TURKISH VALIDITY STUDIES OF AN ENVIRONMENTAL SPATIAL ABILITY SCALE: SANTA BARBARA SENSE OF DIRECTION

MELIH TURGUT

Abstract. In this paper, Turkish validation studies of an environmental spatial ability scale (15-item, single factor), the Santa Barbara Sense of Direction scale (SBSOD), are presented. Turkish language adaption studies were implemented with a group of educators, and thereafter exploratory and confirmatory factor analyses were conducted to analyse whether one factor structure remained. The participants (N=251) were undergraduate students from a government university in central Turkey. The exploratory and confirmatory factor analyses confirmed single factor structures (RMSEA=0.063, SRMR=0.048, NFI=0.95, NNFI=0.97, CFI=0.98, GFI=0.92, AGFI=0.88). The reliability analyses yielded that Cronbach’s alpha of the entire scale was .888, and that the Spearman-Brown and Gutmann’s split-half values were .874 and .870, respectively. These results confirm that the Turkish version of the SBSOD is reliable and valid for assessing undergraduates’ environmental spatial abilities.

Key words: Environmental spatial ability, mental map, sense of direction, giving routes.

1 INTRODUCTION AND THEORETICAL ELEMENTS

Think of someone driving a car in the street. How does he/she find his/her way? The answer is easy. We are living among three-dimensional structures and we are intentionally or unintentionally creating and continually updating our own mental map to comprehend the world better. At this point, a specific concept becomes apparent: spatial ability, which is defined as a combination of specific visualization of 2D and 3D objects, projecting, rotating, and manipulating them and creating mental images from another viewpoint (McGee, 1979; Olkun, 2003; Nagy-Kondor, 2010). Researchers state that this specific ability has several sub-skills. For instance, McGee (1979) proposes two components of spatial ability: spatial visualization and spatial orientation. Spatial visualization includes several sub-skills such as comparing, rotating,
manipulating, projecting 3D to 2D and imagining from 2D to 3D structures and objects. Spatial orientation is associated with skills to create mental images from another viewpoint, thereby visualizing the given object/environment from a different perspective. The distinction between these sub-skills stems from ‘movement of the object or of the observer’ (Clements & Battista, 1992, p. 444). Similar to the definitions above, Linn and Petersen (1985), in their meta-analysis, identify three sub-skills of spatial ability: spatial perception, mental rotation and spatial visualization. Spatial perception is related to specific skills required to understand spatial relationships through body orientation. Mental rotation requires skills to rotate objects mentally and quickly. Spatial visualization is associated with skills needed to implement multi-step visualization manipulations, such as integrating and disintegrating of 2D shapes and 3D objects (ibid. p. 1490). In the literature, there are also other definitions of sub-skills, such as: spatial relations (D’Oliveira, 2004); speeded rotation (Lohman, 1998); and closure speed, flexibility of closure, and perceptual speed (Carroll, 1993). For a careful analysis and classification, see Kalogirou and Gagatsis (2011).

Though the definitions of sub-skills seem similar, visualization of the manipulations of the objects is the core element of spatial ability. The following examples correspond to the definitions expressed above (Figure 1). In the left task, the subject has to rotate the given object in the mind and find the rotated version in the choices. In the right task, the subject has to imagine what he or she will see when observing point A. There are several spatial ability tests give further elaboration, see Olkun (2003) and Turgut (2014).
An analysis of Figure 1 provides evidence of geometrical sense. It is safe to report that we use such skills whilst learning and comprehending 2D-3D objects and classifying them. This process seems especially appropriate to geometry courses (Gutiérrez, 1996), with all courses including geometrical structures and shapes. According to Gutiérrez (1996), visualization is a general reference among mathematics educators. This process refers to kinds of activities including ‘visual or spatial elements’, and is integrated into four sub-process: ‘mental images’; ‘external representations’; ‘the process of visualization’; and ‘ability to visualize’ (p. 9). The core element here is to create ‘mental images’.

