

**Reliability and validity of the Japanese version of the Valued Living Questionnaire
Adapted to Caregiving**

Hiroshi Morimoto, PhD^{1*}, Naoko Kishita, PhD², Hikaru Kondo, MA³, and Takashi Muto, PhD⁴

¹ Faculty of Psychology, Meiji Gakuin University, Tokyo 108-8636, Japan

² Faculty of Medicine and Health Sciences, University of East Anglia, Norwich, NR4 7TJ, UK

³ Sun Academy Nihongo Center, Tokyo 107-0052, Japan

⁴ Faculty of Psychology, Doshisha University, Kyoto 610-0384, Japan

*Corresponding author: Hiroshi Morimoto

Hiroshi Morimoto: hmori@psy.meijigakuin.ac.jp

ORCID: 0000-0001-7299-2190, Tel: +81-3-5421-5305

Naoko Kishita: N.Kishita@uea.ac.uk ORCID: 0000-0001-8453-2714

Hikaru Kondo: hikaru.kondou@gmail.com

Takashi Muto: takamuto@mail.doshisha.ac.jp ORCID: 0000-0003-1988-6983

Short Running Title

Development of the J-VLQAC

Author Note

The data that support the findings of this study are available from the corresponding author, [HM], upon reasonable request.

Funding

This work was supported by the Institute for Psychological Research, Meiji Gakuin University under Grant [2022S001].

Disclosure statement

None declared.

Abstract

Objectives: This study developed the Japanese version of the Valued Living Questionnaire Adapted to dementia Caregiving (J-VLQAC) and assessed its reliability and validity.

Methods: A 2-wave longitudinal survey with an interval of two weeks was conducted with Japanese dementia family caregivers ($n = 521$ at T1; $n = 424$ at T2).

Results: Confirmatory factor analysis demonstrated a poor fit to our data for the original 2-factor model. Exploratory factor analysis resulted in a new 3-factor model (i.e., *Own Values*, *Family Values*, and *Health Values*). Both models showed similar good internal consistency (Cronbach's alpha) and test-retest reliability. Significant correlations between the J-VLQAC and the Valuing Questionnaire (VQ) and measures assessing related constructs (e.g., cognitive fusion) supported good criterion validity and acceptable level of construct validity for both models. Compared to the original 2-factor model, the new 3-factor model showed higher incremental validity, which was assessed through the hierarchical regression analysis examining whether the J-VLQAC predicts depression, anxiety, and life satisfaction over and above the VQ.

Conclusions: The J-VLQAC has good reliability and acceptable validity.

Clinical implications: The information gathered from the J-VLQAC can be used to tailor psychological support and help caregivers engage in activities that reflect their personal values.

Key words: valued living questionnaire adapted to dementia caregiving, family caregivers, acceptance and commitment therapy, reliability, validity

Introduction

Due to the increasing aging population, the number of people with dementia is increasing rapidly worldwide. Family caregivers are often required to provide increasing levels of personal care as the disease progresses (Connell, et al., 2001), while managing behavioral and psychological symptoms of dementia (Feast et al., 2016), which could lead to deterioration in the psychological well-being of caregivers (Collins & Kishita, 2020; Kaddour & Kishita, 2020).

There is emerging evidence that acceptance and commitment therapy (ACT; Hayes et al., 2012) is effective for improving the psychological well-being of dementia family caregivers (e.g., Cheng et al., 2020; Collins & Kishita, 2019). ACT aims to enhance psychological flexibility, the ability to step back from restricting thoughts and allow painful emotions; to focus on the present; and to persist in behavior that reflects personal values (Hayes et al., 2012). To achieve this, the ACT treatment focuses on six core processes (acceptance/defusion/self as context/being present/values/committed action) with the first three processes often categorized as a higher-level component “mindfulness and acceptance” and the latter three processes as “commitment and behavior change” (Hayes et al., 2012). Previous studies on dementia family caregivers have mainly examined the former component with a particular focus on the relationship between experiential avoidance (the opposite of acceptance) and the psychological well-being of caregivers (e.g., Kishita et al., 2020; Romero-Moreno et al., 2016). Studies examining the latter component such as values among dementia family caregivers are scarce.

Preliminary evidence has highlighted the importance of personal values in improving the psychological well-being among dementia family caregivers (Losada et al., 2010). Furthermore, recent research has identified two key broad areas of values that are critical among dementia family caregivers: own values and family values (Romero-Moreno et al., 2017). Own values

refer to values related to caregivers' own personal life such as personal growth, friendship, and employment, while family values refer to values related to affective family relationship such as intimate relation, caregiving role, and parenting (Romero-Moreno et al., 2017). Previous studies demonstrated that higher commitment to both values were associated with lower depression and anxiety and higher life satisfaction in dementia caregivers (Romero-Moreno et al., 2017), while higher commitment to family values was associated with lower feelings of guilt (Gallego-Alberto et al., 2017).

Several measures have been developed to assess commitment to personal values among different populations (Barrett et al., 2019). These measures include tools that are potentially more suitable for clinical practice as they aim to clarify the importance of certain value domains (e.g., the Bull's-Eye Values Survey, Lundgren et al., 2012) and those that are more useful in research as they focus on evaluating the tendency in value-based living in general (e.g., the Valuing Questionnaire, Smout et al., 2014). Among these value measures, the Valued Living Questionnaire Adapted to Caregiving was developed for dementia family caregivers (VLQAC, Romero-Moreno et al., 2017). The VLQAC was developed by adding two new items that are considered to be particularly relevant to this population (i.e., "caring for their relatives" and "caring for oneself") to the existing 10-item Valued Living Questionnaire (Wilson et al., 2010). The original VLQAC has a 2-factor structure: *Commitment to Own Values* consisting of eight items and *Commitment to Family Values* consisting of four items. The VLQAC has demonstrated good internal consistency and construct validity (Romero-Moreno et al., 2017).

There is emerging evidence suggesting that ACT-based intervention may be effective for improving the psychological well-being among Japanese dementia family caregivers (Morimoto & Nomura, 2022; Muto, 2015). Developing a scale, which can assess commitment to personal

values in the dementia caregiving context that can be utilized in Japan, will be beneficial for clinicians and researchers in the assessment of this key ACT process and in filling the gap in our knowledge about the underlying mechanisms of the psychological well-being of this population. Thus, this study aimed to develop the Japanese version of the VLQAC and examine its reliability and validity.

Methods

Development of the Japanese version of the VLQAC (J-VLQAC)

The translation of the VLQAC (Romero-Moreno et al., 2017) from English to Japanese was completed following the International Society for Pharmacoeconomics and Outcomes Research taskforce guideline (Wild et al., 2005). After obtaining permission from the original author, the forward translation was conducted by two co-authors. All authors then discussed and finalized items for the initial version of the J-VLQAC.

