BMC Psychiatry

RESEARCH Open Access

Psychometric properties of the Iranian version of the dissociative experiences measure, Oxford (DEMO)

Seyed Ruhollah Hosseini[1*], Sepehr Maghsoudi[2], Abbas Firoozabadi[1], Nikzad Ghanbari[3] and Maryam Shamsaei[1]

Abstract

Backgrounds Dissociative experiences are described as crucial psychological mechanisms involving the organism's responses to severe psychological traumas and unpleasant past experiences. This research was conducted to examine the psychometric properties of the Dissociative Experiences Measure, Oxford (DEMO) in the Iranian general population.

Methods This study used cross-sectional correlation, and the statistical population consisted of Iranians over 15 years old. Among them, 712 subjects were chosen as the study sample using the convenience sampling technique. Data were acquired between February and April 2022 using DEMO, Dissociative Experiences Scale II (DES-II), and Depression Anxiety and Stress Scale (DASS-21). In order to determine DEMO's psychometric properties, Confirmatory Factor Analysis (CFA) was used to investigate the factorial structure, Cronbach's alpha analyses to examine the internal consistency reliability, and Pearson correlation analyses to examine the relationships between DEMO's subscales and the subscales of DES-II and DASS-21, indicating convergent validity. In order to analyze the data, LISREL 8.0 and SPSS-26 were used.

Results Based on the results of the CFA, the proposed five-factor structure of DEMO showed an acceptable fit to the data ($\chi^2 = 1939.81$, SRMR = 0.078, CFI = 0.96, RMSEA = 0.074). The internal reliability was satisfactory for the total scale (Cronbach's alpha = 0.93) and the five subscales (Cronbach's alpha = 0.89 for unreality, 0.87 for numb and disconnected, 0.80 for memory blanks, 0.85 for zoned out, and 0.79 for vivid internal world). The CFA results indicated that the five factors explained 60.69% of the variance. Significant correlations were observed between the DEMO subscales and the respective subscales of DES-II and DASS-21, confirming the measure's convergent validity.

Conclusion It can be concluded from the results of this study that the DEMO has high reliability and validity among the Iranian general population.

Keywords DEMO, Dissociative experiences, Psychometric properties, Reliability, Validity

*Correspondence:
Seyed Ruhollah Hosseini
r_hosseini@um.ac.ir
[1]Department of Psychology, Faculty of Education Sciences and Psychology, Ferdowsi University of Mashhad, Mashhad, Iran
[2]Department of Social and Organizational Psychology, Faculty of Social Sciences, Leiden University, Leiden, Netherlands
[3]Department of Clinical Psychology, Faculty of Psychology and Educational Sciences, Shahid Beheshti University, Tehran, Iran

Introduction

Dissociation is a complex phenomenon that presents a variety of symptoms. These symptoms can appear in both mental and physical forms, specifically as psychoform dissociation (affecting memory and identity) and somatoform dissociation (affecting sensations and movements) [1]. Dissociative symptoms can be categorized into three main domains: experiential detachment, compartmentalization, and dissociative absorption. Experiential detachment involves feeling disconnected from oneself or the environment, often perceiving things as unreal or dreamlike. Compartmentalization refers to the separation of conflicting experiences, leading to issues like dissociative amnesia, where one temporarily loses access to autobiographical memories. Dissociative absorption is characterized by deep immersion in an activity or event, filtering out other stimuli, which can result in trance-like states and a tendency to escape into fantasy [2]. Dissociative experiences include disruptions or discontinuities in the normal integration of consciousness, emotion, perception, memory, identity, body representation, motor control, and behavior, as defined in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) [3]. Dissociative experiences range from mild to severe and can occur in both clinical and non-clinical populations [4]. These experiences are not always considered pathological, and similar to anxiety or depression, symptoms are only recognized as a mental disorder when they cause severe distress and dysfunction [5]. Pierre Janet [6–9] described dissociative experiences as crucial psychological mechanisms involving the organism's responses to severe psychological trauma and unpleasant past experiences. Carl Jung [10] described dissociative experiences as unique or extreme forms of normal psyche operation. It is also proposed that dissociative experiences are a group of symptoms that some victims of childhood traumas such as physical, psychological, and sexual abuse may experience [11]. Accordingly, research has revealed that dissociative disorders are linked with a childhood sexual abuse history [12] and child abuse, and more especially chronic child abuse, is likely to predict a higher likelihood of dissociative experiences in adulthood [13]. In general, a history of neglect and sexual abuse during childhood [14] as well as the observation of sexual violence in childhood [15] have been considered among the main risk factors for dissociative experiences. These symptoms represent a heterogeneous group of subjective experiences [16], including a variety of experiences such as having problems recalling and the feeling of looking at one's body from the outside. These symptoms can range from daily cognitive lapses to pathological symptoms and eccentric experiences [17]. According to different studies, dissociation scores vary widely in the population. A Finnish sample of 2,001 individuals reported a mean dissociation score of approximately 8, and a Portuguese sample of 224 individuals reported a mean dissociation score of approximately 10. Authors in [18] reported an average dissociation score of 11.6 for healthy subjects in a meta-analysis. Dissociative experiences are generally relatively common, with mean scores ranging from 8 to 11.6 on the Dissociative Experiences Scale (DES) [19]. According to research conducted by [6], college students often experience dissociative experiences. Their study, which analyzed data gathered from 76 studies spanning 13 countries and used the Dissociative Experiences Scale (DES), found that 16.6% of students reported experiencing dissociative symptoms.

Dissociative experiences have been considered symptoms that may indicate psychopathology. These experiences have been observed in a range of mental disorders, such as psychotic disorders (up to 50%) [20], post-traumatic stress disorder (15 to 30%) [21], panic disorder (24%) [22], and eating disorders (12%) [23]. Research has also considered dissociative symptoms as a predictor of committing suicide [5], multiple suicide attempts [24], non-suicidal self-harm [25], and a variety of mental disorders such as depression [26], obsessive-compulsive disorder [14, 27], post-traumatic stress disorder [28], conversion disorder, and borderline personality disorder [19].

In the general population, such experiences can lead to a lack of control in mental processes such as attention [29, 30], general memory, verbal memory performance, long-term memory [31], and emotional memory [32], and thus predict drop-out [27]. The results show that these experiences in the general population can disrupt personal relationships, work, and daily functioning [32] and are associated with emotional, behavioral, and relational difficulties [33]. Research has also demonstrated that dissociative experiences are not connected to gender, education, income, employment status, birthplace, or religious affiliation; however, these experiences decrease with age [34]. In the general population, the presence of these experiences, due to their unknown and strange nature, may be perceived as frightening and even lead to suicidal thoughts or attempts [5, 35].

