Modifying, standardizing and adapting the Adverse Childhood Experience Questionnaire

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Background: *Medical and social workers and psychologists are increasingly faced with challenges relating to the management of the impact of adverse childhood experiences (ACE) on patient's health and feeling of mental wellbeing. Consequently, it is important to develop psychodiagnostic instruments for detecting ACE and to adapt them to the social and cultural realities of the Ukrainian environment.*
Purpose: *To modify, standardize and adapt the Ukrainian version of the ACE Questionnaire.*
Material and Methods: *A sample of 230 respondents aged 18 to 70 years was included in this study. A modified version of the original ACE Questionnaire by Felitti, Anda and colleagues was used in the study.*
Results: *The original items were translated and modified, and the resultant questionnaire was validated. Cronbach's Alpha test was conducted to test internal reliability, and factor analysis, (a) to determine the number and structure of factors describing the covariance structure of the data and (b) to confirm the construct validity of the instrument. In addition, the instrument was standardized by calculating percentile ranks, Z-score normalizing and reporting the scores as stanines. As a result, an advanced Ukrainian version of the instrument was obtained, comprising three main subscales and the additional subscale with 22 items totally. Therefore, the adapted Ukrainian version of the ACE Questionnaire is characterized by high construct validity and reliability.*

Key words:
ACE, adverse childhood experience, questionnaire, standardization, modification, reliability, validity.

Problem setting

This paper continues the series [1, 2] on developing psychodiagnostic instruments for detecting stress reactions and inter-role conflicts for eye-care workers as well as making these instruments psychometrically adapted to social and cultural realities of the Ukrainian professional environment.

A questionnaire on the negative effect of adverse childhood experiences on the individual's psyche and body was developed in the nineteen eighties and nineties. Physicians and researchers of that time found interrelationship between the negative childhood experience and several diseases that may affect an adult individual.

Vincent J. Felitti, the founder and executive director of the California Institutes of Preventive Medicine, noted that most of his patients were recalling negative childhood experiences which he supposed to lead to somatic and psychic changes; this prompted the idea of one of the largest scale studies in the USA. He hypothesized that substantial changes in the body may result from adverse childhood and/or adolescence experience. Although the hypothesis was heavily criticized in the professional literature, it was supported by some researchers, particularly by Robert F. Anda, MD, from the National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention [3].

To assess ACEs, the ACE Study Questionnaire was created. Originally a 17-item measure, its most recent iteration has been consolidated into 10 items. The questionnaire was mailed to more than 26,000 patients. More than 17,000 responded. The items cover different types of physical and emotional discomfort experienced within the family and under potentially unfavorable life conditions. The researchers were highly impressed with the results of the questionnaire study, because although this was a middle-class, mostly college-educated, well-insured sample of adults, only a small portion of the sample reported no adverse childhood experience. They found a strong graded relationship between the breadth of exposure to abuse or household dysfunction during childhood and multiple risk factors for several of the leading causes of death in adults, and concluded that adverse childhood experiences can affect physical and mental health in adulthood [4, 5]. This was demonstrated in numerous studies by Felitti, Enda and others [3, 5, 6, 7], and the ACE methodology has been widely employed

over the world to determine disease cause. Fig. 1 shows the original 1998 version of the ACE Study questionnaire.

Currently, the ACE study methodology without major changes is being used in 14 countries. ACE Study questionnaire testing in a Ukrainian sample has proved its scientific value for the adaptation to social and cultural realities of the Ukrainian professional environment. Donna Jackson Nakazawa, an award-winning science journalist, conference and university speaker, published a profound review of the development and application of the ACE Study methodology. It is in her book (Childhood disrupted: How your biography becomes your biology, and how you can heal) published in Russian in 2018 [4] that one can find the first Russian version of the ACE Study Questionnaire translated from English by T.I. Poroshina (Fig. 2).

While you were growing up, during your first 18 years of life:

1. Did a parent or other adult in the household **often** ...
   Swear at you, insult you, put you down, or humiliate you?
   or
   Act in a way that made you afraid that you might be physically hurt?
   Yes No If yes enter 1 _____

2. Did a parent or other adult in the household **often** ...
   Push, grab, slap, or throw something at you?
   or
   Ever hit you so hard that you had marks or were injured?
   Yes No If yes enter 1 _____

3. Did an adult or person at least 5 years older than you **ever**...
   Touch or fondle you or have you touch their body in a sexual way?
   or
   Try to or actually have oral, anal, or vaginal sex with you?
   Yes No If yes enter 1 _____

4. Did you **often** feel that ...
   No one in your family loved you or thought you were important or special?
   or
   Your family didn't look out for each other, feel close to each other, or support each other?
   Yes No If yes enter 1 _____