We asked a professional language service provider (Crimson Japan Inc.) to back-translate the J-VLQAC from Japanese to English. The original author then compared items of their original scale with items of our back-translated English version of the J-VLQAC to confirm the conceptual equivalence of measures. Some minor changes were made through discussion to ensure the consistency between the original scale and the J-VLQAC. Specifically, the item “caring for their relatives” from the original scale was reworded to “caregiving of a family member with dementia” to clarify that the word “relatives” refers to those living with dementia.

Finally, to check comprehensibility and cognitive equivalence of the translated measure (i.e., cognitive debriefing, Wild et al., 2005), five Japanese female dementia family caregivers were asked to read each item of the J-VLQAC and provide feedback on their readability. Some

minor edits were then made to the scale through discussion between the authors. Based on feedback received, we included additional sentences in the instruction of the scale to clarify the definition of value (“The value here does not refer to what you have to do or should do, but to what you truly value in your life. The “importance” should also be evaluated from this perspective.”) and to inform participants to rate the importance/consistency as “0” if any of the items are not relevant to their current circumstances. These modifications were discussed with the original author for final confirmation of the conceptual equivalence of the translated measure.

Participants and Procedure

This study used a 2-wave longitudinal design with an interval of two weeks. Eligible participants had to be: (a) providing care to a family member with a clinical diagnosis of dementia, (b) living with the care recipient, providing regular home care (>5 days/week) and (c) registered with an online survey company (Cross Marketing Inc.) for the purpose of recruitment. The first online survey including a consent form was distributed to all potential registered participants meeting the eligibility criteria. Participants who provided consent and responded to the first survey were invited to the second survey two weeks later. Participants received a redeemable token from Cross Marketing Inc. for their participation. All questionnaire items were mandatory to submit, which was approved by the university’s ethics committee (approval number 20210008).

In total, 546 family caregivers completed the first survey and 441 completed the second survey. Potentially unreliable responses were identified through a seriousness check (Aust et al., 2013). After excluding unreliable responses, data from 521 participants and 424 participants were available for analysis from the first and second surveys respectively. The sample size of this study met a standard for measurement properties (The COSMIN checklist; Terwee et al., 2012).

Measures

The first survey included sociodemographic and all standardized questionnaires. The second survey only included the J-VLQAC.

Commitment to personal values

The J-VLQAC and the Japanese version of the Valuing Questionnaire (J-VQ; Doi et al., 2017) were used to measure commitment to personal values. The J-VLQAC asks the respondents to rate each area of life from two perspectives: importance and consistency (how consistently they are currently living in accordance with values). Each item of the J-VLQAC is rated on a scale of 1-10 for importance (*1: not at all important to 10: extremely important*) and consistency (*1: actions not at all consistent to 10: actions extremely consistent*). Participants were asked to rate each item considering their circumstances in the past week. Following the recommended procedure (Romero-Moreno et al., 2017), a *Commitment to Values composite score* was calculated by multiplying the importance rating by the consistency rating for each domain and averaging these products. Higher scores indicate greater commitments to personal values.

The J-VQ is a 10-item measure which comprises two subscales: obstruction and progress (five items each). Participants rated each item considering their circumstances in the last two weeks using a seven-point scale. The obstruction subscale measures the extent of disruption of value living due to avoidance of unwanted experiences and distraction from values. The progress subscale measures the extent of enactment of values, including clear awareness of personal values. These subscales are not domain-specific and higher scores for the obstruction subscale indicate lower commitments to personal values in general, and higher scores for the progress subscale indicate vice versa. The subscale scores were used in our analyses (obstruction, $\alpha = .80$; progress, $\alpha = .91$).

Caregiving stressors

The Caregiver Burden Scale (Niina et al., 1992) was used to measure caregiving stressors. This 26-item scale comprises seven subscales that measure support for the care recipient's activities of daily living, the burden of behavioral and psychological symptoms, concern about future caregiving burden, lack of informal support, lack of formal support, caregiving interference with other roles, and the financial burden of caregiving using a four-point scale. Higher scores indicate greater caregiving stressors. The total scores were used in our analyses ($\alpha = .96$).

Cognitive fusion

The Japanese version of the 7-item Cognitive Fusion Questionnaire (Shima et al., 2016) was used to assess the degree of entanglement and effort to control distressing thoughts in general. This scale is rated on a seven-point scale and higher scores indicate greater cognitive fusion. The total scores were used in our analyses ($\alpha = .97$).

Experiential avoidance

The Japanese version of the Experiential Avoidance in Caregiving Questionnaire (Morimoto et al., 2021) was used to measure experiential avoidance. This 15-item scale comprises three subscales: active avoidant behavior, intolerance of negative thoughts and emotions towards the relative, and apprehension concerning negative internal experiences related to caregiving. Each item is rated on a five-point scale. Higher scores indicate greater levels of experiential avoidance. The subscale scores were used in our analyses ($\alpha = .84, .67, .77$, respectively).

Depression

The Japanese version of the Patient Health Questionnaire-9 (Matsumura et al., 2007) was

used to measure depression. This scale asks participants to rate how each of the nine DSM-IV criteria for depression affected them in the past week using a four-point scale. Higher scores indicate greater levels of depressive symptomatology. The total scores were used in our analyses ($\alpha = .93$).

Anxiety

The Japanese version of the Generalized Anxiety Disorder -7 (Matsumura et al., 2009) was used to measure anxiety. This scale asks participants to rate how often they have experienced seven symptoms of anxiety in the last two weeks using a four-point scale. Higher scores indicate greater levels of anxiety. The total scores were used in our analyses ($\alpha = .94$).

Life satisfaction

The Japanese version of the Satisfaction with Life Scale (Sumino, 1994) was used to measure satisfaction with the respondent's current life. This 5-item unidimensional scale is rated on a six-point scale. Higher scores indicate higher life satisfaction. The total scores were used in our analyses ($\alpha = .93$).

Statistical Analysis

Factor structure

A confirmatory factor analysis (CFA) using the maximum-likelihood method was conducted to examine whether the J-VLQAC corresponded to the factor model of the original version of the VLQAC (i.e., 2-factor structure) using data from the first survey (Wave 1). The following combination data were used to evaluate model fit: comparative fit index (CFI), the Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA). A good model fit was assumed when CFI and TLI were $>.95$ and RMSEA was $<.06$ (Hu & Bentler, 1999). This original 2-factor model resulted in a poor fit to the data, and thus an exploratory

factor analysis (EFA) using the maximum-likelihood method with promax rotation was conducted to identify an appropriate factor structure using data from Wave 1. To evaluate the sampling adequacy and whether the correlations between the items were appropriate to perform the EFA, the Kaiser-Meyer-Olkin (KMO) statistic and Bartlett's test of sphericity were performed. If the KMO statistic was $\geq .80$ and Bartlett's test was significant, the data are considered suitable for the EFA. The adequate number of factors was identified based on the following indices: a) Kaiser-Guttman criterion (eigenvalues ≥ 1); b) minimum average partial correlation (MAP); c) parallel analysis (Horn, 1965) based on squared multiple correlations (PA-SMC95); and d) interpretability of the factor. MAP suggests the smallest number of factors, while PA-SMC95 suggests the largest number of factors (O'Connor, 2000). Two criteria for item retention were: a) factor loading to central factor $\geq .40$; and b) factor loading to other factors $\leq .35$. To compare psychometric properties between the original factor model and the model derived from the EFA, the examinations of reliability and validity were conducted for both factor models (i.e., the original 2-factor model and the factor model derived from the EFA).

