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The Self-Talk Scale: Psychometric Properties in University Students

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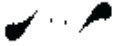
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Abstract

This study was aimed to examine the psychometric properties of the Self-Talk Scale, which was developed to determine the self-talk frequency of individuals, in a sample of Turkish university students. The data were collected from 332 university students for the analysis. Confirmatory factor analysis was conducted to verify the four-factor structure of the scale in the examination of the psychometric properties of the scale, and the Cronbach alpha value was calculated to determine the reliability of the scale. Confirmatory factor analysis results revealed that the scale had a good fit. The Cronbach's alpha value of the scale was .88.

Keywords: self-talk, inner experience, individual differences, university students



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INTRODUCTION

Internal speech or self-talk of individuals draws the attention of many researchers. Vygotsky's (1986) studies on individuals' use of language on self-regulation pioneered the self-talk studies. Vygotsky saw the use of language as a part of the thought process and emphasized private speech as a means of gaining control over the environment as well as control over one's own actions and behaviors (Berk & Winsler, 1995). Although many definitions of self-talk have been made, internal monologue or dialogue corresponds to self-talk, and these concepts are used interchangeably in the literature (Brinthaupt, Hein & Kramer, 2009). Researchers' interest in self-talk has been increased recently because self-talk is considered an important aspect of a person's life and daily routines. Self-talk functions in various fields such as problem-solving and socio-emotional difficulties (Lee, 2011), regulation of thoughts and behaviors (Winsler, Diaz & Montero, 1997), and motivation (de Dios & Montero, 2003). Alderson-Day (2015) argues that internal speech or self-talk functions differently in children and adults; while self-talk in adulthood plays a various roles both cognitively and behaviorally; in childhood, self-talk plays an important role in supporting complex cognitive tasks and regulating behavior.

Self-talk functions as a mechanism that helps people understand and process themselves and their environment (Jonason Webster & Lindsey, 2008). In daily life, it helps individuals to regulate their behaviors and solve problems by increasing both their attention functions (Oliver, Markland, Hardy, & Petherick, 2008) and their awareness of their feelings and thoughts (Depape, Hakim-Larson, Voelker, & Jackson 2006). Speaking with oneself mediates one to focus on himself and to learn and think about himself (Morin, El-Sayed & Racy, 2015). Many processes such as self-reflection, self-rumination, self-evaluation, self-regulation, and self-monitoring are based on talking to oneself (Morin, 2017). It is suggested that self-talk can be beneficial in increasing the sports performance of athletes as well as in other performances (Galanis et al. 2018). Likewise, support has been obtained for increasing the self-awareness of students and its effect on learning motivation (Morin, 2021), academic performance and behaviors (Callicott ve Park, 2003). Self-talk appears as a tool that is frequently used in different moments and areas of life.

Self-talk is also an important aspect of the field of mental health. Self-talk can be used to reach people's thoughts and identify mental disorders (Selzler, 2013). In a study investigating the role of self-talk frequency in protecting against the adverse effects of loneliness on mental and physical health, it was found that as loneliness scores increases the self-talk frequency increases, and as mental health scores increases the frequency of self-talk decreases (Reichl, Schneider & Spinath 2013). On the other hand, it is stated that self-talk is the solution to decreasing social interactions (Jonason, Webster & Lindsey, 2008). According to cognitive theories, self-talk is the basis of anxiety. In this context, it can be suggested that the contribution of different functions of self-talk to psychopathology should be examined. Self-talk frequency can be used to detect mental disorders accompanied by loneliness before progress. Determining the frequency of self-talk can be useful in evaluating mental health and in early interventions (Reichl, Schneider & Spinath 2013).

It is suggested that self-talk is a cognitive skill that people can learn (Reyes, 2016). Emotions can be changed with to be made changes in self-talk (Hughes, Gourley, Madson & Blanc, 2011). Determining the relationship of different types of self-talk with people's emotions and behaviors can help to solve problems by making arrangements in self-talk types. Self-talk is the product of thought and is important in understanding what the individual is thinking. It is necessary to try to clarify the functions of self-talk and to determine what its role is in different task areas (Alderson-Day & Fernyhough, 2015).