5. Did you **often** feel that ...
   You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you?
   or
   Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?
   Yes No If yes enter 1 _____

6. Were your parents **ever** separated or divorced?
   Yes No If yes enter 1 _____

7. Was your mother or stepmother:
   Often pushed, grabbed, slapped, or had something thrown at her?
   or
   Sometimes or often kicked, bitten, hit with a fist, or hit with something hard?
   or
   Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?
   Yes No If yes enter 1 _____

8. Did you live with anyone who was a problem drinker or alcoholic or who used street drugs?
   Yes No If yes enter 1 _____
9. Was a household member depressed or mentally ill or did a household member attempt suicide?
   Yes No If yes enter 1 _____

10. Did a household member go to prison?
    Yes No If yes enter 1 _____

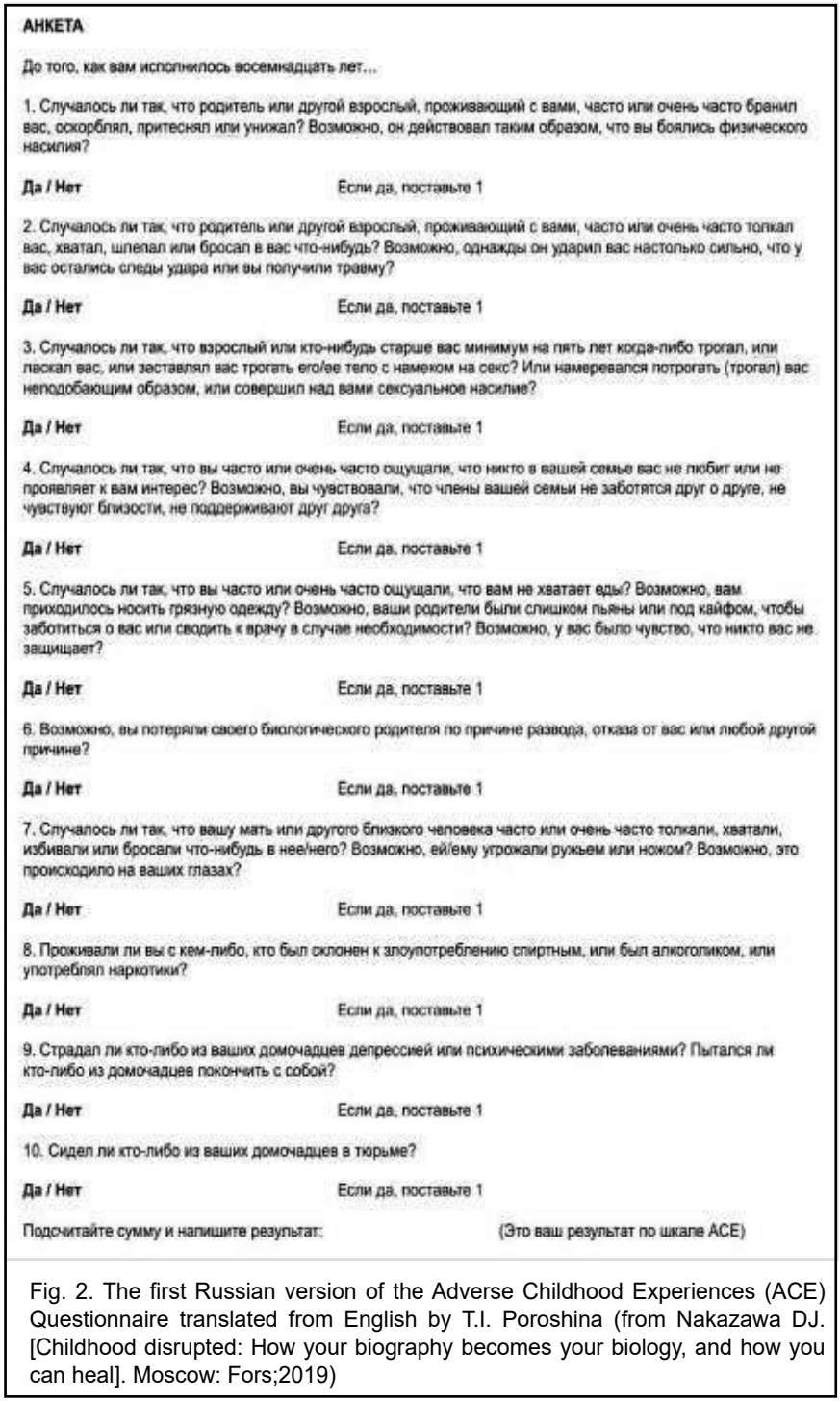
Now add up your "Yes" answers: _____ This is your ACE Score

Fig. 1. Felitti et al Adverse Childhood Experiences (ACE) Questionnaire of 1998

The above Russian version completely conforms and is semantically symmetrical to the original version since it mirrors the sense and colloquialism of the methodology [8]. Given the fact that the book was translated by a qualified translator, there is no reason to doubt the quality of the translation. No difference in the sense or readability between the two versions of the questionnaire was observed, which allowed proceeding to the next step.

