%)		
					A6	59 (17.2%)	285 (82.8%)		
					A7	55 (15.9%)	291 (84.1%)		
					A8	44 (12.8%)	299 (87.2%)		
		Emotional neglect (2 items: P1,P2)	351	0.52 (0.50)	0; 1	P1	152 (43.4%)	198 (56.6%)	
				P2	100 (28.4%)	252 (71.6%)			
	Physical neglect (3 items: P3-P5)	347	0.07 (0.25)	0; 1	P3	6 (1.7%)	345 (98.3%)		
				P4	17 (4.9%)	332 (95.1%)			
				P5	2 (0.6%)	348 (99.4%)			
<b>Family dysfunction (0 to 5)</b>	<i>Mean score of the dimension</i>	367	1.49 (1.23)	0; 5				0.62	0.67
	Substance abuse (1 item: F1)	348	0.21 (0.41)	0; 1	F1	72 (20.7%)	276 (79.3%)		
	Household member incarcerated (1 item: F3)	348	0.03 (0.18)	0; 1	F3	12 (3.4%)	336 (96.6%)		
	Household member mentally ill (1 item: F2)	348	0.39 (0.49)	0; 1	F2	135 (38.8%)	213 (61.2%)		
	Parental separation (2 items: F4, F5)	352	0.43 (0.50)	0; 1	F4	122 (35.1%)	229 (65.2%)		
					F5	47 (13.5%)	304 (87.4%)		
	Domestic violence (3 items: F6-F8)	348	0.51 (0.50)	0; 1	F6	136 (39.1%)	214 (61.1%)		
					F7	124 (36%)	220 (64%)		
				F8	49 (14.2%)	295 (85.8%)			
<b>Violence outside the home (0 to 3)</b>	<i>Mean score of the dimension</i>	367	0.38 (0.61)	0; 3				0.41	0.47
	Bullying (1 item: V1)	348	0.22 (0.42)	0; 1	V1	78 (22.4%)	270 (77.6%)		
	Community violence (3 items: V4-V6)	133	0.06 (0.25)	0; 1	V4	22 (6.4%)	324 (93.6%)		
					V5	1 (0.3%)	345 (99.7%)		
					V6	3 (0.9%)	342 (99.1%)		
	Collective violence (4 items: V7-V10)	346	0.11 (0.32)	0; 1	V7	23 (6.6%)	327 (93.4%)		
					V8	9 (2.6%)	339 (97.4%)		
				V9	3 (0.9%)	348 (99.1%)			
				V10	15 (4.3%)	333 (95.7%)			

the ACE-IQ.

#### 5 Creation of the final version.

The final version of the French tool that is the subject of this article was the result of all the steps described above.

### 2.4. Validation of the metric properties of the ACE-IQ scale

#### 2.4.1. Sample

A total of 367 participants (a minimum of 300 was required for the validation of the scale) were recruited from psychotherapy practices located in the Grand-Est region (a French administrative region including Alsace, Champagne-Ardenne and Lorraine).

Inclusion criteria were defined as the following: (1) must be over the age of 18 years, (2) must be sufficiently literate to be able to complete the questionnaire unaided, (3) must have internet access to complete the questionnaire online, and (4) must agree to participate in the project. Fourteen psychologists-psychotherapists, practicing in the Grand-Est Region, participated in recruiting the sample population from February to March 2021 and proposed participation in the study to selected patients who met the inclusion criteria after providing each patient with a clear overview of the project objectives and an additional flyer with further details about the study. If the patient agreed to participate in the study, a link from which they could complete the questionnaire was sent to their e-mail address. Patients completed the questionnaires at two points in time: at inclusion (T0) and 15 days later (T1) to study test–retest stability.

The institutional review board approved the study. All procedures were carried out in accordance with the French General Data Protection Regulation (GDPR). Informed consent before the study entry is obtained from all patients.

#### 2.4.2. Statistical analysis

First, descriptive statistics were used to examine the distribution of responses for each item. The patients' sociodemographic characteristics were described in number (%) for the categorical variables and in number and mean (SD) for the quantitative variables.

The internal structure of the ACE-IQ scale was studied using principal component factor analysis (PCA). A VARIMAX rotation of the axes was also performed to facilitate interpreting factor solutions.

In accordance with classical test theory, internal consistency and test–retest stability were tested for the selected models. Internal consistency was calculated using Cronbach's alpha for the entire questionnaire and for each of the 3 dimensions. A coefficient  $> 0.80$  was interpreted as very good (Streiner & Norman, n.d.). The intraclass correlation coefficient (ICC) was used to determine the reproducibility of the questionnaire between the 2 measurement times. An ICC  $> 0.8$  was considered very good; 0.65–0.80 was rated as good, and 0.35–0.65 as moderate (Dancey & Reidy, 2007).

Factor analyses were performed using R software with the JMV package (using psych and GPARotation).

Finally, an IRT (Item Response Theory) analysis was performed. A partial credit model (PCM) for polytomous items was used (Wright & Masters, 1982), for each of the 3 dimensions of the ACE-IQ, which is a Rasch model adapted for ordinal data with multiple modalities. This model provides estimates of individual ability, item difficulty, and item-specific thresholds on a logarithmic scale representing latent trait. In order to ensure conditional independence of responses to the different items at the latent trait level (Hardouin, 2005), the correlation matrix of the residuals of the model was studied by considering a possible dependence of the responses if the correlations exceed 0.3. Indeed, Rasch analyses are primarily based on the residuals or the difference between an observed response and a predicted response within the model (Wright & Masters, 1982). Statistics based on residuals calculate the sum of residuals of the items and divide them by the number of items. This is done on raw (outfit) or standardized (infit) residuals. The root mean square of the outfit and infit (MSQ outfit and infit) must be

between 0.6 and 1.4 (Bond & Fox, 2007) to ensure that the items are suitable for measuring the construct. If their value is higher than 1.4 (underfit), this signifies that the meaning of the item is not clear. Conversely, if the MSQ value is  $< 0.6$  (overfit), this shows that the item is too easily anticipated by the respondents (Yasin et al., 2015). On the other hand, the ZSTD (z-standardized) value of the outfit and infit should be between  $-2$  and  $+2$  (Bond & Fox, 2007), but if the MSQ of the outfit and infit is accepted, the ZSTD index can be ignored (Yasin et al., 2015).

The "eRM" package of R software was used to perform the IRT analysis with the partial credit model.

## 3. Results

### 3.1. Sample description

A total of 367 people completed the 1st questionnaire at T1 and 322 (88%) at T2. The sample was composed of 78.2% women ( $N = 273$ ) with a mean age of 37.1 ( $SD = 14.0$ ), 72% were professionally active, 76.7% had a bachelor's degree or higher, and 47% were single ( $N = 165$ ) (Table 1).

### 3.2. Description of the scores of the different scales (Table 2)

For the *child maltreatment* dimension, we find fairly heterogeneous responses for each of the 5 sub-dimensions. In our sample, 43.4% and 6% of the cases, respectively, declared an experience of emotional and physical neglect. It should also be noted that even within certain sub-dimensions, different responses can be found depending on the items. For example, while 22% of the subjects indicated that they had experienced physical violence for item A3, only 6% indicated having experienced physical violence when this was assessed for item A4.

