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Measuring Resilience among Students populations Engaged in a Culturally Adapted Digital Intervention

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Abstract

Background: Depression and emotional distress are increasingly prevalent among students in both schools and universities, often leading to poor academic outcomes and diminished wellbeing. Promoting resilience has become a cornerstone of mental health initiatives in educational settings. Yet, there is limited evidence on the psychometric validity of resilience measures among Arab youth. This study aimed to: (1) evaluate the psychometric properties of the 10-item Connor–Davidson Resilience Scale (CD-RISC-10) across two student populations—adolescents in secondary schools and university students in Jordan, and (2) explore resilience within the context of a culturally adapted digital mental health intervention.

Methods: This randomized controlled trial assessed the Al-Khaizuran program, a culturally adapted and novel web-based depression-prevention program. Participants included 223 students from two educational levels: 117 adolescents from secondary schools and 106 young adults from universities. Reliability, factorial validity, and measurement invariance of the Arabic CD-RISC-10 were examined using confirmatory factor analysis (CFA) and multi-group CFA. Internal consistency was evaluated using Cronbach's α and McDonald's ω, and changes in resilience were analyzed pre- and post-intervention.

Results: The Arabic CD-RISC-10 demonstrated excellent reliability among university students (α = 0.91; ω = 0.91) and acceptable reliability among school students (α = 0.70; ω = 0.71). CFA confirmed a unidimensional factor structure with excellent fit in the university sample (RMSEA = 0.032, CFI = 0.989) and acceptable fit in the school sample (RMSEA = 0.06, CFI = 0.997). Measurement invariance analysis supported configural, metric, and scalar invariance across the two groups, though strict invariance was not achieved. Resilience scores significantly improved post-intervention among university students ($p < 0.001$, Cohen's d = 0.41), while no significant change was observed among school students.

Conclusions: Resilience can be reliably assessed and enhanced among Arab university students through culturally adapted digital interventions, highlighting its role as a key protective factor in student mental health. Tailored measurement and intervention strategies are essential to capture developmental and cultural variability in resilience across school and university populations. Findings indicate that cultural and developmental differences influence specific resilience items, particularly those related to humor.

1. Introduction

Mental health and wellbeing are fundamental to the academic performance and personal development of students in both schools and universities. The transition from adolescence to adulthood is a critical developmental phase often characterized by increased stress, academic pressure, and exposure to social and emotional challenges (1, 2). Depression and anxiety are now among the leading contributors to disease burden worldwide and are particularly prevalent among students, undermining both educational engagement and long-term health outcomes (3, 4).

Within the Arab region, studies indicate alarmingly high rates of depressive symptoms among youth, with limited access to specialized mental health services due to resource constraints, stigma, and a shortage of trained professionals (5). In Jordan, approximately one in three adolescents experiences moderate to severe depressive symptoms, and similar patterns have been observed among university students (6–8). The school and university environments thus represent crucial platforms for preventive interventions targeting early indicators of mental distress.

Digital health interventions (DHIs) have emerged as scalable tools for promoting student mental health across educational settings. These interventions can be integrated into schools and universities with minimal infrastructure, offering anonymity and accessibility that help overcome stigma and logistical barriers (9–11). Evidence from systematic reviews supports the effectiveness of digital programs in reducing depressive symptoms, enhancing coping skills, and improving psychological resilience among adolescents and young adults (12–14). However, most DHIs were designed in Western contexts, and their direct transfer to culturally distinct settings may compromise both engagement and effectiveness (15). Thus, adapting and validating these programs for use in local sociocultural environments—especially in the Middle East—is a vital step toward sustainable mental health promotion in education systems.

The Al-Khaizuran program was developed through a rigorous cultural adaptation of the U.S.-based CATCH-IT (Competent Adulthood Transition with Cognitive, Humanistic, and Interpersonal Training) program (16). Guided by the Ecological Validity Framework (17) and Barrera and Castro's model of cultural adaptation (18), Al-Khaizuran was localized to reflect Jordanian linguistic, cultural, and religious contexts while preserving its core cognitive-behavioral, interpersonal, and behavioral-activation principles. Earlier evidence from Jordan showed that Al-Khaizuran was feasible and acceptable, producing resilience improvements comparable with group cognitive-behavioral therapy (19).

