Adolescents' Resilience Evaluation Scale – ARES-i25 and the Analysis of its Psychometric Characteristics

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Abstract

This study was designed considering the necessity of a questionnaire (validated on Romanian population and built after consulting the available papers on the subject) for evaluating the resilience of adolescents. It was focused on further developing the ARES ("Adolescents' Resilience Evaluation Scale", built in 2018 as a pilot-study, with 62 subjects). This new form (ARES-i25) includes new theoretical aspects, new items and it was completed by 423 subjects. Using factorial exploratory analysis, five factors (which explained 72,1% of the variance of resilience) were identified: tenacity and self-efficiency; self-confidence; learn from life experiences; rapid recovery after trauma; social and familial resources. The reliability was proven by its internal consistency (α= .83 on a general level, and subscales .71<α> .89), while its concurrent validity was proven by .05<r> .75 (comparing the results to those of BRS - Smith et al., 2008) thus proving the adequate psychometric qualities of the new form of ARES-i25. Future studies will focus on extending the sample and on applying ARES-i25 in other countries and creating programs for developing resilience.

Keywords

Escala de Calificación de la Resiliencia de los Adolescentes - ARES-i25 y Análisis de Cualidades Psicométricas

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Resumen

El presente estudio, a partir del análisis de la literatura de especialidad y la necesidad de la existencia de una herramienta validada por la población de Rumanía para analizar la resiliencia de los adolescentes, tiene como objetivo desarrollar y actualizar la escala para evaluar la resiliencia de los adolescentes – ARES (la primera forma siendo construida en 2018 y considerando que se aplicó, como estudio piloto, a solo 62 sujetos).La forma actual de ARES-i25 incluye nuevos conceptos, nuevos elementos y se aplica a 423 sujetos. Gracias al análisis factorial exploratorio se identificaron cinco factores que explican el 72,1% de la varianza de la resiliencia, representando las subescalas: tenacidad y autoeficacia, autoconfianza, aprender de las experiencias de vida, rápida recuperación después de un trauma y recursos sociales y familiares. La fidelidad está probada por la consistencia interna con el valor del α= .83 a nivel general (en las subescalas .71<α>.89), y la validez concurrente por los valores .05<r>.75 (comparado con BRS - Smith et al., 2008); así quedan demostradas las adecuadas cualidades psicométricas de ARES-i25. Futuros estudios se centrarán en ampliar la muestra y colaborar con investigadores de varios países para aplicar ARES-i25 y crear programas de desarrollo de la resiliencia.

Palabras clave

Resiliencia, adolescentes, escala de calificación, recuperación rápida del trauma, características psicométricas.

Most people have experienced at least one traumatic event even since childhood or at least a potentially traumatic one (a disease of their own or of the loved ones, poverty, natural disaster, abuse/molestation, death of a parent/parents or other relatives or friends etc) during their lives (Mancini & Bonanno, 2009).

Such situations are also found in the case of adolescents, but their particularity is that they overlap the characteristics determined by the physical, psychological, and mental changes specific to their age. People's reactions to the challenging life events have been measured both in terms of the dysfunctional answers that they can generate in these situations (Fung, 2020) and from the perspective of authors who identified that the persons experiencing these contexts acquired a resource which have helped them in the interaction with similar events - namely resilience (Rutter, 1985).

The American Psychological Association (2023) defines resilience as the process and outcome of successfully adapting to difficult or challenging life experiences, especially through mental, emotional, and behavioural flexibility and adjustment to external and internal demands. Other authors mention that resilience is also a feature of post-traumatic development, as well as that resilient persons may prove better mental functioning subsequent to traumatising events (Ionescu, 2013). Thus, the adolescents having a higher level of resilience are less likely to experience mental condition like depression and anxiety (Grazzani et al., 2022).

In 2021, the World Health Organisation (WHO) emphasised the existence of an increased number of mental health issues among adolescents - including anxiety, depression, food related disorders, self-harming, and attempted suicide. Thus, the study of resilience is essential in order to analyse the determining factors and to identify proper intervention methods for increasing the adolescents' resilience.

While former studies were focused especially on the family support as a factor for increasing the child's and adolescents' resilience, the latest studies provide a systemic approach, resilience being seen as a dynamic process that involves the interaction of individual, familial, social, and cultural factors (Mesman et al., 2021).

Resilience has been discussed and examined by identifying the individual protection factors which contribute to adaptation. Resilience is useful for the protection of the adolescents' well-being, softening the negative effects of the stressful events, accelerating the recovery process, and diminishing the risk of developing mental health problems (Grazzani et al., 2022).

On the same coordinate, the concept has sometimes been used as a substitute for the expression "protection factors" and has been analysed in connection with the traumatic/potentially traumatic events that have the potential to put an individual's healthy development at risk and to lead to post-traumatic stress disorder or a variety of psychopathological manifestations (Dohrenwend, 2000). The longitudinal studies are rare, but they confirm the connection between adolescents' resilience and their mental health (Mesman et al., 2021).