Reliability

The internal consistency was examined by Cronbach's alpha coefficients using data from Wave 1. Differences in the subscale scores of the J-VLQAC between Wave 1 and Wave 2 were then calculated for each participant to identify outliers. Participants who presented difference values outside two standard deviations in any of the subscale scores for either of the two factor models were considered an outlier, and those data were excluded from the analysis (Flansbjerg et al., 2005). The test-retest reliability was examined by the intraclass correlation coefficient (ICC) using a two-way random effects model. An ICC value of .51 to .75 indicated moderate, .76 to .90 indicated good and $>.90$ indicated excellent test-retest reliability (Koo & Li, 2016). The absolute

reliability was evaluated by checking systematic errors between the scores from Wave 1 and Wave 2 using Bland-Altman analysis (Bland & Altman, 1986). In the case of no systematic error, the standard error of measurement ($SEM_{\text{agreement}}$) and smallest detectable change (SDC) were calculated; $SEM_{\text{agreement}} = \sqrt{(\sigma^2_o + \sigma^2_{\text{residual}})}$ and $SDC = 1.96 * \sqrt{2} * SEM_{\text{agreement}}$ (de Vet et al., 2011). If a systematic error was observed, 95% limits of agreement (LOA) was calculated using the formula described in Shimoi (2011).

Validity

The criterion validity was assessed by examining the correlation between the J-VLQAC and the J-VQ. A small-to-medium positive correlation, especially with the progress subscale, was expected. The construct validity was assessed by examining correlations between the J-VLQAC and measures that assess related constructs. Based on the report of the original version of the VLQAC (Romero-Moreno et al., 2017), small-to-medium negative correlations between the J-VLQAC and measures of caregiving stressors, cognitive fusion, experiential avoidance, depression and anxiety, and a small-to-medium positive correlation between the J-VLQAC and a measure of life satisfaction, were expected. The strength of the correlation was classified according to the following criteria: small ($r = .10$), medium ($r = .30$) and large ($r = .50$) (Cohen, 1998). The incremental validity was assessed through the hierarchical regression analysis examining whether the J-VLQAC score predicted depression, anxiety, and life satisfaction scores over and above the score of the J-VQ. The J-VQ was entered as the only independent variable in step 1, and the J-VLQAC was entered with the J-VQ in step 2. We expected a significant increase in predictive power in step 2 and that the J-VLQAC would be negatively associated with depression/anxiety and positively associated with life satisfaction. Due to large inter-factor correlations in both factor models, scores of each factor of the J-VLQAC were treated in a

separate regression model to avoid the potential issue of multicollinearity.

Results

Demographic characteristics

Most caregivers were male (62.19%) and the most common relationship to the care recipient was son (44.15%). The mean caregiving hours per week was 41.81 ± 35.95 hours and the mean caregiving duration was 64.47 ± 49.90 months. Most care recipients were female (69.48%) and had a clinical diagnosis of Alzheimer's disease (58.54%). Table 1 shows the sociodemographic data.

[Table 1 about here]

Factor structure

The result of the CFA showed a poor fit to the data (CFI = .79, TLI = .74, RMSEA = .14) for the original 2-factor model (Romero-Moreno et al., 2017). The KMO statistic was .87, and Bartlett's test of sphericity was significant ($\chi^2 = 2704.92$, $df = 66$, $p < .01$), indicating that performing the EFA was appropriate. The Kaiser-Guttman criterion suggested a 3-factor solution (eigenvalues = 5.20, 1.35, 1.02, 0.81, 0.76...) while MAP and PA-SMC95 suggested one and five factors respectively. Therefore, we compared the model fit of the 1-, 2-, and 3-factor solutions. After removing items that did not meet the item retention criteria, the 3-factor solution with two items removed, which accounted for 66.23% of the total variance, provided a better fit to the data (CFI = .95, TLI = .94, RMSEA = .08, AIC = 175.59, BIC = 273.47) when compared to the 1-factor solution with an item of "Religion/spirituality" removed (CFI = .79, TLI = .74, RMSEA = .15, AIC = 623.88, BIC = 717.51) or the 2-factor solution with an item of "Recreation, leisure and free time/hobbies" removed (CFI = .88, TLI = .85, RMSEA = .11, AIC = 365.83, BIC =

463.71)¹. In the 3-factor solution, the item “Marriage/couples/intimate relation” was excluded due to insufficient factor loading to Factor 1 (.36), and the item “Recreation, leisure and free time/hobbies” was excluded due to multiple factor loading to the Factor 1 (.41) and the Factor 2 (.40). The factor loadings of the 3-factor solution are presented in Table 2.

Factor 1 consisted of six items mainly related to aspects of caregivers’ own social life and was labeled *Commitment to Own Values*. Factor 2 was labelled *Commitment to Family Values* and comprised two items related to family relationships and caregiving. Factor 3, labelled *Commitment to Health Values*, comprised two items related to caregivers’ own health and self-care.

[Table 2 about here]

Reliability

The Cronbach’s alpha values of the original factor model were .86 for Factor 1 (*Commitment to Own Values*) and .68 for Factor 2 (*Commitment to Family Values*), and the model derived from the EFA in the current study (i.e., 3-factor model) ranged from .70 to .89 (Table 3). Sixty-four participants were considered outliers, and those data were excluded from the analysis of the ICC agreement and the absolute reliability². The remaining data from 360 participants were used for these analyses. The ICC agreement of the original factor model was .72 and .73 respectively, and the 3-factor model ranged from .65 to .74. The Bland-Altman analysis showed no systematic error in both factor models, except for Factor 1 (*Commitment to Own Values*) of the 3-factor model that showed proportional error ($r = .12, p = .022$) (Table 4). Therefore, LOA% was calculated for this factor³, and SEM and SDC were calculated for the remaining factors (Table 3). Descriptive statistics of the indicator variables are presented in Table 5.

[Table 3 about here]

[Table 4 about here]

[Table 5 about here]

Validity

Regarding the criterion validity, all subscale scores of the J-VLQAC had a significant small positive correlation with the subscale score of progress, but not with obstruction, of the J-VQ for both factor models (Table 6). As for the construct validity, all subscale scores of the J-VLQAC showed significant small negative correlations with the scores of cognitive fusion, but not with all subscale scores measuring experiential avoidance, for both factor models. There were variations in correlational patterns with other measures across the subscale of the J-VLQAC. In the original factor model, the scores of Factor 1 (*Commitment to Own Values*) showed significant small negative correlations with the scores of caregiving stressors and depression/anxiety as well as a small positive correlation with the scores of life satisfaction. Correlations between the scores of Factor 2 (*Commitment to Family Values*) and depression and life satisfaction were also significant but smaller. Meanwhile, in the 3-factor model, the scores of Factor 2 (*Commitment to Family Values*) and Factor 3 (*Commitment to Health Values*) showed significant small negative correlations with the scores of caregiving stressors and depression/anxiety while a small positive correlation was observed with the scores of life satisfaction only for the scores of Factor 3. The scores of Factor 1 (*Commitment to Own Values*) in the 3-factor model was significantly positively correlated with life satisfaction, but not with caregiving stressors and depression/anxiety.

