Turkish adaptation of a brief self-report measure of fantasy proneness: The Creative Experiences Questionnaire (CEQ)

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Abstract

This research addresses the construct of fantasy proneness that is unexplored in the context of Turkey by adapting and assessing the psychometric properties of the widely accepted Creative Experiences Questionnaire (CEQ), aiming to fill a significant gap in existing literature and contribute to the understanding of this construct and its correlates in a population aged between 18 and 60 years. The Turkish version of the CEQ demonstrated face validity, aligning participant responses with fantasy, imagination, and dissociation ($n = 15$). Exploratory Factor Analysis confirmed a single-factor solution based on the scree plot graphic, without item removal ($n = 310$). Reliability and validity analyses ($N = 464$) affirmed robustness with adequate internal consistency (Cronbach's Alpha $= 0.78$, McDonald's Omega $= 0.77$) and test-retest reliability ($n = 110$, $r = .72$). Convergent validity was supported by correlations with dissociative experiences ($r = .51$) and magical ideation ($r = .51$). Discriminant validity was evident in negative correlations with social desirability ($r = -.10$, $p < .05$), notably, impression management ($r = -.12$, $p < .05$), indicating unbiased capture of fantasy experiences. Predictive validity was supported by a positive correlation observed between fantasy proneness and interest in creative activities ($r = .21$). Participants engaged in or aspiring to engage in creative activities professionally scored notably higher, broadening implications for creativity research. Similarities between the original and Turkish versions suggested cultural variations do not significantly affect fantasy proneness in adults. Considering limitations, future research should explore age-related variations of fantasy proneness as well as its association with social desirability. Implications extend to clinical research, emphasizing consideration of fantasy proneness and its correlates in psychopathological and broader psychological health studies in Turkey and globally.

Keywords Fantasy proneness · Daydreaming · Dissociation · Schizotypy · Magical ideation · Social desirability

Introduction

Fantasy is a phenomenon rooted in conscious or preconscious processes (Isaacs, 1952/1989) that harnesses imagination in a creative manner (Barrett, 2010) to combine or form rich and absorbing scenes and/or inner worlds (Bacon et al., 2013). Despite its historical enigma, psychoanalytic theory has played a pivotal role in the conceptualization and understanding of fantasy (Isaacs, 1952/1989). However, the landscape of understanding underwent a transformative shift with the ascent of empirical investigations, particularly those focused on *fantasy proneness*. This trait-like construct, defined as a predisposition for fantastical thinking and experiences (Tan et al., 2019), involves imbuing deep perceptual and cognitive representations with added meaning or significance (Lynn & Rhue, 1986; Wilson & Barber, 1983; Merckelbach et al., 2022).

In their pioneering investigation, Wilson and Barber (1983) identified a subgroup of individuals, whom they referred to as "fantasy-prone persons." Through extensive interviews, they unveiled a cluster of distinct yet interconnected characteristics. They displayed dedication of a significant amount of time to engaging in fantasies, frequently recounting vivid childhood memories, experiencing intense

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physical sensations alongside their fantasies, and describing instances of feeling detached from their physical bodies. This inclination towards fantasy was evident in various facets of their lives, encompassing avid participation in reading, play activities, and mystical or religious encounters.

Subsequent studies have explored the potential implications of high fantasy proneness, suggesting a correlation with a higher degree of psychopathology. Frequently absorbed in mental processes to the point where the boundary between fantasy and reality becomes blurred (Bacon et al., 2013; Merckelbach et al., 2001), highly fantasy-prone individuals were characterized in a manner suggesting that fantasy proneness may serve to retreating into a dream world driven by an inability to effectively cope with reality (Waldo & Merritt, 2000). This predisposition has often been linked to depressive and personality disorders (Merckelbach et al., 2020), high levels of neuroticism (Sánchez-Bernardos et al., 2015) as well as dissociative disorders (Duarte et al., 2022) and schizotypy (Giesbrecht et al., 2007).

The relationship between fantasy proneness, dissociation, and schizotypy has been a subject of extensive exploration. Dissociation emerges as a widely examined correlate of fantasy proneness, with consistent findings of heightened dissociative symptoms across clinical and non-clinical populations demonstrating a robust interconnection (Giesbrecht et al., 2008; Lynn et al., 2014). This compelling association has led researchers to propose that any comprehensive theory elucidating dissociation must account for its alignment with fantasy proneness (Merckelbach et al., 2022). Furthermore, a parallel relationship has been established between fantasy proneness and schizotypy (Giesbrecht et al., 2007; Sánchez-Bernardos & Avia, 2006). Notably, this alignment diverges from the interpersonal facets of schizotypy, emphasizing the association with the cognitive-perceptual aspect, particularly magical ideation (Sánchez-Bernardos & Avia, 2006). Additional studies have contributed to the understanding of intricate interplay among fantasy proneness, dissociation, and schizotypy, paving the way for a more nuanced comprehension of their shared dynamics (Giesbrecht et al., 2007; Merckelbach et al., 2000b).

Despite hypotheses about the potential link between fantasy proneness and psychopathological traits, the exact nature of this relationship remains unclear (Merckelbach et al., 2022). Acknowledging the multifaceted nature of fantasy proneness, researchers also highlight its healthy, adaptive, and self-enhancing facets. Initially deemed adaptive for coping, fantasy proneness may turn maladaptive if intense, distressing, or hindering daily functioning (Wilson & Barber, 1983), with the key distinction lying in the degree of control over one's fantasies and their impact on real-life events (Cuper & Lynch, 2009; Lynn et al., 1996). Engaging in fantasy serves various positive purposes, such as alleviating boredom, evoking positive emotions (Cuper & Lynch, 2009), and aiding effective emotion regulation through techniques like positive refocusing (Bacon & Charlesford, 2018). Furthermore, fantasy involvement becomes a valuable tool for planning, simulating, and creatively solving problems (Mooneyham & Schooler, 2013), proving to be adaptive not only for artists but also for individuals engaged in diverse creative endeavors (Merckelbach et al., 2001; Schelleman-Offermans & Merckelbach, 2010; Thomson & Jaque, 2015).