According to the American Psychological Association (2023), one of the important factors that contribute to how people adapt to difficulties/traumatic situations and how resilience develops and manifests is (along with the specificity in which individuals see and interact with the world and coping strategies - as individual factors) the one which concerns

availability and quality of social resources (as social factors). Resilience can change in time based on the level of development of the person and the interaction with the environment (Kim-Cohen & Turkewitz, 2012) or with other persons who provide support or emotional resources. During adolescence, the key factors that support resilience are the ability of stress management and of self-efficacy, as those are able to sustain the individual against failures, rejection, familial conflicts, losses, aggressions and other conflicts, life changes and transitions while also protecting the adolescents from the negative consequences associated to the exposure to risk (Fergus & Zimmerman, 2005).

The most comprehensive theories of the post-traumatic personal development are represented by the descriptive functional model proposed by R.G. Tedeschi and L. Calhoun (2004) and by the organismic theory of development (Joseph & Linley, 2005). Both state that a traumatic experience changes the beliefs of an individual about the world, creating dissonance between the vision about a world pre- and post- trauma, thus leading to significant psychological sufferance. The person must solve the dissonance and rebuild the perspective about the external environment, which could contribute to development (understood as adaptation).

Although the concept of resilience is widely used, the relation between the adolescents' resilience and their mental health was little explored in the case of adolescents that experienced traumatic events. H. Cahill and B. Dadvand (2020) identified the positive connection between resilience and responsible decision making of the adolescents, stating that resilient adolescents tend to use efficient coping strategies in order to adapt to the stress factors and they reflect on the ethical consequences of their actions in the self, social, and collective wellness.

A number of studies identified that the construction of self-identity during adolescence was a complex process that was related to individual, social, and context-related factors that put their mark on the self-development trajectories (Fergus & Zimmerman, 2005; Grazzani et al., 2022), and that the studies of the resilience should include these factors into the construction of efficient programs meant to increase it (Zeleeva & Shubnikova, 2016).

The omnipresent nature of adversity and its effects on health are likely to stimulate a continuous interest for scrutinising resilience, which is accompanied by the stringent need of reliable and validated tools to measure resilience (Salisu & Hashim, 2017). There are many standardised tools in the international literature that measure the protective factors linked to adaptation to stressing demands and adversity and that see resilience as a positive personality trait which contributes to the optimal individual functioning in the case of adolescents or adults, as well as studies which analyse their psychometric characteristics and their usefulness (Hu et al., 2015).

Among the most popular and used tools for measuring resilience is the Connor - Davidson Resilience Scale (CD-RISC, Connor & Davidson, 2003). Its theoretical reliance considers resilience to be a personal quality that reflects one's ability to cope successfully with stress and adversity. Based on the papers of Kobasa, Rutter, and Lyons, CD-RISC describes and evaluates, through its 25 items, characteristics of resilience such as: commitment, seeing change as a challenge, control, self-efficiency, goal- and action- oriented, tolerance to negative affects, patience, sense of humour in situations of stress, and the tendency to bounce back from stress (Connor & Davidson, 2003). Further research reconfirmed the reliability, the

convergent, divergent and criteria validity of CD-RISC (Davidson, 2018) but also proved a unifactorial structure appropriate for achieving an abridged form (of 10 items – CD-RISC-10) for evaluating the adolescents' level of resilience (Connor-Davidson, 2023).

On the same coordinates, the Resilience Scale for Adolescents - READ (Hjemdal et al., 2006) assesses the adolescent's protection resources in adapting to stress by using 39 items grouped in subscales: personal competence, social competence, family cohesion, social resources, and structured style.

Subsequent studies have shown that it has appropriate psychometric characteristics being applied on subjects from various countries (Kelly et al., 2017; Janousch et al., 2020).

Most of the tools used to measure resilience focused on the protection factors and/or resources that enable resilience/adaptation of teenagers, youth, or adults, and less on the resilience seen as the ability of a person to bounce back after confronting a negative life event. That is why the Brief Resilience Scale (BRS, proposed by Smith et al., 2008) was developed in order to operationalise, using its' 6 items, the concept of resilience as the ability of a person to bounce back after a period of stress (Salisu & Hashim, 2017).

In the original study, BRS had a unidimensional factor and a satisfactory internal consistency (α = .80). The convergent and discriminant validity of BRS were proven in relation to other three tools that investigated the personal characteristics, coping style, and social relationships (Smith et al., 2008).

BRS was adopted by researchers from various countries and its` psychometric characteristics were identified as proper for many samples from countries such as: Spain (Rodríguez-Rey et al., 2016), Germany (Chmitorz et al., 2018), Greece (Kyriazos et al., 2018), People's Republic of China (Fung, 2020). It was also translated and validated on the adolescent population from Iasi Municipality of Romania (Robu & Pruteanu, 2015).

In conclusion, the international relevant literature shows significant interest in the study of resilience in adolescents and adults, materialised in definitions of the multiple facets of resilience (an individual protection factor against stress/adversities, recovery after trauma/post-traumatic development, a dynamic system in which the importance is put on the interaction between the internal and external factors - such as social support, family cohesion etc), tools to identify them that were adapted to populations from different countries, and intervention programmes.

Following the analysis of the scientific concept, the objectives of the present research were formulated.