Regarding the incremental validity, in the original factor model, the results of a series of hierarchical regression analyses showed a significant increment in the prediction only for

depression with the addition of Factor 1 (*Commitment to Own Values*) of the J-VLQAC, and the scores of Factor 1 was negatively associated with the scores of depression (Table 7). In the 3-factor model, a significant increment in the expected prediction of depression was observed for Factor 2 (*Commitment to Family Values*) and Factor 3 (*Commitment to Health Values*) and anxiety for Factor 3. There was no significant increment in predicting life satisfaction across all subscales of the J-VLQAC in both factor models.

[Table 6 about here]

[Table 7 about here]

Discussion

This study aimed to develop the Japanese version of the VLQAC and examine its psychometric properties. The CFA showed a poor fit to our data for the original 2-factor model (Romero-Moreno et al., 2017), while the EFA resulted in a new 3-factor model with acceptable model fit to our data. The results showed that both versions of the J-VLQAC had acceptable levels of internal consistency and moderate level of test-retest reliability. The examination of the validity of the scale provided similar expected results for both factor models, except for the relationship with experiential avoidance and the incremental validity in which the 3-factor model demonstrated better predictivity of depression and anxiety than the original factor model. These results provide preliminary evidence of good psychometric properties of the J-VLQAC.

In the 3-factor model, items included in Factor 1 (*Commitment to Own Values*) in the original factor model were divided into two factors: Factor 1 (*Commitment to Own Values*) and Factor 3 (*Commitment to Health Values*). In addition, the item “Parenting” which was included in Factor 2 (*Commitment to Family Values*) in the original factor model was highly loaded to Factor

1 in the 3-factor model. These results suggest that values related to participants' own health are seen as independent of values related to their own social life and family relationships among Japanese dementia caregivers. The results also suggested that parenting may be considered part of caregivers' own social life rather than family relationship among Japanese caregivers.

Parenting has been traditionally considered to be the mothers' responsibility in Japan and seen as a social obligation for female family members rather than a familial obligation shared among wider family members (Sekii et al., 1991; Nagai, 2020). This social recognition in Japan may have affected the results of the EFA.

The Cronbach's alpha values of the subscale scores were higher than .70 for both factor models, except for Factor 2 in the original factor model (.68). These Cronbach's alpha values were higher than those reported in the original study (Romero-Moreno et al., 2017) and met a standard of internal consistency ($\alpha \geq .70$, Barrett et al., 2019), indicating that the J-VLQAC has good internal consistency. The ICC values of the subscale scores were higher than .70 for both factor models, except for Factor 3 (.65) in the 3-factor model, indicating that the test-retest reliability of the J-VLQAC is moderate level according to Koo and Li (2016)' criteria and met an appropriate standard of reliability ($ICC \geq .70$, Barrett et al., 2019). Although the test-retest reliability was not reported in the original study (Romero-Moreno et al., 2017), given that value-based living relates to ongoing and dynamic patterns of various activities, fluctuations in consistency rating are expected in cases without specific intervention (Barrett et al., 2019; Wilson et al., 2010). Thus, the J-VLQAC has good test-retest reliability.

The SDC and LOA suggested that if there is a change in average scores over 23.80 points for Factor 1 and 31.71 points for Factor 2 of the original factor model, as well as over approximately 180% for Factor 1, over 44.83 points for Factor 2, and over 45.12 points for

Factor 3 of the 3-factor model, the change can be regarded as a true change. However, it should be noted that these results were obtained by including data from participants who rated the importance/consistency of some items as “0” since very few participants in this study gave a rating of 1 or over for the importance/consistency scales of all items. Excluding participants who rated “0” in any of the items in either Wave 1 or Wave 2 would make the analysis difficult⁴. Since the composite score of the J-VLQAC is obtained by multiplying the importance score and consistency score of each item, the difference in the composite scores between Wave 1 and Wave 2 tended to be large when, for example, a particular item was rated “0” in Wave 1 and over 1 point in Wave 2. Therefore, interpretation of the true change requires caution.

As expected, the correlation analyses demonstrated small positive correlations between the J-VLQAC and the progress subscale of the J-VQ in both factor models. Although there were some variations across the subscales, most of subscale scores of the J-VLQAC in both factor models were significantly correlated with scores of caregiving stressors, cognitive fusion, depression, anxiety, and life satisfaction in the expected direction with small magnitude. Contrary to our hypothesis, there was no significant correlation between scores of the J-VLQAC and experiential avoidance in both factor models. The original study (Romero-Moreno et al., 2017) reported small positive correlation between the scores of Factor 1 (*Commitment to Own Values*) and acceptance (theoretically opposite concept of experiential avoidance). This inconsistency in the findings could be due to the different scales used as the original study (Romero-Moreno et al., 2017) employed a measure of acceptance not specifically designed for dementia caregivers (i.e., the subscale of the Emotion Regulation Scale, Gratz & Roemer, 2004). Although further study is needed to explore this possibility, the results suggest that the J-VLQAC has sufficient criterion validity and acceptable level of construct validity.

The hierarchical regression analysis showed a significant increment in the prediction of depression with the addition of Factor 1 of the J-VLQAC, but not with the addition of Factor 2 for all dependent variables, for the original factor model. Meanwhile, although scores of Factor 1 did not increase explained variances for all dependent variables, the scores of Factor 2 significantly increased explained variances in depression and the scores of Factor 3 significantly increased those for depression and anxiety in the 3-factor model. However, there was no significant increment in the prediction of life satisfaction in both factor models. Relatively large regression coefficients of the progress subscale of the J-VQ on life satisfaction observed suggest that life satisfaction may be more closely related to commitment to personal values in general measured by the J-VQ than to commitment to each value domain measured by the J-VLQAC. These results suggest that the 3-factor model has better incremental validity than the original factor model and has an acceptable level of incremental validity.

Interestingly, Factor 1 of the 3-factor model (i.e., *Commitment to Own Values*) showed significant correlations with fewer variables than Factor 1 of the original factor model, and there was no significant increment of the prediction for all dependent variables in the hierarchical multiple regression analyses. However, Factor 3 of the 3-factor model (i.e., *Commitment to Health Values*) was consistently correlated with greater caregiving stressors/cognitive fusion and worse psychological well-being. Given that items included in Factor 1 and Factor 3 of the 3-factor model corresponded to the items included in Factor 1 of the original factor model, it is possible that commitment to caregivers' own health was more closely related to caregiving stress and psychological well-being than commitment to caregivers' own social life among Japanese family caregivers.