Fantasy proneness research has gained considerable momentum since the development of the 103-item Inventory of Childhood Memories and Imaginings (ICMI; Wilson & Barber, 1983). As interest in the construct continues, newer self-report instruments have emerged, including the Imaginative Involvement Questionnaire (IIQ; Naylor & Simonds, 2015), the Fantasy Engagement Scale (FES; Plante et al., 2017), the Fantasy Questionnaire (Weibel et al., 2018), and the Retrospective Childhood Fantasy Play Scale (RCFPS; Kirkham et al., 2019). Despite their development, these newer tools have not been extensively applied, and their relationships with other indices, such as measures of schizotypy or dissociation, remain poorly understood (Merckelbach et al., 2022).

The Creative Experiences Questionnaire (CEQ; Merckelbach et al., 2001) was introduced at the beginning of the millennium in response to the escalating interest in fantasy proneness and the demand for simpler and shorter measures. Since then, the CEQ has gained widespread acceptance and recognition, becoming a reliable tool in the assessment of fantasy proneness. Developed by condensing the extensive ICMI, the CEQ's items explore the developmental antecedents of fantasy proneness, the intense elaboration and deep involvement in fantasy and daydreaming, and the concomitants and outcomes of fantasizing. Having proven its utility in diverse populations cross-culturally (Sánchez-Bernardos & Avia, 2004), the CEQ sets the stage for an exploration of fantasy proneness in the context of Turkey.

Despite extensive research on clinical domains in Turkey, such as dissociative symptoms (Demirkol et al., 2020) and schizotypal features (Mısır & Alptekin, 2020), fantasy proneness remains unexplored. The absence of a measure for fantasy proneness in the Turkish language plays a significant role in the constitution of this gap. Acknowledging the relevance of fantasy proneness to various clinical domains and the prospect of enriching their content, this research aims to address this gap by adapting the widely accepted and validated CEQ to the Turkish language. The primary focus will be on investigating the psychometric properties of the Turkish version, including its factor structure, reliability, validity, and applicability to a population aged between 18 and 60 years. Furthermore, the study aims to

explore the relationship between fantasy proneness and its two correlates, dissociation and magical ideation, to assess convergent validity. Discriminant validity will be evaluated by examining the relationship between fantasy proneness and social desirability, considering prior findings that did not suggest a significant association between these variables (Horselenberg et al., 2000; Merckelbach et al., 2001).

Method

Procedure

This study utilized a cross-sectional design with the objective of capturing a momentary snapshot of participants' fantasy proneness and associated psychological factors. After obtaining ethical approval from the Ethics Board, the study commenced with the translation process, followed by data collection.

The data were gathered through a combination of convenient and snowball sampling methods. Invitations for participation were extensively disseminated through various channels, including social media platforms such as Facebook, Instagram, LinkedIn, and WhatsApp. Additionally, invitations were extended through email networks and by leveraging the social connections of the authors. Participants were not only encouraged to actively engage in the study themselves but were also invited to share the online participation link within their own networks. This multifaceted approach to recruitment aimed to ensure a diverse and representative sample for the study.

Developers of the questionnaire chose to avoid references to "fantasy" for the name of the measure because the term could be associated with negative connotations for some respondents (Merckelbach et al., 2001). Although the extent of the measure was not broadly explained in the informed consent form, the participants knew that the study was an adaptation study of a questionnaire related to "creative experiences". The name of the questionnaire was also explicitly mentioned in the form. Participants were granted the option to contact the primary researcher via email for any inquiries. Subsequently, those who consented to the conditions outlined in the informed consent form were invited to complete randomized questionnaires. A demographic information form was asked to be filled after the questionnaires to avoid any possible priming. The form did not involve any identificatory questions. Participants were given the choice to provide their email addresses and initials if they wished to participate in the retest, with assurances of confidentiality. The primary survey required approximately 20 min for completion.

Four weeks later, participants who had agreed to partake in the retest were contacted. During this second phase, participants only completed the CEQ, along with necessary demographic information for data matching. This survey lasted approximately 5 min.

Translation

Permission was secured from the original scale developers for the Turkish translation and psychometric analysis. The cross-cultural adaptation process adhered to the guidelines outlined by Beaton et al. (2000). The translation work was carried out by a doctoral student in English language education and a clinical psychologist. The translators meticulously examined their work, scrutinizing nuances, expressions, and potential ambiguities. Each concern was thoroughly addressed, leading to the development of a mutually agreed-upon version of the translation. Subsequently, a back-translation of the agreed-upon Turkish version was conducted by a master's degree candidate in clinical psychology and a translation studies student, who were blinded to the original scale items. The back-translators generated a version of the back-translation following the same procedure. These agreed-upon translation works underwent thorough discussion by a committee composed of the four translators, the authors, and a faculty member, with a focus on addressing unclear wording or conceptual errors in the translations. Through this collaborative effort, a single consensus-driven Turkish version was established.

