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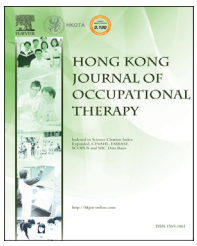

ORIGINAL ARTICLE

Validation of the Everyday Technology Use Questionnaire in a Japanese context

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Summary *Background/Objective:* The Everyday Technology Use Questionnaire (ETUQ), which evaluates the perceived relevance of and the perceived ability in everyday technology (ET) use, has demonstrated acceptable psychometric properties in Swedish studies of older adults. The aim of this study was to examine the reliability and validity of the ETUQ in a Japanese context in older Japanese adults.
Methods: A sample of older Japanese adults ($n = 164$) including persons with ($n = 32$) and without ($n = 132$) cognitive impairment was interviewed with the ETUQ, including original items (ETs) and added Japanese context-specific items. Data were analyzed using a Rasch measurement model.
Results: The analysis demonstrated acceptable functioning of the rating scale, internal scale validity, person response validity, and person-separation reliability of the Japanese ETUQ according to the Rasch model. However, evidence supporting unidimensionality in the Japanese ETUQ was not consistent in this sample. The added Japanese items did not significantly change the estimated individual person measures of perceived ability to use ET.

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Conclusion: The Japanese ETUQ seems to be a sensitive tool to evaluate perceived ability in ET use among elderly people in Japan with and without cognitive impairment. Therefore, it could be used in research and clinical practice.

Introduction

Use of everyday technology (ET), such as computers, automatic telephone services, and remote controls, is increasingly required for participation in everyday occupations. Worldwide, individuals' engagement and participation in everyday life are increasingly influenced by the development and use of ETs (Emiliani, 2006) at home as well as in the community. For example, bills are paid through the Internet, and train tickets are to be purchased in ticket vending machines. Moreover, an extensive variety of assistive technologies has been developed, such as timers for stoves and electronic calendars and reminders. Much hope is placed on both ET and assistive technology to facilitate the everyday lives of all people, and to support the growing population of older adults where cognitive impairment due to, for example, dementia is a common problem. Previous studies have found that a variety of ETs such as computers, telephones, and electronic home appliances are also important for people with dementia, although their use of ET gradually decreases and causes problems (Nygård, 2008; Rosenberg, Kottorp, Winblad, & Nygård, 2009). However, technology may also be a hindrance for occupational engagement and participation in society (Czaja et al., 2006; Nygård & Starkhammar, 2007), particularly when the persons' ability to manage the technology is inadequate, which often is the case with individuals with cognitive impairment (Nygård, Pantzar, Uppgard, & Kottorp, 2012; Rosenberg, Kottorp, et al., 2009). However, technology use is not a question of a person's ability alone; the context is also important: ET use differs between cultures, for example, rice cookers are commonly used in Japan and stove timers in Sweden, but hardly ever the other way around. Thus, it is important to remember that cultural aspects of the environment may influence which ETs we can expect to encounter in different parts of the world, as well as how and when they are used in that context (Kielhofner, 2008). Cultural aspects will also influence how people interpret the meaning of ETs, which will also affect ET use (Long, 2012). In occupational therapy, similar assessment and research methods are used around the world, and therefore, it is important that the properties of assessments are validated across cultural contexts.