Resilience—the capacity to adapt positively in the face of stress and adversity—is recognized as a key protective factor that supports academic perseverance and psychological wellbeing among students (20–22). The Connor–Davidson Resilience Scale (CD-RISC) is a widely used scale that assesses an individual's ability to cope with stress and adversity – resilience. The scale was originally developed with 25-items with a five factor model (23). A short version with 10-items and a one factor model was later developed (24). The 10-item version has been gaining popularity and is more commonly used scale in recent studies. Large-scale validation studies have been done for both versions. Many validation studies show conflicting results regarding the factor structure for the 25-item version, whereas the literature for the 10-item version consistently supports a unidimensional structure (25–27). Nevertheless, validation evidence in Arab and student populations is limited. Prior studies in the region suggest cultural variability in the interpretation of items related to humor, optimism, and independence—dimensions that may not align fully with collectivistic or faith-centered value systems prevalent in Arab societies (28–30).

Building on evidence from a randomized controlled trial conducted in Jordan with participants drawn from both secondary schools and universities, this study provides the first comprehensive psychometric

evaluation of the CD-RISC-10 across Arab students at different educational levels. The study aimed to examine reliability, factorial validity, and measurement invariance across these two student cohorts, and investigate whether the CD-RISC-10 operates equivalently among adolescents and young adults within educational settings. It further assesses pre- and post-intervention changes in resilience following engagement with the culturally adapted Al-Khaizuran digital program, offering insights into its potential as a scalable mental health promotion tool for schools and universities in low- and middle-income contexts.

Study Aims

To evaluate the internal consistency, factor structure, and convergent validity of the CD-RISC-10 among Arab adolescents and university students.

To test measurement invariance across both groups to determine the scale's structural stability across educational and developmental stages.

To assess changes in resilience before and after participation in the Al-Khaizuran intervention.

2. Materials and Methods

Study Design

This study utilized data from two parallel randomized controlled trials (RCTs) that evaluated the a digital depression-prevention program, named Al-Khaizuran. The first trial included school-aged adolescents (13–17 years), while the second involved university students (18 years and older). Both trials employed a two-arm, single-blind design, with participants randomly assigned to either the Al-Khaizuran digital intervention or a control condition—school-based group cognitive-behavioral therapy (CBT) for adolescents or treatment-as-usual (TAU) for university students.

In total, 223 participants were included in the combined dataset. This analysis examined the psychometric properties of the 10-item Connor–Davidson Resilience Scale (CD-RISC-10) across both educational levels. Ethical approval was obtained from the University of Jordan Institutional Review Board and the Jordanian Ministry of Education, and both trials were prospectively registered (**Clinical trial registration**: https://doi.org/10.1186/ISRCTN14751844, identifier ISRCTN14751844, registration date 12/03/2024).

Participants and Recruitment

Adolescent sample: Participants were recruited from public secondary schools in Amman and Zarqa governorates through collaboration with school principals and counselors. Written parental informed consent and student assent were obtained.

University sample: Recruitment occurred at the University of Jordan through online announcements and on-campus sessions. Eligible students provided informed consent prior to randomization.

Inclusion criteria for both studies were: Mild to moderate depressive symptoms on the Beck Depression Inventory-II (BDI-II). Access to an internet-enabled device. No diagnosis of severe psychiatric disorder, suicidality, or ongoing psychotherapy. The merged sample consisted of 60.1% females, with 51.1% assigned to the Al-Khaizuran intervention and 45.3% to control conditions.

Intervention

Al-Khaizuran Digital Health Intervention

Al-Khaizuran is a web-based, self-paced program consisting of 10 interactive modules adapted from the CATCH-IT framework (15–17). Modules integrate cognitive-behavioral, interpersonal, and behavioral activation techniques and incorporate culturally relevant content emphasizing family cohesion, social responsibility, and faith-based coping. Examples, metaphors, and visuals were contextualized for Jordanian youth to enhance engagement. Participants typically completed one to two modules per week via smartphone or computer. Detailed regarding the intervention protocol are available elsewhere (18).