Research

General Objectives of the Research

Starting from the conceptions in the relevant literature and from the lack of a valid instrument for investigating resilience in Romanian adolescents, the first objective of this research intended to update the Romanian adolescents' resilience evaluation scale ARES (the first

form developed in 2018 and only applied to 62 subjects being the outcome of a pilot study) in the form of ARES-i25 and identify its psychometric characteristics.

The second objective involved the analysis of adolescents' resilience - according to categories of age and the following psychological factors: coping style, self-esteem, irrational beliefs, and anxiety - in order to investigate the relation between resilience and other variables, the convergent and divergent validity of ARES-i25, but also to identify directions to design programmes to increase resilience.

Participants and Process

The psychometric data presented in this paper stem from the processing of the answers given by 423 adolescents (260 girls, 163 boys), students from 9th - 12th grades, aged between 15 and 18 years (M = 16.97; AS = 7.23) from four secondary education institutes (theoretical, technical, and vocational studies) of Bucharest Municipality, Romania.

The selection of the participants was done by using the pseudo-random (convenience) sampling method (by using the available subjects), thus ensuring an acceptable representativity for the adolescent population in Bucharest.

The participants to the study were recruited among the adolescents who (both them and their parents) expressed their consent to answer to the questionnaires, the process being mediated by the educational staff in the frame of contracts with the Ecological University of Bucharest and the Institute of Psychology of the Romanian Academy. The answers to the questionnaires were anonymous.

The participants to the study were adolescents who lived ordinary life experiences (N = 193), but also adolescents who went through one or multiple difficult events (poor financial situation, educational and/or relational-related school difficulties, difficult relations inside the family) (N = 167) or potentially traumatic (parents' divorce, domestic violence, death/chronic illness of a parent, personal serious/chronic illness) (N = 63).

Instruments

1. *Adolescents' Resilience Evaluation Scale (ARES-i25)*

Subsequent to identifying the level of resilience the ARES-i25 updated form of the resilience assessment scale of adolescents (initially developed by Glaveanu in 2018) was used, taking into consideration the conceptions of several authors (Connor & Davidson, 2003; Oshio et al., 2003; Takviriyanum, 2008).

Following the factorial analysis process, the scale has to five subscales: toughness and self-efficacy, self-confidence, ability to learn from negative life experiences, swift bounce back from trauma" and "social and family resources", the new version containing 25 items.

The items of the ARES-i25 are described in the Annex no. 1.

The information about the psychometric features of the updated form of ARES-i25 will be presented in detail in the results analysis and interpretation part.

2. *Resilience Assessment Scale - Brief Resilience Scale/ BRS*

In order to obtain information about the concurrent validity of ARES-i25 BRS was selected, as this was a scale translated and used by researchers across various countries (Rodríguez-Rey et al., 2016; Chmitorz et al., 2018; Fung, 2020); correlations between the ARES-i25 and BRS results will be described in the analysis and interpretation of results.

BRS was built in 2008 by Smith, Dalen, Wiggins, Tooley, Christopher & Bernard, and is composed of 6 items that assess the level of resilience in adolescents; in 2015 it was translated and adapted by Robu and Pruteanu only on the population of adolescents in Iaşi Municipality, but not on the Romanian population of adolescents.

The study addressed the application of BRS scale on a sample of 556 adolescents, and the results obtained regarded internal consistency with α coefficient values equal to .73; the model with only one invariant factor according to sex and age of the adolescents and other empirical proof for the construct and criteria validity, concurrent validity showed that BRS is a reliable and valid tool that enables the proper measurement of resilience (Robu & Pruteanu, 2015).

Also, this research used several other scales to identify some of the adolescents` personal characteristics that could be associated with resilience and to verify the convergent and divergent validity of ARES - i25 (scales from the Development Evaluation Platform – PEDb and Cognitrom Assessment System – CAS++, acquired from COGNITROM, that translates and standardises different questionnaires on Romanian population).

3. *Cognitive Emotion Regulation Questionnaire (CERQ)*

CERQ is a multidimensional tool designed in 2001 by Garnefski, Kraaij and Spinhoven, and contains 36 items. It was calibrated and validated on the Romanian population by Perţe and Ţincaş and is included in the Development Evaluation Platform - PEDb (COGNITROM, 2021a). CERQ identifies the cognitive-emotional coping strategies that one uses after having experienced negative events and situations and measures the frequency of using certain strategies through 9 scales: self-blame, acceptance, focus on thought, positive refocusing, refocus on planning, positive reappraisal, putting into perspective, catastrophizing, and blaming others. CERQ was validated on 368 adolescents and demonstrated a proper reliability through the values of the α coefficient between .59 and .79.

4. *Rosenberg Self-Esteem Scale (RSE)*

The scale was elaborated by Rosenberg in 1965 to measure global sentiment of personal value and self-acceptance, contained 10 items and the scores were comprised between 10 and 40. The psychometric qualities of RSE were proven by the α coefficient value (α = .92), and the test-retest reliability by the correlation values between .85 and .88 and by the statistically significant correlation with the Coopersmith Self-Esteem Inventory.