According to Gutiérrez, individuals use one or more of the following skills to create mental images and consequently ‘generate information’ (p. 10): (i) figure-ground perception; (ii) perceptual constancy; (iii) mental rotation; (iv) perception of spatial positions; (v) perception of spatial relationships; and (vi) visual discrimination. These skills are crucial for learning geometry. For example, for ‘the cognitive process of geometric learning’, Duval (1998) identifies three different cognitive processes whilst students comprehend geometrical concepts; visualization, construction and reasoning. Visualization refers to students’ analyses on space and heuristic representations to investigate positions of geometrical objects. Construction can be expressed as the apprehension of semiotic mediations of geometrical objects/ shapes and their use. The reasoning process includes analyses on the determination of relationships between geometrical and mathematical concepts in terms of generalizing, conjecturing and proving (i.e.) activities. In addition, Duval (2002) defines four apprehension modes, i.e. the way to think mathematically for a geometrical figure; perceptual, sequential, discursive and operative apprehension (p. 332). More recently, Kalogirou, Elia and Gagatsis (2013) observe a moderate, but significant, relationship between spatial ability and geometrical apprehension, so that they empirically confirm Duval’s identification of the processes. For further discussion, see Kalogirou et al., (2013, p. 135).

Since, we know that the skills and processes expressed above are necessary for learning spatial geometry and, in this way, spatial skills appear in Scientific, Technological, Engineering and Mathematical (STEM) fields (Uttal & Cohen, 2012), the emphasized importance of spatial ability and associated skills in school curriculums is to prepare pupils to comprehend and interpret their living three-dimensional world (Sarama & Clements, 2009; Turgut & Uygan, 2013). However, we use these skills more in our daily lives, while finding our routes in a labyrinth (Turgut & Uygan, 2014) reading maps and explaining routes to others (Hegarty & Waller, 2004), and intuitively, these sub-skills are also related to recreating mental images by visual memory (Turgut, 2014). Consequently, 2D and 3D manipulations can be called ‘Object Manipulation Spatial Ability’.
(OMSA) and other skills related to navigational skills can be expressed as ‘environmental spatial ability’ or ‘spatial navigation’ (Kozhevnikov & Hegarty, 2001; Hegarty et al., 2002). There are also certain phrases used for similar meanings: spatial location, positional or location awareness and object location (Dabbs et al., 1998; Hegarty et al., 2002). According to Wolbers and Hegarty (2010), ‘spatial navigation is indispensible for finding our way in complex environments, planning routes to distant locations and returning to our car after a walk in a new city’ (p. 138). Therefore, in this process, it is obvious that we are using our skills of spatial orientation (analyse the Figure 1b). Someone, who parked his/her car in a new city, has to create mental images about his/her positional environment with a mental map and visualize his/her car’s position from different perspectives to reach the car again.

Santa Barbara Sense of Direction (SBSOD) is a scale with one factor consisting of 15 items (Appendix A), developed by Hegarty et al. (2002), to evaluate participants’ environmental spatial abilities. The item on the scale asks the participant to rate his/her ‘sense of direction’ and give points from ‘0’ to ‘7’. For instance, the first item of the scale is ‘I am very good at giving directions’ (ibid. p. 445). There are eight negative items on the scale. For instance, the eleventh item is ‘I don’t enjoy giving directions’. The SBSOD had good test-retest reliability (with 61 undergraduates, the value was .91 after 40 days) and four validity studies confirm that the SBSOD was highly correlated with tests of spatial knowledge that involve orienting oneself and estimating distances or drawing maps. Moreover, it was also correlated with measures of spatial knowledge acquired from environment experience, maps, video or virtual environments.

As we know from the available literature, there exists a spatial ability self-report scale (SASRS) in Turkish (Turgut, 2014). This scale consists of 18 items and evaluates participants’ spatial abilities under three factors; object-manipulation spatial ability, spatial navigational ability, and visual memory. In regard to spatial navigational ability (spatial location ability), the SASRS has four items to evaluate individuals’ environmental spatial ability, but this factor is inadequate in the evaluation of the effects of experimental studies aiming to develop individuals’ spatial orientation skills through virtual map applications or virtual games. In addition, a Turkish version of the SBSOD will open a door to revalidate the SASRS as an ameliorator, and a door to international comparative studies to reflect cultural differences and individuals’ backgrounds. Therefore, in this work, I intend to develop a Turkish version of the SBSOD with exploratory and confirmatory factor analyses and reliability studies for future research. I hope that these results will be helpful to psychologists and subject area educators investigating nature and variables of environmental spatial ability.
2 METHODOLOGY

2.1 SUBJECTS

In the present study, the participants included 251 first year and second year level undergraduate students from three different educational departments of a government university in central Turkey. The mean age of the students was 19.29 (SD = 0.99), which ranged from 18 to 21. They were enrolled in the following subject areas: computer and instructional technology education (first year level, 23 females and 28 males); mathematics education (first year level, 41 females and 22 males, second year level, 25 females and 20 males); and science and technology education (first year level, 34 females and 21 males, second year level, 24 females and 13 males).