Control Conditions

In the adolescent trial, the control group participated in eight sessions of group CBT delivered in school settings by trained psychologists. The university trial used treatment-as-usual (TAU), providing standard counseling access without additional intervention.

Measures

Resilience was assessed pre- and post-intervention using the 10-item Arabic version of the Connor–Davidson Resilience Scale (CD-RISC-10) (22). Each item is rated on a 5-point Likert scale (0 = not true at all to 4 = true nearly all the time), with total scores ranging from 0–40. Translation and back-translation followed WHO standards (30) to ensure semantic equivalence. Demographic variables collected included age, gender, parental education, household income, previous psychological help-seeking, and chronic illness status.

Statistical Analysis

All analyses were conducted using SPSS v23 and Mplus v8. Reliability: Internal consistency was estimated using Cronbach's α and McDonald's ω. Confirmatory Factor Analysis (CFA): A one-factor model was tested separately for each group using Weighted Least Squares Mean and Variance adjusted (WLSMV) estimation. Fit indices included RMSEA, SRMR, CFI, and TLI. Measurement Invariance: Multi-group CFA tested configural, metric, scalar, and strict invariance across adolescents and university students. Model changes of $\Delta CFI < 0.01$ and $\Delta RMSEA < 0.015$ indicated invariance. Convergent Validity:

Average Variance Extracted (AVE) ≥ 0.5 was considered acceptable. Change in Resilience: Pre- and post-intervention mean differences were assessed with paired t-tests and Cohen's d for effect size.

Ethical Considerations

Both original RCTs were reviewed and approved by the University of Jordan Institutional Review Board and the Jordanian Ministry of Education. All participants (and guardians, where applicable) provided written informed consent or assent. Individuals identified with severe depressive symptoms or suicidality were referred to professional care. Data were anonymized for this secondary analysis.

3. Results

General Patient Demographics

We combined the data from both randomized clinical trials (RCTs) conducted for the Al-Khaizuran program. We included a total of 223 patients, 106 from the university students/adult RCT, and 117 from the school children/adolescents RCT. Females represented 60.1% of the sample. Almost half of the patients (114, 51.1%) were randomized to the Al-Khaizuran program, and 101 (45.3%) were randomized to the CBT / Treatment-As-Usual (TAU) group. The most common monthly income category was 501–1000 Jordanian Dinars. Only 12 (5.4%) had at least one chronic illness. Thirty-four (15.2%) of patients previously sought psychological help (Table 1).

Table 1
Patient Demographics

Variable		Count	%
Gender	Male	88	39.5%
	Female	134	60.1%
Group	Website – Al-Khaizuran	114	51.1%
	CBT / Treatment As Usual	101	45.3%
Father's Education Level	Uneducated	3	1.3%
	Primary School	27	12.1%
	High School	65	29.1%
	Diploma	27	12.1%
	Bachelor's Degree	59	26.5%
Mother's Education Level	Uneducated	3	1.3%
	Primary School	19	8.5%
	High School	71	31.8%
	Diploma	39	17.5%
	Bachelor's Degree	49	22.0%
Monthly Income	less than 300 JDs	26	11.7%
	300–500 JDs	60	26.9%
	501–1000 JDs	67	30.0%
	1001–1500 JDs	15	6.7%
	more than 1500 JDs	12	5.4%
Chronic Illness Status	No	189	84.8%
	Yes	12	5.4%
Sought Psychological Help	No	167	74.9%
	Yes	34	15.2%

Reliability of the CD-RISC-10 Scale

We tested the reliability of the CD-RISC-10 scales in both RCT populations separately. Reliability was tested using Cronbach's Alpha and McDonald's Omega. For the university students RCT: Cronbach's

alpha and McDonald's omega were 0.906 and 0.911, respectively. For the children/adolescents RCT: Cronbach's alpha and McDonald's omega were 0.697 and 0.712, respectively. (Table 2).