For the *family dysfunction* dimension, the sub-dimensions relating to domestic violence (39.1%, 36% and 14.2% depending on the item) and to mental illness of a family member (38.8%) are the most represented. We should note that parental separation was identified in 35.1% of the participants for item F4, even though item F5 only concerned 13.5%.

Finally, the third dimension related to *violence outside the home* seemed to concern the subjects in our sample less. In particular, the sub-categories of *community or collective violence* (with rates varying between 6.4% and 0.9%), while bullying was relevant for 22.4% of the sample.

### 3.3. Classical test theory results

#### 3.3.1. Acceptability of the scale

We did not note any questions that generated a low response rate in this scale. In other words, very few participants ( $< 5\%$ ) chose the "I do not wish to answer" response modality. This indicates that despite the sometimes intrusive nature of certain items, the majority of respondents answered the questions.

#### 3.3.2. Internal consistency

We observed a satisfactory overall internal consistency of the questionnaire with a Cronbach's alpha of 0.80 for the binary rating and 0.72 for the frequency rating data (Table 3). The results obtained suggest that the internal consistency of the scale as a whole is quite good. For the three dimensions of the questionnaire, Cronbach's alphas ranged from 0.77 for child maltreatment, to 0.62 for household disruption, and 0.41 for violence outside the home.

For this last dimension, we noted a rather weak internal consistency, undoubtedly linked to the fact that the three sub-scales that it comprises have nothing in common with each other. Indeed, *bullying*, *community violence* and *collective violence* have been grouped together in a rather surprising way, without there being any real coherence between these sub-scales, except for the fact that they are related to psychosocial violence. In this respect, it should be noted that community violence

**Table 3**  
Factor analysis.

Item Question [Code]	Composants				Dichotomous mean	Frequency mean
	Factor F1 before rotation	Factor F1	Factor F2	Factor F3	mean ± sd	mean ± sd
Did a parent, guardian or other household member yell, scream or swear at you, insult or humiliate you? [A1]	0.67	0.67			0.37 (0.48)	1.85 (1.13)
Did a parent, guardian or other household member threaten to, or actually, abandon you or throw you out of the house? [A2]	0.53	0.52			0.11 (0.32)	0.65 (1.06)
Did a parent, guardian or other household member spank, slap, kick, punch or beat you up? [A3]	0.57	0.78			0.23 (0.42)	1.52 (1.12)
Did a parent, guardian or other household member hit or cut you with an object, such as a stick (or cane), bottle, club, knife, whip etc? [A4]	0.40	0.66			0.06 (0.24)	0.40 (0.88)
Did someone touch or fondle you in a sexual way when you did not want them to? [A5]	0.53		0.73		0.26 (0.44)	0.51 (0.95)
Did someone make you touch their body in a sexual way when you did not want them to? [A6]	0.58		0.76		0.16 (0.37)	0.32 (0.80)
Did someone attempt oral, anal, or vaginal intercourse with you when you did not want them to? [A7]	0.54		0.84		0.14 (0.34)	0.27 (0.74)
Did someone actually have oral, anal, or vaginal intercourse with you when you did not want them to? [A8]	0.54		0.81		0.12 (0.32)	0.22 (0.68)
Did your parents/guardians understand your problems and worries? [P1]	0.55	0.44			0.41 (0.49)	2.15 (1.45)
Did your parents/guardians <b>really</b> know what you were doing with your free time when you were not at school or work? [P2]					0.27 (0.45)	2.65 (1.44)
How often did your parents/guardians <b>not</b> give you enough food even when they could easily have done so? [P3]					0.02 (0.14)	0.12 (0.50)
Were your parents/guardians too drunk or intoxicated by drugs to take care of you? [P4]	0.44				0.04 (0.20)	0.25 (0.75)
How often did your parents/guardians <b>not</b> send you to school even when it was available? [P5]					0.003 (0.06)	0.13 (0.47)
Did you live with a household member who was a problem drinker or alcoholic, or misused street or prescription drugs? [F1]	0.48				0.19 (0.39)	0.18 (0.38)
Did you live with a household member who was depressed, mentally ill or suicidal? [F2]	0.47				0.36 (0.48)	0.36 (0.48)
Did you live with a household member who was ever sent to jail or prison? [F3]				0.41	0.02 (0.14)	0.02 (0.15)
Were your parents ever separated or divorced? [F4]					0.33 (0.47)	0.33 (0.47)
Did your mother, father or guardian die? [F5]					0.13 (0.33)	0.12 (0.33)
Did you see or hear a parent or household member in your home being yelled at, screamed at, sworn at, insulted or humiliated? [F6]	0.66	0.48			0.38 (0.49)	1.76 (1.20)
Did you see or hear a parent or household member in your home being slapped, kicked, punched or beaten up? [F7]	0.56	0.50			0.36 (0.48)	0.97 (1.21)
Did you see or hear a parent or household member in your home being hit or cut with an object, such as a stick (or cane), bottle, club, knife, whip etc.? [F8]	0.53	0.56			0.14 (0.34)	0.43 (0.91)
How often were you bullied? [V1]	0.31				0.20 (0.40)	1.26 (1.19)
Did you see or hear someone being beaten up in real life? [V4]	0.33			0.44	0.07 (0.25)	0.5 (0.95)
Did you see or hear someone being stabbed or shot in real life? [V5]				0.84	0.003 (0.06)	0.08 (0.35)
Did you see or hear someone being threatened with a knife or gun in real life? [V6]				0.72	0.01 (0.10)	0.16 (0.51)
Were you forced to go and live in another place due to any of these events? [V7]*					0.05 (0.23)	0.10 (0.45)
Did you experience the deliberate destruction of your home due to any of these events? [V8]*					0.03 (0.16)	0.06 (0.35)
Were you beaten up by soldiers, police, militia, or gangs? [V9]				0.73	0.010 (0.10)	0.01 (0.15)

(continued on next page)

Table 3 (continued)

Item Question [Code]	Composants				Dichotomous mean	Frequency mean
	Factor F1 before rotation	Factor F1	Factor F2	Factor F3	mean ± sd	mean ± sd
Was a family member or friend killed or beaten up by soldiers, police, militia, or gangs? [V10]				0.50	0.48	0.07
Eigenvalues		4.92	2.66	2.17	0.21	(0.38)
% variance		16.98	9.17	7.47		

\* wars, terrorism, political or ethnic conflicts, genocide, repression, disappearances, torture and organized violent crime such as banditry and gang warfare.

does not seem to have been considered as an adverse event by the subjects in our sample. This is probably because such a problem may seem foreign to them or inconsistent with what they have experienced or experience on a daily basis. In this respect, if we remove the single item that makes up the *harassment* sub-scale, the alpha value for the violence outside the home dimension rises to 0.58.

