

# The Measure of Quality of the Environments' Turkish Validity and Reliability

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Gokcen Akyurek<sup>1</sup> and Gonca Bumin<sup>1</sup>

## Abstract

The aim of this study was to translate the Measure of Quality of the Environment–Short Form (MQE-SF) into Turkish language and to evaluate the validity and reliability. The MQE-SF was culturally adapted via an internationally suggested method. A total of 185 volunteers with disabilities (age range = 18–55 y/o, 107 males; 78 females) from the Disabled People Association of Turkey completed the MQE-SF. To evaluate the MQE-SF's criterion/concurrent validity, the Craig Hospital Inventory of Environmental Factors (CHIEF) was also administered. Test–retest reliability was evaluated by administering MQE-SF to 85 participants a second time within 14 days of initial administration. The alpha coefficient measuring the internal consistency of the questionnaire were .84 and .83. The criterion-related validity was moderate between the MQE-SF Barriers and the CHIEF ( $r = -.46, p < .05$ ). The questionnaire was moderately reliable in terms of the test–retest reliability ( $r = .69, .70 p < .05$ ). The Turkish adaptation of the MQE-SF had good internal consistency and moderate criterion-related validity as well as test–retest reliability for people with disabilities.

## Keywords

environment, disability, community participation, cultural/cultural sensitivity

## Introduction

Environmental factors are important in determining an individual's degree of independent living and in defining the status of people with disabilities in society. The environment is the most important factor influencing how occupations are performed. Because occupations occur in multiple environments, consideration of these environments is critical to assessment of occupational performance (American Occupational Therapy Association [AOTA], 2014; Stark & Sanford, 2005). In addition, literature suggests that environment is an important issue that significantly affects the quality of life, community participation, and employment of a person with disabilities (Dijkers, Yavuzer, Ergin, Weitzenkamp, & Whiteneck, 2002; Richards et al., 1999). A nonaccessible environment will cause dependency for even the most basic daily life activities of the people with disabilities. This situation creates difficulties for people with disabilities and their families (Chaves et al., 2004; Whiteneck, Meade, et al., 2004). The sustainability of a manageable and independent life for people with disabilities, that is, one that meets his or her needs within the community, is shaped by the social, physical, and the cultural environments (Dunn, Brown, & McGuigan, 1994). In addition to the physical and social environment, natural conditions, technology, and policy also have impact over the quality of life for an individual with disabilities (Levasseur, Desrosiers, & Noreau, 2004).

According to the *International Classification of Functioning, Disability and Health (ICF)*, the environment surrounding the people with disabilities consists of assistive devices and technology, natural and human-made environment, support and relationships, attitudes and services, and systems and policies. These factors can be analyzed for identifying the environmental barriers and enablers over the performance of daily activities (Law, Petrenchik, King, & Hurley, 2007).

Of the 70 million citizens in Turkey, approximately 5 million (5.5%) of the population have disabilities (Turkish Statistical Institute [TSI], 2011). Simsek and Dicle (2013) note that in some societies, having a disability comes from “God” and Özşenol et al. (2003) contend that family/caregivers believe that if they do not provide care, their social circle will criticize them. Although people with disabilities may be entitled to pensions or disability income, the amount of financial assistance is typically not enough to live on, at least in big city environments. In Turkey, most health and rehabilitation services are covered by insurance, but not

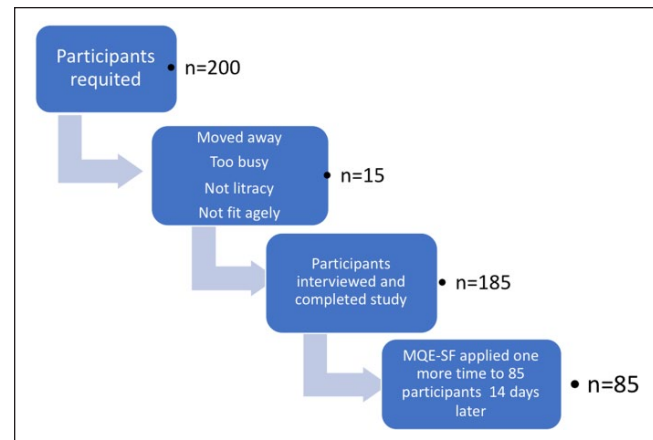
<sup>1</sup>Hacettepe University, Ankara, Turkey