Despite the long history of research literature related to dissociative experiences, the complexities of clinically diagnosing these symptoms in the general population is a research necessity [36]. The early and accurate consideration and diagnosis of these experiences in the general population can lead to a more appropriate differentiation of them from psychotic symptoms and more proper planning for the prevention and management of these symptoms and their negative consequences [20, 27]. Numerous scales have been introduced to assess dissociative experiences. For example, the Dissociative Experiences Scale II (DES-II) [37], which has been one of the

most well-known dissociative scales consisting of twenty-eight items, is intended for screening dissociative symptoms. This scale indicates the possibility of a dissociative syndrome, but it is not diagnostic [3], which means that by using this scale, you cannot diagnose whether the subject has dissociative disorders [38, 39]. However, the main drawback of DES-II is that it is from more than 23 years ago, so it does not include any new understanding of the dissociative experiences observed in the last three decades [40]. This scale is more focused on multiple identities (for example, some people sometimes find that people they do not know approach them, use another name, or claim to have known them before). While the types of experiences that are now referred to as dissociative experiences are broader and more complicated, DES-II does not present a coherent conceptualization of dissociation, and it does not have a consistent subscale structure (including depersonalization, derealization, and dissociative amnesia), which means DES-II allows a perception based only on a relatively global construct, not in the details [40, 41].

In response to the limitations associated with DES-II, the Wessex Dissociation Scale (WDS) was developed using Kennedy et al.'s cognitive dissociation model. However, this forty-item scale was created without reviewing phenomenological research, and the items were developed based on the authors' clinical experiences [42]. Moreover, to the best of the author's knowledge, this cognitive model has not been verified by other researchers, and [42] analysis of the WDS factor structure did not appear to support their model [41]. Exploratory factor analysis performed after confirmatory analysis failed to support the model; it only confirmed two of the three model variables (i.e., two of the three "stages" provided by the cognitive model). This undermines the validity of the standard because it does not completely measure what Kennedy et al. suggest in their cognitive model. In contrast to DES-II, which uses more thematic subscales, WDS has a subscale structure based on processing steps [41].

In addition to DES-II and WDS, other scales have been claimed to measure dissociative experiences [41]. Two recent and more developed ones will be mentioned. One is the 218-item Multidimensional Inventory of Dissociation [43], which makes it unwieldy as part of a research or clinical battery, and the other is the Dissociative Symptoms Scale, which fixes many of the problems associated with DES-II, but it still has shortcomings, including that it was not initially validated by external experts, which may lead to the removal of pertinent content from the scale, and has only been tested with PTSD diagnostic groups and is not suitable to assess dissociation in people with dissociative disorders [3, 44].

Therefore, due to the mentioned limitations of the tools for measuring previous dissociative experiences and also the lack of a coherent concept of dissociative experiences, the Dissociative Experiences Measure, Oxford; DEMO was created in 2018 by Černis et al. This scale uses service user feedback and scores easily and removes the limitations expressed as much as possible. The DEMO scale consists of five subscales: "unreality", "numb and disconnected", "memory blanks", "zoned out" and "vivid internal world" and has high internal stability, convergent, and divergent validity and is highly distinctive which makes the DEMO known as an up-to-date clinical and comprehensive measure for evaluating dissociative experiences. This measure used a bottom-up data-driven methodology, which involved consultation with service users. Since this was not an area that was clearly understood by scientists, exploratory factor analysis has been used. DEMO provides an upgrade to the DES-II; by using its subscale structure, the construct of dissociation can be better understood, and the subscales are more clinically meaningful and descriptive than those in the WDS. Studies indicate that this measure has a very high internal consistency, is correlated well with previous measures of dissociation, and is uncorrelated with unrelated factors. Thus, DEMO can be considered reliable and valid [3].

A few research studies on dissociation conducted in the Iranian population might face some limitations. These Iranian research studies used the DES-II to measure dissociative experiences [45–47], which implies the significance of the validation of a new measure, DEMO, which is able to eliminate the previous restrictions of the DES-II since it is actually an update to the DES-II in the Iranian population. Moreover, although DES-II was validated in Iran, this research was limited to individuals diagnosed with schizophrenia and mood disorders, which cannot be generalized to the Iranian general population [48]. The validation of DEMO can benefit all researchers who are interested in working on dissociative experiences in the Iranian population.

Understanding dissociative experiences is crucial for improving mental health practices and interventions, as these experiences are linked to various psychiatric disorders and can impact treatment outcomes. Also, A measure that incorporates recent advances in our understanding of dissociation is essential for progressing research and clinical care for dissociation-related illnesses. The DEMO offers a comprehensive representation of the various aspects of dissociation. However, psychometric studies of the DEMO across different populations remain limited. This study aims to fill a significant gap by providing a validated tool for clinicians and researchers. Given the role dissociative experiences play in many human experiences and human cognitive functions, this study sought to examine dissociative

experiences' psychometric properties in the Iranian general population.

Materials and methods

Research method

This study aimed to standardize the Dissociative Experiences Measure Oxford (DEMO) in Iran through a descriptive correlational factor analysis research design utilizing a cross-sectional approach. The analysis focused on examining the psychometric properties of the measure within the Iranian general population, with data analyzed using SPSS-26 for descriptive statistics and LISREL-8.0 for confirmatory factor analysis (CFA). The study included individuals aged 15 years and older, as this age threshold ensures participants have the cognitive maturity to understand and reliably complete the questionnaire. Additionally, this aligns with previous research on dissociative experiences and recognizes adolescence as a critical developmental stage for examining such phenomena. The statistical population comprised Iranians aged 15 and above with internet access, who voluntarily participated in the study. A convenience sampling method was employed to recruit a diverse sample, resulting in a total of 712 participants to ensure broad representation of the target demographic. Participants completed an online questionnaire that assessed various dissociative experiences and related psychological constructs. The psychometric evaluation encompassed several key analyses, including CFA to test the factorial structure of the measure, assessed through various fit indices such as the Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), and Comparative Fit Index (CFI), ensuring that all CFA assumptions were met. Additionally, internal consistency reliability for the measure and its subscales was evaluated using Cronbach's alpha coefficients, and Pearson correlation analyses were conducted to examine the relationships between the subscales and other relevant psychological constructs, thereby confirming convergent validity.