A measurement tool for evaluating the frequency of self-talk can be useful in understanding the human person, contributing to their development, and protecting and maintaining mental health. In this context, the Self-Talk Scale was studied in this study to examine individual differences in the frequency of self-talk. The Self-Talk Scale is designed by Brinthaupt, Hein, and Kramer in 2009 and items of the scale describe a wide variety of self-regulating behaviors and situations (Brinthaupt, Benson, Kang & Moore, 2015). These descriptions are related to four functions of self-talk: self-reinforcement, self-criticism, self-management, and social-assessment. Self-reinforcing self-talk is about positive experiences. It involves people reinforcing themselves when they are

happy, when they have accomplished something and when they are proud of themselves. Self-critical self-talk is a reaction to negative situations and behaviors. It involves individuals criticizing themselves as a result of their disappointment when they experience negative situations, when certain things do not go according to their expectations or when they do not come true. Self-managing self-talk includes situations in which individuals need to regulate their behavior. Social-assessing self-talk is about people's relationships with people they communicate within their daily lives. It helps to review relationships and decide what responses will be given to others.

Self-Talk Scale was to be proven valid and reliable measurement tool in American culture (Brinthaup, Hein and Kramer, 2009). In addition, supportive findings regarding the validity and reliability of the Self-Talk Scale in a different culture were obtained (Khodayarifard, Brinthaup, Zardkhaneh, and Azar 2014). Exploratory and confirmatory factor analyzes of the scale in Iranian university students by Khodayarifard et al. (2014) confirmed the four-factor structure of the scale.

Self-talk remains a subject that is not studied sufficiently because of the difficulty of measurement. The results of the literature-based review showed that self-talk is not adequately addressed (Morin, 2009a). Psychologists and cognitive neuroscientists' less interest in self-talk is also attributed to methodological problems (Alderson-Day and Fernyhough, 2015). When the self-talk literature was examined, it was seen that the research focused on sports and athlete performance. In Turkey, it cannot be said that enough work has been done on this subject. However, about one-fourth of life's time spent outside of sleep is spent talking to oneself (Morin, 2009b). What is known about the difference in self-talk frequency among individuals and the source of the difference is also very limited (Ren, Wang & Jarrold, 2016). More research is needed on this subject. This study aims to examine the psychometric properties of the Self-Talk Scale on Turkish university students and contribute to the self-talk literature.

METHOD

Translation Work

In the first stage, permission was obtained from the developers of the original scale for translation and use of the scale. For this, Tom Brinthaup, one of the investigators who developed the scale, was contacted. The scale items were first translated from English into Turkish by the authors of this study. The Turkish form obtained was sent to the developer of the original scale and the scale was translated back into English by a bilingual expert. The original of the scale was compared with the translated forms and the final form of the scale was created by considering the recommendations. The created Turkish form was reviewed by two experts, one of whom was an expert in the field of linguistics teaching, the other one is a bilingual psychology expert who had fluent expression in two languages, and the final Turkish form was made ready for application.

Participants

Participants of this study were university students. In determining the number of participants, the recommended sample size, which is at least 300, was taken as a basis for statistical calculations (Tabachnick & Fidell, 2007). The participants of this study consisted of a total of 332 voluntary university students, 236 (71.1%) women and 84 (25.3%) men, aged between 17-27 ($M = 20.02$ $SD = 1.40$). 12 (3.6%) of the participants did not specify their gender. Ethical permission for this study was received from the ethical committee of the Çanakkale Onsekiz Mart University.

Data Collection Tools

The current study, the data were collected by the Self-Talk Scale, whose psychometric properties were examined, Automatic Thoughts Scale, and Self-Esteem Scale.