### Corresponding Author:

Gokcen Akyurek, Faculty of Health Sciences, Department of Occupational Therapy, Hacettepe University, 06100 Samanpazari Ankara, Turkey.  
Email: gkcnakyrk@gmail.com

everybody has insurance. The government provides support for vocational rehabilitation programs. Standard wheelchairs, orthoses, and walking aids are covered under insurance, but powered wheelchairs are not a covered expense (Erol, 2014). This potential lack of access to powered wheelchairs decreases opportunities for community mobility. Problems such as accessibility to public buildings, disabled parking places, bathrooms have been addressed through various laws (Kayihan, Tekindal, Irmak, & Akyurek, 2013); however, accessibility is still a problem in rural neighborhoods and older urban areas (Efe & Sözer, 2015). In many cities, the number of accessible buses is insufficient and there are limited routes to meet the needs of people with disabilities. In many countries, although there are some subsidies for housing, there is limited availability of accessible housing (including access to nursing homes); thus, many people with disabilities are relegated to residing with their family.

Occupational therapy is a relatively new field in Turkey. The first educational program in the country began in 2010, graduating the first group of 30 practitioners in 2014. A mission of Turkish occupational therapists is to promote occupational engagement and to facilitate access to the environment for people with disabilities. To help people participate in occupations, practitioners must perform evaluations, develop intervention plans, and adapt tasks, occupations, or environments to facilitate maximum engagement. The role of occupational therapy is to use (as well as facilitate engagement in) meaningful activity to promote health and well-being. Practitioners assess and adapt environments to assist people to engage in valued occupations by applying theoretical models as well as the use of screening and assessment tools (including checklists) to evaluate the environment to identify barriers and facilitators that might influence occupation. Measurement of and provision of adaptations to the environment are an important part of occupational therapy intervention that affect the outcome of care (Danford & Steinfeld, 1999; Dijkers et al., 2002; Randström, Asplund, & Svedlund, 2012). Existing measures such as Craig Hospital Inventory of Environmental Factors (CHIEF) provide evaluation of the environment for people with disabilities. Because the CHIEF was designed as a shorter inventory identifying environmental barriers and not facilitators, it can hardly be claimed to offer comprehensive assessment of its target concepts. The MQE-SF is a more comprehensive measure that identifies both barriers and facilitators in the environment that influence occupational performance. Therefore, the cultural adaptation of the MQE-SF is certainly worthwhile to allow the assessment of the environmental factors from other perspectives. The aim of this study was to translate the Measure of Quality of the Environment–Short Form (MQE-SF) into Turkish language and to evaluate the validity and reliability of the Turkish version of MQE-SF.



**Figure 1.** Flowchart depicting participant recruitment and dropout for Phase III.

Note. MQE-SF = Measure of the Quality of Environment–Short Form.

## Method

### Participants

All the participants ( $n = 185$ ) came from eight provinces of Turkey and members of the Disabled People Association Turkey. Participants were randomly selected from the member lists from the association. Participants who agreed to participate in the study were included and signed an informed consent form from the Hacettepe University. This study was evaluated at the meeting of the Ethics Committee of the Hacettepe University Senate and was approved in terms of medical ethics. The participants were included in this study if they (a) had physical disabilities at least for 10 years, (b) were between the ages 18 and 55 years, and (c) were able to read and comprehend the questions with no interfering cognitive or mental problems. To determine that cognition was not a confounding factor, inclusion criteria required that all participants obtain a score of greater than 24 on the Mini-Mental State Examination (Dong et al., 2010). Exclusion criteria were the presence of multiple disabilities that might be blindness, deafness, significant cognitive impairment, and so on. Informed consents were obtained after the purpose and procedures of the study were explained to the participants, and they agreed to participate in the study. Between June 2015 and October 2016, a total of 200 participants were evaluated, and 185 participants agreed to participate (Figure 1).

### Survey Instrument

The Measure of the Quality of Environment–Short Form (MQE-SF) is a modified International Classification and Functioning-format measure that was created especially for people with different degrees and types of disability (Rigby, Cooper, Letts, Stewart, & Strong, 2005). This measure assesses the influence of the environment on the occupation of a person while that person performs daily activities and

social roles in accordance with his or her abilities and limitations (Rigby et al., 2005; Vik, Nyård, & Lilja, 2007). The MQE-SF emphasizes the quality of the environment by showing the obstacles and facilitators for engagement in an occupation. Administered as a self-report questionnaire, the person is asked to estimate the impact of the environment upon his or her daily life through an examination of his or her successes and failures relative to his or her occupational performance within those environments (Fougeyrollas, Noreau, & Boschen, 2002). A person who uses this scale can enhance awareness of whether the environmental facilities are being used or not and thus can develop to support the attainment of the recommended levels of occupation. For this reason, the MQE-SF has potential for use both in the clinic and in the community.