Participants and procedure

The statistical population for this study included Iranians aged 15 years and older who had access to the Internet during the sampling period. Participants voluntarily engaged with an online questionnaire designed to assess their dissociative experiences. The minimum sample size was determined to be 300 subjects according to G-Power software using 25% loss, a test power of 0.95, and an effect size of 0.15 [49]. Nevertheless, in order to improve the test power and generalizability of the results, convenience sampling was used to select 712 subjects as samples. Data collection was conducted during the coronavirus outbreak, necessitating remote engagement. The survey was disseminated using Google Forms, allowing participants to complete the questionnaire without face-to-face interaction. The research link was shared across various social media platforms, community groups, and forums frequented by the target demographic, facilitating access to a broad range of participants from different backgrounds and enhancing the diversity of the sample. To participate, individuals needed to meet specific eligibility criteria: they were required to have at least a junior high school education and to be free of serious medical or psychological disorders, such as epileptic seizures, head trauma, psychotic spectrum disorders, or mood disorders. Prior to accessing the questionnaire, potential participants were directed to a pre-screening page outlining these eligibility criteria. The questionnaire took approximately 10 to 15 min to complete. We emphasized the importance of informed consent, requiring participants to acknowledge their understanding of the study's purpose and their right to withdraw at any time without penalty. Participants were assured that their responses would remain anonymous and that no identifying information would be collected, thereby ensuring confidentiality throughout the study. By following these procedures, we aimed to create a robust and ethical framework for data collection, facilitating a comprehensive assessment of dissociative experiences within the Iranian population. Importantly, there was no missing data in our dataset; all participants completed the questionnaires in their entirety. This completeness ensures that our analysis was based on complete responses, contributing to the robustness of the findings.

Instruments

Demographic information form The purpose of this section was to collect information about individuals such as gender, age, education, state of marital status, history of physical and psychological problems, and a way to communicate the research results.

The dissociative experiences measure oxford (DEMO) The Dissociative Experiences Measure, Oxford (DEMO), developed by Černis, Cooper, and Chan (2018), is designed to comprehensively assess dissociative experiences. Its purpose is to evaluate the frequency and intensity of these experiences in individuals, covering various aspects such as depersonalization, derealization, and amnesia. This scale consists of 30 items. This scale included 5 subscales, including: "Unreality", "Numb and Disconnected", "Memory Blanks", "Zoned Out", and "Vivid Internal World" that were defined, and also used a five-point Likert scale. Scoring per item is between 1 and 5; therefore, the score obtained for each person in this questionnaire will be between 30 and 150. The higher this score is, the more indicative of the existence of more dis-

sociation experiences in the subject. The reliability of the DEMO in this study was assessed using Cronbach's alpha for the total scale and subscales. The total scale demonstrated excellent internal consistency with a Cronbach's alpha of 0.93. Subscale alphas were also strong: Unreality (α=0.89), Numb and Disconnected (α=0.87), Memory Blanks (α=0.80), Zoned Out (α=0.85), and Vivid Internal World (α=0.79), indicating high reliability of the scale in the Iranian population [41].

Dissociative experiences scale II (DES-II) This scale includes 28 items to screen for dissociative symptoms. The subjects are asked how frequently they encounter particular items in their daily lives. In addition to the total score, three individual subscales are provided: dissociative amnesia, absorption, and depersonalization. The higher the score is, the more indicative the possibility of dissociative disorder in the subject but it is not diagnostic [41]. In this study, the Persian version of the DES-II was used, which has previously shown good reliability in Iranian populations. The Cronbach's alpha for the total DES-II scale in this study was 0.85, indicating acceptable internal consistency [37, 48, 50].

Depression anxiety and stress scales (DASS-21) Anxiety, depression, and stress are assessed separately by the DASS-21, which contains 21 questions. The three emotional subscales each have seven questions. Based on a five-point Likert scale, items range from always 0 to never 4. A total score of 0 to 42 can be obtained. As a whole, the scale had a reliability of 0.88, while its subscales for depression, anxiety, and stress each had a reliability of 0.77, 0.79, and 0.78. In this study, the Persian version of DASS-21 was employed, which demonstrated excellent reliability. Cronbach's alpha for the total scale was 0.94, with individual subscale reliabilities of 0.96 (depression), 0.94 (anxiety), and 0.89 (stress), showing strong internal consistency for each subscale [51].

Translation and cultural adaptation process

The adaptation of the DEMO for Persian speakers followed a structured and comprehensive process to ensure linguistic accuracy and cultural relevance. Initially, a bilingual expert with expertise in psychology and linguistics translated the DEMO from English to Persian, focusing on preserving the meaning of the original content while ensuring the language was culturally appropriate and understandable. This translation was then reviewed by a panel of psychologists and linguists who evaluated the content for cultural relevance, conceptual consistency, and clarity, providing suggestions for improvement.

To ensure accuracy, the Persian version underwent a back-translation by another bilingual expert who was not involved in the initial translation. The back-translation was compared with the original English version by the research team, and any discrepancies or deviations were identified and resolved collaboratively to maintain the integrity of the original scale.

The revised Persian version was pilot-tested with a small group of Persian speakers to assess clarity, cultural appropriateness, and ease of understanding. Feedback from this phase was incorporated into further revisions to refine the adaptation. A final review was conducted by supervisors to ensure that the translated scale was consistent, accurate, and suitable for the target population. Once all revisions were completed, the Persian version of the DEMO was finalized and prepared for use in the study. This rigorous process ensured that the Persian adaptation retained the psychometric integrity of the original scale while being culturally and linguistically appropriate for the Iranian context.

Statistical analysis

To ensure the comprehensiveness of our statistical analysis, especially regarding confirmatory factor analysis (CFA), we carefully examined all relevant assumptions, including multivariate normality, linearity, and homoscedasticity. This thorough approach is essential for validating the results and ensuring the accuracy of our findings. As a first step, z-scores and box plots were used to check for univariate outliers (values plus 3 standard deviations represent univariate outliers). The data were normal distributed when checked visually, tested by Kolmogorov-Smirnov, and analyzed by Skewness and Kurtosis (see Table 1). The Dissociative Experiences Measure, Oxford (DEMO) scale was analyzed in the second step through descriptive statistics including mean, standard deviation (SD), and range. In the third step, the internal structure of the DEMO was investigated using a confirmatory factorial analysis (CFA). In order to estimate model fitness, Maximum Likelihood was used and Fitness indexes with a 90% confidence interval were evaluated, including the Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Comparative Fit Index (CFI), Parsimony Normed Fit Index (PNFI), Relative Fit Index (RFI), Incremental Fit Index (IFI), Adjusted Goodness of Fit Index (AGFI) and Normed Fit Index (NFI). For a well- fit model, CFI, IFI, RFI, and NFI should be superior to 0.90, AGFI superior to 0.80, PNFI superior to 0.50, RMSEA inferior to 0.08, and SRMR should be inferior to 0.1. In the fourth step, Cronbach's alpha coefficient was calculated for the DEMO's subscales and total scores to determine whether they are reliable in terms of internal consistency. Finally, in the fifth step, correlations were calculated between the subscales of the DEMO's subscales and the Dissociative Experiences Scale II (DES-II) and DASS-21 in order to

Table 1 Descriptive statistics of components of DEMO in the sample of the Iranian general population