In 2018, one of the first modified Ukrainian versions [9] of the ACE Study Questionnaire was applied to investigate the consequences of adverse childhood experiences in a Ukrainian sample of adults without a major mental disorder (Fig. 3). In the Ukrainian version of the ACE Study Questionnaire modified by Milituina [9], the number of items was increased from 10 to 20, to include e.g., "the experience of a severe disease and/or school bullying", feeling that one received less parental care than a sibling and the two items regarding a special punishing tool (experiencing silence for several hours and experiencing being locked in a room or tied up). In 2019, the ACE Questionnaire as modified by Miliutina was applied by Ukrainian researchers [10] to visually impaired adolescents to investigate their social and psychological adjustment. The researchers found that the level of ACE was positively correlated with anxiety and negatively correlated with emotional comfort and adaptability, whereas the presence of parental antisocial behavior worsened behavioral regulation and orientation towards moral norms of society.

It is the ACE Questionnaire as modified by Miliutina for a Ukrainian sample was used in studies of 2018 to 2020 (a) to check whether the questionnaire was relevant to the respondents and (b) to establish any significant associations between particular adverse childhood experiences and categories of affection, communication and will, and between the former and the features of parent-child relationships as well as adaptability. Totally, two hundred and eighty seven individuals participated in these studies [11, 12, 13]. The three hypotheses on the association between the adverse childhood experience and psyche functions have been confirmed, and the distributions of frequencies and severity of particular experiences warranted for studies aimed at quantifying the prevalence of adverse childhood experiences among current adolescent and adult Ukrainian populations and illuminating the connection of these experience with the



АНКЕТА

До того, как вам исполнилось восемнадцать лет...

1. Случалось ли так, что родитель или другой взрослый, проживающий с вами, часто или очень часто бранил вас, оскорблял, притеснял или унижал? Возможно, он действовал таким образом, что вы боялись физического насилия?

Да / Нет Если да, поставьте 1

2. Случалось ли так, что родитель или другой взрослый, проживающий с вами, часто или очень часто толкал вас, хватал, шлепал или бросал в вас что-нибудь? Возможно, однажды он ударил вас настолько сильно, что у вас остались следы удара или вы получили травму?

Да / Нет Если да, поставьте 1

3. Случалось ли так, что взрослый или кто-нибудь старше вас минимум на пять лет когда-либо трогал, или ласкал вас, или заставлял вас трогать его/ее тело с намеком на секс? Или намеревался потрогать (трогал) вас неподобающим образом, или совершил над вами сексуальное насилие?

Да / Нет Если да, поставьте 1

4. Случалось ли так, что вы часто или очень часто ощущали, что никто в вашей семье вас не любит или не проявляет к вам интерес? Возможно, вы чувствовали, что члены вашей семьи не заботятся друг о друге, не чувствуют близости, не поддерживают друг друга?

Да / Нет Если да, поставьте 1

5. Случалось ли так, что вы часто или очень часто ощущали, что вам не хватает еды? Возможно, вам приходилось носить грязную одежду? Возможно, ваши родители были слишком пьяны или под кайфом, чтобы заботиться о вас или сводить к врачу в случае необходимости? Возможно, у вас было чувство, что никто вас не защищает?

Да / Нет Если да, поставьте 1

6. Возможно, вы потеряли своего биологического родителя по причине развода, отказа от вас или любой другой причине?

Да / Нет Если да, поставьте 1

7. Случалось ли так, что вашу мать или другого близкого человека часто или очень часто толкали, хватали, избивали или бросали что-нибудь в нее/него? Возможно, ей/ему угрожали ружьем или ножом? Возможно, это происходило на ваших глазах?

Да / Нет Если да, поставьте 1

8. Проживали ли вы с кем-либо, кто был склонен к злоупотреблению спиртным, или был алкоголиком, или употреблял наркотики?

Да / Нет Если да, поставьте 1

9. Страдал ли кто-либо из ваших домочадцев депрессией или психическими заболеваниями? Пытался ли кто-либо из домочадцев покончить с собой?

Да / Нет Если да, поставьте 1

10. Сидел ли кто-либо из ваших домочадцев в тюрьме?

Да / Нет Если да, поставьте 1

Подсчитайте сумму и напишите результат: (Это ваш результат по шкале ACE)

Fig. 2. The first Russian version of the Adverse Childhood Experiences (ACE) Questionnaire translated from English by T.I. Poroshina (from Nakazawa DJ. [Childhood disrupted: How your biography becomes your biology, and how you can heal]. Moscow: Fors;2019)

development of life orientation in these populations. The successful use of the ACE questionnaire was a decisive point for improving, standardizing and adapting the instrument.