The author of the present study applied the RSE scale on 423 adolescents and the resulting value of the Cronbach-Alpha coefficient (α = .89) indicated good internal consistency of the items and the scale's reliability for the adolescent population in Romania.

5. *Endler's Multidimensional Anxiety Evaluation Scale (EMAS)*

It was elaborated by Endler, Edwards and Vitelli in 1996 and was adapted in Romania by Miclea, Ciucă and Albu and included in the Development Evaluation Platform - PEDb (COGNITROM, 2021b). The scale contains 88 items spread over 3 distinct anxiety scales: as state (current anxiety subjective state), as trait (evaluates stale relative predispositions and determined according to situations to develop anxiety), and as perception (subjective perception on the type of situation and intensity of threat illustrated by the respective situation during the test). The validated form on the Romanian adolescent population has a proper reliability, the internal consistency for the three scales of anxiety being comprised between .88 and .94.

6. *Attitudes and Beliefs Scale - II (ABS II)*

ABS II is a scale designed by DiGiuseppe, Leaf, Exner and Robin in 1988 that evaluates the irrational and rational beliefs described in Ellis' theory, being translated and adapted on Romanian population by David and was included in the Cognitrom Assessment System - CAS++ (COGNITROM, 2020). ABS II scale has 72 items and three factors: 1) the first factor refers to irrational thinking processes and includes the following subscales: the imperative "demandingness" (DEM), self-downing/global evaluation (SD/GE), low frustration tolerance (LFT), catastrophizing or awfulizing (AWF); 2) the second factor involves beliefs related to approval, achievement, and comfort; 3) the third factor evaluates rational and irrational beliefs in general terms. The scale was applied to 350 persons (of at least 16 years of age), the conclusions being that it has a proper reliability, proven by the value of the α coefficient between .86 and .92. The scores can also be calculated separately, for irrationality and rationality; furthermore, different scores resulting from scales and subscales combinations can be calculated.

Keeping this in mind, but also the large number of scales used in the adolescent's lot, this research only selected and applied the subscales low frustration tolerance (LFT) and catastrophizing or awfulizing (AWF) from ABS II.

Results

The first objective of the research was to update and increase the level of precision of the adolescents` resilience scale (ARES, which was first applied on Romanian adolescents in 2018 as a pilot study on 62 subjects and contained 15 items) and the assessment of its psychometric characteristics.

The research entailed the in-depth analysis of the theories found in the relevant literature about resilience in general (Connor & Davidson, 2003) and resilience in teenagers (Oshio et al., 2003; Takviriyanum, 2008; Smith et al., 2008) and the identification of new factors that may influence teenagers' resilience - thus reaching 40 items that were further evaluated by 10 experts in terms of relevance for the studied construct.

The preliminary data analysis was conducted using the PASW 18 software and included the following processes: verification of the correct recording of data, detection of excessive values, identification of missing data/values (by using the frequency analysis the results of 13 subjects were rejected as they did not complete all the scales), distribution normality analysis and linearity analysis.

The analysis of the values of skewness and kurtosis indexes which have a variation range around 0 (table no. 1), validated by the result of the Shapiro-Wilk normality test (values between .25 and .48 at a p > .05) and verified using the Kolmogorov-Smirnov test (values between .21 and .37 at a p > .05 - values that are not statistically significant) reveals the normality of the distributions of variables.

The investigation of linearity was done by using the residual analysis being observed that the residual values were placed around the prediction line following a random model - thus being noticed a linear-type relation between the adolescents' resilience variable and the analysed psychological variables (coping style, self-esteem, irrational beliefs, and anxiety).

The process continued with the analysis of the items which showed statistically acceptable values of the indices of difficulty (between .2 and .6) and discrimination (between .2 and .5), indicating the ability of the scale's items to discriminate correctly between the subjects included in the research.

Before calculating the coefficient Cronbach-Alpha, the exploratory factorial analysis was conducted with the method of main components (varimax rotation) in order to determine which is the new distribution of the items according to scales/dimensions (Costello & Osborne, 2005, as cited in Popa, 2010), and whether the four subscale of the original form of ARES could be kept.

Descriptive data and internal consistency of the ARES-i25 items was presented in table no.1 .

Table 1
Descriptive data and internal consistency of the ARES-i25 items

Items	M	SD	Skewness	Kurtosis	α
I1	3.07	.90	.008	.011	.85
I2	3.38	.91	.001	.003	.89
I4	3.01	.86	.014	.009	.65
I12	2.85	.74	.002	.023	.72
I16	2.88	.69	.002	.001	.71
I24	2.92	.80	.015	.004	.68
I9	3.20	.72	.003	.005	.86
I17	3.06	.89	.011	.002	.76
I19	3.13	.80	.001	.001	.77
I20	3.21	.64	.009	.012	.71
I21	3.36	.81	.004	.023	.75
I25	2.76	.75	.001	.011	.80
I7	2.10	.77	.017	.008	.83
I8	2.48	.73	.016	.015	.82
I10	2.67	.75	.018	.006	.74
I22	2.81	.82	.011	.003	.73

Items	M	SD	Skewness	Kurtosis	α
I3	2.93	.75	.021	.017	.68
I5	2.57	.88	.009	.012	.65
I13	3.77	1.04	.001	.001	.89
I14	3.18	1.01	.002	.008	.72
I15	2.97	.69	.016	.007	.55
I6	3.07	.72	.002	.016	.79
I11	3.08	.73	.005	.001	.53
I18	2.91	.84	.001	.004	.60
I23	2.90	.99	.019	.022	.51

The exploratory analysis indicated an original communality of 1 to all items (and after the rotation process, values comprised between .63 and .76 - which indicates that the variables were well represented by the respective factorial model) and a saturation of at least .6 (this indicator being a criterion for withholding items in line with the threshold accepted in the relevant literature - according to Sava, 2004 apud. Popa, 2010).