Self-Talk. The Self-Talk Scale was developed to determine the self-talk frequency of individuals (Brinthaup, Hein & Kramer, 2009). The scale consists of four sub-dimensions: self-reinforcement, self-management, self-criticism, and social-assessment. Each subscale contains of four items, and the total scale consists of 16 items. The scores obtained from the 5-Likert type scale range between 16-80. The response scale range from 1 to 5 (5 = very often, 4 = often, 3 = sometimes, 2 = seldom, and 1 = never). Total of 207 university students participated in the study of scale

development. 68 of the students answered only the Self-Talk Scale, while the remaining 139 students answered the Self-Talk Scale and four different scales (the Automatic Thoughts Questionnaire–Revised, Rosenberg’s Self-Esteem Scale, the Self-Consciousness Scale, and the Marlowe–Crowne Social- Desirability Scale). Study findings indicated acceptable fit indexes for the 16-item four-factor structure ($\chi^2_{(98,136)} = 191.79$, GFI=.899, CFI=.945, RMR=0.66, RMSEA=.068, CI₉₈=.054-.082). The internal consistency Cronbach alpha coefficients of the scale were found to be .82 for social-assessment, .89 for self-reinforcement, .83 for self-criticism, and .79 for self-management. It was observed that verbal strategies showed stronger positive and significant correlations with the total self-talk score, which is one of the visual strategies, and the scores of its subscales. On the other hand, when the scores obtained from the Self-Talk Scale were evaluated in terms of positive and negative automatic thoughts, the total self-talk score was found to be positively correlated with negative automatic thought scores, while there was no relationship between self-talk scores and positive automatic thought scores. On the other hand, when the scores obtained from the Self-Talk Scale were evaluated in terms of positive and negative automatic thoughts, the total self-talk score was found to be positively correlated with negative automatic thought scores, while there was no relationship between self-talk scores and positive automatic thought scores. Social-assessment and self-criticism subscales of the scale showed a positive correlation with negative automatic thought scores. While self-esteem was inversely related to self-criticism and social-assessment subscales, it was found to be positively correlated with self-reinforcement subscale. Total score of self-talk and subscale scores were not found to be associated with social desirability. The reliability of the scale was determined by the test-retest by applying the scale over 3 months. While the reliability coefficient for the total score of self-talk was determined as .69, the alpha coefficients of subscales were determined as .50 for self-reinforcement, .56 for self-criticism, .64 for self-management and .69 for social-assessment.

Automatic Thoughts. The Automatic Thoughts Scale determines the frequency of automatic recall of negative thoughts related to depression (Hollon and Kendall, 1980). The study of Turkish adaptation study of scale was performed by Aydın and Aydın (1990). The scale consists of 30 items in the 5-point likert type. The scale correlated .70 with the Beck Depression Scale. The calculated internal consistency coefficient of the scale was determined as high (.95). The correlation coefficient of the scale determined with an interval of 3 weeks is .77. The points that can be obtained in the scoring of the scale with 30 items take values ranging from 30 to 150. High scores from the scale indicate the negativity of self-evaluation and the presence of depression. The alpha reliability of the scale for this research was determined as .95.

Self-Esteem. The Rosenberg Self-Esteem Scale was designed by Rosenberg (1965). The aim of the scale was to determine the self-esteem level of the individual based on their self-report. The Turkish form of the scale was adapted by Çuhadaroğlu (1986). There are five negative items and five positive items in the scale consisting total of 10 items. For this study, the calculated internal alpha reliability of the scale was .88.

Data Analysis

Various statistical methods were utilized to determine the psychometric properties of the Self-Talk Scale. Confirmatory factor analysis was employed to test the construct validity of the scale (IBM SPSS Amos 21). The existence of the four-factor structure determined in the original scale was tested. The reliability of the scale was found by computing the alpha reliability values for the total scale and its subscales and the combined reliability. In testing the criterion-related validity of the Self-Talk Scale, the correlation coefficients between the Automatic Thoughts Scale and the Rosenberg Self-Esteem Scale were computed. Before analyzing the data, the kurtosis and skewness values of the data obtained from the participants were examined regarding their suitability for normal distribution.