Table 2
Reliability for CD-RISC-10

Population	Cronbach's alpha	McDonald's omega
University Students	0.906	0.911
Children and Adolescents	0.697	0.712

Confirmatory Factor Analysis

Confirmatory Factor Analysis was done to evaluate the one factor structure for CD-RISC-10 in both populations separately. In the university students, a CFA model using the Robust Weighted Least Squares (WLSMV) estimation method was used to evaluate the one factor structure. The fit indices showed an excellent fit with a standardized root mean square residual (SRMR) of 0.042 and a root mean square error of approximation (RMSEA) of 0.032 (95% C.I. 0.00–0.08). The comparative fit index (CFI) and Tucker-Lewis Index (TLI) values were 0.989 and 0.986, respectively. The average variance extracted (AVE) was 0.513, showing high convergent validity. Loadings for the majority of items were adequate (Table 3).

Table 3
Factor Loadings for University Students CFA Model

Variable	Standardized Loading (β)	Lower 95% CI	Upper 95% CI
Con_1	0.661	0.529	0.793
Con_2	0.796	0.721	0.870
Con_3	0.397	0.225	0.569
Con_4	0.649	0.535	0.763
Con_5	0.683	0.578	0.789
Con_6	0.796	0.720	0.871
Con_7	0.760	0.668	0.852
Con_8	0.823	0.738	0.909
Con_9	0.803	0.727	0.880
Con_10	0.687	0.565	0.809

A separate confirmatory factor analysis was done to the children/adolescent data, similar to the model done for university students. The fit indices showed an adequate fit: SRMR of 0.07, RMSEA of 0.06 (0.00–0.1), CFI of 0.997, and TLI of 0.996. Factor loadings were moderate as shown in Table 4. However,

convergent validity was poor as AVE was 0.2. When removing item 3, AVE improves to 0.23, Cronbach's alpha improves to 0.721, and McDonald's omega improves to 0.723.

Table 4
Factor Loadings for Children/Adolescents CFA Model

Observed	Standardized Loading (β)	Lower 95% CI	Upper 95% CI
Con_1	0.4662	0.292	0.640
Con_2	0.4007	0.226	0.576
Con_3	0.0824	-0.139	0.304
Con_4	0.4836	0.326	0.642
Con_5	0.5311	0.347	0.716
Con_6	0.4173	0.225	0.610
Con_7	0.5197	0.341	0.699
Con_8	0.5848	0.402	0.768
Con_9	0.4796	0.297	0.662
Con_10	0.3715	0.189	0.554

Measurement Invariance

A multi-group confirmatory factor analysis (CFA) was conducted to assess measurement invariance across the two groups. Configural, metric, scalar, and strict invariance models were tested sequentially. Results demonstrated good model fit and invariance for the configural, metric, and scalar levels (RMSEA 0.020–0.053; CFI ≥ 0.964; TLI ≥ 0.954). Strict invariance criteria were not met, suggesting minor group differences—principally for Item 3. Nevertheless, latent-mean comparisons remain interpretable (24, 25). Detailed fit indices for each level of invariance are presented in Table 5.

Table 5
Measurement Invariance Fit Indices

Invariance Level	RMSEA (95% CI)	SRMR	CFI	TLI
Configural	0.053 (0.000–0.082)	0.056	0.964	0.954
Metric	0.034 (0.000–0.067)	0.061	0.983	0.981
Scalar	0.020 (0.000–0.058)	0.061	0.994	0.993
Strict	0.059 (0.030–0.083)	0.086	0.938	0.943

Resilience Score

Resilience was measured using the CD-RISC-10 scale. The scale has a theoretical minimum of 0 and maximum of 40. The scale was used before and after the intervention to assess resilience. Prior to the intervention, the mean score was 24.45 ± 7.74. After the intervention, the mean score was 24.95 ± 9.45. No significant difference was noted in resilience score when comparing prior and after the intervention. Prior to the intervention, males had a significantly higher resilience score compared to females (27.31 vs 22.64, $p < 0.001$) with a Cohen's d of 0.641. No difference was found in the post-intervention resiliency scores.