Sample suitability measured with the Kaiser-Mezer-Olkin (KMO) test had a value of .81, and the level of Bartlett's test of sphericity was 4196.78 ($p < .001$) - thus showing the existence of common factors, and accounting for the application of the factorial reduction procedure.

After conducting rotation, the eigenvalue index was 1.06, and the variance explained by each factor it was redistributed: factor 1 - 15.60% (this factor lost in saturation to the others), factor 2 - 15.40%, factor 3 - 14.60%, factor 4 - 13.87%, factor 5 - 12.62%, but the total explained variance is still 72,1% (data presented in table no. 2). Correlation between ARES-i25 subscales was presented in table no. 3.

Based on the said statistical information, a new *factorial model of resilience of adolescents* was built, and contains the following factors:

1. *Tenacity and self-efficiency* - concerns the ability to assess the traumatic life situation, the necessary steps to solve it and the personal resources/limits, as well as the ability to cope with change and organise resources to solve problems.
2. *Self-confidence* - reflects a positive image of oneself, obtained in objective relation to one's intuition and capabilities.
3. *Ability to learn from life experiences* (personal and/or other people's).
4. *Rapid recovery after difficult life situations or trauma* - involves tolerance to the negative affects and to uncertainty, bouncing back after the failure in adopting means of resolution, identifying support sources, focusing on achieving the purpose and resilience to the disruptive factors (Glaveanu, 2018)
5. *Social and family resources* - represent the factors external to the person that play a supportive role in coping with various life problems and in manifesting resilience.

Table 2

The contribution of ARES-i25 items and the factor loading to the factorial model – after the exploratory factorial rotation with the method of main components (varimax rotation)

Items	Factors loading				
	F1	F2	F3	F4	F5
I1	.87				
I2	.68				
I4	.73				
I12	.89				
I16	.73				
I24	.65				
I9		.86			
I17		.82			
I19		.84			
I20		.65			
I21		.71			
I25		.68			
I7			.76		
I8			.68		
I10			.74		
I22			.79		
I3				.66	
I5				.72	
I13				.88	
I14				.73	
I15				.64	
I6					.61
I11					.72
I18					.61
I23					.73
Variance	15.60%	15.40%	14.60%	13.87%	12.62%

Table 3

Correlations between ARES-i25 and its` subscales

Pearson correlation coefficient (r)	ARES-i25	Tenacity and self-efficiency	Self-confidence	Ability to learn from life experiences	Rapid recovery after difficult life situations or trauma	Social and family resources
ARES-i25	1	.89**	.85**	.83**	.77**	.71**
Tenacity and self-efficiency	.89**	1	.64**	.61**	52**	.58**
Self-confidence	.85**	.64**	1	.53**	.63**	.51**
Ability to	.83**	.61**	.53**	1	.61**	.54**

Pearson correlation coefficient (r)	ARES-i25	Tenacity and self-efficiency	Self-confidence	Ability to learn from life experiences	Rapid recovery after difficult life situations or trauma	Social and family resources
learn from life experiences						
Rapid recovery after difficult life situations or trauma	.77**	.52**	.63**	.61**	1	.62**
Social and family resources	.71**	.58**	.51**	.54**	.62**	1

**significant correlations at level .01 bilateral

Scaling the items was restructured; adolescents self-assessed the manner specific to their conduct described by the items using five steps (1 - never, 5 - always) instead of three, for a larger chance of discrimination of the answers. This also determined changes in the final score that reflect the level of resilience, the new values being between 25 and 125.

The scale allows the calculation of a global score, but also according to subscale, by summing up the answers to the items. Certain items are graded the other way around (for example, at item " -4", an answer such as "never" will be graded with 5 instead of 1, and "always" - with 1 instead of 5); this procedure was used so that the items be formulated as affirmative sentences, thus trying to diminish any comprehension difficulties (table no. 4).

The results were analysed at a general level and the standardization was made (taking into consideration that the distribution of the raw data was very close to the normal distribution) on normalised classes, being grouped in five classes corresponding to five levels of resilience (very low, low, medium, high, very high) thus obtaining the global standard of adolescents' resilience (table no. 5).

The existence of five subscale/dimensions with a relative autonomy as to the investigation of resilience also allows a specific/independent benchmark for the sole evaluation of the construct associated to the relevant dimension.