Pilot study

To evaluate the intelligibility and clinical usability of the consensus-driven Turkish version, feedback was collected from a diverse group of 15 individuals. Participants were intentionally selected to represent a range of occupations and age groups, and they were invited based on their availability. This sampling aimed to capture perspectives from both laypersons and individuals with potential expertise in relevant fields (e.g., psychologist, artist, etc.). Remarkably, no difficulties were identified in comprehending the scale items or completing the questionnaire. As a result, no revisions to the scale items were deemed necessary at this stage, indicating a favorable outcome in terms of both intelligibility and clinical usability.

Furthermore, participants were asked to provide insights into the face validity of the questionnaire by expressing their perceptions of what the questionnaire aimed to measure and suggesting potential names for it.

Participants

The study aimed to include individuals aged 18 to 60 (Merckelbach et al., 2001). According to Comrey and Lee (1992), a sample size of 500 is considered excellent, and 300 is deemed sufficient for factor analysis. In this research, the minimum sample size for Exploratory Factor Analysis (EFA) was established at 300 to facilitate a more feasible and timely data collection process. In anticipation of potential Confirmatory Factor Analysis (CFA) in case EFA indicated multiple factors, we determined that collecting data from half of the recommended sample size for EFA would be adequate. Therefore, data were planned to be collected from a minimum of 450 participants.

In total, 596 responses with consent were received for the online survey. Among 596 surveys, 86 (14%) were incomplete, and these surveys were not included into the analysis. Among the 510 fully completed surveys, 43 (7%) were excluded due to incorrect answers to leading questions intended for the assessment of participants' attention (i.e., "Please select 20% among options"; "Please select 3 among options"). Two surveys were excluded because the participants did not meet the age criteria. Consequently, 465 (78%) fully completed surveys were eligible for analysis.

Instruments

Demographic information form

At the beginning of the demographic form, participants were informed that the collection of this information aimed to assess the sample's representation of the target population and observe diversity. Participants provided sociodemographic information by responding to questions about age, gender, sexual orientation, marital status, level of education, ongoing education level, working status, and socioeconomic level. Gender and sexual orientation questions were presented in an open-ended format to ensure inclusivity. Additionally, participants were asked about their psychiatric/psychological diagnosis and treatment history, with their own statements forming the basis for the psychological diagnosis question, while the treatment history could be answered with multiple choices. This researcher-designed information form also included inquiries about interest in creative activities (How do you define your interest in creative activities such as art and design? (1) I have no affiliation with such activities, (2) I follow such activities as a hobby, (3) I engage in these activities as a hobby, (4) I engage in such activities as a hobby and I aim to pursue them professionally, (5) I engage in such activities professionally) and the level of interest in these activities (How would you rate your level of interest in creative activities such as art and design? (1) Not interested at all, (2) Not interested, (3) Neither interested nor uninterested, (4) Interested, (5) Very interested).

The Creative Experiences Questionnaire (CEQ)

The CEQ serves as a concise self-report instrument for assessing fantasy proneness in the English language. Comprising 25 yes/no questions, the CEQ yields total scores ranging from 0 to 25, with higher scores indicating greater fantasy proneness. Initial validation of the original measure involved 332 participants, including high school and university students, and university employees aged 16 to 60, with a mean age of 22.7 (Merckelbach et al., 2001). The instrument demonstrated adequate internal consistency (Cronbach's Alpha = 0.76). Notably, a Spanish adaptation was conducted, yielding three factors with an internal consistency rate similar to the original (Cronbach's Alpha = 0.72) (Sánchez-Bernardos & Avia, 2004). Convergent validity was established through correlations with measures of dissociation (Merckelbach et al., 2000a) and schizotypy (Merckelbach et al., 2000b), while discriminant validity was confirmed by its lack of a significant correlation with social desirability (Horselenberg et al., 2000). Additionally, the CEQ displayed predictive validity by yielding higher scores among individuals reporting paranormal experiences or engaging in amateur acting (Merckelbach et al., 2001).

Dissociative Experiences Scale II (DES-II)

DES-II is a self-report instrument designed to assess dissociative tendencies and the frequency of dissociative experiences. It was originally developed by Bernstein and Putnam (1986) and subsequently revised by Carlson and Putnam (1993), leading to the current format known as DES-II. In the DES-II, respondents evaluate each of the 28 items by indicating the frequency of their dissociative experiences on a scale ranging from 0 to 100%, with increments of 10%. To compute the total DES-II score, all item scores are summed and then divided by 28, resulting in a score that falls within the range of 0 to 100. Higher scores on the DES-II reflect a greater presence of dissociative tendencies. Turkish adaptation's suitability for use was assessed through a reliability and validity study, thereby confirming its psychometric properties (Şar et al., 1997). Cronbach's Alpha value was reported as 0.97, while the split-half reliability was 0.95, and the test-retest reliability was 0.77. As a result of analysis of variance, it was observed that the mean DES-II total score differed significantly from the dissociative disorder group, other diagnostic groups, and the normal control group.

Magical Ideation Scale (MIS)

MIS, developed by Eckblad and Chapman (1983), assesses individuals' levels of magical ideation. The scale prompts respondents to respond to questions related to psychotic experiences, schizotypal experiences, affective symptoms, difficulties in concentration, and magical thoughts. Comprising 30 items with "True" or "False" responses, the scale yields a total score ranging from 0 to 30. Higher scores indicate a greater proclivity towards magical thinking. Turkish adaptation's reliability and validity were established (Atbaşoğlu et al., 2003). The test-retest score was reported 0.84 and Cronbach's Alpha was found 0.78. Convergent validity was provided by its significant relationship with a paranormal belief scale ($r = .61$).