### 3.3.3. Factorial structure

**3.3.3.1. PCA before rotation.** The pre-rotation Principal Component Analysis (PCA) identified a common F1 factor, as childhood adversity (which alone explains 17% of the variance; Table 3). The factorial solution explains 34% of the variance with three factors, which does not account for the three dimensions on which the scale was constructed.

Overall, while a large majority of the items saturate on a factor F1 before rotating around a single dimension that could be called *adversity experienced during childhood*, a number of items show a lack of saturation for this dimension, i.e. items: P2, P3, P5, F3, F4, F5, V5, V6, V7, V8, V9 and V10.

The difficulty, however, is giving a common explanation for all these items to justify the lack of saturation on the F1 factor. Indeed, there is nothing in common between the items relating to emotional neglect (P2, P3, P5), those relating to family dysfunction (F3, F4, F5) or the items relating to external violence (notably V5, V6, V7, V8, V9 and V10).

**3.3.3.2. PCA after rotation.** The Principal Component Analysis (PCA) after VARIMAX rotation allowed us to obtain a more precise factorial organization of the sub-dimensions and items of the scale. On the F1 factor, we observed a saturation of items A1, A2 (sub-dimension: *emotional abuse*), A3 and A4 (sub-dimension: *physical abuse*), P1 (sub-dimension: *emotional neglect*) as well as items F6, F7 and F8 (sub-dimension: *domestic violence*). These 8 items can be considered as more or less homogeneous since they allow a measurement of adversity during childhood of which the subjects may have been either victims or witnesses but which, in all cases, could potentially have generated anguish, fear and distress. This first factor F1 can thus be considered a reference to intra-family adversity since all events evaluated by the items that saturate this factor refer to events related to family life.

Factor F2 measures saturation for 4 items (A5, A6, A7 and A8) in the sub-dimension of sexual abuse. This second factor may explicitly be considered as an adversity factor that exclusively refers to sexual abuse experienced during childhood.

A total of 6 items loads onto the third factor F3. These are items F3 (sub-dimension: *household member incarcerated*), V4, V5, V6 (sub-dimension: *community violence*), V9 and V10 (sub-dimension: *collective violence*). It should be noted that all of these items refer to specific adversity specific to certain social environments that must be taken into account when administering this scale. This is particularly true for item F3, which refers to living in the same household as a person who has been incarcerated. Again, the meaning of this item could be problematic, as it implicitly suggests that former prisoners who have served their sentences are a greater potential source of danger than those who have never been to prison, which is highly debatable. Items V4, V5, and V6 question if participants were indirectly involved in the adverse events

discussed as witnesses, and all begin with “*Did you hear of see someone...?*”. In terms of consequences, this is in no way less serious than being subjected to adverse events directly; research in psychopathology has provided evidence of this (Tarquinio & Auxéméry, 2022). However, we agree that this “suffered” adversity can be distinguished from “perceived” adversity, which seems to clearly characterize these last items. Finally, items V9 and V10 refer to a specific type of psychosocial adversity, which may be quite different, as we mentioned earlier, from what our study respondents may have experienced. This last factor is structured around measuring items that refer to a more distant and less direct experience of adversity than that assessed by the other two factors F1 and F2.

It should be noted that items P2 (sub-dimension: *emotional neglect*), P3, P5 (sub-dimension: *physical neglect*), F4, F5 (sub-dimension: *parental separation*), V7 and V8 (sub-dimension: *collective violence*) do not load on any factor of the factorial solution. We believe that this is a difficulty with this scale, since neglect, whether emotional or physical, remains a major component of adversity experienced during childhood. However, there are a number of problems with the wording of the items in question. Items P2 (“*Did your parents/guardians really know what you were doing in your free time when you were not at school or work?*”) and P3 (“*How often did your parents/guardians not give you enough food even when they could easily have done so?*”) might be problematic in this respect. It is difficult to define how a lack of interest during free time, for example, represents adversity. Conversely, not feeding one’s children enough (when adequate nutrition is essential in early childhood for proper development) can be considered a strong expression of parental neglect. If this last item undoubtedly refers to adversity, the fact that it does not saturate on the factor in question can be explained by the fact that the subjects in our sample were less affected by this particular problem (1.7%). Item P5 (“*How often did your parents/guardians not send you to school when it was available?*”) clearly places emphasis on the recurrence of a scenario children experience that may compromise the future of children and adolescents who, due to a lack of training or education, can end up failing at school or in work contexts later in life. Here again, we noted a certain mismatch between these items and the participants in our study, since only 0.6% appeared to have been affected by this particular experience. Item F4 (“*Were your parents ever separated or divorced?*”) did not saturate on any of the factors, even though it concerned 35.5% of the sample population. This is undoubtedly due to the fact that the impact of divorce or separation becomes clear with hindsight and is put into perspective once individuals reach adulthood. Item F5 (“*Did your mother, father or guardian die?*”), which is part of the sub-dimension relating to parental separation in the original version, refers to a specific and even radical type of separation. It should be noted, however, that this item concerned 13.5% of the population in our sample. Items V7 (“*Were you forced to go and live in another place due to any of these events?*”) and V8 (“*Did you experience the deliberate destruction of your home due to any of these events?*”), with the latter referring to dramatic violent events, only appeared to affect 6.6% and 2.6% of our respondents respectively.

### 3.3.4. Reproducibility of the scale

With regard to the temporal stability of the scale, an intra-class

correlation of 0.79 (0.76–0.82) was observed for the questionnaire as a whole, which reflects a fairly good reproducibility, confirmed by the first two dimensions, childhood maltreatment and family dysfunction 0.76 (0.72–0.79) and 0.78 (0.74–0.81). For the dimension of violence outside the home, the reproducibility of this dimension is somewhat average at 0.61 (0.55–0.66).

3.3.5. Results of IRT analysis

We noted problematic aspects of several items in each of the three major dimensions of the ACE-IQ scale. These results are consistent with and complement the results of the previous classical analysis methods.

3.3.5.1. *Child maltreatment dimension.* Items P1-P2 (sub-dimension: *emotional neglect*) posed the most difficulty for participants (threshold –2.29 and –1.31). It is understandable why respondents had difficulty with these two items. Item P1 in particular asks respondents to effectively evaluate qualities of understanding and empathy of the parents or guardians in question and is quite distant from an adverse childhood experience. Indeed, feeling more or less well understood by a parent or caregiver is a more complex and subjective dimension, and clearly less easily definable than the experience of physical violence. The latter is a tangible reality that is generally not debatable, whether it exists or not, whereas the ability or capacity of parents to understand their children may be more difficult to assess. Item P2, which we should recall is one of the items that does not saturate any of the dimensions of the factorial solution proposed above, measures a part of the what may conceivably be defined as an adverse early-life experience. Ultimately, the nature of the question characterizes a dissonance between what the child may have felt at the time (pleasure or satisfaction at not going to school) and what the individual as an adult may feel today when he or she reflects on the inconsistent nature of the parents’ conduct in neglecting their schooling. In addition, responses to certain items were perceived as too easy for the sample (P3, P4 and P5; sub-dimension: *physical neglect*) (respective thresholds of + 2.46, +1.29 and + 3.59). It should be noted that these three items are also among those that do not saturate on any of the factors. Their non-specificity no doubt explains the fact that the majority of subjects responded in the negative, without giving any

further consideration to items that are perhaps too far removed from or even unsuited to the actual experiences of the participants. Local dependencies between item A1 and items A5 to A8 of the *sexual violence* sub-dimension were observed with residual correlations > 0.3 (0.29 > r > 0.36).