To gain an in-depth understanding about the abilities of people to use ET and, based on that, be able to design and evaluate interventions regarding ET use in everyday occupations, occupational therapists need standardized assessments that can produce valid measures of the ability. The Everyday Technology Use Questionnaire (ETUQ) (Rosenberg, Nygård, & Kottorp, 2009) can be used to evaluate the perceived relevance of ETs and the perceived difficulty in ET use among adults. The ETUQ covers a wide range of items, including technological artefacts and services such as coffee machines, cell phones, and automatic ticket machines. The ETUQ has demonstrated acceptable psychometric properties in Swedish studies of older adults with and without cognitive impairment (Nygård et al., 2012; Rosenberg, Kottorp, et al., 2009). However, to ensure that the ETUQ supports validity despite cultural differences, it is important to validate the ETUQ in different cultural contexts. Hence, the aim of this study was to examine the validity and reliability of the ETUQ in a Japanese context in Japanese older people with and without cognitive impairment. The specific objectives were to assess (a) the functioning of the rating scale used in the ETUQ, (b) the fit of the ETUQ items to the Rasch model, (c) unidimensionality of the scale, (d) person response validity, and (e) person-separation reliability. Finally, a special focus was also placed on the evaluation of effects of the Japanese context-specific items (i.e., ETs) added to the ETUQ, and how they contributed to the generated measures of the participants' abilities to use ET.

Methods

Participants

In this cross-sectional study, the participants were a sample of older Japanese adults ($n = 164$) including persons with ($n = 32$) and without ($n = 132$) cognitive impairment. In the analyses, the sample was treated as one group of older adults. The participants were recruited from hospitals, day-service centres, general community support centres, and a senior citizens' club in the Kansai region of Japan. General inclusion criteria for *all* participants were that they should (a) live in an ordinary home, (b) be able to participate in the ETUQ interview, and (c) have a score of 18 or more on the Mini Mental State Examination (MMSE) (Folstein, Folstein, & Mc Hugh, 1975). The MMSE cut-off of 18 was based on our clinical experience: although scores between 11 and 20 are commonly considered to indicate a moderate degree of dementia (Folstein, Folstein, McHugh, Fanjiang, & Odessa, 2001), our experience is that it is difficult to obtain good quality data through the use of questionnaires if the MMSE score is below 18. The participants with cognitive impairment were having mild cognitive impairment or a dementia disease diagnosed by physicians. The participants' demographics are presented in Table 1. Before the study's initiation, approval was obtained from the Kobe University Ethical Committee.

Table 1 Participants' Demographic Characteristics.

	Total (n = 164)	Older adults without known cognitive impairment (n = 132)	Older adults with MCI or AD (n = 32)
Sex, n (%)			
Male	51 (31)	49 (37)	2 (6)
Female	113 (69)	83 (63)	30 (94)
Age, y			
Mean (SD), min–max	76.97 (6.79), 57–90	76.39 (6.91), 57–90	79.34 (5.77), 65–90
Living conditions, n (%)			
Apartment	44 (26.5)	35 (26.5)	9 (28)
Detached house	106 (65.5)	83 (63)	23 (72)
Rented apartment/house	14 (8)	14 (10.5)	0 (0)
Education, y			
Mean (SD), min–max	11.41 (2.54), 6–20	11.58 (2.45), 6–20	10.72 (2.82), 6–18
MMSE, score			
Mean (SD), min–max	25.67 (3.77), 12–30	26.62 (3.24), 12–30	21.68 (3.25), 14–28
Place for interview, n (%)			
In the participant's home	96 (58.5)	64 (48.5)	32 (100)
Outside participant's home	68 (41.5)	68 (51.5)	0

Note. AD = Alzheimer's disease; MCI = mild cognitive impairment; MMSE = Mini Mental State Examination (maximum score, 30); SD = standard deviation.