Social Desirability Scale (SDS)

Social desirability is characterized by the tendency to provide culturally appropriate and socially acceptable responses in order to gain approval (Akın, 2010). The SDS, originally developed by Crowne and Marlowe (1960), is designed to detect underreporting behaviors. This scale employs a 5-point Likert-type format (1. Not at all appropriate, 2. Not appropriate, 3. Somewhat appropriate, 4. Appropriate, 5. Completely appropriate), with the total score calculated as the mean of responses across all items. Higher scores on the scale indicate greater levels of social desirability. The Turkish adaptation comprises 29 items (Akın, 2010). In the adaptation study, social desirability was viewed as a multifaceted construct, yielding two distinct factors through factor analysis: *impression management* and *self-deceptive enhancement*. Impression management refers to the conscious inclination to present a favorable self-image by downplaying negative attributes and accentuating positive ones (Danioni & Barni, 2021). This dimension consists of 16 items. Self-deceptive enhancement involves an unconscious and positively biased self-description, reflecting a belief in the possession of various positive qualities that an individual genuinely believes to be true (Danioni & Barni, 2021). The self-deceptive enhancement dimension consists of 13 items. Cronbach's Alpha found to be 0.96 for impression management and 0.95 for self-deception. The test-retest reliability coefficients were 0.83 for impression management and 0.79 for self-deception.

Data analysis

Face validity for the Turkish version was evaluated through two questions posed during the pilot study. Fifteen participants were asked to contemplate what the scale might be measuring and what they would name the measure.

The data were analyzed using IBM SPSS Statistics Version 28 (IBM Corp., 2021). Regarding distribution, Tabachnick and Fidell's, (2013) approach, which they suggested kurtosis-skewness values should be between $+1.5$ and -1.5, was adopted for the present study.

Descriptive features of the sample were reported, with categorical variables presented as numbers and percentages, and numerical variables as means and standard deviations. Following the descriptive analysis, the Turkish version of the CEQ underwent validation and reliability assessment.

To assess the construct validity of the Turkish version of the CEQ, an EFA was performed. Two-thirds of the data, consisting of 310 cases, were utilized for the EFA, while the remaining one-third was reserved for potential CFA. The suitability of the data set for factor analysis was assessed using the Kaiser-Meyer-Olkin sample adequacy measure and Bartlett's test for sphericity. Following the approach employed in the original study (Merckelbach et al., 2001), Principal Component Analysis (PCA) served as the factor extraction method, and the varimax method was employed for factor rotation. Given that the results of the EFA pointed to a single-factor solution, a CFA was not pursued.

All data collected from the entire participant pool were included in subsequent analyses to assess the reliability and validity of the measure. Following the initial screening post-EFA, significant outliers for each variable were identified using vertical boxplots and subsequently excluded from the analysis ($N = 464$).

The internal consistency of the Turkish version of the CEQ was assessed using various methods to ensure a comprehensive evaluation. First, Cronbach's Alpha coefficient was computed. While Cronbach's Alpha is widely used, it was acknowledged that it may not be the optimal choice in comparison to McDonald's Omega (Hayes & Coutts, 2020). To address this, the OMEGA macro developed by Hayes and Coutts (2020) was employed to calculate McDonald's Omega. This method calculates Omega without relying on the estimation of factor loadings or error variances through confirmatory factor analysis. In addition to Cronbach's Alpha and McDonald's Omega, the study also computed item-total score correlations, examined the Cronbach's Alpha coefficient when each item was deleted, and conducted a split-half reliability test.

To assess the test-retest reliability of the Turkish version of the CEQ, the measure was administered once more to 110 participants four weeks after their initial completion. The relationship between participants' test-retest scores was analyzed using the Pearson product-moment correlation coefficient.

Descriptive statistics were computed for the Turkish versions of the CEQ, DES-II, MIS, and SDS before conducting convergent and discriminant validity analyses. The

relationships between these measures and the CEQ were examined using the Pearson product-moment correlation coefficient.

To evaluate predictive validity, participants' engagement with creative activities was assessed through two questions. Their level of interest in creative activities was also measured using a 5-point Likert scale. The relationships were analyzed using the Pearson product-moment correlation coefficient.

Participants were also asked to specify their level of interest in creative activities, ranging from no interest to engagement at a professional level. To observe meaningful group differences, a one-way ANOVA was conducted. Post hoc Tukey's test and independent group t-tests were performed for further exploration.

Results

The study enrolled a total of 465 participants, aged between 18 and 59 ($M=30.2$, $SD=7.79$). The age distribution demonstrated normality, indicated by a skewness of 1.12 ($SE=0.11$) and kurtosis of 1.26 ($SE=0.23$) (Tabachnick & Fidell, 2013). Notably, individuals aged 18 to 45 constituted the majority, accounting for 95.1% of the total sample.

Concerning gender, out of the 465 participants, 77.4% ($n=360$) identified as women, with ages ranging from 18 to 59 ($M=29.99$, $SD=7.48$), while 21.7% ($n=101$) identified as men, aged between 18 and 58 ($M=31.2$, $SD=8.83$). Additionally, 0.8% ($n=4$) identified with genders other than male or female and were aged between 21 and 35 ($M=27.25$, $SD=6.85$).

In terms of sexual orientation, 63.7% ($n=296$) identified as heterosexual, 2.4% ($n=11$) as homosexual, 4.3% ($n=20$) as bisexual (including indications of pansexuality and heteroflexibility within this category), and 1.1% ($n=5$) identified with other sexual orientations, including asexual, questioning, and queer. It is noteworthy that while the term "queer" is often associated with gender identity, it is also frequently referred to as sexual orientation (e.g., Dunbar et al., 2017). A subset of 28.6% ($n=133$) either chose not to specify their sexual orientation or provided answers that were not interpretable in terms of sexual orientation (e.g., woman, man, normal, etc.).