RESULTS

Descriptive Statistics

In terms of the mean score and standard deviation values of the 16 items of the Self-Talk Scale are examined (Table 1). The skewness and kurtosis values of the scale were used to evaluate suitability for the normal distribution and are presented in Table 1. It is observed that the average values of the items vary in the range of 3.06 and 4.13, and values of the skewness and kurtosis of the items are between $-.78$ and $.34$. It is suggested that if the skewness and kurtosis values fall within the range of ± 2.58 , the data will be accepted as a normal distributed (Tabachnick & Fidell, 2007). In this case, the data of this study are normally distributed.

Table 1. Descriptive Information of the 16 Items of Self-Talk Scale

Item #	Average	SD	Skewness	Kurtosis
1	3.84	.78	-.24	-.39
2	3.54	.97	-.28	-.43
3	3.92	.04	-.78	.34
4	3.64	1.06	-.57	-.34
5	3.30	1.13	-.23	-.78
6	3.69	1.02	-.44	-.44
7	3.73	1.12	-.64	-.37
8	3.32	1.10	-.24	-.69
9	4.13	.82	-.69	-.08
10	3.61	1.13	-.48	-.55
11	3.77	1.13	-.57	-.61
12	3.64	1.11	-.57	-.38
13	3.06	1.14	.03	-.72
14	3.56	1.13	-.53	-.50
15	3.84	.89	-.34	-.65
16	3.71	1.07	-.48	-.56

Relationship between subscales and total scale calculated by Pearson correlation analysis. The coefficients (Table 2) showed high correlations ranging between $.76$ and $.81$. When the relationships among the subscales were examined, it was found that the correlation coefficients ranged from $.38$ to $.65$. The positive correlation coefficients showed that the frequency of using self-talk is more important than self-talk type. Accordingly, a positive rather than an inverse relationship was found between self-reinforcement and self-criticism. It can be stated that the increase in any type of self-talk is correlated with the increase of other self-talk types.

Table 2. Correlations Between Subscales and Total Score of the Self-Talk Scale

Factor	1	2	3	4	5
1-Self-reinforcement		.51**	.47**	.38**	.76**
2-Self-criticism			.50**	.56**	.81**
3-Self-management				.65**	.81**
4-Social assessment					.81**
5-Total self-talk					

** $p < .001$

Internal Consistency

It is recommended to test the validity and reliability of the designed model before confirmatory factor analysis (Rui Sarmento and Costa 2017). The reliability of the Self-Talk Scale was determined by calculating the Cronbach alpha values and the Composite Reliability. Internal consistency is used to determine whether the items of a measurement tool consistently measure a certain conceptual structure in a single measurement (Şencan, 2005). The internal consistency values obtained from the subscales as a result of removing the subscales of the scale and each item are given in Table 3. The results indicated that the Cronbach alpha reliability for the scale as a whole was .88. Cronbach's alpha reliability for the subscales of the scale were determined as .84 for self-reinforcement, .72 for self-criticism, .67 for self-management, and .73 for social-assessment. The composite reliability coefficient is an internal consistency calculation based on the factor loads and error variance values obtained as a finding of the confirmatory factor analysis (Yang & Green, 2011). The calculated composite reliability coefficient was found as .83 for self-reinforcement, .68 for self-criticism, .67 for self-management, and .74 for social-assessment. In addition, when any item of any subscale is removed from the reliability analysis, if the calculated Cronbach alpha value of the subscale decreases, this is interpreted as that item is important. When the findings are viewed, it is seen that all of the scale items are important.