The MQE-SF assesses the effect of the environment on the abilities and limitations of the people with disabilities while accomplishing their daily activities (Fougeyrollas et al., 2002). The six subscale of this survey were defined as follows: (a) Social Network (two items), (b) Income (four items), (c) Governmental and Public Services (eight items), (d) Physical Environment and Accessibility (eight items), (e) Technology (one item), and (f) Political Orientation (three items) aspects of the environment (Fougeyrollas et al., 2002). A list of conditions intending to explore the influence of such things as winter climatic conditions (snow, ice, cold), public transportation services in the community (schedule, stops, frequency, route), work hours and social networks (support from others), income (availability, financial programs, services), and physical accessibility are included in an example case of the MQE (Fougeyrollas et al., 2002). The questions in each section consider the individual's abilities, limits, and conditions and seek to gain information about the effects of the environmental factors on daily activities and social roles. The scoring of this measure ranges between 3 and -3. A score between 1 and 3 indicates that the environmental factors are facilitating the subjects' daily life and social roles, a score of "zero" indicates that there is no effect on social interactions, and a score of -1 to -3 is considered an obstacle (Levasseur et al., 2004). All positive and negative results are summed separately. The short form used in this study contains 26 questions and can be completed in less than 10 min. The scale can also be completed at home, at work, or in a public place (Rigby et al., 2005). The validity and the test-retest reliability of the MQE in both English and French language was investigated in cognitively intact adolescents with cerebral palsy, and despite the small sample sizes, results indicate a moderate to high reliability (Boschen, 1998). The impact of the environment on the community participation of individuals with myotonic dystrophy, spinal cord injuries, the elderly, people with paralysis, and young people with cerebral palsy was assessed using the MQE survey in other studies (Boucher, Dumas, Maltais, & Richards, 2010; Gagnon et al., 2008; Levasseur et al., 2004; Noreau, Fougeyrollas, & Boschen, 2002).

The CHIEF is a 12-item questionnaire that measures the impact of the environment on people with disabilities was used to determine the content validity as a standardized and quantitative evaluation. Because the CHIEF was previously translated into Turkish and had demonstrated good reliability in Turkish language, this tool was used as a method of assessing content/concurrent validity of the MQE. The Turkish version of the CHIEF has a high internal consistency (0.93) and test-retest reliability (.92; Dijkers et al., 2002). The CHIEF defines *Accessibility*, *Accommodation*, *Resource Availability*, *Social Support*, and *Equality* as the five subscales that facilitate or inhibit community participation of the people with disabilities (Ephraim, MacKenzie, Wegener, Dillingham, & Pezzin, 2006; Rigby et al., 2005). The participants responded to the CHIEF questions in two ways, that is, he or she first identifies and then rates the barrier. First, he or she defines how often he or she faces the problem using a 5-point Likert-type scale, and then he or she decides if this is a "major" or a "minor" problem for him or her. Three methods are used for scoring. The frequency of the problem is scored using a scale between 0 and 4, and the extent of the problem is assigned with a score of 1 or 2. Then, a final score between 0 and 8 is found by multiplying these two scores. With the addition of all the results, the total score is obtained. A higher score indicates a greater impact of environmental barriers. Participants can complete the short form in approximately 5 to 10 min. Content and structure validity have been verified between people with disabilities and without disabilities as well as between the groups of people with different disabilities (Whiteneck, Meade, et al., 2004).

### Procedure

A three-stage process was used for the adaptation of the MQE-SF: (1) translation and cultural adaptation, (2) pre-testing and preanalyze, and (3) evaluation of concurrent/criterion-related validity as well as test-retest reliability of the Turkish version of the MQE-SF and validity of the last version.

Permission was obtained from the original author of MQE before the initiation of the translation process. The cultural adaptation of the MQE-SF was conducted according to the standardized procedures outlined by Beaton, Bombardier, Guillemin, and Ferraz (2000).