We therefore note a poor fit of the model with infit-t outfit-t indices that fall outside the acceptable range (0.6–1.4) for some items (Table 4). The most problematic item of the dimension is item P2 (p < 0.001; t ~ 4.7).

3.3.5.2. *Family dysfunction dimension.* Only one item, F3 (“Did you live with a household member who was ever sent to jail or prison?”), shows any ease of response (threshold 2.27). As suggested above, this item, related to the history of incarceration of a person who at the time was living under the same roof as the participants in this study, is somewhat questionable in how it is worded and in what it suggests in terms of impact potentially related to adversity. The of consistency of this item likely led participants to respond easily, especially since in most cases the responses were negative.

Local dependencies emerged between item F7 and items F2 and F4 (r < 0.3).

A poor fit of the model is apparent with infit/outfit-t indices that fall outside the acceptable range (0.6–1.4) for most of the items in this dimension (Table 4). The most problematic items of the dimension are F4 and F5 (p < 0.001; t ~ 3 and t ~ 2.5 respectively).

3.3.5.3. *Violence outside the home dimension.* Participants’ difficulty responding emerged for the item specific to bullying, V1 (threshold –2.4). Hesitancy pertaining to this item is somewhat surprising given that bullying or harassment in general are concrete patient experiences frequently encountered in clinical practice and the literature. Mentioning the frequency with which participants were bullied complicates objective assessment. On the contrary, items V5 and V6 show a greater ease of response by the participants (threshold 2.6 and 1.5). For these items, the analyses proposed above, linked to the inadequacy of their content with the experience of the participants in this study, may have led them to respond (too) quickly, without giving too much

Table 4  
IRT Analyses.

Dimension	ACE-IQ Scale Item	Threshold	ChiSq	Outfit t	Infit t	p-value	
<i>Child maltreatment</i>	A3	-0,84	221	-0,668	-0,67	0,802	
	A4	1,03	169	-0,863	-0,237	1	
	A2	0,13	193	-0,919	-0,409	0,984	
	A1	-1,94	225	-0,619	-0,582	0,736	
	A5	-1,36	232	-0,101	-0,228	0,526	
	A6	-0,46	147	<b>-2,863</b>	<b>-2,453</b>	1	
	A7	-0,31	163	<b>-2,164</b>	<b>-2,347</b>	1	
	A8	0,00	172	<b>-1,456</b>	<b>-2,162</b>	0,999	
	P1	<b>-2,29</b>	240	-0,018	0,474	0,498	
	<b>P2</b>	<b>-1,31</b>	371	<b>4,688</b>	<b>4,732</b>	<b>&lt;0,0001</b>	
	P3	<b>2,46</b>	144	-0,443	-0,419	1	
	P4	<b>1,29</b>	233	0,063	-0,402	0,582	
	P5	<b>3,59</b>	104	-0,171	-0,14	1	
	<i>Family dysfunction</i>	F1	0,12	194	<b>-2,564</b>	<b>-2,101</b>	1
		F2	-1,01	274	0,307	0,547	0,376
F3		<b>2,27</b>	274	0,189	-0,999	0,369	
F6		-1,02	210	<b>-3,149</b>	<b>-3,197</b>	0,996	
F7		-0,88	230	-1,726	-1,803	0,925	
F8		0,60	141	<b>-3,443</b>	<b>-3,002</b>	1	
F4		-0,79	337	<b>3,082</b>	<b>3,262</b>	<b>0,003</b>	
F5		0,70	408	<b>2,706</b>	<b>2,389</b>	<b>&lt;0,0001</b>	
<b>V1</b>		<b>-2,44</b>	187	<b>5,791</b>	<b>2,927</b>	<b>&lt;0,0001</b>	
V4		-0,77	98	-0,836	-0,836	0,832	
<i>Violence outside the home</i>	V5	<b>2,59</b>	5	-1,463	-0,61	1	
	V6	1,46	19	<b>-2,073</b>	-1,072	1	
	V7	-0,82	91	-1,363	-1,351	0,938	
	V8	0,27	48	<b>-2,265</b>	-1,423	1	
	V10	-0,30	88	-1,065	-0,909	0,961	



thought to the actual content of the item question. A strong local dependence is observed between item V1 and all the other items of the dimension ( $r > 0.3$ ).

This dimension shows the greatest degree of poor fit with infit-outfit indices outside the acceptable range (0.6–1.4) for many items (Table 4).

Items P2, F4, F5, and V1 appear to be dissonant and thus poorly fit the model of childhood adversity within the different sub-dimensions. These are likely to be potentially dysfunctional items, as we previously mentioned.

### 3.4. Relationship between ACE-IQ and anxiety and depression

It appears that there is a fairly weak but significant correlation between the different dimensions of adversity, namely maltreatment, family dysfunction and violence outside the home. It should be noted that the strongest correlations are those that consider maltreatment during childhood, with regard to both the presence of depressive (0.31) and anxiety disorders (0.24) Table 5.

## 4. Discussion

The interest of adapting the ACE-IQ in French is to allow the use of an instrument promoted by the World Health Organization to address the public health problem of exposure to adversity in childhood associated with elevations of physical and mental health outcomes across the life course, for which there is ample evidence in the literature (Felitti et al., 1998; Holman et al., 2016; Huang et al., 2015; Hughes et al., 2017; Lopes et al., 2020; McLaughlin et al., 2019; Petruccioli et al., 2019). The translation and validation of the scale has a number of valuable benefits that will serve French-speaking researchers and clinicians. It will provide a structured assessment of childhood adversity that can be compared with other assessments (using the same scale) in numerous countries around the world. This is of undeniable interest and will allow public health researchers to propose comparable indicators across cultures and nationalities.

This scale was translated into French following the procedures for cross-cultural adaptation of the scales (Harkness & Schoua-Glusberg, 1998). The overall results confirm rather satisfactory psychometric properties. The scale appears to thoroughly address all the dimensions of adversity.

The ACE-IQ has been used in many countries (Ford et al., 2014; Ho et al., 2019; Kazeem, 2015; Kidman et al., 2019; Pereira & Viana, 2021), which makes it an interesting scale for drawing comparisons between international populations and cultures. It is a tool that allows for an assessment of the most central dimensions of adversity, namely maltreatment, family dysfunction, and violence outside the home. It should allow researchers, but also clinicians in their daily practice, to better understand histories of adversity of study participants and patients. The questionnaire provides a framework that could serve future research on somatic disorders and their determinants by linking the experience of adversity with the occurrence of psychological and physical health problems. In the context of psychotherapy, the questionnaire could provide therapists and patients with a framework for choosing more effective interventions that specifically address ACEs.