2.2 INSTRUMENT AND PROCEDURE

The SBSOD scale was used as a main instrument. First of all, permission for an adaptation of the Turkish version was provided by Professor Mary Hegarty (University of Santa Barbara, Department of Psychological and Brain Sciences) via e-mail. Thereafter, the following process was implemented; expert analysis for language validation, pre-applications and a confirmatory factor analysis. As an initial step, the items on the original SBSOD were translated into Turkish by three different mathematics educators, and later, they came together and to discuss the initial Turkish version of the items. Thereafter, the initial items underwent an expert analysis by a team (consisting of two science educators, one Turkish language educator, one measurement and evaluation expert, one psychological counselling and guidance educator, and three English language educators) with the following criteria: (i) the item can be given an exact position on the scale; (ii) the item should be amended as follows; and (iii) other comments. A percentage of agreement of the experts on all the items was calculated at 88.6%. After making a number of corrections to the items, the 15-item scale was given to three Doctoral students of education and five Master of Science students of elementary education to ensure that the items were easy to read, follow and understand. As a final step of the language adaptation, I implemented short clinical interviews with two students (one doctoral level and one master level) to explain the meanings of all items. English & Turkish language experts analysed the scripts and, in this way, the final version of the scale for exploratory and confirmatory factor analyses was obtained. The data was collected within small groups in the fall and spring semesters of 2013-2014 by the author after an explanation of the aim of the study and assured anonymity of the participants. The obtained data was analysed by SPSS 21 and LISREL 8.72 software packages.
3 RESULTS

First of all, to analyse the factor structure of the translated scale exploratory factor analysis with principal components method, the Kaiser–Meyer–Olkin (KMO) value was calculated and was found to be .896. Bartlett’s Sphericity test results were also of a significant level ($\chi^2 = 1480.997, df = 105, p<.001$). These results confirm that the data had a multivariable distribution. An initial analysis suggested four factors that had Eigen values greater than 1 (see Figure 2).

![Figure 2. The scree plot](image)

Although these four factors explain a 61.85% total variance, some items have negative loadings on separate factors. Moreover, an analysis of the scree plot suggests a one factor structure. Therefore, I considered a one factor model as in the original version, since it explained 40.45% of the scale’s total variance. A component matrix of the one factor structure is presented in Table 1.

<table>
<thead>
<tr>
<th>Item No</th>
<th>Component</th>
<th>Item No</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>.799</td>
<td>8</td>
<td>.627</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>14</td>
<td>.769</td>
<td>5</td>
<td>.623</td>
</tr>
<tr>
<td></td>
<td>.749</td>
<td>7</td>
<td>.583</td>
</tr>
<tr>
<td>6</td>
<td>.686</td>
<td>13</td>
<td>.566</td>
</tr>
<tr>
<td>10</td>
<td>.685</td>
<td>11</td>
<td>.537</td>
</tr>
<tr>
<td>15</td>
<td>.676</td>
<td>2</td>
<td>.426</td>
</tr>
<tr>
<td>9</td>
<td>.669</td>
<td>12</td>
<td>.336</td>
</tr>
<tr>
<td>3</td>
<td>.638</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In order to assess a one factor fit model, the following specific indexes were based (Çelik & Yılmaz, 2013; Çokluk et al., 2012; Seçer, 2013): the $\chi^2 / df$ ratio; the Adjusted Goodness of Fit Index (AGFI); the Comparative Fit Index (CFI); the Goodness of Fit Index (GFI); the Normed Fit Index (NFI); the Non-Normed Fit Index (NNFI); the Relative Fit Index (RFI); the Root Mean Square Error of Approximation (RMSEA); and the Standardized Mean Square Residual (SRMR). The obtained data was analysed with LISREL 8.72 software taking into consideration the values above. A first order confirmatory factor analysis (CFA) results are summarized in Figure 3.

Figure 3. CFA results of the single factor model of the translated version

The initial analysis suggested certain modifications among some items: between 1 and 4; 7 and 9; 11 and 13; 5 and 15. The ‘criteria of the indexes’
(Çelik & Yılmaz, 2013, p. 39) and the modified results are summarized in Table 2.