In the adult RCT, a significant increase in resiliency scores was noted when comparing pre and post resiliency scores (23.23 vs 26.97, $p < 0.001$) with a Cohen's d of 0.408. This was not noted in the children/adolescent RCT ($p > 0.05$).

4. Discussion

This investigation is the first to evaluate the psychometric properties of the Arabic CD-RISC-10 among both adolescent and university student cohorts within a randomized educational trial. The instrument demonstrated excellent internal consistency in university students and acceptable reliability among younger participants, confirming its potential suitability for resilience assessment in Arab educational contexts. These findings parallel prior international validations of the short form (24–28, 31–35).

Our confirmatory factor analysis showed a one-factor model for our university student population with excellent fit indices (RMSEA 0.032, SRMR 0.042). Our results also show high composite reliability and good convergent validity with a McDonald's omega of 0.911 and an AVE of 0.513. All items showed high factor loadings except for item 3 which had a factor loading of 0.397. Item 3 corresponds to "I try to see the humorous side of things when I am faced with problems.". Interestingly, in the Lebanese validation of CD-RISC-10 (28), item 3 also had the lowest factor loading from all 10 questions. Similar findings are shown in psychometric analyses of CD-RISC-25 in Arab populations, as item 6 corresponds to item 3 from the shorter version. Item 6 showed low factor loadings and item-total correlation.

In the original publication for the development of CD-RISC-10, item 3 had one of the lowest factor loadings (0.44). In a Russian validation of CD-RISC-10, item 3 also had the lowest loading. However, it still had moderate loading overall (0.539). On the other hand, validation studies on Chinese individuals and Greek healthcare workers showed high factor loadings for item 3 (25–27).

The widely varying factor loadings on item 3 across different settings might indicate a cultural aspect to using humor as a coping mechanism. Previous studies have shown that Americans are more likely to use self-defeating and self-enhancing humor compared to Arabs. It has also been shown that easterners in general are less likely to use humor as a coping mechanism compared to westerners. It has also been suggested that Arabs have a collectivistic orientation, blurring the effect of humor as a coping mechanism (29, 36–37). Nonetheless, our results are consistent with previous literature showing an excellent fit to the unidimensional model among university students, even when including item 3.

The confirmatory factor analysis for CD-RISC-10 in the children/adolescent group showed an acceptable fit, with an SRMR of 0.07 and RMSEA of 0.06. Reliability was also acceptable with a McDonald's omega of 0.712 and Cronbach's alpha of 0.697. Convergent validity was poor with an AVE of 0.2. All in all, the scale demonstrates acceptable but not optimal psychometric properties in this group. Factor loadings showed moderate factor loadings for all variables, except item 3, which had a very low factor loading at 0.08. A factor loading this low has enough justification to be removed from the analysis due to poor fit. Removing item 3 improved reliability scores past the typical cut-offs used in the literature (0.7), while also improving AVE. The problematic loading of item 3 in both patient groups suggests that humor might not be a commonly used coping mechanism in Arab populations, especially in children and adolescents. In addition, a recently published study on CD-RISC-10 in psychiatric outpatients in the US reported a low factor loading for item 3. This study is most similar to ours, as our study was conducted on patients with mild to moderate depression. This finding suggests that depressed patients might not use humor as a coping mechanism. This has been shown in the literature (38, 39).

Previous literature reporting psychometric analyses of CD-RISC-25 or 10 reported conflicting results. Only few studies have validated CD-RISC-10 in children or adolescent populations. Two studies reported a two-factor solution for CD-RISC-10 in adolescent populations (15, 32). Three other studies on CD-RISC-25 reported different factor solutions that differed greatly from the original five-factor solution (33–35). The widely varying factor solutions highlight the instability of CD-RISC as a measure of resilience in children and adolescent populations. This is expected as CD-RISC was originally developed and validated for use in adults.

Our results show that configural, metric, and scalar invariance were achieved between the two patient groups. However, strict invariance was not achieved. This suggests that there are some slight differences in how some questions are answered between both groups, for example: item 3. Overall, despite not reaching strict invariance, latent mean overall resilience scores can be compared between both groups. Caution is advised when comparing total scores between the two groups.