Compared to the original ACE Study questionnaire (Felitti et al.,

1998), the ACE-IQ is clearly of better quality. Notably, it includes *violence outside the home* as an additional dimension of adversity, which effectively complement the two dimensions of *maltreatment* and *family dysfunction*. Second, the response formats combine dichotomous and Likert scale response modalities, whereas the original ACE Study questionnaire was limited to only dichotomous (yes or no) responses. In addition, the ACE Study questionnaire included items that, in light of current knowledge, appear potentially problematic. In particular, questions related to sexual violence were conditioned on the parents or a person at least 5 years older. These items are presented differently in the ACE-IQ. The ACE-IQ, although not exhaustive, also addresses a broader range of questions about childhood adversity. Finally, the ACE-IQ considers two scoring algorithms, a binary scoring method and a frequency scoring method. From a metric perspective, this gives researchers the advantage of greater flexibility in terms of how the data is used.

It should be noted that, in accordance with the literature, there is a link between having experienced adversity during childhood and the development of an anxiety or depressive disorder in adulthood. Although the links observed in our study remain weak, they nevertheless indicate that adverse experiences in childhood and adolescence are risk factors for a range of psycho-emotional problems. This is particularly true in our study with regard to the results relating to the “childhood maltreatment” dimension which correlates with both anxiety and depression.

However, despite the overall quality of the ACE-IQ, we feel it is worth addressing several limitations we observed and recommending possible modifications to guide its future use and interpretation.

The first is that the issue of bullying, which is limited to item V1 (“How often were you bullied?”), merits specification and further development.

Bullying is an important item related to childhood adversity, identified in the literature as being eminently psychologically destabilizing for children and adolescents victimized by such behavior (Moore et al., 2017). The experience, however, is measured through only one question. It would probably be appropriate to distinguish between bullying by peers and bullying at school, and to specify each in terms psychopathological consequences on victims. It might even be advisable to include an item on cyberstalking, which is receiving increasing attention as an important issue in the recent literature.

In addition, it is surprising that item V2 (“How were you bullied most often?”), which specifies the characteristics of bullying, is not included in the total score of the scale. The dimension of bullying could potentially be the subject of its own dimension (i.e., peer violence) which should be distinguished from the other dimensions proposed by the scale, such as community violence (V4-V6) and collective violence (V8-V10). It is clear that these items, which saturate the 3rd factors, refer to a very specific form of childhood adversity, which can be found in geopolitical situations subject to very specific forms of violence.

Moreover, it is debatable whether violence linked to soldiers in a war context, to the police, or to members of a militia or gang, which are elements that refer to specific aspects, deserve to be relativized. Perhaps these items should not be offered to all subjects, especially if they live in a more psychosocially and geopolitically “protected” environment.

On the other hand, concerning sexual violence, only items A5 to A8 (item A5: “Did someone touch or fondle you in a sexual way when you did not want them to?”; item A6: “Did someone make you touch their body in a sexual way when you did not want them to?”; item A7: “Did someone attempt oral, anal, or vaginal intercourse with you when you did not want them to?”; item A8: “Did someone actually have oral, anal, or vaginal intercourse with you when you did not want them to?”) address this dimension as if sexual violence could be restricted to the family context, and does not differentiate between sexual violence in a broader psychosocial context, by anyone known or unknown to the victim. Moreover, the literature shows that sexual violence in the family environment tends to be repetitive (Fergusson et al., 1996). The specifics of the context of childhood sexual abuse need to be better contextualized in order to

**Table 5**  
Correlation with other scales.

	HADS- Anxiety	HADS-Depression
ACE score	0.32*	0.18*
Childhood maltreatment	0.31*	0.24*
Family dysfunction	0.21*	0.03
Violence outside the home	0.19*	0.16*

\*  $p < 0.001$ .

better understand its implications for adulthood.

One of the major limitations of this scale is its inability to specify the time periods during which the participants were confronted with these different events. We note that all the sub-dimensions are preceded by the words “*during the first 18 years of your life*”. We would argue that such an instruction does not make it possible to distinguish at what period exactly the confrontation with the adverse events took place. If adversity is defined as “childhood events, of varying severity and often chronic, occurring in a child’s family or social environment that cause harm or distress, thereby disrupting the child’s health and physical or psychological development” (Kalmakis & Chandler, 2014), there is nothing comparable between an infant and a 16- or 17-year-old. The variability in developmental plasticity based on the timing of exposure to adverse experiences is well established (McLaughlin et al., 2019). Adversity can have a differential impact between young children and adolescents (Lippard & Nemeroff, 2020). The former are undoubtedly more impacted by a sense of helplessness in the face of violence, abuse, or neglect and less able to understand what is going on around them. Adolescents may be better able to cope with, avoid, or develop strategies for dealing with such events. Some questionnaires measuring childhood adversity offer such an indication (Hawes et al., 2021).

Regarding items F4 (“*Were your parents ever separated or divorced?*”) and F5 (“*Did your mother, father or guardian die?*”), it seems strange to group these items under the same dimension “parental separation”. Indeed, these two items do not refer to the same reality. If the separation and divorce of parents implies a form of mourning for what was the family or the family unit, the psychological impacts are in no way comparable with the actual death of one of the parents, which upsets a whole set of beliefs about the invulnerable and immortal character of the parents, and whose literature attests to these negative effects on psychological and physical health (Luecken, 2008).

The wording of the question in item F4, with its association of separation and divorce and the term “ever”, could potentially be confusing, in that it might be interpreted to mean that the parents may have once been separated and gotten back together or remarried, which seems unlikely. It would be more appropriate to make a distinction between the two dimensions as two separate items.

As such, it would be much more relevant to look at the impacts of the divorce, asking not just whether the parents separated or divorced, but whether the parents’ divorce represented a difficult time, or was an ordeal for the children, otherwise one misses the adverse dimension of the event. The issue has been identified in the literature as a problematic dimension (Felitti et al., 1998) which here does not saturate on any of the dimensions of the scale.

Another limitation concerns the population on which the study was conducted. Indeed, the participants were recruited within the framework of their psychotherapeutic treatment in private practice settings. This may imply a socio-economic bias, since only the most affluent, due to the cost of private practice consultations, have access to this level of care. Those living with limited resources are more likely to rely on available public health care services.

The fact that our sample is composed mainly of women (78.32%), and is not representative of the wider population, merits consideration. A further limitation relates to the fact that the survey was administered online, which presupposes familiarity with, and access to computers and the Internet. Several authors mention that respondents to online surveys are generally regular, even expert, users of the Internet, a factor that can potentially impact the type of sample (generally more affluent, educated, and younger, for example) (Bosnjak et al., 2013). This aspect of our study design could also call into question the representativeness of our sample.