Results

The instrument was adapted in two phases. The first phase aimed to determine whether respondents understand the items as they are intended, and, if required, to introduce corrections in the final version. With this in mind, the instruction text was expanded to include the following questions: 'Are all the questions understandable? If not, please, write down the numbers of the questions which are not understandable. Should any questions be rephrased? How would you rephrase them?' The group of the first phase was composed of 15 individuals, 6 of which were final year post-graduate students of the School of Psychology with experience in adapting foreign tests to the Ukrainian environment, and able to conduct expert assessment and correct for minor inaccuracies in the formulation of questions. For example, items nos. 1, 3, 7, 9, 12 and 18 of the Ukrainian version (Fig. 3) included the equivalent of the phrase 'often or very often'. Because it was decided that these words made question formulation somewhat wordy but did not alter the sense of the answer, the equivalent of the phrase 'very often' was excluded from each relevant question (which corresponds to the original English-language version presented in Fig. 1). However, item No. 3 ('While you were growing up, during your first 18 years of life, did an adult often push, grab, slap, or throw something at you? or Ever hit you so hard that you had bruises?', Fig. 3) was divided into two separate items, because being hit with a belt for punishment is a different experience from being hit so hard that it resulted in an injury.

The next step was the final reconciliation of the English version with the Ukrainian version translated from English. Thus, the item on sexual relationships was left unchanged from the original version, with clarification of the type of sexual contact (item No.3, Fig. 1, 'Did an adult or person at least 5 years older than you ever touch or fondle you or have you touch their body in a sexual way? or Attempt or actually have oral or anal intercourse with you?', compared to item No.6, Fig. 3, 'While you were growing up, during your first 18 years of life, did an adult or person at least 5 years older than you ever have sex with you?'). In item No. 7, Fig.3 ('While you were growing up, during your first 18 years of life, did you often feel that no one in your family loved you or thought you were important or special'), the word 'зневага' (disdain) was replaced with 'байдужість' (indifference) to make a more accurate transfer of meaning

Instruction. If yes, enter +.

1. Did an adult often or very often insult you or humiliate you?

2. Did an adult act in a way that made you afraid that you might be physically hurt?

3. Did an adult often push, grab, slap, or throw something at you?

or Ever hit you so hard that you had bruises?

4. Have you ever been hospitalized for more than seven days for an injury or illness?

5. Did an adult or person at least 5 years older than you ever touch or fondle you in a sexual way?

6. Did an adult or person at least 5 years older than you ever have sex with you?

7. Did you often or very often feel that no one loved you or thought you were important or special?

8. Did you feel that your family didn't look out for each other, feel close to each other, or support each other?

9. Did you often or very often feel that you didn't have enough to eat and had to wear dirty clothes?

10. Did you often feel that your parents were too drunk or high to take care of you if you needed it?

11. Were your parents ever separated or divorced?

12. Was your mother or other family member often or very often pushed, grabbed, or slapped?

13. Was your mother or other family member ever threatened with a gun or knife by an adult?

14. Did you live with anyone who was a problem drinker or alcoholic or who used drugs?

15. Did a household member go to prison?

16. Was a household member mentally ill?

17. Did a household member attempt suicide?

18. Were you often or very often being punished by an adult by being locked in a room or tied up?

19. Were you often or very often being punished by an adult by being not talked to for hours?

20 Were you ever a victim of bullying or violence at school?

Fig. 3. The Ukrainian version of the Adverse Childhood Experience (ACE) Questionnaire as modified by Miliutina in 2018

from the original (Item No. 4, Fig. 1 "Did you often or very often feel that no one in your family loved you or thought you were important or special? or Your family didn't look out for each other, feel close to each other, or support each other?'). In addition, because it was noted that item No.5 of the original version on 'having no one to protect' was incorrectly translated in the trial Ukrainian version, the relevant portion was rephrased using a separate question (item No.5, Fig. 1, 'Did you often or very often feel that you didn't have enough to eat, had to wear dirty clothes, and had no one to protect you? or Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?'). Therefore, questionnaire items were assessed by experts in the field, which enabled to improve the methodology (particularly by including more branched items) and more understandable to a Ukrainian respondent. These were all the changes that were made in the questionnaire in the process of its translation into Ukrainian and shaping as a stand-alone methodology (Annex 1).

The second phase of the study was conducted both on-line and off-line. Of 230 respondents, 170 were women and 60, men. Respondents' mean age was 26 years.