Table 2

The indexes, criteria and results of the modified analysis

<table>
<thead>
<tr>
<th>Index</th>
<th>Good Fit*</th>
<th>Acceptable**</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\chi^2/df$</td>
<td>$0 \leq \chi^2/df \leq 2$</td>
<td>$2 \leq \chi^2/df \leq 3$</td>
<td>2.04**</td>
</tr>
<tr>
<td>RMSEA</td>
<td>$0 \leq \text{RMSEA} \leq 0.05$</td>
<td>$0.05 \leq \text{RMSEA} \leq 0.08$</td>
<td>0.063**</td>
</tr>
<tr>
<td>SRMR</td>
<td>$0 \leq \text{SRMR} \leq 0.05$</td>
<td>$0.05 \leq \text{SRMR} \leq 0.1$</td>
<td>0.048*</td>
</tr>
<tr>
<td>NFI</td>
<td>$0.95 \leq \text{NFI} \leq 1$</td>
<td>$0.90 \leq \text{NFI} \leq 0.95$</td>
<td>0.95 *</td>
</tr>
<tr>
<td>NNFI</td>
<td>$0.97 \leq \text{NNFI} \leq 1$</td>
<td>$0.95 \leq \text{NNFI} \leq 0.97$</td>
<td>0.97 *</td>
</tr>
<tr>
<td>CFI</td>
<td>$0.97 \leq \text{CFI} \leq 1$</td>
<td>$0.95 \leq \text{CFI} \leq 0.97$</td>
<td>0.98 *</td>
</tr>
<tr>
<td>GFI</td>
<td>$0.95 \leq \text{GFI} \leq 1$</td>
<td>$0.90 \leq \text{GFI} \leq 0.95$</td>
<td>0.92**</td>
</tr>
<tr>
<td>AGFI</td>
<td>$0.90 \leq \text{AGFI} \leq 1$</td>
<td>$0.85 \leq \text{AGFI} \leq 0.90$</td>
<td>0.88**</td>
</tr>
</tbody>
</table>

According to Table 2, four indexes are at an acceptable level and four indexes are at a good fit level. Therefore, it can be stated that the 15-item Turkish version of the SBSOD confirms a single factor model. The final version of the scale is presented in Appendix B. As a next step, we present descriptive results of the item statistics of the SBSOD in Table 3.

Table 3

Item statistics of the Turkish version of SBSOD (N=251)

<table>
<thead>
<tr>
<th>Item No</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.05</td>
<td>1.64</td>
</tr>
<tr>
<td>2</td>
<td>3.21</td>
<td>1.92</td>
</tr>
<tr>
<td>3</td>
<td>3.28</td>
<td>1.61</td>
</tr>
<tr>
<td>4</td>
<td>3.19</td>
<td>1.71</td>
</tr>
<tr>
<td>5</td>
<td>3.29</td>
<td>1.71</td>
</tr>
<tr>
<td>6</td>
<td>3.39</td>
<td>1.83</td>
</tr>
<tr>
<td>7</td>
<td>3.68</td>
<td>1.85</td>
</tr>
<tr>
<td>8</td>
<td>2.93</td>
<td>1.67</td>
</tr>
<tr>
<td>9</td>
<td>3.82</td>
<td>1.63</td>
</tr>
<tr>
<td>10</td>
<td>3.21</td>
<td>1.80</td>
</tr>
<tr>
<td>11</td>
<td>3.28</td>
<td>1.94</td>
</tr>
<tr>
<td>12</td>
<td>1.96</td>
<td>1.62</td>
</tr>
<tr>
<td>13</td>
<td>3.07</td>
<td>1.93</td>
</tr>
<tr>
<td>14</td>
<td>2.96</td>
<td>1.69</td>
</tr>
<tr>
<td>15</td>
<td>3.05</td>
<td>1.81</td>
</tr>
</tbody>
</table>
Reliability studies were conducted with Cronbach’s alpha (the internal consistency) and two half reliability (split halves) values through SPSS 21 software. The Cronbach’s alpha value of the entire scale was $\alpha = .888, N = 251$. Thereafter, the scale was divided into one 8-item and one 7-item part to analyse the reliability of the halves. The Cronbach’s alpha values of the halves were, respectively, .821 and .780. The correlation between the halves was .777. The Spearman-Brown prophecy formula was .874 and Guttman’s split-half coefficient value was .870. In the light of the obtained results, it can be confirmed that the 15-item Turkish version of the SBSOD is a reliable instrument to evaluate individuals’ environmental spatial ability.