Concerning participants' relationship status, considerable portion, comprising 40.2% ($n=187$), reported being single without an ongoing relationship. Meanwhile, 28.2% ($n=131$) indicated being in a relationship while still identifying as single. Participants who reported being currently married were comprised 29.7% ($n=138$), while those who disclosed being divorced or widowed were 2.1% ($n=9$).

Regarding educational attainment, 49.5% ($n=230$) had completed undergraduate studies, and 34.9% ($n=162$) had achieved a graduate-level education. A significant portion, 56.8% ($n=264$), did not pursue any ongoing educational degree, there were 2.4% ($n=11$) high school students, 1.7% ($n=8$) associate degree students, 17.6% ($n=82$) bachelor's degree students, 15.3% ($n=71$) master's level students, and 6.2% ($n=29$) doctorate level students.

In terms of participants' working status, a small proportion, constituting 7.7% ($n=36$), reported being unemployed. Additionally, 1.9% ($n=9$) identified as housewives. A significant proportion, representing 32.9% ($n=153$), were officers or employees, while 29% ($n=135$) reported being self-employed. A minor percentage of 0.9% ($n=4$) were retired, and 27.5% ($n=128$) identified as students.

In terms of income distribution, the majority clustered around the middle-income level, with 2.8% ($n=13$) reporting a high income, 21.7% ($n=101$) having a middle-high income, 46.7% ($n=217$) falling within the middle-income level, 18.1% ($n=84$) indicating a middle-low income, and 10.8% ($n=50$) reporting a low income.

In addition to collecting demographic information, participants were queried about their psychiatric/psychological diagnosis and treatment histories. Among the participants, 20.2% reported having received a psychiatric diagnosis. This percentage was distributed across various diagnostic categories, with the highest percentages found in anxiety disorders at 9.9% (e.g., generalized anxiety disorder, social phobia) and depressive disorders at 7.5% (e.g., major depression, atypical depression). Other diagnoses included 1.7% for Attention-Deficit Hyperactivity Disorder, 1.3% for obsessive-compulsive disorder and related disorders, 1.1% for bipolar and related disorders, and 1.7% for other diagnoses such as anorexia nervosa. Regarding treatment, 40.9% of participants had not sought any help, 30.1% had received help in the past, and 29% indicated that they were currently receiving help. Among the treatment modalities, 40% of the participants reported having received psychotherapy, while 18.7% had received psychological counseling, and 22.2% had used medication.

In summary, the study's sample exhibits notable diversity across various demographic dimensions, including age, occupation, relationship status, and socioeconomic status. The distribution of sexual orientation and psychiatric/psychological history reflects moderate diversity within the cohort. On the other hand, the majority of the participants in the sample identified as women and the overall demographic profile portrays a predominantly highly educated group.

Face validity

During the pilot study, participants were asked to provide their thoughts on what this scale might be measuring. Out of 15 responses, six of them were related to fantasies (i.e., "fantasy," "fantasies," "fantasy world," "the link between the fantasies in childhood and adulthood," "It may be measuring how childhood experiences and fantasies affect the perception of reality in adult life," "The relationship between fantasy and reality perception and creativity in childhood"). Three responses were associated with dissociation, and two responses were related to imagination. One participant did not provide an answer, and the remaining three responses were linked to the concepts of memory, emotion, and thoughts. Additionally, participants were asked to suggest a name for the measure, and six of the responses included the terms fantasy and/or imagination. These responses indicate that the measure possesses face validity.

Exploratory Factor Analysis (EFA)

The methodology employed by Merckelbach et al. (2001) in their analysis of the original CEQ served as the foundation for the data analysis in this study. Consequently, PCA with varimax rotation was applied to the CEQ scores obtained from the participants' responses.

Out of the 465 eligible surveys, 310 were utilized for EFA. Bartlett's test of sphericity, which assesses the significance of correlations within the correlation matrix, was highly significant ($\chi^2(310) = 1288.42$, $p < .001$), indicating that the factor analysis model was suitable for this dataset. The Kaiser-Meyer-Olkin (KMO) measure of sample adequacy indicated strong associations between variables ($KMO = 0.77$), justifying further analysis.

The initial factor extraction yielded eight factors with eigenvalues exceeding 1.0. However, it is noteworthy that the differences in variance explained by the last seven factors were not substantial. Collectively, these eight factors accounted for 55.35% of the variance in the CEQ. Nevertheless, based on the scree test, a single-factor solution (eigenvalue: 4.32), explaining 17.3% of the variation, was suggested.

To determine the appropriate number of retained components, it is recommended to employ the scree test in conjunction with eigenvalues (Cattell, 1978). It is worth noting that the scree test is more reliable with a sample size of 200 or more (Yong & Pearce, 2013). Figure 1 depicts the scree plot graph, displaying eigenvalues and factors. The number of factors to retain corresponds to the data points above the cutoff (i.e., the point of inflection). Researchers typically draw a vertical and horizontal line, starting at each end of the curve, to define the "break" (Yong & Pearce, 2013).