Everyday Technology Use Questionnaire

The ETUQ is used as a standardized interview to identify people's perceived relevance and difficulty in the use of ETs (Rosenberg, Nygård, et al., 2009). The original ETUQ included 92 items, (i.e., technological artefacts and services) and is administered in a 30–45-minute face-to-face interview. The items are proposed to be relevant to a majority of people and range from easier to more challenging in use, covering both newly developed and well-known ETs. To register the perceived difficulty in each item that is relevant for the person, a six-step category scale was used (Table 2). The rating scale in ETUQ is based on clinical experience and research (Nygård, 2008; Nygård & Starkhammar, 2007), and is initially intended to target various levels of perceived difficulty in ET use among older adults with and without cognitive impairments. It is based on the idea that when people's ability to use ET is compromised, the descending pattern first shows in difficulties using the ET independently, then support is needed, and finally the specific ET may be abandoned. A nonrelevant ET is not available, or the participant has never been interested in using it even if it is available. The ETUQ generates a measure of each participant's perceived difficulty in ET use, which also can be expressed as the participant's perceived ET usability. In this study, the concept of perceived ability in ET use will primarily be used. The ETUQ was originally developed for use among older adults with and without cognitive impairment. In examinations of the psychometric properties of the ET in these groups in a Swedish context, acceptable internal scale validity, unidimensionality, and person response validity have been demonstrated. The ETUQ has also demonstrated to be able to separate at least three distinct groups of ability in ET use (Nygård et al., 2012; Rosenberg, Nygård, et al., 2009). For more detailed description of the ETUQ, see Rosenberg, Nygård, et al. (2009).

Table 2 Description of the Six-Step Rank-Category Scale Used in ETUQ.

Category	Description
A	Does not use ET anymore or has not started to use it even if it is available and relevant
B	Always uses ET together with another person
C	Sometimes uses ET together with another person
D	Uses ET without another person, but with frequent/major perceived difficulties
E	Uses ET without another person, but with minor perceived difficulties
F	Uses ET without another person and without perceived difficulties

Note. ET = everyday technology; ETUQ = Everyday Technology Use Questionnaire.

Japanese version of the ETUQ

The process of translating and adapting the ETUQ to Japanese was initiated in March 2008 as a research collaboration between Kobe University and Karolinska Institutet (KI) in the field of ET use in the older population. The collaboration was initiated to learn from and compare conditions within each cultural context. Consequently, the decision was to replicate in Japan a Swedish cross-sectional study with the ETUQ including older adults with and without cognitive impairment (Rosenberg, Kottorp, et al., 2009). The Kobe expert team (RT, TN, KN, and JS) received a 2-day training course in English at KI on the theory and practice of ETUQ. In parallel, the English version of the ETUQ was translated into Japanese by the expert team. This process was continuously mediated by the two bilingual co-authors, both well acquainted with both cultures and languages (EA

and PB). All items in the ETUQ were translated into Japanese. Those that were not available or valid in the Japanese context were kept as blanks, while new items, particularly for the Japanese context, were added. The selection of new items was based on a consensus process (with members of the Japanese expert team), in concordance with how the selection of items for the Swedish version was accomplished (Rosenberg, Nygård, et al., 2009). Only ETs that commonly occurred in that context were considered. Examples were rice cooker, electric carpet, and electric fish grill. This process continued as a discussion between the two teams until consensus was reached for a final 118-item Japanese version of the ETUQ in 2009. To facilitate the data-collection process in Kobe, a second 2-day training course was given there by the co-authors LN and CM in March 2010, where the Kobe team (RT, TN, KN, and JS) and one of the bilingual colleagues (PB) took part, along with 11 Japanese occupational therapists. This training course was given in English with a professional Japanese interpreter. Thus, this repeated training course served as a check of the translation as it was mediated by an interpreter and resulted in clarification of definitions.

Data-gathering procedures

Potential participants with cognitive impairment were first contacted at specialized units in the Kobe area by physicians handing out written information about the study. Older adults without known cognitive impairment were informed about the study by written information at the Kobe Federation of Senior Citizens' Clubs Inc. and day-service centres. Those interested in study participation were then contacted and recruited by the Kobe team. The data collection was performed either in the participant's home or "out of house," for example, at Kobe University (Table 1). All participants gave their oral and written consent for participation in the study. For participants with dementia, a significant other (daughter, son, or spouse) was present during the interview, as a support to provide the best quality in data, as recommended based on earlier experiences (Nygård et al., 2012; Rosenberg, Kottorp, et al., 2009; Rosenberg, Nygård, et al., 2009). The sessions included interviews with the ETUQ and MMSE assessments and lasted approximately 90 minutes. Data were collected by eight experienced occupational therapists who had participated two times in the 1-day ETUQ courses. They also had continuous discussions and received feedback through personal communication with the creator of the ETUQ (LN) during the data-collection process. Data were collected from September 2008 to November 2013. The reason for the delay in data collection was the tsunami disaster in 2011.