Taken together, both factor models provided similar results in terms of reliability and

criterion/construct validity. However, considering that the original factor model provided a poor fit to our data and had less incremental validity than the 3-factor model, it is recommended to use the new 3-factor model derived from the EFA with Japanese family caregivers in future research. It may still be useful to use all items of the J-VLQAC including two items excluded in the EFA in clinical practice if clinicians wish to identify the key areas of life their client values at the individual level.

One of the limitations of the VLQAC is that it does not allow us to determine which valued areas are more central to the caregiver than the others. Recently, an alternative measure has been developed to overcome such shortcoming of the VLQAC for dementia family caregivers (Vara-García et al., 2021) and future research evaluating various measures of values among family caregivers could provide further important implications.

Methodological limitations

There were some methodological limitations. First, this study was successful in recruiting a large number of young male caregivers, a population that is often understudied. This could be due to the recruitment strategy (i.e., the survey company) used. The findings need to be interpreted with caution as the majority of dementia family caregivers are female (72.08%) in their 50s to 70s in Japan (Alzheimer's Association Japan, 2022). These may have affected our results of the EFA, which contradicted with the results of the original study.

Second, given that the test-retest interval was short (i.e., two weeks), additional examination using a longer test-retest interval is needed. Third, since this study did not examine the responsiveness (Terwee et al., 2012) of the J-VLQAC, future research should assess this by examining whether the score of the J-VLQAC change through psychological intervention (e.g., ACT) for dementia family caregivers.

Conclusion

The J-VLQAC has good reliability and acceptable validity. There is emerging evidence that ACT may be effective for improving the psychological well-being of dementia family caregivers. However, fundamental research of ACT in the dementia caregiving context, especially studies exploring the role of commitment to personal values, is still limited. The development of the J-VLQAC is a crucial step for future research and the J-VLQAC will be a useful tool not only for research but also for clinical practice.

Clinical Implications

- The degree of commitment to personal values is associated with mental health outcomes in Japanese dementia family caregivers.
- The J-VLQAC has good psychometric properties and clinicians can use it to assess the degree of commitment to personal values in Japanese dementia family caregivers.
- The information gathered from the tool can be used to tailor psychological support and help Japanese caregivers engage in activities that reflect their personal values.

Footnote

1. Since the EFA using the maximum-likelihood method with two items removed (i.e., “Marriage/couples/intimate relation” and “Recreation, leisure and free time/hobbies”) provided improper solution for the 3-factor solution, we reported the results of the EFA using least-square method for this solution. This method does not output model fit indices and thus the model fit indices we reported for 1-, 2-, and 3-factor solutions were the results of CFA using the factor structure obtained by the EFA.
2. To examine the difference between outliers and participants included in the test-retest and absolute reliability test, in accordance with Goodman and Blum (1996), the multiple logistic regression analysis was conducted to explore which participants would considered as outlier ($n = 64$) and which would not ($n = 360$). We used five demographic variables (i.e., participants’ sex [0 = male and 1 = female] and age, caregiver status [0 = primary caregiver and 1 = secondary caregiver], hours per week spent caregiving, and time since becoming a caregiver) and all indicator variables in Wave 1 as explanatory variables. The subscale scores of the original factor model and 3-factor model of the J-EACQ were analysed in a separate model to avoid potential multicollinearity. Results were similar in the two models, and all models were not significant (the original factor model, $\chi^2 = 21.01$, $df = 17$, $p = .23$; the 3-factor model, $\chi^2 = 22.86$, $df = 18$, $p = .20$), while caregiving stressors was significant in all models (the original factor model, $OR = 2.96$, $z = 3.42$, $p < .01$, CI for $OR [1.59, 5.53]$; the 3-factor model, $OR = 2.87$, $z = 3.29$, $p < .01$, CI for $OR [1.53, 5.38]$) which suggests that participants with higher caregiving stressors were more likely to be considered as outlier. We also conducted the multiple logistic regression analysis to explore which participants would

respond to both two surveys ($n = 424$) and which would drop out ($n = 97$) in the same way. Results were similar in the two models, and all models were not significant (the original factor model, $\chi^2 = 18.88$, $df = 17$, $p = .34$; the 3-factor model, $\chi^2 = 21.24$, $df = 18$, $p = .27$), while life satisfaction was significant in all models (the original factor model, $OR = 1.40$, $z = 2.42$, $p = .02$, CI for OR [1.07, 1.84]; the 3-factor model, $OR = 1.39$, $z = 2.36$, $p = .02$, CI for OR [1.06, 1.84]) which suggests that participants with higher life satisfaction were more likely to drop out from the study. However, given that interpretation of the significance of each explanatory variable is not appropriate when the regression model is not significant, we concluded that there are no statistical differences between outliners and remaining participants included in the test-retest and absolute reliability test as well as between those completed both surveys and those who did not.

3. In accordance with Shimoi (2011), 95% LOA (%) was calculated using following formula;

$LOA (\%) = (\overline{\%d} - 1.96 * SD_{\%d}) + t * SE_{LOA} \sim (\overline{\%d} + 1.96 * SD_{\%d}) - t * SE_{LOA}$, where $\overline{\%d}$ means the mean of the difference of the scores (i.e., scores in Wave 2 minus those in Wave 1) divided by the mean of the scores (i.e., scores in Wave 1 and those in Wave 2) multiplied by 100, $SD_{\%d}$ means the standard deviations of $\overline{\%d}$, and $SE_{LOA} = \sqrt{(3SD_{\%d}^2/n)}$.

4. The number of participants who rated “0” on items of the J-VLQAC in Wave 1 was as follows; 45 for “Family relationships”, 193 for “Marriage/couples/intimate relation”, 338 for “Parenting”, 34 for “Caregiving of a family member with dementia”, 114 for “Friendships and social relations”, 192 for “Education, training, personal growth/development”, 176 for “Employment/professional life”, 112 for “Recreation, leisure and free time/hobbies”, 370 for

“Religion/spirituality”, 216 for “Citizenship/community life”, 60 for “Health/physical wellbeing”, and 69 for “Caring for myself”.