Table 4

Internal consistency of the ARES-i25 subscales and the distribution of ARES-i25 items on subscales

Subscales	Number of items	Cronbach- α coefficients	Items
Tenacity and self-efficiency	6	.89	1, 2, -4, -12, 16, 24
Self-confidence	6	.85	9, 17, -19, 20, 21, 25
Ability to learn from life experiences	4	.83	7, 8, 10, 22
Rapid recovery after difficult life situations or trauma	5	.77	-3, -5, 13, 14, -15
Social and family resources	4	.71	6, 11, 18, 23

Table 5

ARES-i25 Benchmark

Score	Resilience level
Under 41	Very low
42-62	Low
63-95	Medium
96-116	High
Over 117	Very high

Psychometric Characteristics of ARES-i25: Reliability and Validity

Following the calculation of the coefficient Cronbach-Alpha of ARES-i25 (after observing that by removing any item there is no obtaining of a higher value of this coefficient for each subscale, and after removing 15 items), the value of .83 was obtained. The values between .71 and .89 of this coefficient Cronbach-Alpha for the ARES-i25 subscales show that it has a statistically relevant internal consistency of the items: in the relevant literature, in the case of scales of 10-15 items - as are those of ARES-i25 - values of .5 are also accepted (Popa, 2010), which reveals the reliability of the scale (table no. 4).

In addition to internal consistency indices, test-retest reliability was assessed on a group of 50 subjects, with an interval between tests of approximately 1 month. The results (table no 6) confirmed the reliability.

The validation of ARES-i25 was made by two principal processes:

- **Content/construct and criterion validity** was determined by the analysis and integration in building the items of the concepts from the relevant literature regarding resilience and its particular features in adolescents (so they can better reflect the construct in actual behaviours), by extracting the significant behaviours from the results provided in the previous pilot-studies, by item analysis, as well as by using the Delphi method (10 experts have measured the relevance of each item for the construct and proposed enhancement options) and using the identified factorial model;

- **Concurrent validity** was ensured by using the correlation coefficient Pearson to the scores to the ARES-i25, as well as to BRS (Brief Resilience Scale - Smith et al., 2008), the results indicate the existence of significant correlations was presented in the table no. 7 regarding the size of the effect, the values of the coefficient r^2 between .25 and .56 indicate a medium and high association (Cohen, 2004, as cited in Popa, 2010) between variables.

Table 6

ARES-i25 test-retest reliability

Pearson correlation coefficient (r)	ARES-i25	Tenacity and self-efficiency	Self-confidence	Rapid recovery after difficult life situations or trauma	Rapid recovery after difficult life situations or trauma	Social and family resources
ARES-i25	.91**					
Tenacity and self-efficiency		.89**				
Self-confidence			.87**			
Ability to learn from life experiences				.83**		
Rapid recovery after difficult life situations or trauma					.85**	
Social and family resources						.81**

**significant correlations at level .01 bilateral

Table 7

The results of the correlations between ARES-i25 and BRS

ARES-i25 Item	BRS Item	r	ARES-i25 Item	BRS Item	r
1	5	.54	14	2	- .73
2	3	.50	15	4	.62
3	5	.75	16	6	.64
4	2	.72	17	2	- .71
5	5	.74	18	1	- .55
6	2	- .75	19	5	.72
7	1	.62	20	3	.73
8	3	.66	21	4	.71
9	1	.73	22	2	- .69
10	2	- .71	23	3	.61
11	5	- .73	24	2	- .65
12	1	.72	25	3	.67
13	4	.74			

The second objective focused on the one hand on the analysis of adolescents' resilience depending on categories of age and on the other hand on evaluating it in relation with the following psychological factors: the following psychological factors: coping style, self-esteem, dysfunctional beliefs, and anxiety (that could be associated with the manifestation of resilience) for determining the convergent and divergent validity of the scale, but also for identifying directions for the development of programmes to increase resilience.

In order to investigate if adolescents' resilience differs depending on categories of age the t test for independent samples was used, the results indicating that the adolescents between 15 and 16 years of age have lower scores (m = 65.33 ; SD = 21.24, N = 188) than those between those from the 17-18 category (m = 67.11 ; SD = 21.83, N = 235), but the differences are not statistically significant (t = 135 ; df = 421 , p = .16).

The analysis of the results and of the statistically significant (p < .001) positive correlations between the adolescents' resilience and the following efficient coping styles: acceptance (r = .58), refocusing on planning (r = .66), positive refocusing (r = .71), putting into perspective (r = .74), and positive reappraisal (r = .38), but also the analysis correlations between resilience and self-esteem (r = .81; p < .001) prove the convergent validity of ARES-i25.

The results also show the existence of statistically significant (p < .001) negative correlations between adolescents' resilience and the following inefficient coping styles: rumination (r = - .76), catastrophizing (r = - .74), self-blame (r = - .80), and blaming others (r = - .78).

Also, there are statistically significant (p < .001) negative correlations between adolescents' resilience and irrational beliefs such as awfulisation (r = - .56) and frustration intolerance (r = - .72) and also between adolescents' resilience and the anxiety as a state (r = - .80), as a trait (r = - .42) and as a perception (r = - .75).

These statistically significant negative correlation between the scores of the resilience and those of the aforementioned variables indicate the divergent validity of ARES-i25.