Variable	Gender	Mean	SD	Kurtosis	Skewness	Range	Alpha
UR	female	5.21	11.26	1.067	0.608	6–30	0.905
	male	4.63	11.20	1.184	1.689	6–29	0.852
ND	female	5.53	15.10	0.235	−0.645	6–30	0.869
	male	5.85	15.15	0.254	−0.680	6–30	0.879
MB	female	3.63	9.16	1.490	2.249	6–26	0.797
	male	3.92	9.88	1.229	1.152	6–24	0.806
ZO	female	4.68	11.96	1.047	1.021	6–30	0.857
	male	4.53	12.23	0.696	0.257	6–27	0.825
VIW	female	4.73	16.96	0.237	−0.488	6–30	0.794
	male	4.56	16.97	0.111	0.247	6–30	0.789
DEMO	female	18.27	64.43	0.671	0.308	31–135	0.931
	male	17.88	65.42	0.979	1.386	31–129	0.925

Note: UR = Unreality, ND = Numb and Disconnected, MB = Memory Blanks, ZO = Zoned Out, VIW = Vivid Internal World

Table 2 Model fit index

$_{sb}X^2$	SRMR	CFI	NFI	PNFI	IFI	RFI	GFI	AGFI	RMSEA
1939.81 **	0.078	0.96	0.95	0.86	0.96	0.94	0.85	0.82	0.074

confirm their validity with other variables. The data analysis was performed using SPSS-26 and LISREL-8.0 statistical software.

Results

Descriptive statistic

The age range of the participants was between 15 and 75 years old (M = 24.46 years, SD = 9.16). Gender status includes 529 (74.4%) females, and 182 (24.6%) males, while 111 (15.6%) subjects were married, and 600 (84.4%) participants were single. The mean standard deviation (SD) was as follows; unreality 11.24 (5.07), numb and disconnected 15.11 (5.61), memory blanks 9.34 (3.72), zoned out 12.03 (4.64), vivid internal world 16.96 (4.69), and total score of DEMO 64.68 (18.16). Cronbach's alpha for subscales of DEMO, unreality (0.89), memory blanks (0.80), numb and disconnected (0.87), zoned out 0.85, vivid internal world 0.79, and DEMO total (0.93) was calculated (see more in Table 1). Using 95 subjects, the temporal stability was determined, and after two weeks, the coefficient of re-test and test score was 0.89 (CI = 0.86–0.92).

Confirmatory factor analysis (CFA)

The CFA results for a five-factor structure are presented in Table 2. CFA showed that the five factor structure delivered an appropriate fit to the data: $_{sb}X^2$ = 1939.81 ($p < 0.001$); SRMR = 0.078; CFI = 0.96; NFI = 0.95; PNFI = 0.86; IFI = 0.96; RFI = 0.94; GFI = 0.85; AGFI = 0.82; RMSEA = 0.074 (Table 2). There is a significant factor for each of the items of loads, as shown in Table 3, and the five factors account for 60.69% of the variance in the load data. Figure 1 shows the results of the Confirmatory Factor Analysis of DEMO.

Convergent validity

Based on the correlation analysis between DEMO's components and those of DES-II and DASS-21, a high level of divergent validity for DEMO's components can be seen. DASS-21's subscales and DEMO's factors were significantly and positively correlated with the Dissociative Experiences Scale II (DES-II). These findings illustrate acceptable convergent validity (Table 4). The role of each factor of DEMO has been assessed as a predictor criterion (Table 5).

Discussion

The purpose of this study was to examine the factor structure, validity, and reliability of The Dissociative Experiences Measure, Oxford (DEMO) to evaluate a wide range of qualitative and functional aspects of dissociative experiences in the Iranian population. Gathering information about the dissociative experiences of individuals is usually not an easy task, but in this study, an attempt was made to obtain the necessary information while observing ethical principles. The DEMO contains five subscales with desirable reliability that have been obtained by exploratory factor analysis and have been proven by confirmatory factor analysis [3].

To assess the validity of this scale, the internal consistency method was calculated by Cronbach's alpha. The alpha coefficients of the subscales, unreality (0.89), numb and disconnected (0.87), vivid internal world (0.79), memory blanks (0.80), and zoned out (0.85) were psychometrically very favorable in both genders and the whole subject. This result indicates strong internal consistency for all subscales. The above findings are in line with the results reported in the main scale, which reported Cronbach's alpha of 0.95 and indicate that the internal

Table 3 Standardized factor loads for a five-factor solution from DEMO by using descriptive statistics and CFA and for all items

	Item's statistics					Item's statistics			
Item No.	**Factors**	***M***	***SD***	**F.L.**	**Item No.**	**Factors**	***M***	***SD***	**F.L.**
ITEM 1	UR	2.08	1.031	0.84	ITEM 16	MB	1.31	0.644	0.51
ITEM 2	UR	1.91	0.998	0.84	ITEM 17	MB	1.30	0.647	0.72
ITEM 3	UR	1.68	0.981	0.81	ITEM 18	MB	1.87	1.094	0.61
ITEM 4	UR	1.85	1.069	0.57	ITEM 19	ZO	2.46	1.110	0.81
ITEM 5	UR	1.82	1.095	0.75	ITEM 20	ZO	2.02	1.051	0.82
ITEM 6	UR	1.91	1.099	0.78	ITEM 21	ZO	2.01	1.117	0.82
ITEM 7	ND	2.86	1.138	0.77	ITEM 22	ZO	1.74	0.904	0.46
ITEM 8	ND	2.78	1.238	0.84	ITEM 23	ZO	1.93	0.934	0.52
ITEM 9	ND	2.69	1.195	0.69	ITEM 24	ZO	1.87	1.014	0.48
ITEM 10	ND	2.11	1.162	0.74	ITEM 25	VIW	3.46	1.079	0.46
ITEM 11	ND	2.01	1.156	0.63	ITEM 26	VIW	3.24	1.111	0.77
ITEM 12	ND	2.65	1.300	0.71	ITEM 27	VIW	3.07	1.067	0.74
ITEM 13	MB	1.89	1.096	0.72	ITEM 28	VIW	2.75	1.178	0.78
ITEM 14	MB	1.44	0.805	0.72	ITEM 29	VIW	2.82	1.297	0.62
ITEM 15	MB	1.54	0.850	0.64	ITEM 30	VIW	1.63	0.936	0.42

Note. M=Mean, SD=Standard Deviation, FL=Factor Loadings, UR=Unreality, ND=Numb and Disconnected, MB=Memory Blanks, ZO=Zoned Out, VIW=Vivid Internal World

consistency of the Persian form subscales of the DEMO is desirable. Therefore, the results obtained from the analysis of internal consistency in Iranian society align with previous research findings [3]. However, no research has been done in other societies.