References

- Alzheimer's Association Japan. (2022). Ninchisyo no hito no kazoku no omoi to uketeiru shien ni kansuru zittai chousa [*Survey of the thought and support received among family caregivers of people with dementia*]. Retrieved from https://www.alzheimer.or.jp/wp-content/uploads/2022/03/202203_Kazokushien_Report.pdf
- Aust, F., Diedenhofen, B., Ullrich, S., & Musch, J. (2013). Seriousness checks are useful to improve data validity in online research. *Behavior Research Methods*, *45*(2), 527–535. <https://doi.org/10.3758/s13428-012-0265-2>
- Barrett, K., O'Connor, M., & McHugh, L. (2019). A systematic review of values-based psychometric tools within acceptance and commitment therapy (ACT). *The Psychological Record*, *69*(4), 457-485. <https://doi.org/10.1007/s40732-019-00352-7>
- Bland, J. M., & Altman, D. G. (1986). Statistical methods for assessing agreement between two methods of clinical measurement. *The lancet*, *327*(8476), 307-310. [https://doi.org/10.1016/S0140-6736\(86\)90837-8](https://doi.org/10.1016/S0140-6736(86)90837-8)
- Cheng, S. T., Li, K. K., Losada, A., Zhang, F., Au, A., Thompson, L. W., & Gallagher-Thompson, D. (2020). The effectiveness of nonpharmacological interventions for informal dementia caregivers: An updated systematic review and meta-analysis. *Psychology and Aging*, *35*(1), 55-77. <https://doi.org/10.1037/pag0000401>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Routledge.
- Collins, R. N., & Kishita, N. (2019). The effectiveness of mindfulness- and acceptance-based interventions for informal caregivers of people with dementia: A meta-analysis. *The Gerontologist*, *59*(4), e363-e379. <https://doi.org/10.1093/geront/gny024>
- Collins, R. N., & Kishita, N. (2020). Prevalence of depression and burden among informal

caregivers of people with dementia. *Ageing and Society*, 40(11), 2355-2392.

<https://doi.org/10.1017/S0144686X19000527>

Connell, C. M., Janevic, M. R., & Gallant, M. P. (2001). The costs of caring: Impact of dementia on family caregivers. *Journal of Geriatric Psychiatry and Neurology*, 14(4), 179–187.

<https://doi.org/10.1177/089198870101400403>

de Vet, H. C., Terwee, C. B., Mokkink, L. B., & Knol, D. L. (2011). *Measurement in medicine: A practical guide*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511996214>

Doi, S., Sakano, A., Muto, T., & Sakano, Y. (2017). Reliability and validity of a Japanese version of the valuing questionnaire (VQ). *Japanese Journal of Behavior Therapy*, 43(1), 83-94.

<https://doi.org/10.24468/jjbt.16-170>

Feast, A., Moniz-Cook, E., Stoner, C., Charlesworth, G., & Orrell, M. (2016). A systematic review of the relationship between behavioral and psychological symptoms (BPSD) and caregiver well-being. *International psychogeriatrics*, 28(11), 1761-1774.

<https://doi.org/10.1017/S1041610216000922>

Flansbjer, U. B., Holmbäck, A. M., Downham, D., Patten, C., & Lexell, J. (2005). Reliability of gait performance tests in men and women with hemiparesis after stroke. *Journal of rehabilitation medicine*, 37(2), 75-82. <https://doi.org/10.1080/16501970410017215>

Gallego-Alberto, L., Losada, A., Márquez-González, M., Romero-Moreno, R., & Vara, C. (2017). Commitment to personal values and guilt feelings in dementia caregivers.

International psychogeriatrics, 29(1), 57-65. <https://doi.org/10.1017/S1041610216001393>

Goodman, J. S., & Blum, T. C. (1996). Assessing the non-random sampling effects of subject attrition in longitudinal research. *Journal of Management*, 22, 627-652.

<https://doi.org/10.1177/014920639602200405>

- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of psychopathology and behavioral assessment*, 26(1), 41-54. <https://doi.org/10.1023/B:JOBA.00000007455.08539.94>
- Hayes, S. C., Pistorello, J., & Levin, M. E. (2012). Acceptance and commitment therapy as a unified model of behavior change. *The Counseling Psychologist*, 40(7), 976–1002. <https://doi.org/10.1177/0011000012460836>
- Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, 30(2), 179–185. <https://doi.org/10.1007/BF02289447>
- Hu, L., & Bentler, P. M. (1999) Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55. <https://doi.org/10.1080/10705519909540118>
- Kaddour, L., & Kishita, N. (2020). Anxiety in informal dementia caregivers: A meta-analysis of prevalence. *Journal of Geriatric Psychiatry and Neurology*, 33(3), 161–172. <https://doi.org/10.1177/0891988719868313>
- Kishita, N., Contreras, M. L., West, J., & Mioshi, E. (2020). Exploring the impact of carer stressors and psychological inflexibility on depression and anxiety in family carers of people with dementia. *Journal of Contextual Behavioral Science*, 17, 119-125. <https://doi.org/10.1016/j.jcbs.2020.07.005>
- Koo, T. K., & Li, M. Y. (2016). A Guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, 15(2), 155-163. <https://doi.org/10.1016/j.jcm.2016.02.012>
- Losada, A., Márquez-González, M., Knight, B. G., Yanguas, J., Sayegh, P., & Romero-Moreno,

- R. (2010). Psychosocial factors and caregivers' distress: Effects of familism and dysfunctional thoughts. *Aging & Mental Health, 14*(2), 193–202.
<https://doi.org/10.1080/13607860903167838>
- Lundgren, T., Luoma, J. B., Dahl, J., Strosahl, K., & Melin, L. (2012). The bull's-eye values survey: A psychometric evaluation. *Cognitive & Behavioral Practice, 9*(4), 518–526.
<https://doi.org/10.1016/j.cbpra.2012.01.004>
- Muramatsu, K., Kamijima, K., Yoshida, M., Otsubo, T., Miyaoka, H., Muramatsu, Y., & Gejyo, F. (2007). The patient health questionnaire, Japanese version: Validity according to the mini-international neuropsychiatric interview–plus. *Psychological reports, 101*(3), 952-960.
<https://doi.org/10.2466/pr0.101.3.952-960>
- Muramatsu, K., Muramatsu, Y., Miyaoka, H., Fuse, K., Yoshimine, F., Hosaka, M., ... & Kutsumi, R. (2009, September 23-26). *Validation and utility of a Japanese version of the GAD-7*. 20th World Congress on Psychosomatic Medicine, Torino, Italy.
- Morimoto, H., Kishita, N., Kondo, H., Tanaka, N., Abe, Y., & Muto, T. (2021). *Reliability and validity of the Japanese version of the Experiential Avoidance in Caregiving Questionnaire (EACQ)* [Manuscript submitted for publication]. Faculty of Psychology, Meiji Gakuin University.
- Morimoto, H., & Nomura, N. (2022). A group-based cognitive behavioral therapy program for family caregivers of people with dementia: Feasibility and preliminary outcomes. *Japanese Journal of Clinical Geropsychology, 3*, 8-20.
- Muto, T. (2015). Acceptance and Commitment Therapy (ACT) for reducing distress and enhancing quality-of-life in a male caregiver of elderly spouse with dementia: An evidence-based practice in psychology. *Doshisha Clinical Psychology: Therapy and Research, 5*, 3-

33.

Nagai, A. (2020). Marital relationships concerning housework and work. *The Japanese Journal of Labour Studies*, 719, 38-45.

Niina, R., Yatomi, N., & Homma, A. (1992). The relationship between burdens and stress symptoms of family caregivers of the demented elderly. *Japanese Journal of Psychosomatic Medicine*, 32(4), 323–329. https://doi.org/10.15064/jjpm.32.4_323

O’connor, B.P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer’s MAP test. *Behavior Research Methods, Instruments, & Computers*, 32(3), 396–402. <https://doi.org/10.3758/BF03200807>

Romero-Moreno, R., Gallego-Alberto, L., Márquez-González, M., & Losada, A. (2017).