Cronbach's Alpha was calculated to be 0.78, indicating a satisfactory level of internal consistency. Additionally, McDonald's Omega yielded a value of 0.77. Merckelbach et al. (2001) viewed that items should be considered for elimination if less than 10% of respondents endorse them or if their corrected item-to-total correlation is less than 0.15 (Raine, 1991). All items in the adapted version were endorsed by 10% or more of the participants, and all items, except the item-16 with a reported correlation of $r = .13$, demonstrated item-to-total correlations larger than 0.15 ($p < .05$) (see Table 1). Although the item-16 fell slightly below the suggested threshold, its endorsement rate was substantial at 43%. Consequently, the results affirm the internal consistency of the measure, with all items meeting the criteria, and no items were deemed necessary to be deleted.
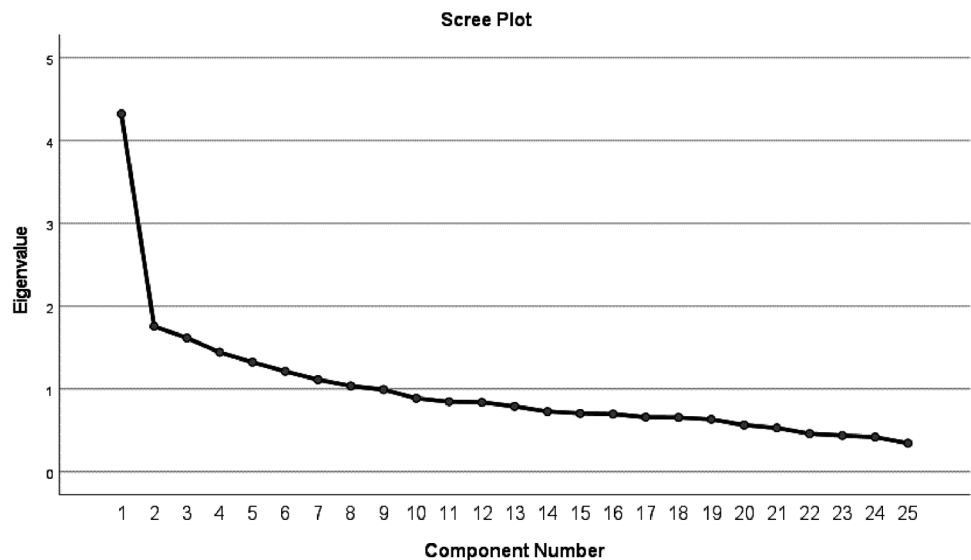
Fig. 1 Scree plot graph ($n = 310$)

Table 1 Percentage endorsement and corrected item-total correlations ($n=310$)

	Yes (%)	Corrected item-total r	Merckelbach et al. (2001)	
			Yes (%)	Corrected item-total r
Item-1	21	0.38	34	0.38
Item-2	41	0.37	45	0.35
Item-3	17	0.24	29	0.26
Item-4	79	0.31	83	0.17
Item-5	31	0.40	42	0.39
Item-6	17	0.20	28	0.23
Item-7	47	0.23	20	0.27
Item-8	56	0.22	69	0.21
Item-9	31	0.48	23	0.36
Item-10	59	0.43	36	0.31
Item-11	30	0.46	53	0.31
Item-12	41	0.57	48	0.37
Item-13	10	0.21	14	0.16
Item-14	27	0.42	43	0.43
Item-15	21	0.39	24	0.41
Item-16	43	0.13	58	0.22
Item-17	13	0.18	12	0.24
Item-18	55	0.29	26	0.20
Item-19	25	0.31	35	0.19
Item-20	43	0.31	38	0.18
Item-21	28	0.26	30	0.37
Item-22	58	0.20	60	0.36
Item-23	23	0.30	19	0.35
Item-24	16	0.30	14	0.29
Item-25	15	0.17	11	0.25

In summary, the path taken during the development of the original questionnaire was largely followed, and the adapted questionnaire yielded highly similar results. The Turkish version of the CEQ was determined to be a single-factor construct consisting of 25 items, and subsequent analyses were carried out based on this.

Further reliability and validity analyses

Initial descriptive statistics were computed for the main variables using all 465 eligible surveys. It was observed that DES-II scores exhibited a non-normal distribution with a kurtosis of 1.61 ($SE=0.226$), surpassing the threshold of $+1.5$ (Tabachnick & Fidell, 2013). Outliers were identified, and the data from a participant who scored 63.6 were

removed. After this removal, both the skewness and kurtosis of the sample remained below $+1.5$ for all variables (see Table 2). Therefore, no further surveys were deemed necessary to be removed from the dataset. As a result, the study's sample comprised the remaining 464 participants, and additional analyses for reliability and validity were conducted using the entire set of 464 surveys.

Internal reliability

The Cronbach's Alpha for the CEQ was computed to be 0.78, and McDonald's Omega found to be 0.77. Cronbach's Alpha values, when each item was deleted individually, ranged between 0.76 and 0.78. Moreover, a split-half reliability test was conducted by comparing odd and even numbered items. The reliability coefficient of the first half of the test was 0.68, and the reliability coefficient of the second half was found to be 0.62. The Spearman-Brown coefficient and the Guttman Split Half Coefficient were reported as equal to 0.76, which is fairly close to the Cronbach's Alpha value. Parallel to the earlier findings in the EFA, item-total correlations varied between 0.16 and 0.53. Furthermore, it was observed that the item-total correlation of item-16 increased as the sample size grew larger, surpassing the 0.15 criterion (Merckelbach et al., 2001). Overall, the results indicated that the internal consistency of the CEQ was high.

Test-retest reliability

Of the 464 participants, 110 completed the scale twice. Test-retest interval was 28 to 45 days. Test–retest reliability was calculated through Pearson product-moment correlation coefficient. Acceptable test–retest stability was reported as $r=.72$.