Statistical analysis

The data were analyzed using a Rasch model (Bond & Fox, 2007). In the Rasch analysis, the ETUQ ordinal item raw scores were converted into interval measures using a logarithmic transformation of the odds probabilities of each response. The conversion provides both an estimation of a person's perceived ability to use ET (person measure in perceived ability in ET use expressed in logits, ranging from low to high perceived ability) and estimates of each ET's level of difficulty along a calibrated continuum (measure of item difficulty expressed in logits, ranging from low to high level of difficulty). The Rasch analysis also generates goodness-of-fit statistics for all persons and items for evaluation of their fit to the Rasch model. These statistics are presented as infit mean-square (MnSq), outfit MnSq, and standardized *z* values (Bond & Fox, 2007), and indicate the degree of match between actual and expected responses. Because *infit* statistics are more informative when exploring the fit of items and persons (Bond & Fox, 2007; Wright & Masters, 1982), we chose to focus on these statistics in our analysis. The analyses were conducted using a seven-step logistical approach similar to that used in previous studies (Lerdal, Johansson, Kottorp, & von Koch, 2010; Lerdal & Kottorp, 2011; Lerdal et al., 2011). The steps are shown in Table 3. The Winsteps analysis software program, version 3.69.1.16 (Beaverton, Oregon, USA), was used to analyze the data (Linacre, 2009).

In the first step, the measurement properties of the rating scale used in the ETUQ were evaluated according to the following set criteria: (a) the average calibration for each category on each item should advance monotonically, (b) there should be at least ten observations of each category in the rating scale, and (c) outfit *MnSq* values for each category calibration should be less than 2.0 (Linacre, 2004). If the rating scale did not function according to the criterion set, we decided to follow Linacre's recommendation of collapsing categories (Linacre, 2004). We also monitored the numbers of unexpected ratings, with a set criterion of less than 1%.

In the second step, *internal-scale validity* of the ETUQ was evaluated by analyzing the fit-of-the-item responses to the Rasch model assertions (Bond & Fox, 2007). If any of the items did not demonstrate acceptable goodness-of-fit to the model according to the set criteria, one item at a time was removed and the scale was reanalyzed with the remaining items. The item-fit procedure was repeated until all items demonstrated acceptable goodness-of-fit. We chose here to include only ETUQ items that had been scored 10 times or more, as a limited number of scores could increase the risk of generating higher-than-acceptable MnSq values, resulting in exclusion of an item due to a limited number of unexpected scores for one or two participants. For evaluation of the *item goodness-of-fit*, a criterion of infit *MnSq* values larger than 1.4 associated with a *z* value of 2.0 or more was used for detecting item misfit, in accordance with earlier validity studies with the ETUQ (Fallahpour, Kottorp, Nygård, & Larsson-Lund, 2014; Hällgren, Nygård, & Kottorp, 2011; Rosenberg, Nygård, et al., 2009).

The third step evaluated evidence of unidimensionality in the generated measures by conducting a *principal component analysis* (PCA) of the residuals, generated from the Winsteps program. The PCA was also performed to identify the presence of additional explanatory dimensions other than the perceived difficulty in ET use in the data (Linacre, 2005). The two criteria set were as follows: (a) the first latent dimension should explain at least 50% of the

Table 3 Overview of the Analytic Process Using a Rasch Model Approach.