Cronbach's Alpha test was conducted to test internal reliability. The internal reliability was found to be high since the relevant value was higher than the norm (Cronbach's $\alpha = 0.874$). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.809, indicating sampling adequacy. Bartlett's test of sphericity (test of at least one significant correlation between 2 of the items studied) was used to evaluate the "factorability" of our data and was significant ($p = 0.000$), indicating correlations amongst our items and confirming the appropriateness of factor analysis.

Factor analysis was applied to explore the factor structure of the questionnaire. On the basis of the Kaiser's criterion, principal components with an eigenvalue above 1 were extracted. The percentage of cumulative variance was 47%. This indicates that 47% of relationships are not accidental, and thus we obtain three subscales. In addition, this favors the validity of the methodology (see below). The scree plot is another method used to determine subscales to be retained. Fig. 4 shows that the point where the plot bends from steeper to flatter is between the 6th and 7th components. The location or the bend at which the curve first begins to straighten out indicates the maximum number of components to retain.

The results of the Varimax rotation for obtaining the simplest factor structure, however, did not support the structure of the measure with 6, 5 or even 4 subscales, because in this case some subscales would contain only one item. Consequently, after checking for the bend point at the plot and using the Kaiser's criterion, the rotated component matrix was used to create a table for obtaining the construct with the most informative subscales.

Of note that the results of the rotated component matrix indicated that no subscale contained one of the 23 items (item No. 7, 'While you were growing up, during your first 18 years of life, have you being hospitalized with a severe illness?'). Since the software has identified this item as one that does not work as intended and is not associated with any other items, the item was excluded from the questionnaire. Therefore, the final version of the questionnaire will include 22 items. Based on the largest correlation value (> 0.301), we decided to develop three major subscales and one additional subscale to contain the 22 items totally (Table 1).

Assigning the items to subscales after Varimax factor rotation was a challenge because there were overlapping items between different subscales. Consequently, the assignment was based on a higher value of a particular item and relationships of the item with other items in this or that category. Thus, the software proposed to have 14, 10 and 6 items in the first, second and third subscales, respectively. After conducting the qualitative analysis, we assigned the items to these subscales in a manner that the composition of the third subscale, but the first or second subscale, was

still under question. Because the item regarding "early sexual life" had a high value (> 0.834), it could not be excluded from the questionnaire. The items regarding other childhood experiences in this category were repeated in the first scale or the second scale with significantly higher values and were deemed more appropriate in the first scale or the second scale. Therefore, it was finally decided to retain 10, 10 and 2 items in the first, second and third subscales, respectively, of the Ukrainian version of the ACE questionnaire. It was, however, also decided to develop an additional informative subscale (the fourth subscale) which can be used in studies with particular purposes. Below is a more detailed description of the subscales.

Subscale 1. The Exposure to Household Dysfunction subscale includes 10 questions (Nos. 11, 12, 13, 15, 16, 17, 18, 19, 20, and 21) about exposure to substance abuse, parental separation/divorce, mental illness, suicide attempt, criminal behavior in the household, having a family member incarcerated, and failure to provide basic needs prior to one's 18th birthday. Therefore, the Exposure to Household Dysfunction subscale describes the features of the intrafamilial situation that fails to provide for positive childhood experience.

Subscale 2. The Exposure to Destructive Attitudes subscale includes 10 questions (Nos. 1, 2, 3, 4, 8, 9, 10, 14, 22 and 23) about frequent exposure to insult or humiliation; frequent exposure to pushing, grabbing, slapping or throwing subjects; feeling that no one in the family loved him/her or thought he/she was special; feeling that one received less parental care than a sibling; feeling that the family didn't feel close to each other, or support each other; feeling that he/she had no one to protect him/her; exposure to the use of silence as a punishing tool; and exposure to bullying and violence at school prior to one's 18th birthday. Therefore, the Exposure to Destructive Attitudes subscale describes the features of the psychological status of a person that received little attention, acceptance and support in his/her childhood. In addition, the subscale relates to exposure to the use of physical and psychological violence as a method of upbringing.

Subscale 3. The Early Exposure to Sexual Life subscale includes 2 questions (Nos. 5 and 6) about exposure to sexual abuse (including attempts to have sex) by a person at least five years older. The purpose of this subscale is to identify early childhood sexual experience and early childhood maturation.

Subscale 4 (the additional subscale). The Social and Emotional Neglect subscale includes 6 questions (Nos. 5, 6, 13, 19, 21, and 23). The questions of the subscale are shown in a separate table (Table 4).