The size of the effect of each statistically significant positive or and negative correlation between different variables was measured using the r2 coefficient. The values of the r2 coefficient were between .14 and .65, above the .13 limit, thus indicating a medium and high association between variables (Cohen, 2004, as cited in Popa, 2010) that, beyond the statistic environment, adequately reflects reality.

Discussion

This study investigated the present issue of Romanian adolescents` resilience and of the psychosocial variables that were associated with it. In the course of the study, the scale for evaluating the resilience of adolescent in Romania (Adolescents Resilience Evaluation Scale) was updated from ARES (containing 15 items and applied to 62 subjects as a pilot study) to ARES-i25 (with 25 items applied to 423 test subjects).

By updating the scale new items were included, in accordance to the scientific literature and the definition of resilience of the American Psychological Association (2023) which

considered the social resources as an associated factor, and it was analysed is the Romanian adolescents` resilience could be best measured using unifactorial scales (like the BRS - Smith et al., 2008) or multifactorial ones (like the CD-RISC – Conor & Davidson, 2003; 2023 or READ - Hjemdal et al., 2006) which also have subscales such as social resources and family cohesion, which could interact with the personal factors involved in resilience).

By using exploratory factorial analysis, a five-factor model was identified and became the subscales of ARES-i25, also providing proof that a multifactorial model more adequately explained the resilience of the Romanian adolescents in Bucharest.

The adequate values of the α coefficient (of the subscales and of the entire scale) and the values of the r coefficient (that show - after a one-month period - the test-retest reliability of the results) indicate the reliability of ARES-i25.

ARES-i25 has content validity (according to the specific available literature and using the Delphi method), construct validity (using the identified factorial model), concurrent validity (in comparison to BRS - Brief Resilience Scale, Smith et al., 2008), convergent validity (compared to scales that measure efficient coping and self-esteem) and divergent validity (compared to scales measuring inefficient coping, irrational beliefs, and anxiety).

The fact that the number of adolescents that experienced potentially traumatic life events (63) was small in comparison to the total number of subjects included in this study (423) led to the decision to analyse the differences between the two groups (the adolescents that passed through difficult life situations and those who experienced only common life events) in future studies.

The results of the study revealed no statistically significant differences based on the age groups (group one - 15-16 years old and group two - 17-18 years old), as a result the standard could be used on a general level for assessing the adolescents' resilience.

The higher values of resilience identified in the adolescents from the second group (17-18 years of age) could be explained by: the larger number of subjects compared to those in the 15-16 years of age group; a higher level of cognitive, emotional and social development as an effect of advancing from one year to the next; acquisition of knowledge and personal/other persons' experiences with adversities and/or trauma; and other factors that were not approached in this study.

The fact that these higher values are not statistically significant might signify that the spontaneous development of adolescents' resilience due to growing up is not sufficient by itself, thus being worth taking into consideration that the development of resilience can be optimised only by specialised psychological and educational intervention.

The high level of adolescents' resilience is associated with efficient coping styles: acceptance, refocusing on planning, positive refocusing, putting into perspective, and positive reappraisal and also with a high level of self-esteem. The low level of adolescents' resilience is associated with inefficient coping styles: rumination, catastrophizing, self-blame, and blaming others but also with irrational beliefs (awfulisation and frustration intolerance and anxiety (as a state, as a trait and as a perception).

The results are consistent with those in relevant literature regarding the positive association of resilience with coping styles with an adaptation value (Connor & Davidson, 2003; Tedeschi & Calhoun, 2004) and self-trust/self-esteem (Moljord et al., 2014) and also the negative association with coping styles with low or no adaptation value, irrational beliefs,

and anxiety (Motti-Stefanidi, 2023); however, the purpose of the study was to investigate if these associations are present also in relation to the Romanian adolescents' resilience and also to verify the convergent and divergent validity of the ARES-i25.

Although ARES-i25 has statistically adequate psychometric qualities, the results that were obtained by using it should be cautiously extrapolated, as it was applied only to subjects from Bucharest; this represents the main limit of the research and will be overcome in future studies.

The scale is useful for evaluating the level of resilience of the adolescents living in Bucharest, Romania and for identifying (using its' 5 subscales that approach both personal and social/familial factors) the targets for qualified intervention for the development of resilience.

The following course of action involves an increase of the number of subjects and a diversification of the geographical areas of their origins (in order to increase the degree of accuracy of the psychometric characteristics of ARES-i25). Also, further collaboration with researchers from other countries will be done in order to verify through confirmatory factorial analysis if the 5-factor model will remain or another factorial structure will be identified in accordance with the factor model of Ferrando et al. (2022).

The significant correlations identified during the studies regarding the convergent and divergent validity between the adolescents` resilience and variables such as the coping style, self-esteem, dysfunctional beliefs, or anxiety provide future directions for clarifying their role in manifesting resilience but also for evaluating if there are determinant factors, and if these and the correlated variables can be used as premises for developing programs for increasing resilience.

These programs (focused on the adequate and equilibrate development of self-esteem and self-trust, efficient coping strategies, tolerance to frustration but also on reducing catastrophic thoughts and anxiety) could be potentially initiated in educational institutions in order to foster adolescents to resist harmoniously to the challenges of life.