Finally, it is difficult to consider item F5 as a separation as such. Death refers more to the idea of irretrievable loss, without hope. Even in situations where children are separated from their parents, the prospect of repairing the relationship can still be considered. Thus, this dimension composed of these two items lacks coherence and deserves the vigilance

of the scale’s users.

Recommendations for the use of the ACE-IQ:

We suggest that future users of the ACE-IQ distinguish between age periods that would be: infancy (0 to 3 years); childhood (4 to 8 years); preadolescence (9–13 years); and adolescence (14–18 years). Such an addition would more accurately situate adversity issues in terms of the intellectual and emotional development of the children who face them.

In addition, in the context of the research, a necessary modification would be to adapt certain items to the appropriate psychosocial context, particularly items V8, V9 and V10.

Finally, we feel it is worth acknowledging that completing the ACE-IQ could be triggering for certain (if not all) respondents, such that, with the exception of clinical contexts, it would be advisable to provide additional psychotherapeutic care when administering the questionnaire.

## 5. Conclusion

Although the ACE-IQ has a certain number of psychometric limitations, it is important to remember that this scale was developed by the WHO with a specific objective in mind, namely to contribute to a better understanding of the incidence of adversity during childhood, in order to allow comparisons between countries and cultures with the aim of developing prevention programs and policies throughout the world (World Health Organization, 2009, 2011a, 2011b). In turn, this scale provides French-speaking countries with a sufficiently comprehensive tool to identify and quantify the experience of adversity during childhood. Further validation will be necessary, however, to account for different cultural characteristics and perspectives between French speaking countries.

Its use can be envisaged in the context of research to further develop data in the field of adversity, as a tool for public health authorities working closely with children to identify and prevent contexts of adversity, and a valuable aid for psychologists and physicians seeking to better understand the history of their patients and ultimately the source of a range of physical and mental disorders.

An instrument in French will allow researchers and clinicians to introduce an adversity assessment to consider the link between the presence of ACEs and the occurrence of physical and psychological health problems.

This issue is not well taken into account in French-speaking countries, often due to a lack of reliable tools capable of operationalizing the conceptual aspects of adversity. For researchers, this will provide them with method for determining parameters that can give their work an additional heuristic scope. For clinicians, the availability of this scale will provide a means of identifying a range of ACEs, targeting them in the context of psychotherapy and better understanding how exposure to adversity may have impacted their patients.

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## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data will be made available on request.

## Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chilyouth.2023.107007>.