Also, to investigate the construct validity and whether the five-factor structure of DEMO in the Iranian population is appropriate, confirmatory factor analysis was used. The model fit well according to the results of the confirmatory factor analysis. As a result, it is reasonable to conclude that the five-factor structure of the scale corresponds well with the Iranian population. In other words, the results of confirmatory factor analysis showed that 30 scale questions have a high factor load with five factors: unreality, numb and disconnected, vivid internal world, zoned out, and memory blanks. In the study related to the main scale, the indicators related to the pattern indicated a very good fit of the pattern with five factors [3]. In the present study, all the obtained indicators met the considered psychometric criteria.

To examine the convergent and divergent validity of the DEMO, the obtained results show that there is a positive and significant correlation between the DEMO with DES-II and DASS-21 [3] .Therefore, the DEMO's convergent and divergent validity is verified.

Despite the rich history of dissociative experiences, up to a certain level, these experiences are less well known clinically, because of difficulties in identifying their symptoms. Since such experiences play an essential role in the development and maintenance of psychosis, the identification of dissociative experiences has become very important today [3]. Recent studies have shown that dissociative experiences in the general population reduce self-esteem, mindfulness, empathy, and emotional regulation. Hence, they have problems with their relationships and overall performance in life [52], resulting in less life satisfaction [53]. Dissociative experiences are a common phenomenon in a broad range of psychiatric disorders, such as depression, anxiety, psychotic spectrum disorders, and suicide, and also have clinical implications for determining treatment planning in these individuals [54]. Moreover, dissociative experiences were associated with increased frontal lobe activity, decreased limbic activity, and altered communication between the two regions. These changes in the brain and neural connections may underlie behavioral changes and symptoms of several psychiatric conditions [55]. Therefore, rehabilitation devices can be used to enhance brain function related to reducing these experiences. Furthermore, sleep-wake cycle disorders, such as disrupted sleep patterns or sleepwalking, can contribute to dissociative symptoms. Cultural factors, including lifestyle habits, social norms, and awareness about sleep health, may influence how sleep disorders are understood and managed. For example, limited public knowledge about the relationship between sleep disturbances and psychological health may result in underdiagnosis or mismanagement of these issues. Promoting culturally tailored education on the importance of sleep hygiene and its potential role in preventing dissociative symptoms could help address these challenges. Accordingly, sleep hygiene may help treat or prevent the symptoms of dissociation [56]. Early and accurate assessment of these experiences can prevent most of the problems associated with the dissociative experiences mentioned throughout the text [54]. The Persian version of this scale can be considered a suitable tool for measuring and evaluating dissociative

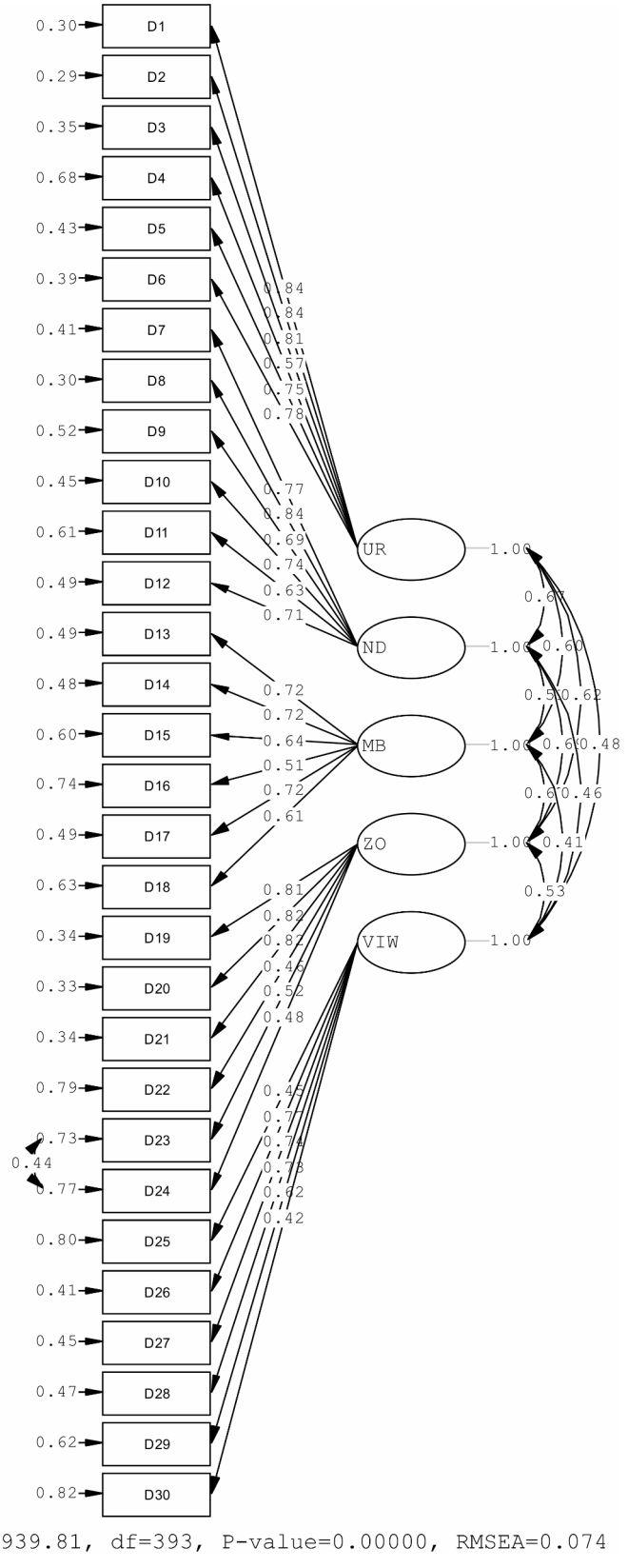

Fig. 1 Results of confirmatory factor analysis of DEMO

Table 4 Correlation between the components of DEMO with DASS-21 and dissociative experiences scale II (DES-II)

Factors	Eigenvalue		DES-II Dissociative experiences	DASS-21 Depression	DASS-21 Stress	DASS-21 Anxiety
	Total	% of Variance				
UR	10.33	34.45	0.555**	0.501**	0.424**	0.483**
ND	2.48	8.26	0.510**	0.784**	0.619**	0.549**
MB	1.99	6.63	0.671**	0.447**	0.415**	0.467**
ZO	1.83	6.11	0.626**	0.484**	0.382**	0.455**
VIW	1.58	5.25	0.508**	0.361**	0.494**	0.519**
DEMO total	-	-	0.741**	0.690**	0.620**	0.650**

Note: *$P \leq 0.05$ **$P \leq 0.01$

Table 5 Components DEMO as multiple predictors for DASS-21 and dissociative experiences scale II (DES-II)

		B	S. E	Beta	T	*P*	*R*	R2	F	*P*
A	Constant	-63.6	4.971		-12.79	0.000				
	UR	1.059	0.326	0.106	3.252	0.001	0.78	0.61	216.59	0.001
	ND	0.345	0.292	0.038	1.183	0.237				
	MB	5.144	0.415	0.377	12.388	0.000				
	ZO	2.842	0.348	0.260	8.171	0.000				
	VIW	2.387	0.293	0.220	8.155	0.000				
B	Constant	10.58	1.246		8.495	0.000				
	UR	0.010	0.082	0.004	0.123	0.902	0.79	0.62	230.85	0.001
	ND	1.342	0.073	0.580	18.347	0.000				
	MB	0.510	0.104	0.146	4.903	0.000				
	ZO	−0.009	0.087	−0.003	−0.106	0.916				
	VIW	0.646	0.073	0.233	8.805	0.000				

Note: A = components of DEMO predict Dissociative Experience; B = components of DEMO predict DASS-21

experiences in the Iranian sample and psychological research [55].