Based on the rotated component matrix of the factor analysis, the items relating to feeling of having not enough to eat and having to wear dirty clothes; experience of having a family member incarcerated; experience of being locked in a room or tied up; and experience of school bullying were added to the subscale. Therefore, the analysis of the combination of the above childhood experiences allows describing Subscale 4 (the additional subscale) as one that reflects early maturation due to the following reasons: a family living under severe social and economic constraints and failing to provide basic needs; the disappearance of a parent through divorce, death or abandonment; and early sexual relations. Practicing psychologists believe that, in early sexual relations, a sexual partner is commonly perceived not as a mature life partner, but rather as a transferred paternal (maternal) imago, and sex is perceived as manifestation of attention, care or intimacy that cannot be experienced in the family or other social institutions (e.g., school). Therefore, the additional subscale was composed of six items to demonstrate the life circumstances relating to social and emotional neglect.

Another noteworthy aspect was checking for internal consistency reliability. With this in mind, Pearson correlation coefficients were calculated for the relationships (a) between the three subscales and total ACE scores of study participants and (b) among the three subscales (Table 3). In addition, correlations were found between the answers to particular questions of these subscales and the total ACE score, which confirmed the appropriateness of using the methodology in studies on adverse childhood experience.

The next stage of the study was to standardize the questionnaire in order to determine score distribution and to confirm that the questionnaire operates as expected and is appropriate for use. The analysis of the obtained data demonstrated that normal distribution histograms of each of the subscales and total ACE score were shifted to the left. This was natural, because the questionnaire uses a binary yes/no response to a specific experience (Fig. 5).

It was decided to use the concepts of normal and abnormal when assessing score distributions for subscales. This is because the instrument contains only 22 questions, and if the results are assessed using the concepts of high, moderate and low levels, researchers will have to deal with decimal numbers. It is noteworthy that the original (English-language) ACE instrument has a similar pattern of distribution, and a maximum sum score of 10, with a participant with an ACE score of 4 or more being considered as that with a disruptive effect of ACE on long-term health [3, 14, 15].

Discussion

Therefore, standardization was performed with conversion of stanine to Z-scores using the following formula: Z = (X - Xmean)/ SD, where Xmean is the mean value of X; SD is standard deviation. For this purpose, scores for subscales and respondents were calculated; Xmean, SD, and ranges for normal and abnormal were determined based on histograms of normal distribution for each of the subscales as well as total ACE score (Table 4).

At last, the construct validity of the modified Ukrainian ACE questionnaire was investigated, with the original American ACE questionnaire used as the reference standard. The original ACE questionnaire contains

three subscales: abuse (psychological, physical, and sexual), neglect (emotional and physical), and household dysfunction (violence against mother, parental separation/ divorce, mental illness in home, household substance use, and incarcerated household member).

We examined the factorial structure of the modified Ukrainian ACE questionnaire in the Ukrainian sample and the results also suggested that a three-factor solution adequately fit the data. However, there was a difference with regard to the description, and we used the additional subscale. We believe that the difference in the grouping of items could be caused by social and cultural differences among respondents, difference in respondents understanding and interpretation of items, and an increased number of items (the original version is composed of 10 items, each of which contains a subquestion).

Therefore, although differences in questionnaire construct pattern and study sample resulted in the difference in the grouping of items, the internal consistency was preserved, and this was enough for confirming the construct validity of the Ukrainian version of the methodology.

Conclusion

We demonstrated the appropriateness, reliability, construct validity and internal reliability of the instrument using statistical methods (including factor analysis and reliability analyses). As a result of comprehensive modification, adaptation and standardization of the original English-language ACE questionnaire, an advanced Ukrainian version of the instrument was obtained, comprising three main subscales (Exposure to Household Dysfunction, Exposure to Destructive Attitudes, and Early Exposure to Sexual Life) and the additional subscale (Social and Emotional Neglect) with 22 items totally.

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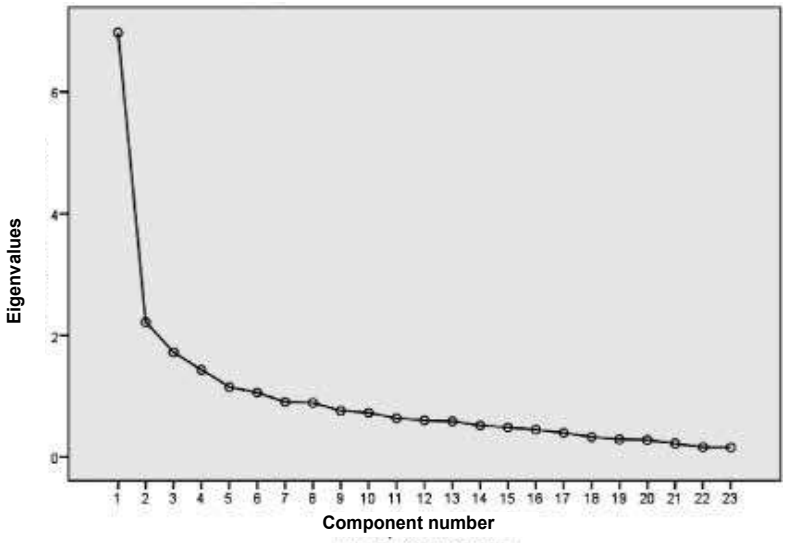