## References

- Alhowaymel, F., Kalmakis, K., & Jacelon, C. (2021). Developing the concept of adverse childhood experiences: A global perspective. *Journal of Pediatric Nursing*, 56, 18–23. <https://doi.org/10.1016/j.pedn.2020.10.004>
- Baglivio, M. T., Wolff, K. T., Piquero, A. R., & Epps, N. (2015). The relationship between adverse childhood experiences (ACE) and juvenile offending trajectories in a juvenile offender sample. *Journal of Criminal Justice*, 43(3), 229–241. <https://doi.org/10.1016/j.jcrimjus.2015.04.012>
- Bellis, M. A., Hughes, K., Ford, K., Ramos Rodriguez, G., Sethi, D., & Passmore, J. (2019). Life course health consequences and associated annual costs of adverse childhood experiences across Europe and North America: A systematic review and meta-analysis. *The Lancet. Public Health*, 4(10), e517–e528. [https://doi.org/10.1016/S2468-2667\(19\)30145-8](https://doi.org/10.1016/S2468-2667(19)30145-8)
- Bellis, M. A., Hughes, K., Leckenby, N., Hardcastle, K. A., Perkins, C., & Lowey, H. (2015). Measuring mortality and the burden of adult disease associated with adverse childhood experiences in England: A national survey. *Journal of Public Health*, 37(3), 445–454. <https://doi.org/10.1093/pubmed/dfu065>
- Bergen, H. A., Martin, G., Richardson, A. S., Allison, S., & Roeger, L. (2004). Sexual abuse, antisocial behaviour and substance use: Gender differences in young community adolescents. *Australian and New Zealand Journal of Psychiatry*, 38(1–2), 34–41. <https://doi.org/10.1111/j.1440-1614.2004.01295.x>
- Bocéréan, C., & Dupret, E. (2014). A validation study of the Hospital Anxiety and Depression Scale (HADS) in a large sample of French employees. *BMC Psychiatry*, 14, 354. <https://doi.org/10.1186/s12888-014-0354-0>
- Bond, T. G., & Fox, C. M. (2007). *Applying the Rasch model: Fundamental measurement in the human sciences* (2nd ed). Lawrence Erlbaum Associates Publishers.
- Bosnjak, M., Haas, I., Galesic, M., Kaczmirek, L., Bandilla, W., & Couper, M. P. (2013). Sample composition discrepancies in different stages of a probability-based online panel. *Field Methods*, 25(4), 339–360. <https://doi.org/10.1177/1525822X12472951>
- Campbell, J. A., Walker, R. J., & Egede, L. E. (2016). Associations between adverse childhood experiences, high-risk behaviors, and morbidity in adulthood. *American Journal of Preventive Medicine*, 50(3), 344–352. <https://doi.org/10.1016/j.amepre.2015.07.022>
- Chapman, D. P., Whitfield, C. L., Felitti, V. J., Dube, S. R., Edwards, V. J., & Anda, R. F. (2004). Adverse childhood experiences and the risk of depressive disorders in adulthood. *Journal of Affective Disorders*, 82(2), 217–225. <https://doi.org/10.1016/j.jad.2003.12.013>
- Cougle, J. R., Timpano, K. R., Sachs-Ericsson, N., Keough, M. E., & Riccardi, C. J. (2010). Examining the unique relationships between anxiety disorders and childhood physical and sexual abuse in the National Comorbidity Survey-Replication. *Psychiatry research*, 177(1–2), 150–155. <https://doi.org/10.1016/j.psychres.2009.03.008>
- Dancey, C. P., & Reidy, J. (2007). *Statistics Without Maths for Psychology*. Pearson Education.
- Danese, A., & McEwen, B. S. (2012). Adverse childhood experiences, allostasis, allostatic load, and age-related disease. *Physiology & Behavior*, 106(1), 29–39. <https://doi.org/10.1016/j.physbeh.2011.08.019>
- De Venter, M., Demyttenaere, K., & Bruffaerts, R. (2013). The relationship between adverse childhood experiences and mental health in adulthood: A systematic literature review. *Tijdschrift Voor Psychiatrie*, 55(4), 259–268.
- Essex, M. J., Thomas Boyce, W., Hertzman, C., Lam, L. L., Armstrong, J. M., Neumann, S. M. A., & Kobor, M. S. (2013). Epigenetic Vestiges of Early Developmental Adversity: Childhood Stress Exposure and DNA Methylation in Adolescence: Epigenetic Vestiges of Early Adversity. *Child Development*, 84(1), 58–75. <https://doi.org/10.1111/j.1467-8624.2011.01641.x>
- Exley, D., Norman, A., & Hyland, M. (2015). Adverse childhood experience and asthma onset: A systematic review. *European Respiratory Review*, 24(136), 299–305. <https://doi.org/10.1183/16000617.00004114>
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., ... Marks, J. S. (1998). Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults. *American Journal of Preventive Medicine*, 14(4), 245–258. [https://doi.org/10.1016/S0749-3797\(98\)00017-8](https://doi.org/10.1016/S0749-3797(98)00017-8)
- Fettes, D. L., Aarons, G. A., & Green, A. E. (2013). Higher rates of adolescent substance use in child welfare versus community populations in the United States. *Journal of Studies on Alcohol and Drugs*, 74(6), 825–834. <https://doi.org/10.15288/jsad.2013.74.825>
- Fergusson, D. M., Lynskey, M. T., & Horwood, L. J. (1996). Childhood Sexual Abuse and Psychiatric Disorder in Young Adulthood: I. Prevalence of Sexual Abuse and Factors Associated with Sexual Abuse. *Journal of the American Academy of Child & Adolescent Psychiatry*, 35(10), 1355–1364. <https://doi.org/10.1097/00004583-199610000-00023>
- Fergusson, D. M., & Mullen, P. (1999). *Childhood sexual abuse: An evidence-based perspective*. SAGE.
- Ford, D. C., Merrick, M. T., Parks, S. E., Breiding, M. J., Gilbert, L. K., Edwards, V. J., ... Thompson, W. W. (2014). Examination of the factorial structure of adverse childhood experiences and recommendations for three subscale scores. *Psychology of Violence*, 4(4), 432–444. <https://doi.org/10.1037/a0037723>
- Grogan-Kaylor, A., Ruffolo, M. C., Ortega, R. M., & Clarke, J. (2008). Behaviors of youth involved in the child welfare system. *Child Abuse & Neglect*, 32(1), 35–49. <https://doi.org/10.1016/j.chiabu.2007.09.004>
- Guillemin, F., Bombardier, C., & Beaton, D. (1993). Cross-cultural adaptation of health-related quality of life measures: Literature review and proposed guidelines. *Journal of Clinical Epidemiology*, 46(12), 1417–1432. [https://doi.org/10.1016/0895-4356\(93\)90142-n](https://doi.org/10.1016/0895-4356(93)90142-n)
- Hakamata, Y., Suzuki, Y., Kobashikawa, H., & Hori, H. (2022). Neurobiology of early life adversity: A systematic review of meta-analyses towards an integrative account of its neurobiological trajectories to mental disorders. *Frontiers in Neuroendocrinology*, 65, Article 100994. <https://doi.org/10.1016/j.yfrne.2022.100994>
- Hardouin, J.-B. (2005). *Construction d'échelles d'items unidimensionnelles en qualité de vie* [These de doctorat, Paris 5]. <http://www.theses.fr/2005PA05S020>
- Harkness, J., & Schoua-Glusberg, A. (1998). Questionnaires in translation. In J. Harkness, *Cross-cultural survey equivalence* (p. 87–126). Zentrum für Umfragen, Methoden und Analysen -ZUMA-. <https://nbn-resolving.org/urn:nbn:de:0168-soar-49733-1>
- Hawes, D. J., Lechowicz, M., Roach, A., Fisher, C., Doyle, F. L., Noble, S., & Dadds, M. R. (2021). Capturing the developmental timing of adverse childhood experiences: The Adverse Life Experiences Scale. *American Psychologist*, 76(2), 253–267. <https://doi.org/10.1037/amp0000760>
- Herzog, J. I., & Schmah, C. (2018). Adverse Childhood Experiences and the Consequences on Neurobiological, Psychosocial, and Somatic Conditions Across the Lifespan. *Frontiers in Psychiatry*, 9, 420. <https://doi.org/10.3389/fpsy.2018.00420>
- Ho, G. W. K., Chan, A. C. Y., Chien, W.-T., Bressington, D. T., & Karatzias, T. (2019). Examining patterns of adversity in Chinese young adults using the Adverse Childhood Experiences—International Questionnaire (ACE-IQ). *Child Abuse & Neglect*, 88, 179–188. <https://doi.org/10.1016/j.chiabu.2018.11.009>
- Holman, D. M., Ports, K. A., Buchanan, N. D., Hawkins, N. A., Merrick, M. T., Metzler, M., & Trivers, K. F. (2016). The Association Between Adverse Childhood Experiences and Risk of Cancer in Adulthood: A Systematic Review of the Literature. *Pediatrics*, 138 (Supplement 1), S81–S91. <https://doi.org/10.1542/peds.2015-4268L>
- Huang, H., Yan, P., Shan, Z., Chen, S., Li, M., Luo, C., ... Liu, L. (2015). Adverse childhood experiences and risk of type 2 diabetes: A systematic review and meta-analysis. *Metabolism: Clinical and experimental*, 11(64), 1408–1418.
- Hughes, K., Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., ... Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: A systematic review and meta-analysis. *The Lancet. Public Health*, 2(8), e356–e366. [https://doi.org/10.1016/S2468-2667\(17\)30118-4](https://doi.org/10.1016/S2468-2667(17)30118-4)
- Hughes, K., Ford, K., Bellis, M. A., Glendinning, F., Harrison, E., & Passmore, J. (2021). Health and financial costs of adverse childhood experiences in 28 European countries: A systematic review and meta-analysis. *The Lancet. Public Health*, 6(11), e848–e857. [https://doi.org/10.1016/S2468-2667\(21\)00232-2](https://doi.org/10.1016/S2468-2667(21)00232-2)
- Kalmakis, K. A., & Chandler, G. E. (2014). Adverse childhood experiences: Towards a clear conceptual meaning. *Journal of Advanced Nursing*, 70(7), 1489–1501. <https://doi.org/10.1111/jan.12329>
- Kazeem, O. T. (2015). A Validation of the Adverse Childhood Experiences Scale in Nigeria. *Research on humanities and social sciences*, 5, 18–23.
- Kidman, R., Smith, D., Piccolo, L. R., & Kohler, H.-P. (2019). Psychometric evaluation of the Adverse Childhood Experience International Questionnaire (ACE-IQ) in Malawian adolescents. *Child Abuse & Neglect*, 92, 139–145. <https://doi.org/10.1016/j.chiabu.2019.03.015>
- Lippard, E. T. C., & Nemeroff, C. B. (2020). The Devastating Clinical Consequences of Child Abuse and Neglect: Increased Disease Vulnerability and Poor Treatment Response in Mood Disorders. *American Journal of Psychiatry*, 177(1), 20–36. <https://doi.org/10.1176/appi.ajp.2019.19010020>
- Lopes, S., Hallak, J. E. C., Machado de Sousa, J. P., & de Osório L., F. (2020). Adverse childhood experiences and chronic lung diseases in adulthood: A systematic review and meta-analysis. *European Journal of Psychotraumatology*, 11(1), 1720336. <https://doi.org/10.1080/20008198.2020.1720336>
- Lovallo, W. R. (2013). Early life adversity reduces stress reactivity and enhances impulsive behavior: Implications for health behaviors. *International Journal of Psychophysiology: Official Journal of the International Organization of Psychophysiology*, 90(1), 8–16. <https://doi.org/10.1016/j.ijpsycho.2012.10.006>
- Luecken, L. J. (2008). Long-term consequences of parental death in childhood: Psychological and physiological manifestations. In M. S. Stroebe, R. O. Hansson, H. Schut, & W. Stroebe (Éds.), *Handbook of bereavement research and practice: Advances in theory and intervention*. (p. 397–416). American Psychological Association. <https://doi.org/10.1037/14498-019>
- McGowan, P. O., Sasaki, A., D'Alessio, A. C., Dymov, S., Labonté, B., Szyf, M., ... Meaney, M. J. (2009). Epigenetic regulation of the glucocorticoid receptor in human brain associates with childhood abuse. *Nature Neuroscience*, 12(3), 342–348. <https://doi.org/10.1038/nn.2270>
- McKay, M. T., Kilmartin, L., Meagher, A., Cannon, M., Healy, C., & Clarke, C. (2022). A revised and extended systematic review and meta-analysis of the relationship between childhood adversity and adult psychiatric disorder. *Journal of Psychiatric Research*, 156(268), 283. <https://doi.org/10.1016/j.jpsyres.2022.10.015>
- McLaughlin, K. A., Weissman, D., & Bitrán, D. (2019). Childhood Adversity and Neural Development: A Systematic Review. *Annual Review of Developmental Psychology*, 1(1), 277–312. <https://doi.org/10.1146/annurev-devpsych-121318-084950>
- Merrick, M. T., Ports, K. A., Ford, D. C., Afifi, T. O., Gershoff, E. T., & Grogan-Kaylor, A. (2017). Unpacking the impact of adverse childhood experiences on adult mental health. *Child Abuse & Neglect*, 69, 10–19. <https://doi.org/10.1016/j.chiabu.2017.03.016>
- Moore, S. E., Norman, R. E., Suetani, S., Thomas, H. J., Sly, P. D., & Scott, J. G. (2017). Consequences of bullying victimization in childhood and adolescence: A systematic