Table 3. The Significance and Reliability of the Four Subscales of the Self-Talk Scale

	Number of Items	Cronbach Alpha	Composite Reliability	Reliability of the original scale	Item #	Subscale reliability when the item is excluded
Self-reinforcement	4	.84	.83	.89	2	.80
					5	.79
					8	.79
					13	.82
Self-criticism	4	.72	.68	.83	1	.71
					7	.66
					10	.62
					14	.61
Self-management	4	.67	.67	.79	3	.59
					9	.62
					12	.57
					15	.62
Social-assessment	4	.73	.74	.82	4	.66
					6	.65
					11	.72
					16	.65

Confirmatory Factor Analysis

Confirmatory factor analysis is a method enabled to verify a designed structure statistically (Çokluk, Şekercioğlu, & Büyüköztürk, 2012). This technique is recommended for testing whether the existing structure is preserved so that a measuring instrument designed and tested in one culture can be used in another culture. If the designed structure cannot be verified by confirmatory factor analysis, it is recommended to resort to exploratory factor analysis (Costa & Sarmento, 2019). For this reason, confirmatory factor analysis was utilized for the first-level multi-factor model, which was created to determine whether the four-factor structure of the Self-Talk Scale devised by Brinthaupt, Hein, and Kramer (2009) was preserved. Confirmatory factor analysis was employed by using IBM SPSS Amos software tools (version 21). The maximum likelihood method was utilized in the analyzes. As a result of the analysis, χ^2/df , GFI, CFI, RMR, RMSEA, SRMR fit indices were examined to evaluate the appropriateness of the proposed structure. The goodness of

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fit ranges of Schermelleh-Engel, Moosbrugger, and Müller (2003) were used to decide on the good fit or acceptable fit of these values.

When the standardized factor load values of each subscale are examined as findings of the Confirmatory Factor Analysis (Figure 1), the standardized factor loads were between .63-.83 for self-reinforcement, between .57-.63 for self-criticism, between .48-.67 for self-management, and between .59-.69 for social-assessment. When the factor loadings of the subscales were examined at the level of significance, it was determined that the items were loaded correctly on the factors they depend on ($p < .05$) (Karagöz, 2017). At the same time, factor loadings were found to be above the suggested value of .30 (Harrington, 2009).