Psychometric properties of the valued living questionnaire adapted to dementia caregiving. *Aging & mental health*, 21(9), 983-990. <https://doi.org/10.1080/13607863.2016.1191055>

Romero-Moreno, R., Losada, A., Márquez-González, M., & Mausbach, B. T. (2016). Stressors and anxiety in dementia caregiving: multiple mediation analysis of rumination, experiential avoidance, and leisure. *International Psychogeriatrics*, 28(11), 1835-1844.

<https://doi.org/10.1017/S1041610216001009>

Sekii, T., Onode, S., Matsuda, T., & Yamane M. (1991). Gender orientations and informal networks in child care among working mothers with nursery school children. *Japanese Journal of Family Sociology*, 3(3), 72-84. <https://doi.org/10.4234/jjoffamilysociology.3.72>

Shima, T., Kawai, T., Yanagihara, M., & Kumano, H. (2016). Validation of the Japanese version of the cognitive fusion questionnaire: The 13-item content revised version and the 7-item version. *Japanese Journal of Behavior Therapy*, 42(1), 73-83.

https://doi.org/10.24468/jjbt.42.1_73

- Shimoi, T. (2011). The absolute reliability of evaluation. *Rigakuryoho Kagaku*, 26(3), 451-461.
<https://doi.org/10.1589/rika.26.451>
- Smout, M., Davies, M., Burns, N., & Christie, A. (2014). Development of the valuing questionnaire (VQ). *Journal of Contextual Behavioral Science*, 3(3), 164-172.
<https://doi.org/10.1016/j.jcbs.2014.06.001>
- Sumino, Z. (2014, September 28-30). *Zinsei ni taisuru manzoksyakudo (the Satisfaction With Life Scale [SWLS]) nihongoban sakusei no kokoromi [Development of the Japanese version of the Satisfaction With Life Scale]* [Paper presentation]. Annual convention of the Japanese Association of Educational Psychology, Kyoto, Japan.
https://doi.org/10.20587/pamjaep.36.0_192
- Terwee, C. B., Mokkink, L. B., Knol, D. L., Ostelo, R. W. J. G., Bouter, L. M., & de Vet, H. C. W. (2012). Rating the methodological quality in systematic reviews of studies on measurement properties: A scoring system for the COSMIN checklist. *Quality of Life Research*, 21(4), 651-657. <https://doi.org/10.1007/s11136-011-9960-1>
- Vara-García, C., Romero-Moreno, R., Barrera-Caballero, S., Pedroso-Chaparro, M. D. S., Cabrera, I., Márquez-González, M., Olazarán, J., & Losada, A. (2021). Personal values profiles in dementia family caregivers: Their association with ambivalent feelings and anxious and depressive symptoms. *Aging & Mental Health*, 25, 2160-2168.
<https://doi.org/10.1080/13607863.2020.1821169>
- Wild, D., Grove, A., Martin, M., Eremenco, S., McElroy, S., Verjee-Lorenz, A., Erikson, P. (2005). Principles of good practice for the translation and cultural adaptation process for patient-reported outcomes (PRO) measures: Report of the ISPOR task force for translation and cultural adaptation. *Value in Health*, 8(2), 94-104. <https://doi.org/10.1111/j.1524->

4733.2005.04054.x

Wilson, K. G., Sandoz, E. K., Kitchens, J., & Roberts, M. (2010). The Valued Living Questionnaire: Defining and measuring valued action within a behavioral framework. *The Psychological Record*, 60(2), 249-272. <https://doi.org/10.1007/BF03395706>

Table 1

Sociodemographic characteristics of participants and their care recipients at Wave 1

Caregiver	<i>n / M</i>	<i>% / SD</i>	Care recipient	<i>n / M</i>	<i>% / SD</i>
Sex			Sex		
Male	324	62.19	Male	159	30.52
Female	197	37.81	Female	362	69.48
Age (years)	54.38	9.66	Age (years)	82.35	13.17
Marital status			Type of dementia		
Unmarried	225	43.19	Alzheimer's disease	305	58.54
Married living with the spouse	220	42.23	Vascular dementia	60	11.52
Married not living with the spouse	11	2.11	Frontotemporal dementia	11	2.11
Divorced	54	10.36	Dementia with Lewy bodies	46	8.83
Bereaved	11	2.11	Others	99	19.00
Caregiver status			Approved levels of care under LTCI		
Primary caregiver	426	81.77	Not using public LTCI	8	1.54
Secondary caregiver	95	18.23	Requiring help 1	7	1.34
Relationship to the care recipient			Requiring help 2	15	2.88
Wife	23	4.41	Long-term care level 1	108	20.73
Husband	14	2.69	Long-term care level 2	104	19.96
Daughter	119	22.84	Long-term care level 3	125	23.99
Son	230	44.15	Long-term care level 4	96	18.43
Daughter-in-law	35	6.72	Long-term care level 5	58	11.13
Son-in-law	8	1.54			
Others	92	17.66			
Hours per week spent caregiving	41.81	35.95			
Time since becoming a caregiver (months)	64.47	49.90			
Occupation					
Not working	207	39.73			
Office worker	84	16.12			
Executive officer	54	10.36			
Government worker	16	3.07			
Self-employed worker	45	8.64			
Specialist job	37	7.10			
Part-time job	44	8.45			
Others	34	6.53			
Employment status					
Full-time	244	46.83			
Part-time	70	13.44			

Note. LTCI = long-term care insurance.

Table 2

Factor structure of the J-VLQAC

Item	CFA (Original factor model)		EFA			h^2
	Factor 1	Factor 2	Factor 1	Factor 2	Factor 3	
Family relationships		.73	-.05	.71	.11	.57
Marriage/couples/intimate relation		.67				
Parenting		.46	.46	.02	-.01	.22
Caregiving of a family member with dementia		.52	-.22	.79	.02	.48
Friendships and social relations	.76		.57	.33	-.02	.64
Education, training, personal growth/development	.72		.79	.07	-.04	.67
Employment/professional life	.62		.43	.34	-.06	.43
Recreation, leisure and free time/hobbies	.64					
Religion/spirituality	.34		.59	-.28	.06	.24
Citizenship/community life	.58		.70	-.15	.10	.46
Health/physical wellbeing	.78		-.03	.09	.93	.95
Caring for myself	.76		.13	.02	.74	.69
	Model fit					
CFI	.79		.95			
TLI	.74		.94			
RMSEA	.14		.08			
	Interfactor correlations					
Factor 1	—		—			
Factor 2	.83	—	.61	—		
Factor 3			.57	.64	—	

Note. Numbers in bold in each column represent items clustered to the corresponding factor. J-

VLQAC = Japanese version of the valued living questionnaire adapted to caregiving, CFA =

confirmatory factor analysis, EFA = explanatory factor analysis, CFI = comparative fit index,

TLI = Tucker-Lewis index, RMSEA = root mean square error of approximation.