Future research efforts should be directed to study measures of resilience to determine the most accurate measure for children and adolescents. Further studies should also be conducted to study resilience in Arab populations across multiple demographic populations. Last but not least, resilience should be measured in patients with and without psychiatric disorders. This can elucidate the relation between resilience and depression, anxiety, obsessive-compulsive disorder, and other disorders.

The strength of our study lies in the novelty of our study population, as no previous study validated a resilience measure in Arab patients with depression. In addition, our study has a relatively large sample size compared to previous similar studies. Limitations include the lack of generalizability to the Arab population as a whole due to our inclusion criteria. Missing data is also a limitation, as not all patients filled the pre-intervention questionnaire.

5. Conclusions

Resilience can be reliably assessed and enhanced among Arab university students through culturally adapted digital interventions, highlighting its role as a key protective factor in student mental health. Tailored measurement and intervention strategies are essential to capture developmental and cultural variability in resilience across school and university populations.

Declarations

Author Contributions: Conceptualization, Amjad Al-Khayat, Benjamin W. Van Voorhees and Latefa Dardas; Investigation, Malak Oreikat; Methodology, Amjad Al-Khayat, Benjamin W. Van Voorhees and Latefa Dardas; Project administration, Latefa Dardas; Validation, Benjamin W. Van Voorhees and Latefa Dardas; Writing – original draft, Amjad Al-Khayat, Benjamin W. Van Voorhees, Jawad Al-Rawabdeh, Rama Al-Abbadi, Malak Oreikat, Abdulrahman Al-Froukh, Majed Al-Khayat, Firas Al-Raimony and Latefa Dardas; Writing – review & editing, Amjad Al-Khayat, Benjamin W. Van Voorhees, Jawad Al-Rawabdeh, Rama Al-Abbadi, Malak Oreikat, Abdulrahman Al-Froukh, Majed Al-Khayat, Firas Al-Raimony and Latefa Dardas.

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Ethics Approval declaration: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of The University of Jordan Deanship of Scientific Research (protocol code PS 22 11 18).

t to Participate declaration: Written informed parental consent and adolescent assent were obtained for all participants younger than 18 years of age. For participants aged 18 years and older, written informed consent was obtained directly from the participants themselves prior to enrollment in the study.

Data Availability Statement: The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: https://doi.org/10.6084/m9.figshare.27328200.v1.

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Consent for Publication: Not Applicable

References

1. World Health Organization. Adolescent mental health: Key facts. (2023).
2. Arnett JJ. (2014). *Emerging Adulthood: The Winding Road from the Late Teens Through the Twenties.*
3. Li Z, Wang Y, Zhang D, et al. Prevalence and associated factors of depression and anxiety symptoms among college students: a systematic review and meta-analysis. J Child Psychol Psychiatry.

2022;63(11):1231–3. 10.1111/jcpp.13660.