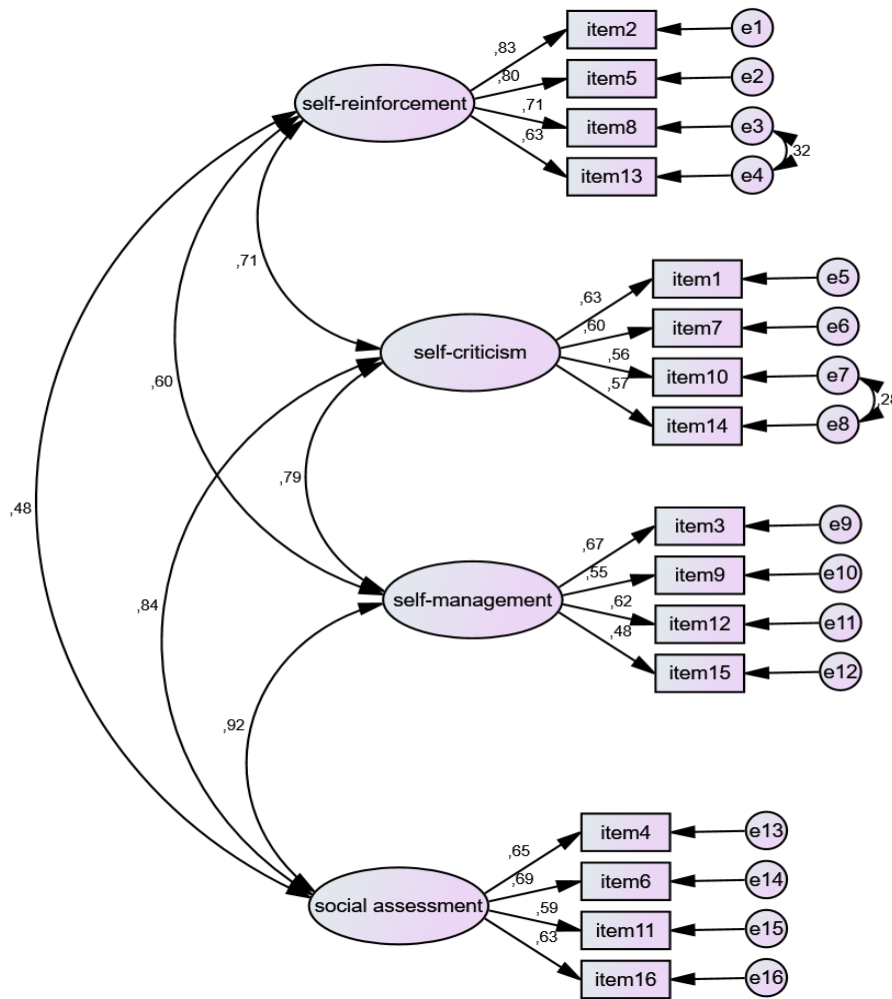


Figure 1: First Level Four Factor Confirmatory Measurement Model

Confirmatory Factor Analysis showed that the goodness of fit indexes of the first-level multi-factor model were $\chi^2/df=2.941$, GFI=.903, CFI= .896, RMR= .057, RMSEA=.077, SRMR=.052. In order for the model to fit better, corrections indicated by the suggested modification indices were made, provided that it conforms to the theoretical structure (Karagöz, 2016). Covariance was formed between e3-e4 and e7-e8 as indicated by the modification indices. After corrections, the fit values of the model were determined as $\chi^2/df=2.595$, GFI=.914, CFI= .917, RMR= .055,

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RMSEA=.069, SRMR= .050. The obtained model fits the data better than the first model. The structure of the scale consisting of four factors was confirmed: social assessment, self-management, self-criticism and self-reinforcement.

The adaptation values of the Self-Talk Scale, which was adapted to Turkish, showed similar results with the compliance values of the studies conducted in the USA (Brinthaupt, Hein & Kramer, 2009) and Iran (Khodayarifard, Brinthaupt, Zardkhaneh, and Azar 2014) (Table 4).

Table 4. Fit Index Results of the Self-Talk Scale

	χ^2/df	GFI	CFI	RMR	RMSEA	SRMR
Original Scale (English)	1.96	.899	.945	.066*	.068	-
Persian	3.25	-	.91	-	.093	.070
Turkish	2.94	.903	.896	.057	.077	.052
Turkish (modification)	2.60	.914	.917	.055	.069	.050
Acceptable values	≤ 3	$\leq .90$	$\leq .90$	$\leq .08$	$\leq .08$	$\leq .10$

Criterion Validity of the Self-Talk Scale

In determining the criterion-based validity of the Self-Talk Scale, the relationships between automatic thoughts and self-esteem, which are claimed to be related in the literature, were examined. Automatic Thoughts Scale and Self-Esteem Scale were used to determine these relationships. The direction and degree of the relationship were determined with the Pearson correlation coefficient. A significant and positive relationship was found between self-criticism ($r = .18$) and social-assessment subscales ($r = .19$) and automatic thoughts. It is observed that there is a non-significant inverse relationship ($r = -.01$) between the self-reinforcement subscale and automatic thoughts. It was determined that there is a non-significant positive correlation ($r = .08$) between self-management self-talk and automatic thoughts. A significant inverse correlation was found between self-critical and social-assessment ($r = -.11$) and social evaluation ($r = -.12$) subscales of self-talk (Table 5). As self-criticism and social-assessment increase, self-esteem decreases. It was determined that the direction of the correlation between self-reinforcement and self-esteem was positive ($r = .06$), and the direction of the correlation relationship between self-management self-talk was negative ($r = -.04$). While there was a significant positive correlation ($r = .13$) between the Self-Talk Scale and automatic thoughts, there was no significant correlation between the Self-Talk Scale and self-esteem ($p = .25$).