Step	Psychometric property	Statistical approach and criteria	Results
1	*Rating scale functioning:* Does the rating scale function consistently across items?	• Average measures for each step category should advance monotonically. • $z < 2.0$ in outfit mean-square *(MnSq)* values for step category calibrations[a]	Scale Steps C and D reversed. After collapsing scale steps, rating scale met criteria
2	*Internal scale validity:* How well do the actual item responses match the expected responses from the Rasch model?	Item goodness-of-fit statistics • *MnSq* values ≤ 1.4[b,c]	The following four items initially failed to meet criterion: Kotatsu, *MnSq* = 1.58 Room heater, *MnSq* = 1.55 Dishwasher, *MnSq* = 1.44 Alarm clock, *MnSq* = 1.43
3	*Internal scale validity:* Is the scale unidimensional (i.e., does it measure a single construct)?	Principal component analysis • ≥50% of total variance explained by first component (depressive symptoms)[d] • Any additional component explains <5% of the remaining variance after removing the first component[d]	First component explained 42.4% of the total variance. Second component explained 2.8% of the total variance.
4	*Person response validity*	Person goodness-of-fit statistics • *MnSq* values ≤ 1.4 or $z < 2.0$[e] • ≤5% of sample fails to demonstrate acceptable goodness-of-fit values[e,f]	Three respondents (1.8% of sample) failed to demonstrate acceptable goodness-of-fit values.
5	*Person-separation reliability*	Person-separation index • ≥ 2.0[g]	• 2.56
6	*Fit of the added Japanese context-specific items to the ETUQ*		Two items of the 72 original items (2.8%)—dishwasher and alarm clock—and two of the 24 Japanese items (8.3%)—kotatsu and room heater —did not fit the Rasch model.
7	*Differential test functioning:* How consistent are the scores from the original ETUQ and ETUQ with added Japanese-specific scales?	• All z-score differences $< \pm 1.96$	

Note: ETUQ = Everyday Technology Use Questionnaire.
[a] Linacre (2004).
[b] Rosenberg, Kottorp, et al. (2009).
[c] Hällgren et al. (2011).
[d] Linacre (2011).
[e] Patomella et al. (2006).
[f] Kottorp et al. (2003).
[g] Fisher (1992).

total variance, and (b) any additional dimension should explain less than 5% of the remaining variance of the residuals (Linacre, 2011).

The fourth step evaluated aspects of person response validity. A criterion for evaluating *person goodness-of-fit* was to reject infit *MnSq* values of 1.4 logits or more or associated *z* value of 2 or more. It is generally accepted that 5% of the sample may by chance fail to demonstrate acceptable goodness-of-fit without threatening evidence of person response validity (Hällgren et al., 2011; Kottorp, Bernspång, & Fisher, 2003; Patomella, Tham, & Kottorp, 2006).

The fifth step estimated the ability of the ETUQ to reliably separate the participants into distinct groups (i.e., person-separation reliability). A *person-separation index* of 2.0 was required to ensure that the ETUQ scale could differentiate people with at least three different levels of perceived ability to use ET. This criterion was primarily based on clinical experience (three distinct groups, namely, high ability using ET, moderate ability using ET, and low ability using ET). The sixth step specifically explored the fit of the added Japanese context-specific items to the scale, and finally, the seventh step assessed uniform differential test functioning, by comparing the generated person measures from the ETUQ without the added Japanese context-specific items with those based on ETUQ including these items, by using standardized *z* comparisons of the two-

person measures. None of the measures should be outside a 95% confidence interval, when comparing the two different versions of ETUQ, both with and without the added Japanese context-specific items.

Results

Rating scale function (Step 1)

When evaluating the rating scale function for each item, the category calibrations were used more than 10 times; all were associated with acceptable outfit *MnSq* values. The overall percentage of unexpected responses was also lower than the set criterion: 0.54%. However, when examining the average category calibrations between the categories, the category calibrations for C (2.04 logits) and D (1.92 logits) were reversed (Table 3). We therefore collapsed these two categories before proceeding to other analyses.

Item fit to the Rasch model and unidimensionality (Steps 2 and 3)

Initially, all items with less than or equal to 10 scores (i.e., item data from equal to or less than 10 participants) were deleted from the analysis ($n = 18$ items), resulting in a total (n) of 100 items. After an iteration, four items (dishwasher, alarm clock, kotatsu, and room heater) out of these 100 items did not meet the criterion for the goodness-of-fit item. After excluding these items, 96 items that all met the criteria set remained.