4 CONCLUSIONS

Spatial skills are considered as ‘intellectual abilities’ (Yılmaz, 2009). As a result, great attention has been given to studies, not only focusing on engineering and related sciences (Nagy-Kondor, 2007, 2010; Sorby, 2009), but also focusing on psychological and brain sciences (i.e., Wolbers & Hegarty, 2010; Peters, 2005) to determine variables affecting spatial ability and its development. Environmental spatial ability is the core element of spatial thinking to be studied, i.e., navigational skills are necessary for someone living in a three-dimensional world to comprehend his/her position. The SBSOD is a highly cited scale in the existing literature, assessing individuals’ environmental spatial ability. The initial version of this scale also indicated correlations between Object-Perspective Test, Map Perspective, Cube Comparison and Mental Rotations Tests (Kozhevnikov & Hegarty, 2001). The aim of this paper is to adapt this scale into Turkish to be used in virtual applications to evaluate participants’ sense of direction or other further related research.

This work is based mainly on two steps. The first step, which took a number of months, was to translate the items into Turkish. This task was accomplished by a team of educators. Thereafter, exploratory and confirmatory factor analyses revealed that the Turkish version of the SBSOD also had a single factor, as in the original (English) form, and that the reliability analyses results were at acceptable levels. However, as a limitation, certain concurrent validations have not yet been implemented. Further studies should be addressed to improve the validation of the Turkish version of the SBSOD with the Mental Rotations Test (redrawn version-A) (Peters et al., 1995), the Purdue Spatial Visualization Test (Guay, 1976), the Santa Barbara Cross Sections Test (Cohen & Hegarty, 2012), the Objective-Perspective Taking Test (Kozhevnikov & Hegarty, 2001) or the Measure of the Ability to Rotate Mental Images Test (Campos, 2012). With respect to the potentiality of the new instrument, these analyses are important because the Turkish version of the SBSOD scale is easier.
to administer than other spatial tests, since it is now a useful instrument in the evaluation of undergraduates’ spatial ability. Following the idea of Kalogirou et al. (2013), relationships among the spatial thinking processes that Gutiérrez (1996) identifies and the spatial environmental ability of students can be analysed through the Turkish version of the SBSOD.

The related literature shows a male superiority on spatial tasks, especially in mental rotation performance (Maeda & Yoon, 2013; Pietsch & Jansen, 2012). Similarly, an observation with the initial version of the SBSOD (10-item version) was obtained in favour of males (Montello et al., 1999). This could be investigated in further analyses. This is because, hypothetically, if we think of someone in a virtual labyrinth application, it is obvious that he/she has to rotate his/her initial position mentally to leave the labyrinth (for an example see Figure 4).

![Figure 4. Sample mental map task](image)

Another fact is that spatial navigational ability has been found to be the strongest component of spatial ability among Turkish undergraduate students (Turgut, 2014). The Turkish version of the SBSOD can be used as a component for further correlational studies investigating male superiority among Turkish undergraduates and the role of spatial navigational abilities in spatial skills through further experimental treatments. It is important to emphasize that the Turkish version is a meaningful scale for undergraduates, but that it is not suitable for K1-K12 students.
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Appendix A

SANTA BARBARA SENSE-OF-DIRECTION SCALE
Sex: F M   Today's Date:________________
Age:_______   V. 2

This questionnaire consists of several statements about your spatial and navigational abilities, preferences, and experiences. After each statement, you should circle a number to indicate your level of agreement with the statement. Circle ‘1’ if you strongly agree that the statement applies to you, ‘7’ if you strongly disagree, or some number in between if your agreement is intermediate. Circle ‘4’ if you neither agree nor disagree.