Fig. 4. Exploratory Factor Analysis Scree Plot

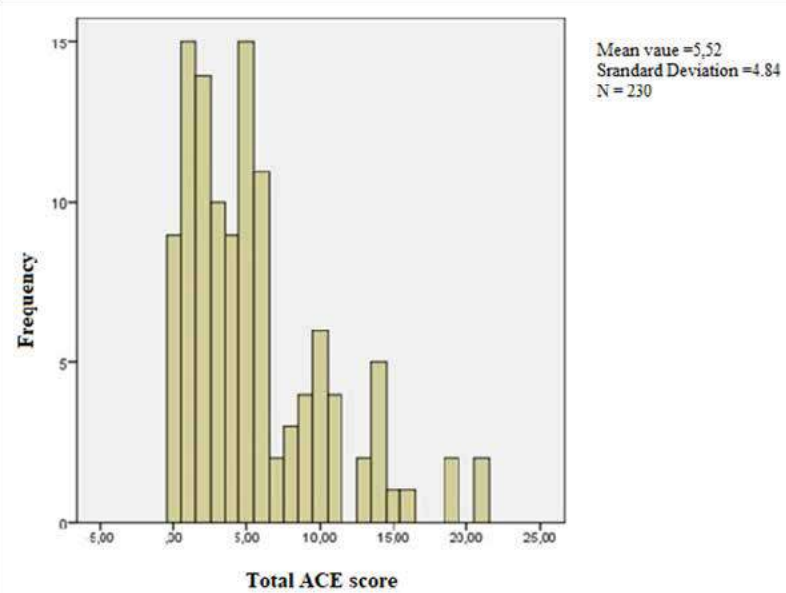

Fig. 5. Normal distribution histogram for Total Score of the modified Ukrainian version of the ACE Study Questionnaire

Table 1. Subscales of the Ukrainian modified version of Adverse Childhood Experience Questionnaire

Subscale	Item Number	Item
1. Exposure to Household Dysfunction	11 (0.621)	Prior to the age of 18, did you live with a household member who was a problem drinker or used drugs regularly?
	12 (0.747)	Would you say that your parents did not take care of you if you needed it due to their problem drinking or using drugs regularly?
	13 (0.587)	Did you often feel that you didn't have enough to eat and had to wear dirty clothes at school?
	15 (0.623)	When you were a child (prior to the age of 18), was your mother or other family member often pushed, grabbed, or slapped by an adult?
	16 (0.685)	When you were a child (prior to the age of 18), was your mother or other family member ever threatened with a gun or knife by an adult?
	17 (0.474)	When you were a child (prior to the age of 18). were your parents ever separated or divorced?
	18 (0.530)	When you were a child, was a household member mentally ill?
	19 (0.633)	When you were a child, did a household member go to prison?
	20 (0.747)	When you were a child, did a household member attempt suicide?
	21 (0.640)	When you were a child (prior to the age of 18), were you often being punished by an adult by being locked in a room or tied up?
2. Exposure to Destructive Attitudes	1 (0.722)	When you were a child (prior to the age of 18), did an adult often or very often insult you or humiliate you?
	2 (0.684)	When you were a child (prior to the age of 18), did an adult act in a way that made you afraid that you might be physically hurt?
	3 (0.745)	When you were a child (prior to the age of 18), did an adult often push, grab, slap, or throw something at you?
	4 (0.581)	When you were a child (prior to the age of 18), did an adult ever hit you so hard that you had bruises?
	8 (0.658)	When you were a child (prior to the age of 18), did you often feel that no one loved you or thought you were important or special?
	9 (0.480)	Did you often feel that your brother or sister gets more parental attention than you?
	10 (0.301)	Did you feel that your family didn't look out for each other, feel close to each other, or support each other?
	14 (0.670)	Prior to the age of 18, did you often feel that you had no one to protect you?
	22 (0.581)	When you were a child (prior to the age of 18), were you often being punished by an adult by being not talked to for hours?
	23 (0.533)	When you were a child (prior to the age of 18), were you ever a victim of bullying or violence at school?
3. Early Exposure to Sexual Life	5 (0.834)	When you were a child (prior to the age of 18), did a person at least 5 years older than you ever touch or fondle you in a sexual way?
	6 (0.886)	When you were a child (prior to the age of 18), did a person at least 5 years older attempt or actually have oral, anal, or vaginal intercourse with you?