The PCA in the Rasch analysis for the final Japanese ETUQ version (96 items) explained 42.4% of the total variance in the data set, which was lower than the set criterion. The secondary dimension explained an additional 2.8% of the variance indicating absence of multidimensionality in the data. However, to explore in more depth the presence of potential multidimensionality within the data, we also decided to monitor the standardized residual correlations by loadings (Table 4). A pattern emerged in which items addressing ET use in public transportations seemed to correlate to a higher degree, whereas those that were more related to the various uses of cell phone correlated to a lower degree. To explore the impact of a potential secondary dimension in the ETUQ, we excluded the four items addressing ET use in public transportations. The total variance of the 92 remaining items stayed, however, similar (42.0%) to the earlier analysis. We concluded that the evidence supporting unidimensionality in the ETUQ was not consistent in this Japanese sample.

Table 4 Standardized Residual Correlations for ETUQ Items Sorted by Loadings from Principal Component Analysis.

Loading	ETUQ item
0.81	Automatic ticket gate for buses
0.81	Automatic ticketing machine for trains
0.81	Automatic ticket gate in a bus/train subway
0.72	Request bus stop
0.36	Pruning shears
−0.33	Tumble dryer
−0.36	Cell phone: call
−0.37	Cell phone: answer
−0.37	Cell phone: charging

Note: ETUQ = Everyday Technology Use Questionnaire.

Person response validity and reliability (Steps 4 and 5)

Of the 164 participants answering the ETUQ questionnaire, data from only five participants (3.0%) did not demonstrate acceptable goodness-of-fit to the Rasch model, which were below our set criterion. Because the number of person measures not demonstrating acceptable fit was small, we did not perform any additional statistical procedures on the person measures. The person-separation index in the 96-item Japanese ETUQ was 2.56, which exceeded the set criterion of acceptable separation reliability.

Examination of added Japanese items and differential test functioning (Steps 6 and 7)

Of the 18 items excluded due to very few responses, none of the items were added specifically for the Japanese context. Of the four items excluded due to higher-than-expected goodness-of-fit statistics, two items of the 72 original items (2.8%)—dishwasher and alarm clock—and two of the 24 Japanese items (8.3%)—kotatsu and room heater—did not fit the Rasch model. We concluded that the proportion of Japanese-specific items that demonstrated misfit in the Japanese sample was overall higher than expected, given the total number of specific Japanese items in the ETUQ.

Finally, we compared the person measures derived from the original items of ETUQ ($n = 72$) with the measures generated from the ETUQ (Japanese version), also including the Japanese context-specific items ($n = 72 + 24$), to explore if these context-specific items changed the estimated measures of the participants. Using standardized z comparisons, all of the person measures were within a 95% confidence interval. Therefore, we concluded that the added items did not significantly change the estimated individual person measures, additionally supporting the scale and person response validity of the ETUQ.

Discussion

The purpose of this study was to examine the validity and reliability of the Japanese ETUQ version in a Japanese sample of older adults with and without cognitive impairment. The results provided initial evidence of internal scale validity, person response validity, and person separation, thereby indicating that the Japanese version of the ETUQ seems to be a valid tool to evaluate perceived ability in ET use among elderly people in Japan with and without cognitive impairment with high precision. In the final Japanese ETUQ scale of 96 ETUQ items, all met the criteria that suggest an acceptable overall item fit in this sample. However, a higher-than-expected misfit was demonstrated

among the Japanese context-specific items (ETs) added in the Japanese version of the ETUQ. Two of the 24 added Japanese items demonstrated misfit to the Rasch model: kotatsu and room heater. These two items are technologies that—although common, that is, culturally relevant—for some might be used only part of the year (cold season) and this might in turn influence their evaluations: when reflecting on the perceived difficulty in using ETs that are not often utilized, it may be difficult for some persons to recall the use of these items. This might have an impact on the validity of the answers and lead to a larger variation than expected regarding item difficulty. These issues might then have had an impact on the goodness-of-fit statistics for these items (i.e., the level of perceived difficulty for these items may be unexpectedly high or low in relation to some persons' perceived ability to use ET; Bond & Fox, 2007). However, the goodness-of-fit statistics are sensitive and the misfitting values could be derived from and explained by just a few individuals with unexpected responses; thus, this might not be a threat to scale validity.