**Questions to reverse code in bold.**

1. I am very good at giving directions.
   strongly agree 1 2 3 4 5 6 7 strongly disagree

2. I have a poor memory for where I left things.
   strongly agree 1 2 3 4 5 6 7 strongly disagree

3. I am very good at judging distances.
   strongly agree 1 2 3 4 5 6 7 strongly disagree

4. My ‘sense of direction’ is very good.
   strongly agree 1 2 3 4 5 6 7 strongly disagree

5. I tend to think of my environment in terms of cardinal directions (N, S, E, W).
   strongly agree 1 2 3 4 5 6 7 strongly disagree

6. I get lost in a new city very easily.
   strongly agree 1 2 3 4 5 6 7 strongly disagree

7. I enjoy reading maps.
   strongly agree 1 2 3 4 5 6 7 strongly disagree

8. I have trouble understanding directions.
   strongly agree 1 2 3 4 5 6 7 strongly disagree

9. I am very good at reading maps.
   strongly agree 1 2 3 4 5 6 7 strongly disagree

10. I don't remember routes very well while riding as a passenger in a car.
    strongly agree 1 2 3 4 5 6 7 strongly disagree

11. I don't enjoy giving directions.
    strongly agree 1 2 3 4 5 6 7 strongly disagree

12. It's not important to me to know where I am.
    strongly agree 1 2 3 4 5 6 7 strongly disagree
13. I usually let someone else do the navigational planning for long trips.
   strongly agree 1 2 3 4 5 6 7 strongly disagree

14. I can usually remember a new route after I have traveled it only once.
   strongly agree 1 2 3 4 5 6 7 strongly disagree

15. I don't have a very good "mental map" of my environment.
   strongly agree 1 2 3 4 5 6 7 strongly disagree
TURKISH VALIDITY STUDIES OF A SPATIAL ENVIRONMENTAL ABILITY SCALE

Appendix B

SANTA BARBARA YÖN HİSSİ ÖLÇEĞİ

Bu anket, sizin uzamsal ve dolaşımsal yetenekleriniz, seçimleriniz ve tecrübelerinizle ilgili cümlelerden oluşmaktadır. Her bir cümleden sonra, düşüncenizin bu cümleye ne kadar örtüşüğünü belirten bir sayı işaretleyiniz. Eğer tamamen katılıyorsanız 1'i, eğer tamamen katılmıyorum 7'i ya da fikrinizle örtüşen dereceyi gösteren, aralardaki sayılardan birisini işaretleyiniz. Eğer kararsızsanız 4'ü işaretleyiniz.

Yaş:         
Cinsiyet: Kadın ( ) Erkek ( )   
Ölçeğin Doldurulduğu Tarih:   

Maddeler

1. Yön tarif etmede oldukça iyiyimdir.  
   Tamamen katılıyorum - 1 2 3 4 5 6 7 - Tamamen katılmıyorum

2. Eşyaları bıraktığım yeri hatırlamada güçlük çekerim.  
   Tamamen katılıyorum - 1 2 3 4 5 6 7 - Tamamen katılmıyorum

   Tamamen katılıyorum - 1 2 3 4 5 6 7 - Tamamen katılmıyorum

4. Yön bulma sezgim oldukça iyidir.  
   Tamamen katılıyorum - 1 2 3 4 5 6 7 - Tamamen katılmıyorum

5. Çevremi, ana yönleri kullanarak düşümme eğilimim vardır.  
   Tamamen katılmıyorum - 1 2 3 4 5 6 7 - Tamamen katılmıyorum

6. Yeni bir şehirde kolaylıkla kaybolurum.   
   Tamamen katılmıyorum - 1 2 3 4 5 6 7 - Tamamen katılmıyorum

   Tamamen katılmıyorum - 1 2 3 4 5 6 7 - Tamamen katılmıyorum

8. Yön tariflerini anlamada sorun yaşarım.  
   Tamamen katılmıyorum - 1 2 3 4 5 6 7 - Tamamen katılmıyorum

   Tamamen katılmıyorum - 1 2 3 4 5 6 7 - Tamamen katılmıyorum

    Tamamen katılmıyorum - 1 2 3 4 5 6 7 - Tamamen katılmıyorum

11. Yön tarif etmekten hoşlanmam.  
    Tamamen katılmıyorum - 1 2 3 4 5 6 7 - Tamamen katılmıyorum
   Tamamen katılıyorum - 1 2 3 4 5 6 7 - Tamamen **katılmıyorum**

   Tamamen katılıyorum - 1 2 3 4 5 6 7 - Tamamen **katılmıyorum**

   Tamamen katılıyorum - 1 2 3 4 5 6 7 - Tamamen **katılmıyorum**

   Tamamen katılıyorum - 1 2 3 4 5 6 7 - Tamamen **katılmıyorum**