4. Arias D, James SL, Abedi V, et al. Quantifying the global burden of depressive and anxiety disorders: epidemiological and economic analyses of 204 countries. EClinicalMedicine. 2022;50:101564. 10.1016/j.eclinm.2022.101564.
5. Dardas LA, Bailey DE Jr, Simmons LA. Adolescent depression in the Arab region: a systematic literature review. Issues Ment Health Nurs. 2016;37(8):569–85. 10.1080/01612840.2016.1177760.
6. Dardas LA, Silva S, Smoski M, Noonan D, Simmons L. The prevalence of depressive symptoms among Arab adolescents: findings from Jordan. Public Health Nurs. 2018;35:100–8. 10.1111/phn.12363.
7. Najdawi ZR, Kardan R, Zuraik I, Shobaki ZA, Alarood S, Dardas LA. (2022). Depressive symptoms among students pursuing the general secondary education certificate examination (Tawjihi): A national study. Int J Mental Health, 1–18.
8. Khwaldeh A, Shoiab A, Alsarhan A, Gardouh A, Alsheikh A, Ababneh S, Alqaraleh M, Bdeir R. Prevalence of Depression Among Jordanian University Students During COVID-19 Pandemic. Biomed Pharmacol J 2023;16(2).
9. Patel V, Chowdhary N, Rahman A, Verdeli H. Improving access to psychological treatments: lessons from developing countries. Behav Res Ther. 2011;49:523–8. 10.1016/j.brat.2011.06.012.
10. Sander L, Rausch L, Baumeister H. Effectiveness of internet-based interventions for the prevention of mental disorders: A systematic review and meta-analysis. JMIR Ment Health. 2016;3(3):e38. 10.2196/mental.6061.
11. Karyotaki E, Ebert DD, Donkin L, Riper H, Twisk J, Burger S, et al. Do guided internet-based interventions result in clinically relevant changes for patients with depression? An individual participant data meta-analysis. Clin Psychol Rev. 2018;63:80–92. 10.1016/j.cpr.2018.06.007.
12. Garber J, Clarke GN, Weersing VR, Beardslee WR, Brent DA, Gladstone TRG, et al. Prevention of depression in at-risk adolescents: a randomized controlled trial. JAMA. 2009;301:2215–24. 10.1001/jama.2009.788.
13. Dickter B, Bunge EL, Brown LM, Leykin Y, Soares EE, Van Voorhees BW, et al. Impact of an online depression prevention intervention on suicide risk factors for adolescents and young adults. Mhealth. 2019;5:11–1. 10.21037/mhealth.2019.04.01.
14. Gladstone TRG, Buchholz KR, Fitzgibbon M, Schiffer L, Lee M, Voorhees BWV. Randomized clinical trial of an internet-based adolescent depression prevention intervention in primary care: internalizing symptom outcomes. Int J Environ Res Public Health. 2020;17:7736. 10.3390/ijerph17217736.
15. Spanhel K, Balci S, Feldhahn F, Bengel J, Baumeister H, Sander LB. Cultural adaptation of internet- and mobile-based interventions for mental disorders: a systematic review. NPJ Digit Med. 2021;4(1):128. 10.1038/s41746-021-00498-.
16. Van Voorhees BW, Vanderplough-Booth K, Fogel J, Fagan B, Kyard C, et al. Integrative internet-based depression prevention for adolescents: a randomized clinical trial in primary care for the CATCH-IT

program (Competent Adulthood Transition with Cognitive, Humanistic, and Interpersonal Training). J Consult Clin Psychol. 2009;77(6):1021–32. 10.1037/a0016776.

17. Bernal G, Jiménez-Chafey MI, Domenech Rodríguez MM. Cultural adaptation of treatments: a resource for considering culture in evidence-based practice. Prof Psychol Res Pract. 2009;40(4):361–8. 10.1037/a0016401.
18. Barrera M Jr, Castro FG, Strycker LA, Toobert DJ. Cultural adaptations of behavioral health interventions: a progress report. J Consult Clin Psychol. 2013;81(2):196–205. 10.1037/a0027085.
19. Dardas LA, Al-Khayat AM, Al-Rawabdeh J, et al. Validating Al-Khaizuran: A culturally adapted digital mental-health intervention for Arab adolescents. Front Psychiatry. 2024;15:1529006. 10.3389/fpsyt.2024.1529006 . (Feasibility and acceptability trial in Jordanian schools).
20. Masten AS. Ordinary magic: Resilience processes in development. Am Psychol. 2001;56(3):227–38. 10.1037/0003-066X.56.3.227.
21. Rutter M. Resilience as a dynamic concept. Dev Psychopathol. 2012;24(2):335–44. 10.1017/S0954579412000028.
22. Pidgeon AM, Keye M. Relationship between resilience, mindfulness and psychological well-being in university students. Int J Educ Psychol. 2014;3(1):15–28.
23. Connor KM, Davidson JRT. Development of a new resilience scale: The Connor–Davidson Resilience Scale (CD-RISC). Depress Anxiety. 2003;18(2):76–82. 10.1002/da.10113.
24. Campbell-Sills L, Stein MB. Psychometric analysis and refinement of the Connor–Davidson Resilience Scale (CD-RISC): Validation of a 10-item measure of resilience. J Traum Stress. 2007;20(6):1019–28. 10.1002/jts.20271.
25. Wang L, Shi Z, Zhang Y, Zhang Z. Psychometric properties of the 10-item Connor–Davidson Resilience Scale (CD-RISC-10) in Chinese earthquake victims. Psychiatry Clin Neurosci. 2010;64(5):499–504. 10.1111/j.1440-1819.2010.02130.x.
26. Leontjevas R, et al. Validation of the 10-Item Connor–Davidson Resilience Scale: The Case of Russian Youth. Psychiatry Res. 2020;290:113101. 10.1016/j.psychres.2020.113101.
27. Katsarou A, et al. Psychometric properties of the Greek version of the Connor–Davidson Resilience Scale (CD-RISC-10) in a sample of nurses. Psychol Res Behav Manag. 2018;11:177–84. 10.2147/PRBM.S158951.
28. Taher D, Kazarian SS, Martin RA. Validation of the Arabic Humor Styles Questionnaire in a community sample of Lebanese in Lebanon. J Cross Cult Psychol. 2008;39(5):552–64. 10.1177/0022022108321177 ResearchGate.
29. Kalliny M, Cruthirds KW, Minor MS. Differences between American, Egyptian and Lebanese humor styles: Implications for international management. Int J Cross Cult Manag. 2006;6(2):173–94. doi:10.1177/1470595806062354 SAGE Journals.
30. Ben-Zur H, Zeidner M. Appraisals, coping and affective and behavioural reactions to academic stressors among Jewish and Arab students. Psychology. 2012;3(9):713–21. 10.4236/psych.2012.39108.

