

11 Scale, which was originally developed in Italian by Donini and his colleagues (2005) and also validated in Turkish (Arusoğlu et al., 2008). Low internal consistency coefficients reported for ORTO-11 according to the results of various studies that were conducted in different countries (e.g., Alvarenga et al., 2012; Brytek-Matera et al., 2014) including Turkey (Arusoğlu et al., 2008) also support the idea that TOS may be an alternative instrument to assess the construct of orthorexia. Taking these points into consideration, validating TOS into Turkish and thereby contributing to the relevant literature of orthorexia by the help of a more appropriate assessment tool was the prominent reason to conduct the present study.

METHODS

Two different studies were conducted to collect data. The participants of these studies were selected through convenience sampling. The first sample included 300 participants (175 females and 125 males). The average age of the participants in this sample was 34.25 ($SD = 14.01$, age range [18-63]). Exploratory factor analysis (EFA), convergent and concurrent validity analyses, Cronbach Alpha internal consistency coefficient analysis and item-total correlation analysis were carried out with the data that was obtained from the first sample. The test-retest study was conducted with 86 participants (70 females and 16 males) of this sample. TOS was re-tested in this group after 3 weeks. In addition to Demographic Information Form and TOS (Barrada & Roncero, 2018), Turkish versions of ORTO-11 (Arusoğlu et al., 2008), Eating Attitude Test (Garnel & Garfinkel, 1979), Maudsley Obsessive Compulsive Question List (Hodgson & Rachman, 1977) and Positive and Negative Affect Schedule (Watson et al., 1988) were utilized in the first study. Confirmatory factor analysis (CFA) was carried out with the data collected in the second study. The sample of this second study included 302 participants (173 females and 129 males). The average age of the participants was 26.76 ($SD = 7.95$, age range [18-66]). The statistical analyses were conducted by the Statistical Package for Social Sciences (SPSS) 20 and the Linear Structural Relations (LISREL) 8.7 programs.

RESULTS

Principal components analysis was conducted in order to determine the structure validity of the Turkish version of TOS. Although 3 factors which had eigenvalues higher than 1 emerged, the analysis was forced into a 2-factor structure taking into consideration the scree plot and the original factor structure of the scale. Fourth item of the scale (I feel guilty when I eat foods that I don't think are healthy) that cross-loaded in both factors (.49 for healthy orthorexia; .50

for orthorexia nervosa) was excluded from the rest of the analyses. The first factor (healthy orthorexia) explained 27.88% of the total variance and consisted of 9 items (1, 2, 3, 6, 7, 8, 11, 13, and 15) and the second factor (orthorexia nervosa) explained 21.42% of the total variance and consisted of 7 items (5, 9, 10, 12, 14, 16, and 17). Factor structure was similar to the original form of the TOS. Following EFA, CFA was performed with the data of second sample including 302 participants. Fit indices were acceptable. The NFI (.937), CFI (.961) and NNFI (.937) values were higher than .90 and the RMSEA value (.075) was smaller than .08, showing acceptable fit for the data (Sümer, 2000; Tabachnick & Fidell, 2007).

Correlations of TOS with eating problems, obsessive compulsive symptoms, positive and negative affect and ORTO-11 were examined to support the validity of the scale. Healthy orthorexia was positively correlated with eating problems ($r = .33, p < .001$), positive affect ($r = .16, p < .01$) and it was negatively correlated with negative affect ($r = -.14, p < .05$). It had no significant relationship with obsessive compulsive symptoms ($p > .05$). On the other hand, orthorexia nervosa factor of the TOS was positively correlated with eating problems ($r = .45, p < .001$), obsessive compulsive symptoms ($r = .24, p < .001$) and negative affect ($r = .15, p < .01$). It did not have a significant relationship with positive affect ($p > .05$).

Cronbach's alpha internal consistency, item-total correlation and test-retest reliability coefficients of the TOS were examined for the reliability analyses. The item-total correlation coefficients of the scale varied between .37 and .71. Besides, Cronbach's alpha internal consistency values were calculated as .86 and .81 for the healthy orthorexia and orthorexia nervosa factors respectively. In addition, the test-retest reliability coefficients were .78 for the healthy orthorexia and .67 for the orthorexia nervosa ($p < .001$) in three weeks period.

DISCUSSION

The aim of the present study was to examine the psychometric properties of TOS (Barrada & Roncero, 2018) in Turkish. According to the results of the factor analyses, the scale consisted of healthy orthorexia and orthorexia nervosa factors as in the original version. One item that cross-loaded in both factors was deleted from the scale and the analyses were conducted with the rest of 16 TOS items. Both the exploratory and confirmatory factor analyses that were conducted with two different samples supported the factor structure of the scale in Turkish. Moreover, positive correlations of orthorexia nervosa with eating problems, obsessive compulsive symptoms, and negative affect supported the validity of the TOS. In addition, healthy orthorexia scores' positive correlation with positive affect and negative correlation with

negative affect also supported the validity of the scale. These findings were in line with the view of Barrada and Roncero (2018) suggesting a distinction between healthy orthorexia and orthorexia nervosa and proposing that healthy orthorexia represents a non-problematic interest in nutrition. Moreover, Cronbach's alpha, item-total correlation and test-retest coefficients were satisfactory and supported the reliability of Turkish version of TOS.

The study has some limitations that need to be expressed. Self-report of the participants was one of those limitations. It is possible that some participants may have under-reported their eating difficulties due to the low social acceptability of those problems. In relation, future research including the participants' data of past and current eating problems and related treatment history will help to support the validity of the scale and to generalize the present findings. On the other hand, healthy orthorexia was correlated with the eating problems of the participants unexpectedly. Barrada and Roncero (2018) reported a similar result according to the findings of the original study. Future research is required to explore the relation of healthy orthorexia and eating disorders. Elaborating this relation will improve the understanding about the discrimination between orthorexia nervosa and healthy orthorexia factors in relation to eating problems. Moreover, by the help of new studies, development of more valid measurement instruments will be possible.

As a conclusion, according to the results of the present study, it has been revealed that the Turkish version of TOS can be used as a valid and a reliable measurement tool in order to examine orthorexia. Promising psychometric properties of the TOS in Turkey indicate that orthorexia may have common features across different societies. However, more research is required both to enhance our understanding about the factors that constitute orthorexia and to improve the relevant measurement tools.

Compliance with Ethical Standards This study was approved by Maltepe University Ethical Committee (Trial Number: 2019/01-21, Date: 01.17.2019)

Conflict of Interest The authors declare that they have no conflict of interest.

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