Table 5. Relationships Between Total and Subscales of Self-Talk Scale and Criterion Variables

	Self-criticism	Self-reinforcement	Self-management	Social-assessment	Self-Talk Scale Total
Automatic Thoughts	.18**	-.01	.08	.19**	.13*
Self-esteem	-.12*	.06	-.04	-.11*	-.06

* $p < .05$, ** $p < .001$

DISCUSSION AND RECOMMENDATIONS

Self-talk plays an important role in human life, and therefore it is considered important to consider and investigate it not only theoretically but also empirically. A measurement tool that will enable the determination frequency of self-talk can help to better understand the notion of self-talk and to clarify its functions. In addition, it can contribute to the development, protection, and maintenance of mental health, especially by revealing its relationship with mental health.

In this study, the four-factor structure of the Self-Talk Scale was examined by confirmatory factor analysis. Before the confirmatory factor analysis was applied, the reliability of the scale was determined by calculating Cronbach's alpha value and composite reliability coefficient. It was observed that Cronbach's alpha coefficient was .88 when calculated for the whole scale, and values

ranged from .84 to .67 when calculated for the subscales. On the other hand, the reliability values of the original scale ranged between .89 and .79. Although it is emphasized that acceptable reliability coefficients should be above .70 (DeVellis, 1991), Nunnally (1978) states that reliability coefficients above .60 are also acceptable in scale development studies in social sciences. In this context, it is considered that the reliability coefficients of each of the sub-dimensions of the adopted scale are above .60 and that it is reliable at a sufficient level. The coefficients are close to those obtained in the Persian form of the scale (between .75 and .67) (Khodayarifard et al., 2014).

Confirmatory factor analysis based on the first-level multi-factor model showed that the scale consisted of four factors: self-criticism, self-management, self-reinforcing and social assessment. This finding supports the existence of a four-factor structure obtained in the original and Persian forms of the scale.

In determining the existence of criterion-related validity of the Self-Talk Scale, the relationship between the Self-Talk Scale and its subscales and automatic thoughts and self-esteem was examined. Compared to positive thoughts, it is claimed that neutral or negative thoughts are associated with self-talk (Alderson-Day & Fernyhough, 2015). In this direction, negative automatic thoughts were found to be positively related to the self-criticism subscale and social-assessment subscale related to negative experiences. Self-reinforcement subscale was associated with positive experiences but not with negative automatic thoughts. On the other hand, it is stated that self-esteem is closely correlated to self-talk (Racy, 2015). Alderson-Day et al. (2014) found a negative relationship between self-esteem and evaluative self-talk and self-talk involving other people. This evidence supports the finding of the current study. It was determined that while self-criticism and social-assessment self-talk scores increased, self-esteem decreased. On the other hand, it was observed that there was no significant correlation between the self-reinforcement subscale and self-management subscale and self-esteem. This finding of this study is similar to the fact that Alderson-Day et al. (2018) did not find statistically a significant relationship between positive/regulatory self-talk and self-esteem. Among the types of self-talk frequency in current study, the total self-talk score was found to be associated with automatic thoughts, but not with self-esteem. The insignificance of the relationship between total self-talk and self-esteem may be due to the nature of self-talk consisting of positive and negative expressions (Brinthaup, Hein & Kramer, 2009). The results obtained are consistent with the studies in the field of self-talk and can be accepted as a proof for the validity of the Self-Talk Scale.

The present study has some limitations. First of all, this study group consisted of mostly female university students, so it can be recommended to work with a study group in which the number of male participants is balanced with females. The present study was carried out with university students, and studying the scale with different groups and in different areas may contribute to the validity and reliability of the scale, as well as enabling self-talk to be studied with those groups. In addition, the present study is cross-sectional and the test-retest reliability of the scale can be investigated with a longitudinal study. In addition, although there is support for the validity and reliability of the scale in the present study, the negative expression of self-talk in Turkish culture, and even the expression "the one who talks to himself is crazy" among the public may have affected the sincere response of the scale. For this reason, it can be recommended to apply the Self-Talk Scale together with a measurement tool that reveals the attitudes of the participants towards self-talk. On the other hand, the short-term response feature of the 16-item scale may provide an advantage in terms of easy application by researchers.

STATEMENT OF RESPONSIBILITY

The authors contributed equally to the current research. All authors have read and approved the published final version of the article.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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