Convergent and discriminant validity

DES-II and MIS were used to test the convergent validity and SDS were used to test the discriminant validity. Internal consistency of DES-II (Cronbach's Alpha $=0.92$), MIS (Cronbach's Alpha $=0.76$), and SDS (Cronbach's Alpha $=0.87$) were calculated before validity analyses and found adequate to high. The relationship between these

Table 2 Descriptive statistics of all variables

	N	Min.	Max.	M	SD	Skewness		Kurtosis	
						Statistic	SE	Statistic	SE
CEQ	464	0	22	8.81	4.46	0.520	0.113	−0.214	0.226
MIS	464	2	25	8.82	4.31	0.649	0.113	0.046	0.226
DES	464	0.00	62.50	16.3	11.95	1.278	0.113	1.42	0.226
SDS	464	52.00	138.00	93.2	15.02	−0.039	0.113	−0.016	0.226

Note. N sample size, *Min.* minimum, *Max.* maximum, *M.* Mean, *SD* standard deviation, *SE* standard error

measures and the Turkish version of the CEQ were evaluated using Pearson product-moment correlation coefficient.

A positive correlation was expected between CEQ scores and scores on DES-II and scores on MIS. The analysis revealed a significant positive correlation between DES-II scores and CEQ scores, with a calculated correlation coefficient of r (464) = 0.51, $p < .001$. Similarly, a significant positive correlation between MIS scores and CEQ scores was revealed, as indicated by a correlation coefficient of r (464) = 0.51, $p < .001$. These results suggest that adapted CEQ questionnaire has convergent validity. Consequently, fantasy proneness was found to be strongly associated with dissociative experiences and magical ideation.

SDS scores and CEQ scores exhibited a negative correlation with a calculated correlation coefficient of r (464) = -0.10 at a significance level of $p < .05$. This outcome suggests that the adaptation of the CEQ has discriminant validity. However, it is worth noting that the relationship between the total scores of these two scales was weak. Notably, previous research has reported that social desirability and fantasy proneness are not significantly correlated (Horselenberg et al., 2000; Merckelbach et al., 2001). To gain a deeper understanding of the relationship between these two variables, CEQ scores were further examined in relation to the scores of the two subscales of SDS: impression management and self-deception. It was found that fantasy proneness and self-deception did not exhibit a significant relationship, r (464) = -0.04, $p = .405$. However, fantasy proneness was negatively correlated with impression management, r (464) = -0.12, $p < .05$.

Predictive validity

The study revealed a positive relationship between the level of interest in creative activities and fantasy proneness ($r = .21$, $p < .001$). To further assess the predictive validity of the CEQ, participants were asked to rate their interest in creative activities, such as art and design (see Table 3). Notably, a trend of increasing fantasy proneness scores was observed across the reported means for each option ranging from having no affiliation with creative activities to being professionally involved.

A one-way ANOVA analysis unveiled a significant difference between the groups (F (4, 459) = 7.665, $p < .001$).

Post-hoc Tukey's test results allowed for the classification of differences into two main groups: *participants who are not engaged in or aspiring to engage in creative activities professionally* ($n = 354$, encompassing the first three interest options), and *participants engaged in or aspiring to engage in creative activities professionally* ($n = 110$, encompassing the last two interest options). Consequently, a significant difference in fantasy proneness scores was estimated between these two groups. In an independent t-test analysis, participants engaged in or aspiring to engage in creative activities professionally were found to have significantly higher fantasy proneness scores ($M = 10.8$, $SD = 4.78$) compared to participants who are not engaged in or aspiring to engage in creative activities professionally ($M = 8.21$, $SD = 4.18$), t (462) = -5.415, $p < .001$. This finding highlights the predictive validity of the adapted questionnaire, as it clearly demonstrates that individuals involved in creative activities exhibit higher degrees of fantasy proneness.

Discussion

The primary aim of this study was to adapt the CEQ into Turkish, providing a reliable and culturally appropriate tool for assessing fantasy proneness. This exploration into the realm of fantasy proneness within the context of Turkey aimed to bridge a notable gap in the existing literature. The key findings of this study, affirming the effectiveness of the Turkish version of the CEQ, lay a foundation for a nuanced understanding of fantasy proneness and its correlates within the cultural framework of Turkey.

The construct validity, assessed through EFA, revealed a single-factor solution, echoing the structure found in the original CEQ (Merckelbach et al., 2001). Notably, none of the items required removal, underscoring the robustness of the Turkish adaptation. The PCA with varimax rotation further supported the fidelity of the Turkish version, aligning closely with the original CEQ across key parameters, including the number of components, the variance explained by the first component, cumulative variance, and the scree test.

Internal reliability measures (Cronbach's Alpha = 0.78; McDonald's Omega = 0.77) surpassed those reported for the original (Cronbach's Alpha = 0.76) (Merckelbach et al., 2001) and the Spanish versions (Cronbach's Alpha = 0.72)

Table 3 CEQ scores regarding the interest in creative activities ($N = 464$)

	n	Min.	Max.	M	SD	SE
(1) I have no affiliation with such activities.	48	2	21	8.63	4.00	0.578
(2) I follow such activities as a hobby.	168	0	19	8.01	4.11	0.317
(3) I engage in such activities as a hobby.	138	1	20	8.30	4.33	0.369
(4) I engage in such activities as a hobby, and I aim to pursue them professionally.	64	0	20	10.50	5.18	0.647
(5) I engage in such activities professionally.	46	3	22	11.13	4.19	0.617
Total	464	0	22	8.81	4.46	0.207

(Sánchez-Bernardos & Avia, 2004), suggesting strong internal consistency in the Turkish adaptation. The acceptable test-retest reliability ($r = .72$), despite a larger sample size than the original study ($r = .95$) (Merckelbach et al., 2001), indicated the questionnaire's stability over time. The consistent results obtained through the split-half reliability method further bolstered confidence in the CEQ's reliability.