#### Phase 1: Translations and cultural adaptation

- Forward translation. The survey items and instructions were translated into Turkish by four independent translators, two with a medical background and two without a medical background. The translations were compared to create the pre-Turkish version.
- Backward translation. The translated Turkish version of the survey was translated back into English by two native English speakers without a medical background to check linguistic errors.

- Expert committee. Expert committee checked the discrepancies between the original scale and Turkish translation. A detailed discussion of the cultural differences and nuance ensured semantic equivalence and aimed to overcome conceptual differences by identifying parallel concepts.
- Cultural adaptation. The original basis of the survey was preserved during the forward and backward translations, but to preserve the meaning, the content of Items 3, 21, and 24 was modified. In Item 3 (current availability of jobs in your community), the word *job* was amended to read “job opportunities” to improve understanding. Item 21 of the original survey contained the phrase “the time allowed for carrying out tasks.” In this article, the word *carry out* was changed to “do” to convey the same meaning. A word-by-word translation of Item 24 resulted in the phrase “means of participating in decision making in your community.” To better express this concept in Turkish, the phrase was changed as “participation during decision-making process in your community.” Changes have been made for the language; in the meaning of cultural differences, there was no need to make adaptive changes.

#### Phase 2: Pretesting, preanalyze, and face validity

- Prior to conducting a pilot study, the internal consistency of the modified MQE-SF was evaluated using a Cronbach’s alpha coefficient, which showed moderate internal consistency (0.67). A pilot study using 30 participants was conducted to evaluate the intelligibility and cultural appropriateness of the modified version of the MQE-SF. Inclusion criteria for these 30 participants were the same as that of the complete study. The average duration of disabilities of the participants was  $12.8 \pm 8.0$  in years. The participants were interviewed individually about the lucidity of the items in the survey, the accuracy of the reflection of environmental problems in the survey, and the usefulness and the length of the survey. Pilot study participant interviews and completion of the survey took approximately 20 min per participant. Feedback from the pilot study participants revealed that 40% of the respondents said that they did not understand some of the questions, and 55% reported that the scoring was complex. Sixty percent of the participants stated that the survey provided an accurate overview of the environment, whereas 40% thought that the number of questions related to the physical and political environment was insufficient. After the completion of the pretest and the interviews, the answers given by participants were examined and the necessary changes (illustrative examples were added in parentheses next to Items 7, 11, 21, 24, and 26) were made to create the final version of the survey.

**Table 1.** Demographical Characteristics.

Age (year), $M \pm SD$ (min-max)	33.00 $\pm$ 8.97 (18-55)
Duration of disability (year), $M \pm SD$ (min-max)	18.00 $\pm$ 11.80 (10-48)
Gender, male/female, $n$	137/48
Marital status, single/married/divorced, $n$	82/70/35
Educational status, literate/primary/high/university, $n$	25/78/53/29
Vocational status, unemployed/employed, $n$	91/94
Mobility level, wheelchair/walking aids/independent, $n$	51/69/65
Total, $n$	185

#### Face validity

The face validity of the MQE-SF was evaluated by the members of the expert committee throughout the cross-cultural adaptation process and through the analysis of the comments provided by the participants of the pre-test.

The final phase of the adaptation process was the testing phase where we evaluated the (a) concurrent/criterion validity by giving the modified MQE-SF as well as the CHIEF to 185 participants and (b) test–retest reliability by repeating administration of the MQE-SF within 14 days of the first administration to 85 randomly selected participants.

#### Statistical Analysis

All of the statistical analyses were performed using SPSS v.17 software. A significance level of  $p < .05$  was used for all statistical analyses. In this study, the mean and the standard deviation ( $SD$ ) were also presented for each of the measures as well as for demographic variables.

Evaluation of the modified MQE-SF was performed via the following: (a) internal consistency was assessed using Cronbach’s alpha; (b) concurrent/criterion validity was assessed via a Pearson’s correlation between the MQE-SF and the CHIEF. This correlation was done only after data were tested for normality using Shapiro–Wilks’s test. In addition, the relationship among the subscales and between each subscale and the total score of each measure was examined via the Pearson correlation coefficients; and (c) the intraclass correlation coefficient (ICC) with a confidence interval of 95% was the statistical test chosen to evaluate the test–retest reliability of the MQE-SF.