Table 2. Item distribution for the additional subscale (Social and Emotional Neglect subscale)

4. Social and Emotional Neglect	5 (0.834)	When you were a child (prior to the age of 18), did a person at least 5 years older than you ever touch or fondle you in a sexual way?
	6 (0.886)	When you were a child (prior to the age of 18), did a person at least 5 years older attempt or actually have oral, anal, or vaginal intercourse with you?
	13 (0.357)	Did you often feel that you didn't have enough to eat and had to wear dirty clothes at school?
	19 (0.412)	When you were a child, did a household member go to prison?
	21 (0.375)	When you were a child (prior to the age of 18), were you often being punished by an adult by being locked in a room or tied up?
	23 (0.331)	When you were a child (prior to the age of 18), were you ever a victim of bullying or violence at school?

Table 3. Internal consistency reliability of the modified Ukrainian version of the ACE Study Questionnaire as assessed by Pearson correlation coefficients

	ACE	Exposure to Household Dysfunction	Exposure to Destructive Attitudes	Early Exposure to Sexual Life	Social and Emotional Neglect
ACE	1	0.805**	0.911**	0.404**	0.733**
Exposure to Household Dysfunction	0.805**	1	0.542**	0.168*	0.548**
Exposure to Destructive Attitudes	0.911**	0.542**	1	0.273**	0.548**
Early Exposure to Sexual Life	0.404**	0.168*	0.273**	1	0.793**
Social and Emotional Neglect	0.733**	0.548**	0.548**	0.793**	1

Table 4. Normal and abnormal score ranges for the modified Ukrainian version of the ACE Study Questionnaire and its subscales

Scale/ Score range	Total ACE	Exposure to Household Dysfunction	Exposure to Destructive Attitudes	Early Exposure to Sexual Life	Social and Emotional Neglect
normal	0-9	0-5	0-4	0	0-2
abnormal	10-22	5-10	5-10	2	3-6

Annex 1

Ukrainian version of the Adverse Childhood Experience Questionnaire

Instruction: Please respond YES or NO to each of the following 22 statements relating to the time prior to your 18th birthday.

Gender: M F

Age:_____

1. When you were a child (prior to the age of 18), did an adult often or very often insult you or humiliate you?

Yes-No 1 point for Yes

2. When you were a child (prior to the age of 18), did an adult act in a way that made you afraid that you might be physically hurt?

3. When you were a child (prior to the age of 18), did an adult often push, grab, slap, or throw something at you?

Yes-No 1 point for Yes

4. When you were a child (prior to the age of 18), did an adult ever hit you so hard that you had bruises?

Yes-No 1 point for Yes

5. When you were a child (prior to the age of 18), did a person at least 5 years older than you ever touch or fondle you in a sexual way?

Yes-No 1 point for Yes

6. When you were a child (prior to the age of 18), did a person at least 5 years older attempt or actually have oral, anal, or vaginal intercourse with you?

Yes-No 1 point for Yes

7. When you were a child (prior to the age of 18), did you often feel that no one loved you or thought you were important or special?

Yes-No 1 point for Yes

8. Did you often feel that your brother or sister gets more parental attention than you?

Yes-No 1 point for Yes

9. Did you feel that your family didn't look out for each other, feel close to each other, or support each other?

Yes-No 1 point for Yes

10. Prior to the age of 18, did you live with a household member who was a problem drinker or used drugs regularly?

Yes-No 1 point for Yes

11. Would you say that your parents did not take care of you if you needed it due to their problem drinking or using drugs regularly?

Yes-No 1 point for Yes

12. Did you often feel that you didn't have enough to eat and had to wear dirty clothes at school?

Yes-No 1 point for Yes

13. Prior to the age of 18, did you often feel that you had no one to protect you?

Yes-No 1 point for Yes

14. When you were a child (prior to the age of 18), were your mother or other family member often pushed, grabbed, or slapped by an adult?

Yes-No 1 point for Yes

15. When you were a child (prior to the age of 18), was your mother or other family member ever threatened with a gun or knife by an adult?

Yes-No 1 point for Yes

16. When you were a child (prior to the age of 18), were your parents ever separated or divorced?

Yes-No 1 point for Yes

17. When you were a child, was a household member mentally ill?

Yes-No 1 point for Yes

18. When you were a child, did a household member go to prison?

Yes-No 1 point for Yes

19. When you were a child, did a household member attempt suicide?

Yes-No 1 point for Yes

20. When you were a child (prior to the age of 18), were you often being punished by an adult by being locked in a room or tied up?

Yes-No 1 point for Yes

21. When you were a child (prior to the age of 18), were you often being punished by an adult by being not talked to for hours?

Yes-No 1 point for Yes

22. When you were a child (prior to the age of 18), were you ever a victim of bullying or violence at school?

Yes-No 1 point for Yes