The examination of dimensionality among different language versions revealed an interesting pattern. While both the original and Turkish versions maintained a single-factor structure, the Spanish version exhibited three factors. This variation can be attributed to age-related differences in the samples, highlighting the impact of developmental stages on the nature of fantasy proneness. Sánchez-Bernardos and Avia (2004) suggested that age-related differences in the structure of fantasy activities may contribute to a more diverse nature of fantasy in younger individuals. Aligned with the perspective, the current study revealed that cultural variations may not significantly influence the structure of fantasy in adults, emphasizing the stability of the construct in diverse cultural contexts.

The convergent validity analysis revealed significant positive correlations between the Turkish CEQ and measures of dissociation ($r = .51$) and schizotypy ($r = .51$). This not only underscores the effectiveness of the Turkish version, but also opens avenues for cross-cultural comparisons. The results provide initial data regarding the relationship of fantasy proneness with dissociation and schizotypy and align closely with the existing literature that suggests both dissociative experiences and magical ideation are among the strongest correlates of fantasy proneness, with correlation coefficients typically exceeding 0.50 (Merckelbach et al., 2022). The current results suggest consistent and strong correlations of fantasy proneness with dissociation and schizotypy in adults across different cultural contexts (Merckelbach et al., 2022).

Intriguingly, the study revealed an unexpected weak negative correlation between social desirability and fantasy proneness ($r = -.10$, $p < .05$). This nuanced relationship challenges conventional assumptions and adds a layer of complexity to the understanding of fantasy proneness. The results stand in contrast to previous suspicions regarding the potential influence of social desirability on responses (Weibel et al., 2018), indicating that the CEQ items do not imply deception or dishonesty (Schelleman-Offermans & Merckelbach, 2010). It is indisputable that the term "creative" conveys favorable connotations. While the instrument's name could encourage individuals to provide responses that enhance impression management scores, the negative correlation ($r = -.12$, $p < .05$) offers additional support for the effectiveness of the items.

Furthermore, this study established a positive relationship between the level of interest in creative activities and fantasy proneness ($r = .21$, $p < .001$), demonstrating the predictive validity of the adapted CEQ. In addition to demonstrating predictive validity, this research provides further evidence that individuals engaged in or aspiring to engage in creative activities professionally exhibit higher levels of fantasy proneness compared to those not engaged or aspiring to engage in creative activities. These findings align with efforts to link the concept of fantasy proneness with creativity (Lynn & Rhue, 1986; Merckelbach et al., 2001; Schelleman-Offermans & Merckelbach, 2010; Thomson & Jaque, 2015; Weibel et al., 2018).

This study successfully addressed several potential limitations. Notably, the extensive survey comprising over 100 questions did not present a significant obstacle, given the low dropout rate (14%). To safeguard against errors resulting from inattention or random responses, the survey incorporated thoughtfully designed attention-check questions, with only a minimal of participants (7%) failing to meet the specified criteria. The commendable completion rate was better understood by the participants' positive feedback provided after completing the survey, highlighting not only the intriguing nature of the scales but also their engaging quality. This positive sentiment was further underscored by participants' notable interest in the retest phase of the study.

Despite the robustness of the present study, it is important to acknowledge certain limitations that warrant careful consideration. The current adaptation excluded individuals below 18 and above 60 years old. A notable limitation is the skewed age distribution, with 95.1% of participants falling within the 18 to 45 age range. This introduces constraints to the generalizability of the findings for individuals falling within the 45 to 60 age range. Future research endeavors should, therefore, encompass a more comprehensive age spectrum to enhance the overall applicability and relevance of the findings. This approach will contribute to a more nuanced understanding of the factors influencing fantasy across different age groups. Furthermore, it is worth emphasizing that the observed relationship between fantasy proneness and social desirability in this study exhibited a weak association. To establish the replicability of this finding, further investigations among adult populations are needed. Additionally, considering the developmental stage of adolescence, it may be prudent to explore this relationship with an adolescent population, as the concept of social desirability aligns closely with the peculiarities of this developmental stage.

Moreover, the study marks a starting point for more complex forms of analysis (Merckelbach et al., 2022). Any insights gained regarding the interplay among fantasy proneness, dissociation, schizotypy and variety of other

clinical domains can contribute significantly to both clinical research and clinical practice. Studies in Turkey have predominantly approached the correlates of fantasy proneness from a psychopathological perspective (e.g., Demirkol et al., 2020). These traits, whether marked by the presence or absence of related symptoms, can encompass a wide spectrum, spanning from pathological conditions to indicators of psychological well-being (Garzitto et al., 2016; Mısır & Alptekin, 2020; Wilson & Barber, 1983). Future research, both in the context of Turkey and globally, should consider fantasy proneness not only in psychopathological research but also in psychological health and resilience studies.

Conclusion

The analyses conducted to assess the psychometric properties of the Turkish version of the CEQ have demonstrated that this questionnaire is a reliable and valid measurement tool. Notably, the negative relationship observed between fantasy proneness and impression management provided additional support for the questionnaire's validity. The findings pertaining to the associations between fantasy proneness, dissociation, magical ideation, and social desirability in this study have contributed important initial insights into the construct of fantasy proneness within the context of Turkey. This valuable information adds to the understanding of how fantasy proneness operates in a cultural context that has not been explored in the existing literature. While the primary goal of this study was to introduce a brief, reliable, and valid measure of fantasy proneness for use in the research in Turkey, it has also reinforced the psychometric qualities of the questionnaire. The study has expanded the knowledge of the strength of the relationship between fantasy proneness and its established correlates. As a next step, it is recommended to conduct further validity and reliability testing of the questionnaire in different age groups to enhance its robustness and applicability. Furthermore, this study emphasizes the significance of incorporating fantasy proneness in research on psychological health and resilience, alongside psychopathology. This recommendation extends beyond the Turkish context to the broader landscape of psychological research.

Declarations

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