A somewhat unexpected result was that the Japanese ETUQ did not meet the criteria for unidimensionality. Earlier studies of the ETUQ have shown higher levels of unidimensionality (Hällgren et al., 2011; Rosenberg, Nygård, et al., 2009). However, the ETUQ was developed in Sweden and these aforementioned studies were all conducted in a Western European (Swedish) context. Because there probably are differences in how ET is viewed in Japan and Sweden, the use of technology may also be affected (Long, 2012) and this might be one explanation for the finding concerning unidimensionality. As 24 context-specific ETs were added to the original ETUQ items in the Japanese version and a number of the original items were not relevant to the Japanese sample, the ETUQ version in this study is different from the earlier versions evaluated for unidimensionality and a direct comparisons of findings may therefore not be possible. The findings also indicated that further evaluation of the PCA results to explore whether more than one construct of ET use may be necessary in and across contexts, as additional data may be needed for each item to ensure that it fits a construct.

After merging two of the six categories in the rating scale into one (C = sometimes uses the ET together with another person, and D = uses the ET without another person, but with frequent/major perceived difficulties; Table 2), the five-category-rating scale met the set criteria (Linacre, 2004). Such functioning of the scale is in line with earlier research with older people also showing these two categories as disordered (Nygård et al., 2012). The reason for this disordering might be that these two categories are not clearly separated from each other. Another reason can be that the categories reflect different contextual conditions in the sample. Individuals who score D on an item may be living independently without any partner and/or caregiver, and therefore, may use ET independently but with major perceived difficulties, whereas individuals who score C may have another person available who supports them in using the specific ET. Based on our findings, future in-depth analyses to monitor the ordinal structure of the rating scale, taking also contextual variables into considerations, is suggested. It might, however, be valuable in clinical practice to use the six categories of the ETUQ to capture the perceived ability to use ET in more detail, regarding the need to use ET together with another person.

The study has some methodological limitations. First, for a number of items, the data were limited. Although we had a limit of data for each item (from only 10 or less participants), there were still few responses; in further studies, more evaluations for the items are needed to make the calibration of item difficulty more precise. Second, the findings may be biased by the constitution of the sample. There were a number of individuals in the sample with very low scores on the MMSE, which might have affected the participation in and results of the ETUQ interviews. In earlier studies investigating the psychometric properties of the ETUQ among older adults with and without cognitive impairment (Nygård et al., 2012; Rosenberg, Kottorp, et al., 2009), both the minimum MMSE scores and the mean MMSE scores in the samples were higher than in the current sample. This indicates that the persons with dementia in this Japanese sample might be in more advanced stages of dementia than the samples in the Swedish ETUQ studies; this may have influenced the quality of the data. Moreover, there might be differences in how dementia is diagnosed in Japan and Sweden and how support from significant others in the ETUQ interview could differ between cultures, which might have had an impact on the sample as well as on the results. In addition, the long time for data gathering might have impacted on the quality of the ratings. Studies have shown that the perceived relevance as well as the perceived difficulty of ET may change over time (Malinowsky et al., personal communication), and this could have happened during the present data collection.

Conclusion

This study has demonstrated an initial evidence of validity and reliability in general for the Japanese ETUQ in a sample of older Japanese adults with and without cognitive impairment. However, further evaluation of the unidimensionality is needed. The Japanese version of the ETUQ could be used to evaluate the perceived ability to use ET, for example, to plan interventions aiming to support the ability to use ET in research as well as in clinical practice.

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