Our findings are further corroborated by the psychometric assessment of the Hong Kong Chinese version of DEMO (HKC-DEMO) by Ng and Chan (2023). Their research also confirmed the five-factor structure, with McDonald's Omega values ranging from 0.85 to 0.91, which is comparable to our alpha range. This consistency across both studies underscores the reliability and stability of DEMO's subscales in diverse cultural contexts. Both studies exhibited strong convergent validity, showing significant correlations between DEMO and the Dissociative Experiences Scale II (DES-II). Our correlations (0.50 to 0.67) are closely aligned with those reported in the Hong Kong study (Rho = 0.53 to 0.69), affirming the scale's consistent ability to assess dissociative symptoms. In both studies, the distinction between "zoned out" and "vivid internal world" as separate factors was validated. However, our study noted a slightly lower internal consistency for "vivid internal world" ($\alpha = 0.79$) compared to the Hong Kong study (McDonald's Omega = 0.85), indicating potential cultural differences that merit further investigation [1].

Overall, according to the results, it can be stated that current findings confirm the reliability and validity of the DEMO. The present research uses the latest scale to measure dissociative experiences in the Iranian population to remove the previous restrictions. Therefore, researchers in Iran are encouraged to conduct comprehensive studies on dissociative experiences using the Persian version of the DEMO. This scale serves as a contemporary, psychometrically robust tool, providing significant improvements over older measures. In clinical practice, the DEMO has several key applications. It enables clinicians to identify and measure dissociative experiences in patients, particularly those with symptoms related to trauma, mood disorders, or psychotic conditions. By offering detailed subscale scores, the scale provides a deeper understanding of various dissociative dimensions, such as depersonalization, derealization, and memory blanks. The scale also supports treatment planning by allowing clinicians to monitor symptoms over time and evaluate the effectiveness of therapeutic interventions. For instance, it can be used alongside psychotherapy or medication to track changes in dissociative symptoms and treatment outcomes. In research, the DEMO is an essential tool for studying the prevalence and nature of dissociative experiences within the Iranian population. It facilitates exploration of how cultural, social, and demographic factors influence these experiences, contributing to a better understanding of mental health in Iran. Overall, the DEMO is a versatile tool with significant potential for advancing diagnosis, treatment, and research on dissociative phenomena in Iran.

Limitations

This study presents valuable findings, but several limitations should be noted. First, the use of convenience sampling may have introduced selection bias, potentially overrepresenting younger, more educated individuals with internet access, and underrepresenting older adults or those from lower socio-economic backgrounds. While our sample of 712 participants is substantial, it may not fully capture the diversity of the Iranian population. Geographic distribution, urban versus rural representation, and socio-economic status (for example, including exclusively people who had access to the Internet) can significantly influence dissociative experiences. The predominance of urban participants may limit the generalizability of our findings to rural areas, where cultural and environmental factors could differ. Additionally, socioeconomic disparities may affect access to mental health resources and the reporting of dissociative symptoms. Therefore, caution is needed when applying these results broadly, and future research should include more diverse samples to better represent the country's demographics.

Another key limitation is the reliance on self-reported data. Self-reported measures are susceptible to several biases, including social desirability bias, where participants may underreport or overreport symptoms based on what they perceive as socially acceptable or expected. Recall bias is another concern, as participants may struggle to accurately remember or report past dissociative experiences. Additionally, individuals with severe dissociative symptoms might have difficulty comprehending or completing the questionnaire consistently, which could impact data accuracy. Future research should consider integrating clinician-administered interviews or objective assessments to validate and complement self-reported data.

Also, this study may not fully consider the influence of cultural norms, values, and historical contexts on the understanding and expression of these experiences. Cultural beliefs can greatly shape how psychological phenomena, including dissociation, are interpreted. As a result, the generalizability of the findings to the broader Iranian population is limited. This study's cross-sectional design means that any observed correlations between dissociative experiences and psychological constructs should not be interpreted as causal relationships. Consequently, our results are limited to correlational associations, and we cannot establish causality between dissociative experiences and psychological outcomes. The study also relied on self-reported data, which can be prone to social desirability and recall biases, potentially affecting the accuracy of the responses. Furthermore, although we found high reliability for the DEMO subscales, further analyses could be conducted to confirm that these subscales measure distinct constructs. Lastly, the study did not control for confounding variables such as trauma history, comorbid mental health conditions, or socio-economic status, which may have influenced the observed relationships. We recommend that future research address these limitations by employing more representative sampling methods, longitudinal designs, and controlling for potential confounders. Comparative studies across different cultural contexts would also be beneficial to assess the universality of the findings.

Practical and research implication

The validation of the Iranian version of the Dissociative Experiences Measure, Oxford (DEMO), has important implications for clinical practice and research in Iran. Dissociation is a prevalent symptom in various psychological disorders, and its accurate assessment is crucial for effective diagnosis and treatment planning. The Iranian DEMO provides a modern and culturally appropriate tool for clinicians and mental health professionals, enabling them to assess multiple dimensions of dissociative experiences in individuals with different psychological conditions. This measure could serve as a valuable alternative to older dissociative scales, such as the DES-II, offering more precise insights into the dissociative symptoms common in the Iranian population.

From a research standpoint, this study is the first to adapt and validate the DEMO for Persian-speaking individuals. This paves the way for future research to use the Iranian DEMO to explore dissociative experiences in various Iranian groups, facilitating cross-cultural comparisons and enhancing our understanding of dissociation in non-Western populations. Additionally, the Iranian DEMO can help researchers apply the latest conceptualizations of dissociation, contributing to global research on this complex phenomenon. Future studies could investigate how dissociative symptoms manifest differently in the Iranian population compared to Western cultures, particularly considering cultural factors such as trauma, socio-economic status, and mental health stigma. This would increase the clinical and research utility of the DEMO, making it an essential tool for studying and addressing dissociative symptoms in both local and cross-cultural contexts.