- review and meta-analysis. *World Journal of Psychiatry*, 7(1), 60–76. <https://doi.org/10.5498/wjp.v7.i1.60>
- Nelson, S. M., Cunningham, N. R., & Kashikar-Zuck, S. (2017). A Conceptual Framework for Understanding the Role of Adverse Childhood Experiences in Pediatric Chronic Pain. *The Clinical Journal of Pain*, 33(3), 264–270. <https://doi.org/10.1097/AJP.0000000000000397>
- Pereira, F. G., & Viana, M. C. (2021). Adaptação transcultural do Adverse Childhood Experiences International Questionnaire. *Revista de Saúde Pública*, 55, 79. <https://doi.org/10.11606/s1518-8787.2021055003140>
- Petruccioli, K., Davis, J., & Berman, T. (2019). Adverse childhood experiences and associated health outcomes : A systematic review and meta-analysis. *Child Abuse & Neglect*, 97, Article 104127. <https://doi.org/10.1016/j.chiabu.2019.104127>
- Ports, K. A., Holman, D. M., Guinn, A. S., Pampati, S., Dyer, K. E., Merrick, M. T., ... Metzler, M. (2019). Adverse Childhood Experiences and the Presence of Cancer Risk Factors in Adulthood : A Scoping Review of the Literature From 2005 to 2015. *Journal of Pediatric Nursing*, 44, 81–96. <https://doi.org/10.1016/j.pedn.2018.10.009>
- Powell, N. D., Sloan, E. K., Bailey, M. T., Arevalo, J. M. G., Miller, G. E., Chen, E., ... Cole, S. W. (2013). Social stress up-regulates inflammatory gene expression in the leukocyte transcriptome via  $\beta$ -adrenergic induction of myelopoiesis. *Proceedings of the National Academy of Sciences*, 110(41), 16574–16579. <https://doi.org/10.1073/pnas.1310655110>
- Razavi, D., Delvaux, N., Farvacques, C., & Robaye, E. (1989). Validation de la version française du HADS dans une population de patients cancéreux hospitalisés. *Revue de Psychologie Appliquée*, 39(4), 295–307.
- Seeman, T., Epel, E., Gruenewald, T., Karlamangla, A., & McEwen, B. S. (2010). Socio-economic differentials in peripheral biology : Cumulative allostatic load: SES peripheral biology. *Annals of the New York Academy of Sciences*, 1186(1), 223–239. <https://doi.org/10.1111/j.1749-6632.2009.05341.x>
- Schuck, A. M., & Widom, C. S. (2001). Childhood victimization and alcohol symptoms in females : Causal inferences and hypothesized mediators. *Child Abuse & Neglect*, 25(8), 1069–1092. [https://doi.org/10.1016/S0145-2134\(01\)00257-5](https://doi.org/10.1016/S0145-2134(01)00257-5)
- Steel, J. L., Antoni, M., Pathak, R., Butterfield, L. H., Vodovotz, Y., Savkova, A., ... Geller, D. A. (2020). Adverse childhood experiences (ACEs), cell-mediated immunity, and survival in the context of cancer. *Brain, Behavior, and Immunity*, 88, 566–572. <https://doi.org/10.1016/j.bbi.2020.04.050>
- Tarquino, C., & Auxéméry, Y. (2022). *Manuel clinique des troubles psychotraumatiques*. Dunod.
- van der Feltz-Cornelis, C. M., Potters, E. C., van Dam, A., Koornrijk, R. P. M., Elfeddali, I., & van Eck van der Sluijs, J. F. (2019). Adverse Childhood Experiences (ACE) in outpatients with anxiety and depressive disorders and their association with psychiatric and somatic comorbidity and revictimization. Cross-sectional observational study. *Journal of Affective Disorders*, 246, 458–464. <https://doi.org/10.1016/j.jad.2018.12.096>
- World Health Organization. (s. d.). *Whodas 2.0 translation package (version 1.0) translation and linguistic evaluation protocol and supporting material*. <https://terrance.who.int/mediacentre/data/WHODAS/Guidelines/WHODAS%202.0%20Translation%20guidelines.pdf>
- World Health Organization. (2009). *Addressing adverse childhood experiences to improve public health : Expert consultation*.
- World Health Organization. (2011a). *Adverse childhood experiences international questionnaire (ACE-IQ)*.
- World Health Organization. Adverse childhood experiences international questionnaire (pilot study review and finalization meeting) 2011.
- Wright, B., & Masters, G. (1982). Rating scale analysis. *Measurement and statistics*. <https://research.acer.edu.au/measurement/2>.
- Yasin, R. M., Yunus, F. A. N., Rus, R. C., Ahmad, A., & Rahim, M. B. (2015). Validity and Reliability Learning Transfer Item Using Rasch Measurement Model. *Procedia - Social and Behavioral Sciences*, 204, 212–217. <https://doi.org/10.1016/j.sbspro.2015.08.143>
- Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica*, 67(6), 361–370. <https://doi.org/10.1111/j.1600-0447.1983.tb09716.x>