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Annex 1. Adolescents` Resilience Evaluation Scale (ARES-i25)

This questionnaire evaluates the way you approach different life situations. Please assess the degree you think the following sentences are true for you, using the next five-point rating scale:

1. Never.
2. Rarely.
3. Sometimes.
4. Often.
5. Always.

		1	2	3	4	5
1	When a crisis occurs, I focus on what needs to be done to overcome it.					
2	If I have a specific task to complete, I let no one and nothing to distract me.					
3	When I encounter problems in life, they emotionally affect me for a long time and it is difficult for me to regain my good mood.					
4	If a crisis situation occurs, I do a lot of analysis to identify who is responsible for that, and then I work on solving the situation.					
5	I feel that the problems of life are taking me down.					
6	When confronted to life difficulties I had support from a family member to overcome them.					
7	I think that I can learn from my personal failures.					
8	I ask questions in order to solve a task as well and quickly as possible.					
9	I have the capacity of solving a lot of situations.					
10	I can also learn from other people's way of being and behaving.					
11	In difficult situations I was supported by persons outside my family (colleagues, friends, teachers, counsellors etc.)					
12	I like to work on my own and do not ask for further explanations even if I do not completely understand the case.					
13	I remain calm even when I have problems in life and I really do not know how to solve them.					
14	If a plan for solving a difficult life situation is not working, I keep on and move to the next plan.					
15	I find it difficult to recover when I go through crisis situations in life.					
16	When I do not know something, I look for information to other people (colleagues, professors, specialists etc.).					
17	I can truly read people and I follow my intuition.					
18	When I have difficult times in life my friends help me to overcome them.					
19	When a difficult situation for which I have no solution occurs, I quickly lose my self-confidence.					
20	I like the way I react to the challenges of life.					
21	I accept myself even when I am wrong.					
22	When people close to me encounter life problems, I analyse the situation to see what I can learn from it.					
23	When problems occur, the members of our family try to solve them on their own.					

		1	2	3	4	5
24	If I encounter a situation I do not know how to solve, I look for more information online.					
25	I have a lot of qualities and I can manage any situation.					

Annex 2. Scala de evaluare a rezilienţei psihologice a adolescenţilor (ARES-i25) (Romanian)

Acest chestionar evaluează modul în care abordaţi diverse situaţii de viaţă. Vă rugăm să evaluaţi gradul în care consideraţi că vă caracterizează afirmaţiile de mai jos, utilizând următoarea scală cu cinci valori:

1. Niciodată;
2. Rareori;
3. Câteodată;
4. Deseori;
5. Întotdeauna

		1 2 3 4 5
1	Într-o situaţie de criză mă concentrez pe ce trebuie făcut pentru a ieşi din ea.	
2	Când am ceva de făcut nu las pe nimeni şi nimic să mă distragă.	
3	Atunci când întâmpin probleme în viaţă, acestea mă afectează emoţional mult timp şi cu greu îmi recapăt buna dispoziţie.	
4	Când apare o situaţie de criză analizez mult să văd cine este vinovat, apoi trec la soluţionarea ei.	
5	Simt că problemele vieţii mă doboară.	
6	Când m-am confruntat cu dificultăţi în viaţă am avut sprijinul unui membru al familiei pentru a le depăşi.	
7	Consider că pot învăţa din eşecurile personale.	
8	Pun întrebări pentru a rezolva o sarcină cât mai bine şi mai repede.	
9	Am capacitatea de a rezolva multe situaţii.	
10	Pot să învăţ şi din modul altor oameni de a fi şi de a se comporta.	
11	În situaţii dificile am avut sprijinul unor persoane din afara familiei (colegi, prieteni, profesori, consilieri etc.).	
12	Îmi place să lucrez pe cont propriu şi nu cer explicaţii chiar dacă nu înţeleg complet situaţia.	
13	Am o stare de calm şi atunci când am probleme în viaţă şi chiar nu ştiu cum să le rezolv.	
14	Dacă un plan nu merge pentru a rezolva o situaţie dificilă de viaţă, nu mă las şi trec la următorul.	
15	Îmi este greu să-mi revin emoţional atunci când trec prin situaţii de criză în viaţă.	
16	Atunci când nu ştiu ceva caut informaţii de la alte persoane (colegi, profesori, specialişti etc.).	
17	Citesc bine oamenii şi mă bazez pe intuiţie.	
18	Când am dificultăţi în viaţă prietenii mă ajută pentru a le depăşi.	

1 2 3 4 5

19 Când apare o situaţie problematică, pe care nu ştiu să o rezolv, îmi pierd repede încrederea în sine.

20 Îmi place cum reacţionez la provocările vieţii.

21 Mă accept şi atunci când greşesc.

22 Când oameni apropiaţi mie au probleme în viaţă, analizez situaţia ca să văd ce pot învăţa din ea.

23 Când apar probleme, membrii familiei noastre încearcă să le rezolve pe cont propriu.

24 Când întâmpin o situaţie în care nu ştiu ce să fac caut informaţii online.

25 Am multe calităţi şi mă pot descurca în orice situaţie.