Conclusion

This study examined the psychometric properties of the Dissociative Experiences Measure Oxford (DEMO) within the Iranian population, showing strong reliability and validity. The confirmatory factor analysis confirmed the five-factor structure, indicating that the DEMO is a valuable tool for assessing dissociative experiences in this context. While the study has some limitations, including the use of convenience sampling, reliance on self-reported data, and a cross-sectional design that limits

causal interpretations, the findings provide important insights into dissociative phenomena in Iran. Future research should focus on addressing these limitations, exploring more representative samples, and conducting cross-cultural studies to further validate the DEMO and assess the generalizability of these results across different populations. Despite the limitations, this study contributes meaningfully to understanding dissociative experiences and offers a robust foundation for further research and clinical applications.

Abbreviations

DEMO	Dissociative Experiences Measure, Oxford
DES	Dissociative Experiences
DASS	Depression Anxiety and Stress Scale
CFA	Confirmatory Factor Analysis
DSM-5	Diagnostic and Statistical Manual of Mental Disorders
WDS	Wessex Dissociation Scale
PTSD	Post-Traumatic Stress Disorder
RMSEA	Root Mean Square Error of Approximation
SRMR	Standardized Root Mean Square Residual
PNFI	Parsimony Normed Fit Index
RFI	Relative Fit Index
IFI	Incremental Fit Index
AGFI	Adjusted Goodness of Fit Index
NFI	Normed Fit Index

Acknowledgements
The authors are grateful to all the participants in this research.

Author contributions
SRH contributed to the methodology, supervision, and review of the writing. SM was involved in preparing the original draft, methodology, and AF conducted formal analysis and reviewed the writing. NG participated in reviewing the writing. MS provided language editing, reviewed the writing, and assisted with the submission, and the revisions. All authors have read and approved the final version of the manuscript for publication.

Funding
The authors received no specific funding for this work.

Data availability
The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
The study procedures performed in accordance with the ethical standards of the Helsinki Declaration. Informed consents for data collection and usage were obtained from all participants and their parents and/or legal guardians in this study.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Received: 8 August 2024 / Accepted: 11 December 2024
Published online: 03 January 2025

References

1. Ng ASY, Chan WS. Psychometric evaluation of the Hong Kong Chinese version of the Dissociative Experiences Measure, Oxford (HKC-DEMO). J Trauma Dissociation. 2023;24(3):321–32.
2. Schulze A, Hughes N, Lis S, Krause-Utz A. Dissociative Experiences, Borderline Personality Disorder Features, and Childhood Trauma: Generating Hypotheses from Data-Driven Network Analysis in an International Sample. J Trauma Dissociation. 2024;25(4):436–55.
3. Černis E, Cooper M, Chan C. Developing a new measure of dissociation: The Dissociative Experiences Measure, Oxford (DEMO). Psychiatry Res. 2018;269:229–36.
4. Krause-Utz A. Dissociation, trauma, and borderline personality disorder. Borderline Personality Disorder Emot Dysregulation. 2022;9(1):14.
5. Ross CA. Dissociative identity disorder: Diagnosis, clinical features, and treatment of multiple personality. John Wiley & Sons Inc; 1997.
6. Kate MA, Hopwood T, Jamieson G. The prevalence of Dissociative Disorders and dissociative experiences in college populations: a meta-analysis of 98 studies. J Trauma Dissociation. 2020;21(1):16–61.
7. Janet P. The major symptoms of hysteria. New York, NY, US: Macmillan Publishing; 1907. x, 350-x, p.
8. Janet P. Les médications psychologiques: études historiques, psychologiques et cliniques sur les méthodes de la psychothérapie. F. Alcan; 1919.
9. Janet P. Psychological healing: A historical and clinical study. G. Allen & Unwin; 1925.
10. Jung C, Beebe J. Psychological types: Routledge; 2016.
11. Briere JE, Berliner LE, Bulkley JA, Jenny CE, Reid TE. The APSAC handbook on child maltreatment. Sage Publications, Inc; 1996.
12. Briere J, Runtz M. Augmenting Hopkins SCL scales to measure dissociative symptoms: Data from two nonclinical samples. J Pers Assess. 1990;55(1–2):376–9.
13. Merckelbach H, Muris P. The causal link between self-reported trauma and dissociation: A critical review. Behav Res Ther. 2001;39(3):245–54.
14. Belli H. Dissociative symptoms and dissociative disorders comorbidity in obsessive compulsive disorder: Symptom screening, diagnostic tools and reflections on treatment. World J Clin Cases: WJCC. 2014;2(8):327.
15. Zanarini MC, Ruser TF, Frankenburg FR, Hennen J, Gunderson JG. Risk factors associated with the dissociative experiences of borderline patients. J Nerv Ment Dis. 2000;188(1):26–30.
16. Holmes EA, Brown RJ, Mansell W, Fearon RP, Hunter EC, Frasquilho F, et al. Are there two qualitatively distinct forms of dissociation? A review and some clinical implications. Clin Psychol Rev. 2005;25(1):1–23.
17. Giesbrecht T, Lynn S, Lilienfeld S, Merckelbach H. Cognitive Processes in Dissociation: An Analysis of Core Theoretical Assumptions. Psychol Bull. 2008;134:617–47.
18. van IJzendoorn MH, Schuengel C. The measurement of dissociation in normal and clinical populations. Meta-analytic validation of the dissociative experiences scale (des). Clin Psychol Rev. 1996;16:365–82.
19. Lyssenko L, Schmahl C, Bockhacker L, Vonderlin R, Bohus M, Kleindienst N. Dissociation in Psychiatric Disorders: A Meta-Analysis of Studies Using the Dissociative Experiences Scale. Am J Psychiatry. 2018;175(1):37–46.
20. Renard SB, Huntjens RJ, Lysaker PH, Moskowitz A, Aleman A, Pijnenborg GH. Unique and overlapping symptoms in schizophrenia spectrum and dissociative disorders in relation to models of psychopathology: a systematic review. Schizophr Bull. 2017;43(1):108–21.
21. Wolf EJ, Miller MW, Reardon AF, Ryabchenko KA, Castillo D, Freund R. A latent class analysis of dissociation and posttraumatic stress disorder: Evidence for a dissociative subtype. Arch Gen Psychiatry. 2012;69(7):698–705.
22. Segui J, Ma M, Garcia L, Canet J, Salvador-Carulla L, Ortiz M. Depersonalization in panic disorder: a clinical study. Compr Psychiatr. 2000;41(3):172–8.
23. Vanderlinden J, Vandereycken W, Van Dyck R, Vertommen H. Dissociative experiences and trauma in eating disorders. Int J Eat Disord. 1993;13(2):187–93.
24. Foote B, Smolin Y, Neft DI, Lipschitz D. Dissociative disorders and suicidality in psychiatric outpatients. J Nerv Ment Dis. 2008;196(1):29–36.
25. Sar V, Akyuz G, Kugu N, Ozturk E, Ertem-Vehid H. Axis I dissociative disorder comorbidity in borderline personality disorder and reports of childhood trauma. J Clin Psychiatry. 2006;67(10):1583–90.
26. Soffer-Dudek N. Dissociation and dissociative mechanisms in panic disorder, obsessive–compulsive disorder, and depression: A review and heuristic framework. Psychol Consciousness: Theory Res Pract. 2014;1(3):243.