31. García-León MA, González-Gutiérrez JL, Hoyos-Fernández J, Padilla JL, Peralta-Ramírez MI. Psychometric properties of the Spanish version of the 10-item Connor–Davidson Resilience Scale (CD-RISC) among adolescent mothers in Peru. Psychol Rep. 2019;122(3):913–31. https://doi.org/10.1177/0033294118774762.
32. Nguyen Q-AN, Dinh H-VT. The validation of the 10-item Connor–Davidson Resilience Scale and its correlation to emotional intelligence and life satisfaction among Vietnamese late adolescents. Front Psychol. 2022;13:839180. https://doi.org/10.3389/fpsyg.2022.839180.
33. Yu X, Zhang J, Zhou M. An examination of resilience cross-culturally in child and adolescent survivors of the 2008 China earthquake using the Connor–Davidson Resilience Scale (CD-RISC). Compr Psychiatr. 2011;52(4):450–5. https://doi.org/10.1016/j.comppsych.2010.10.008.
34. Hernández-Holguín DM, Martínez-Vizcaíno V, et al. Psychometric properties of the Connor–Davidson Resilience Scale for South America (CD-RISC-25SA) in Peruvian adolescents. Front Psychol. 2021;12:632754. https://doi.org/10.3389/fpsyg.2021.632754.
35. Luna AS, Caldera YM, Avila JG. Resilience in a sample of Mexican American adolescents with substance use disorders. J Ethn Subst Abuse. 2016;15(2):97–113. https://doi.org/10.1080/15332640.2014.991987.
36. Zourrig H, Chebat J-C, Toffoli R. Cultural differences in humor perception, usage, and implications. Front Psychol. 2015;6:129. https://doi.org/10.3389/fpsyg.2015.00129.
37. Ford B, Seif E, Abdallah T. The impact of humor in North American versus Middle East cultures. Europe's J Psychol. 2017;13(3):456–70. https://doi.org/10.5964/ejop.v13i3.1367.
38. Martin RA, Puhlik-Doris P, Larsen G, Gray J, Weir K. Individual differences in uses of humor and their relation to psychological well-being: Development of the Humor Styles Questionnaire. J Res Pers. 2003;37(1):48–75. https://doi.org/10.1016/S0092-6566(02)00534-2.
39. Chen W, Wang X, Zhang W, Luo Z. Does the relation between humor styles and subjective well-being vary across culture and age? A meta-analysis. Front Psychol. 2020;11:1239. https://doi.org/10.3389/fpsyg.2020.0123.