#### Results

Among the 185 participants, 137 (74.1%) were male and 48 (25.9%) were female. The average duration of the disability was  $18.0 \pm 11.8$  in years (Table 1). The conditions associated with disabilities included poliomyelitis syndrome ( $n = 48$ ), lower extremity amputation ( $n = 36$ ), neurological conditions

**Table 2.** ICCs for Test–Retest Reliability for Factors in the MQE.

	Number of item	Cronbach's alpha	Test–retest reliability ICC (95% confidence interval)
Social network	2	.75	.60 [.38, .81]
Income	4	.65	.63 [.41, .77]
Public service	8	.36	.42 [.08, .52]
Physical	8	.77	.73 [.35, .84]
Technology	1	—	—
Political orientation	3	.74	.75 [.41, .80]
Total MQE	26	.84	.69 [.57, .85]
		.83	.70 [.63, .88]

Note. ICC = intraclass correlation coefficient; MQE = measure of the quality of the environment.

such as stroke ( $n = 16$ ), spinal cord injury ( $n = 28$ ), polyneuropathy ( $n = 25$ ), cerebral palsy ( $n = 20$ ), and spina bifida ( $n = 12$ ). The demographic characteristics of the subjects including gender, age, duration of disability, educational status, marital status, vocational status, and level of mobility are presented in Table 1.

### Phase 3: Analyze and Measure Reliability and Validity of Last Version

*The internal consistency of the measure and subscale.* The Cronbach's alpha coefficient for the internal consistency of the Social Network, Income, Physical, Public Service, Political Orientation subscales, and the total scores were .75, .65, .77, .36, .74, and .83, respectively (Table 2). As the number of items measuring the Technology subscale (one item) was considered insufficient, the internal consistency could not be evaluated. The results indicate that the applicability and the internal consistency of the Turkish version of the survey can be rated as moderate (Boschen, 1998).

### Reliability

The test–retest reliability was evaluated using the ICC, which is the highest for the product score. In this sample, subscale ICC values for the product score ranged from .42 to .75, while the total scale was .69 and .70, respectively (Table 2). In addition, the relationships among the subscales were examined. A high correlation was found between the public service and the income, physical, and political orientation. The overall survey was strongly correlated with the income, public service, physical environment, and political orientation subscales and it was weakly correlated with the technology subscale (Table 3).

### Criterion/Concurrent Validity

A moderate negative correlation ( $r = -.46$ ;  $p = .026$ ) was found between the CHIEF and the MQE-SF barriers, which

reflects an intermediate compatibility between the scores of these two scales.

## Discussion

The measure of the quality of the environment (MQE) is primarily designed to be administered by community health professionals for the evaluation of the environment's influence on the accomplishment of the person's daily activities in relation to his or her abilities and limits (Fougeyrollas et al., 2002). MQE is brief, simple to use, and capable of scoring. The MQE is based on the conceptual model of disability creation process. This study demonstrated that the adapted MQE-SF was appropriate for the Turkish culture.

This study not only provides preliminary information but it also constitutes an evidence that the MQE is a reliable (internal consistency of 0.83) instrument and has promising face and concurrent validity for assessing the quality of the environments of people with disabilities. The overall and subscale of the test measurements such as social network, income, physical, and political orientation internal consistency were acceptable. The internal consistency of the public service subscale was found too low, although it had enough number of items. The results of this study suggest that the MQE-SF has an acceptable reliability and a moderate validity. In other words, this means that the MQE-SF is suitable for measuring environment quality for people with disabilities.

When the subscale correlations of the MQE-SF were examined, a high correlation was found between the public service and the income, physical, and political environment and between the total score and the income, public service, physical environment, and political orientation. This suggests that socialization is associated with economic status and over all policies; the physical environment also plays an important role in socializing. The consistency of each subscale was evaluated alongside the total score for MQE-SF, and a strong correlation was observed.

The subscale's numbers of items are not equal. Especially, the public service and physical environment subscales have more items than the other subscales. Therefore, the overall score of the survey is a reflection of the public service and physical environment subscale of the survey. If subscales of the survey had equal number of items, it might have yielded higher correlations.

In the study, the MQE-SF instrument was compared with the CHIEF, as another environmental assessment, to determine the concurrent validity. As a result of the statistical analysis, the MQE-SF was found to be moderately compatible with the CHIEF, which suggests that the two surveys evaluate slightly different dimensions of the environment (Heinemann et al., 2016). The subscales of the MQE-SF are social network, income, public service, physical environment, technology, and political orientation. The subscales of the CHIEF are social support, resource availability, accessibility, accommodation, and equality (Whiteneck,

**Table 3.** Correlation Between MQE-SF and Each Subscale.

	Social network	Income	Public service	Physical	Technology	Political orientation
Social network	1	.341**	.298**	.217**	.000	.219**
Income		1	.488**	.437**	-.084	.457**
Public service			1	.484**	.004	.472**
Physical				1	-.092	.401**
Technology					1	-.058
Political orientation						1

Note. MQE-SF = Measure of Quality of the Environment–Short Form.