27. Buchnik-Daniely Y, Vannikov-Lugassi M, Shalev H, Soffer-Dudek N. The path to dissociative experiences: A direct comparison of different etiological models. Clin Psychol Psychother. 2021;28(5):1091–102.
28. Stein DJ, Koenen KC, Friedman MJ, Hill E, McLaughlin KA, Petukhova M, et al. Dissociation in posttraumatic stress disorder: evidence from the world mental health surveys. Biol Psychiatry. 2013;73(4):302–12.
29. Evren C, Evren B, Dalbudak E, Topcu M, Kutlu N. Measuring anxiety related to COVID-19: A Turkish validation study of the Coronavirus Anxiety Scale. Death Stud. 2020:1–7.
30. Evren C, Evren B, Dalbudak E, Topcu M, Kutlu N. Measuring anxiety related to COVID-19: A Turkish validation study of the Coronavirus Anxiety Scale. Death Stud. 2022;46(5):1052–8.
31. Özdemir O, Özdemir PG, Boysan M, Yilmaz E. The relationships between dissociation, attention, and memory dysfunction. Nöro Psikiyatri Arşivi. 2015;52(1):36.
32. Candel I, Merckelbach H, Kuijpers M. Dissociative experiences are related to commissions in emotional memory. Behav Res Ther. 2003;41(6):719–25.
33. Tolmunen T, Honkalampi K, Hintikka J, Rissanen M-L, Maaranen P, Kylmä J, et al. Adolescent dissociation and alexithymia are distinctive but overlapping phenomena. Psychiatry Res. 2010;176(1):40–4.
34. Ross CA, Joshi S, Currie R. Dissociative experiences in the general population. Am J Psychiatry. 1990;147(11):1547–52.
35. Bertule M, Sebre SB, Kolesovs A. Childhood abuse experiences, depression and dissociation symptoms in relation to suicide attempts and suicidal ideation. J Trauma Dissociation. 2021;22(5):598–614.
36. Ross CA, Joshi S, Currie R. Dissociative experiences in the general population: A factor analysis. Psychiatric Serv. 1991;42(3):297–301.
37. Carlson EB, Putnam FW. The dissociative experiences scale (DES-II). Psychoanal Inq. 2000;20(2):361–6.
38. Bernstein EM, Putnam FW. Development, reliability, and validity of a dissociation scale. 1986.
39. Carlson EB, Putnam FW. An update on the dissociative experiences scale. Dissociation: progress in the dissociative disorders; 1993.
40. Kennedy FC, Kennerley H, Pearson DG. Cognitive behavioural approaches to the understanding and treatment of dissociation. Routledge London; 2013.
41. Černis E, Cooper M, Chan C. Developing a new measure of dissociation: The Dissociative Experiences Measure, Oxford. Psychiatry Res. 2018;269:229–36.
42. Kennedy F, Clarke S, Stopa L, Bell L, Rouse H, Ainsworth C, et al. Towards a cognitive model and measure of dissociation. J Behav Ther Exp Psychiatry. 2004;35(1):25–48.
43. Dell PF. The Multidimensional Inventory of Dissociation (MID): A comprehensive measure of pathological dissociation. J Trauma Dissociation. 2006;7(2):77–106.
44. Carlson EB, Waelde LC, Palmieri PA, Macia KS, Smith SR, McDade-Montez E. Development and validation of the Dissociative Symptoms Scale. Assessment. 2018;25(1):84–98.
45. Ahmadi F, Goodarzi M, Kazemi Rezaei SA. the Effectiveness of Intensive Short-Term Dynamic Psychotherapy in dissociative experiences, object relations and delayed reward discounting in patients with substance use disorders and addiction. J Clin Psychol. 2021;13(1):65–78.
46. Firoozabadi A, Golshani S, Razeghian L, Rahimi S, Sepehry AA, Farnia V, et al. Dissociative experiences In Iranian depressed patients. J Trauma Dissociation. 2019;20(4):445–56.
47. Nobakht HN, Ojagh FS, Dale KY. Risk factors of post-traumatic stress among survivors of the 2017 Iran earthquake: The importance of peritraumatic dissociation. Psychiatry Res. 2019;271:702–7.
48. Ghaffarinejad A, Sattari N, Raaii F, Arjmand S. Validity and reliability of a Persian version of the Dissociative Experiences Scale II (DES-II) on Iranian patients diagnosed with schizophrenia and mood disorders. J Trauma Dissociation. 2020;21(3):293–304.
49. Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behav Res Methods. 2007;39(2):175–91.
50. Nooripour R, Mazloomzadeh M, Shirkhani M, Ghanbari N, Var TSP, Hosseini SR. Can We Predict Dissociative Experiences Based on Inner Speech in Nonclinical Population by Mediating Role of Sleep Disturbance? J Nerv Ment Dis. 2022;210(8):607–12.
51. Asghari A, Saed F, Dibajnia P. Psychometric properties of the Depression Anxiety Stress Scales-21 (DASS-21) in a non-clinical Iranian sample. Int J Psychol. 2008;2:82–102.
52. Schimmenti A. Dissociative experiences and dissociative minds: Exploring a nomological network of dissociative functioning. J Trauma Dissociation. 2016;17(3):338–61.
53. Lee S, Kim B. Cognitive and Emotional Processes and Life Satisfaction of Korean Adults With Childhood Abuse Experience According to the Level of Emotional Expressiveness. Psychol Rep. 2022;125(4):1957–76.
54. Payne A, Kralj A, Young J, Meiser-Stedman R. The prevalence of intrusive memories in adult depression: A meta-analysis. J Affect Disord. 2019;253:193–202.
55. Krause-Utz A, Elzinga B. Current Understanding of the Neural Mechanisms of Dissociation in Borderline Personality Disorder. Curr Behav Neurosci Rep. 2018;5(1):113–23.
56. van der Kloet D, Giesbrecht T, Lynn SJ, Merckelbach H, de Zutter A. Sleep normalization and decrease in dissociative experiences: evaluation in an inpatient sample. J Abnorm Psychol. 2012;121(1):140–50.

Publisher's note