Table 3

Reliability and measurement error of the J- VLQAC

Variables	α	ICC _{agreement} (95% CI)	SEM _{agreement}	SDC	95% LOA (%)
Original factor model					
Factor 1: COV	.86	.72 (.66, .76)	8.59	23.80	—
Factor 2: CFV	.68	.73 (.67, .77)	11.44	31.71	—
Exploratory factor analysis					
Factor 1: COV	.79	.74 (.68, .78)	—	—	-181.75, 183.72
Factor 2: CFV	.70	.72 (.66, .76)	16.17	44.83	—
Factor 3: CHV	.89	.65 (.59, .71)	16.28	45.12	—

Note. J-VLQAC = Japanese version of the valued living questionnaire adapted to caregiving, ICC

= intraclass correlation coefficient, CI = confidence interval, SEM = standard error of measurement,

SDC = smallest detectable change, LOA = limits of agreement, COV = commitment to own values,

CFV = commitment to family values, CHV = commitment to health values.

Table 4

The results of Bland-Altman analysis of the J- VLQAC

Variables	\bar{d}	Fixed error 95% CI		Proportional error r	
Original factor model					
Factor 1: COV	-0.13	-1.39, 1.13	No	.07	No
Factor 2: CFV	-1.06	-2.74, 0.61	No	-.01	No
Exploratory factor analysis					
Factor 1: COV	0.34	-0.75, 1.43	No	.12 *	Yes
Factor 2: CFV	-1.82	-4.19, 0.55	No	-.07	No
Factor 3: CHV	-0.47	-2.86, 1.92	No	.02	No

Note. \bar{d} means the mean difference in the scores of Wave 1 and Wave 2 (i.e., Wave 2 minus Wave

1). r represents correlations between the difference in the scores of Wave 1 and Wave 2 and the mean between the scores of Wave 1 and Wave 2. J-VLQAC = Japanese version of the valued living questionnaire adapted to caregiving, CI = confidence interval, COV = commitment to own values, CFV = commitment to family values, CHV = commitment to health values.

* $p < .05$.

Table 5

Descriptive statistics of the indicator variables

Variables	Range	Wave 1 (<i>n</i> = 521)		Wave 2 (<i>n</i> = 360)	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Commitment to personal values					
J-VLQAC: original factor model					
Factor 1: COV	0–100	20.39	18.06	20.23	15.70
Factor 2: CFV	0–100	32.67	23.75	33.27	21.94
J-VLQAC: exploratory factor analysis					
Factor 1: COV	0–100	14.56	16.29	13.92	13.85
Factor 2: CFV	0–100	46.28	31.78	48.18	31.08
Factor 3: CHV	0–100	34.20	30.24	34.31	27.51
J-VQ					
Obstruction	0–6	2.83	1.10		
Progress	0–6	2.54	1.32		
Caregiving stressors	0–3	1.65	0.63		
Cognitive fusion	1–7	2.94	1.51		
Experiential avoidance					
Active avoidant behavior	1–5	2.69	0.80		
Intolerance of negative thoughts and emotions towards the relative	1–5	2.60	0.77		
Apprehension concerning negative internal experiences related to caregiving	1–5	2.83	0.78		
Depression	0–3	0.99	0.84		
Anxiety	0–3	1.01	0.89		
Life satisfaction	1–6	2.66	1.16		

Note. J-VLQAC = Japanese version of the valued living questionnaire adapted to caregiving,

COV = commitment to own values, CFV = commitment to family values, CHV = commitment to health values, J-VQ = Japanese version of the valuing questionnaire.

Table 6

Zero-order correlations between J-VLQAC and other variables

Variables	J-VLQAC					
	Original factor model		EFA		Factor 3:	
	Factor 1: COV	Factor 2: CFV	Factor 1: COV	Factor 2: CFV	CHV	
Valuing questionnaire						
Obstruction	-.06	.03	-.07	.06	-.01	
Progress	.27 **	.19 **	.23 **	.16 **	.22 **	
Caregiving stressors	-.09 *	-.03	.00	-.09 *	-.14 **	
Cognitive fusion	-.18 **	-.09 *	-.10 *	-.10 *	-.19 **	
Experiential avoidance						
Active avoidant behavior	-.04	.05	-.02	.05	-.02	
Intolerance of negative thoughts and emotions towards the relative	-.06	.02	-.05	.03	-.05	
Apprehension concerning negative internal experiences related to caregiving	-.09	.01	-.08	.03	-.03	
Depression	-.19 **	-.11 **	-.08	-.13 **	-.24 **	
Anxiety	-.14 **	-.06	-.04	-.10 *	-.18 **	
Life satisfaction	.19 **	.13 **	.16 **	.07	.18 **	

Note. J-VLQAC = Japanese version of the valued living questionnaire adapted to caregiving,

EFA = exploratory factor analysis, COV = commitment to own values, CFV = commitment to family values, CHV = commitment to health values.

** $p < .01$, * $p < .05$.

Table 7

Incremental validity of the J-VLQAC above the VQ

	Depression		Anxiety		Life satisfaction	
	ΔR^2	β	ΔR^2	β	ΔR^2	β
Original factor model						
Step 1: Obstruction of J-VQ	.17 **	.31 **	.13 **	.29 **	.41 **	-.17 **
Progress of J-VQ		-.31 **		-.25 **		.65 **
Step 2: Factor 1 (COV) of J-VLQAC	.01 *	-.09 *	.00	-.05	.00	.01
Step 1: Obstruction of J-VQ	.17 **	.32 **	.13 **	.30 **	.41 **	-.17 **
Progress of J-VQ		-.32 **		-.26 **		.65 **
Step 2: Factor 2 (CFV) of J-VLQAC	.00	-.06	.00	-.02	.00	.01
Exploratory factor analysis						
Step 1: Obstruction of J-VQ	.17 **	.32 **	.13 **	.31 **	.41 **	-.17 **
Progress of J-VQ		-.34 **		-.28 **		.66 **
Step 2: Factor 1 (COV) of J-VLQAC	.00	.02	.00	.04	.00	-.01
Step 1: Obstruction of J-VQ	.17 **	.32 **	.13 **	.30 **	.41 **	-.17 **
Progress of J-VQ		-.32 **		-.25 **		.66 **
Step 2: Factor 2 (CFV) of J-VLQAC	.01 *	-.10 *	.01	-.07	.00	-.03
Step 1: Obstruction of J-VQ	.17 **	.31 **	.13 **	.29 **	.41 **	-.16 **
Progress of J-VQ		-.30 **		-.24 **		.65 **
Step 2: Factor 3 (CHV) of J-VLQAC	.03 **	-.17 **	.02 **	-.13 **	.00	.03

Note. J-VLQAC = Japanese version of the valued living questionnaire adapted to caregiving, J-VQ = Japanese version of the valuing

questionnaire, COV = commitment to own values, CFV = commitment to family values, CHV = commitment to health values.

** $p < .01$, * $p < .05$.