\* $p < .05$ . \*\* $p < .001$ .

Harrison-Felix, et al., 2004). Moreover, MQE-SF evaluates the attitudes and supports and income separately as a social network, but the CHIEF social network (environment) is more generalized in terms of social support. When analyzing public service with more detailed items, CHIEF has two items about public service. Moreover, while the MQE-SF evaluates the physical environment with eight items, there are only three items about the physical environment in CHIEF. MQE-SF contains items about the technology used by the individual with disabilities and CHIEF does not contain any items about technology. Especially in our area, devices and technologies produced for people with physically disabilities have more importance. The MQE-SF examines the public service using more detailed questions, while the CHIEF examines it more generally in two parts. Furthermore, the MQE-SF evaluates the physical environment using eight questions, whereas the CHIEF evaluates it with only three questions. The MQE-SF mentions technology with an entire section, while the CHIEF does not mention technology at all. This also suggests that the MQE-SF is much more complex than the CHIEF.

People with disabilities can live under the same conditions as anyone else with the proper accessible environment. Moreover, by fostering a more tolerant attitude and reducing prejudice, the social environment within the community can contribute to the improvement in the relationships and community participation of people with disabilities (Law et al., 2007). An important support question is how the contextual conditions can be improved to achieve a productive, fulfilling, and participative life in the community for people with disabilities. However, it is clear that the quality of the environment and its impact on participation of the disabled Turkish population are not fully understood. Considering the relevance of the relation between community participation and personal and environmental factors for understanding the health and functioning of individuals and populations, this instrument could help determine community participation among those with disabilities, serving as a reference for appropriate interventions at the contextual level and thereby contributing to the planning and evaluation of public policies (Silva, Sampaio, Ferreira, Camargos, & Neves, 2013). The literature suggests that the impact of life on people with

disabilities should not be ignored by any rehabilitation professional, and that the tools used to measure the quality of the environment should be used in the clinic and the field (Bronfenbrenner, 1999). In addition, for the researchers working on people with disabilities, MQE-SF will be an important instrument to monitor the changing status of the physical structures with the new policy in Turkey.

Although several checklists and measures are available to evaluate specific aspects of the environment, the MQE is a comprehensive way to assess the frequency of social, income, service, physical, technological, political obstacles, and facilitators. Hence, it has a unique type of environmental measure. Therefore, MQE-SF can be suggested as a useful measure of occupational therapy for therapists to consider the measures of the environmental factors that have influence on people's daily activities, occupational performances, participation, and subsequently the health status related to their disabilities subjectively. The MQE-SF is designed for the use of people with various disabilities.

### Study Limitations

This study does have some limitations. Because of our recruitment process, the limited age range hinders our ability to investigate the effect of age, especially late-life changes, and the limited number of women participants may have posed a threat to the external validity of the study. Moreover, the MQE-SF is applicable to all impairment groups. Thus, in the future, studies focusing on environmental factors can be conducted for people who have visual, auditory, or cognitive impairments.

### Conclusion

In this study, the MQE-SF was adapted to Turkish and administered to Turkish people with disabilities. This study has demonstrated that MQE-SF was useful, valid, and a reliable measure for people with disabilities. However, a balanced distribution of the number of items in each subscale may be advised to increase the validity of the MQE-SF. To improve the reliability for technology subscale, additional technology subscale items may be added. But still, MQE

offered a scientific approach to assess environmental features that are relevant to participation by people with disabilities. Future studies may use this instrument to determine environmental barriers for participation by individuals with other impairments. Moreover, further studies in large samples are needed to evaluate and cross-validate the MQE-SF among people with different disabilities. Such studies will enable policy makers and researchers have a better understanding on what the environmental barriers and facilitators are for this people.

### Authors' Note

The authors declare that this article is original, has not been published before, and is not currently being considered for publication elsewhere. No significant financial support for this work that could have influenced its outcome.

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### Research Ethics

This study was evaluated at the meeting of the Ethics Committee of the Hacettepe University Senate, under Application No. 431-3223 and was approved in terms of medical ethics.

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