

## **DEVELOPMENT OF THE GEROTRASCENDENCE SCALE TYPE 2: JAPANESE VERSION\*†**

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### **ABSTRACT**

This study developed the Japanese version of the Gerotranscendence Scale Type 2 (the GST2) and examined reliability and validity of the scale. In Japan, 525 community-dwelling older adults (Male = 260, Female = 265) answered a questionnaire. An exploratory factor analysis of the Japanese version of the GST2 revealed the same three-factor structure including the Dimensions of the Cosmic, the Coherence, and the Solitude, which had been reported by Tornstam with the omission of item 1. Reliability and construct validity of the Japanese version of the GST2 were confirmed. These findings provide support for use of the Japanese version of the GST2 as a measure of lifespan development among the oldest old in Japan. The GST2 can be applicable not only for older adults in Sweden but also for older adults in Japan.

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The percentage of older adults of the total population was 13% in the United States, 18% in Sweden, and 23% in Japan in 2010 (World Bank, 2012). Life expectancy at birth was 79 years in the United States, 82 years in Sweden, and 84 years in Japan in 2011 (United Nations, 2012). In global super-aging societies, the oldest old populations, whose ages are 85 years and older, will be expected to grow and will need more social services and health care in the near future (Edebalk, 2010). Researchers are expected to discuss the theoretical basis of lifespan development among the oldest old including gerotranscendence (Tornstam, 1989, 2005) and to assess their lifespan development by using scales with psychometric properties in different sociocultural contexts. This study developed the Japanese version of the Gerotranscendence Scale Type 2 (Tornstam, 1997a, 1997b, 2005) and examined the reliability and validity of the scale to evaluate gerotranscendence as lifespan development among the oldest old.

Zarit (1980) reviews how researchers have given meanings to aging and how older adults have viewed physical, social, and psychological declines. In the disengagement theory, Cumming and Henry (1961) propose interactions of disengagement between individuals and societies since the late middle age. Cumming and Henry (1961) regard these processes as adaptive, by making older adults exit from their social roles before they have serious health problems and other decrements in functioning. On the other hand, the activity theory suggests that maintaining a high level of activities can lead to good adaptation in later life. Moreover, the continuity theory addresses consistency of older adults' activity levels in later life, which reflects their earlier developmental stages. The continuity theory reports that consistency is associated with good adaptation, regardless of high or low activity levels (Neugarten, 1968).

In psychosocial development theory, Erikson and Erikson (1997) set up integrity versus despair as a psychosocial crisis in the eighth developmental stage. "This (integrity) in its simplest meaning is, of course, a sense of *coherence* and *wholeness* that is, no doubt, at supreme risk under such terminal conditions as include *a loss of linkages* in all three organizing processes; in the Soma, the pervasive weakening of tonic interplay in connecting tissues, blood-distributing vessels, and muscle system; in the Psyche, the gradual loss of mnemonic coherence in experience, past and present; and in the Ethos, the threat of a sudden and nearly total loss of responsible function in generative interplay" (Erikson & Erikson, 1997, pp. 64-65).

With regard to adjustments to physical, social, and psychological declines among older adults, Baltes and Baltes (1990) and Baltes (1997) define selective optimization with compensation, which can clarify how older adults adjust to aging. Older adults select suitable ranges of their commitments to social life and skills, and compensate for their physical, social, and psychological declines by comparing with their past. They also optimize their knowledge and skills so that they can adapt to aging, with minor changes in how to complete their daily tasks.

Also, Baltes and Smith (1990) report that virtue of older adults' everyday wisdom can be created throughout their lifespan development, and that they can develop their attitudes toward acceptances of lives and deaths via virtue.

### **LIFESPAN DEVELOPMENT AMONG THE OLDEST OLD**

Erikson and Erikson (1997) propose transcendence as the ninth stage of psychosocial development and suggest that the term of gerotranscendence has not been specified as clearly as possible. "With great satisfaction I have found that 'transcendence' becomes very much alive if it is activated into '*transcendence*,' which speaks to soul and body and challenges it to rise above the dystonic, clinging aspects of our worldly existence that burden and distract us from true growth and aspiration. To reach for gerotranscendence is to rise above, exceed, outdo, go beyond, independent of the universe and time. It involves surpassing all human knowledge and experience. . . . Transcendence need not be limited solely to experiences of withdrawal. In touching, we make contact with one another and with our planet. Transcendence may be a regaining of lost skills, including play, activity, joy, and song, and, above all, a major leap above and beyond the fear of death" (Erikson & Erikson, 1997, p. 127). However, the concept of transcendence is not further clarified and is not based on empirical studies and data analyses among the oldest old.

On the other hand, Tornstam (1989, 2005) first defines the concept of gerotranscendence based on literature reviews (Cumming & Henry, 1961; Erikson, 1950, 1982; Jung, 1930) and tries to integrate Eastern philosophy (e.g., Zen Buddhism) with Western philosophy (e.g., Fromm, 1960). The primary concept of gerotranscendence includes the following eight components:

1. An increasing feeling of cosmic communication with the spirit of the universe;
2. A redefinition of the perception of time, space, and objects;
3. A redefinition of the perception of life and death, and a decrease in the fear of death;
4. An increased feeling of affinity with past and coming generations;
5. A decrease in interests in superfluous social interaction;
6. A decrease in interests in material things;
7. A decrease in self-centeredness; and
8. An increase in meditation.

Second, Tornstam (1996a, 1996b, 1997a, 1997b) conducts interviews in Sweden and asks the participants about the Cosmic Dimension, the Dimension of the Self, and the Dimension of Social and Personal Relationships. The qualitative data analysis ( $N = 50$ , the age range = 52-97 years old) reveals the subcategories of each dimension. The Cosmic Dimension includes Time and

childhood, Connection to earlier generations, Life and death, Mystery in life, and Rejoining. The Dimension of the Self consists of Self-confrontation, Decrease of self-centeredness, Development of body-transcendence, Self-transcendence, and Ego-integrity. The Dimension of Social and Personal Relationships is comprised of Changed meaning and importance of relations, Role playing, Emancipated innocence, Modern asceticism, and Everyday wisdom.

### **Gerotranscendence Scales in Europe and the United States**

Tornstam (1994) develops Gerotranscendence Scale Type 1 (the GST1) and conducts a questionnaire survey among Danish ( $N = 912$ , 74-100 years old). An explanatory factor analysis finds two factors including the Cosmic Transcendence and the Ego Transcendence. The Cosmic Transcendence (six items) is Cronbach's coefficient alpha = .81, and the Ego Transcendence (four items) is alpha = .75. Since the instruction asks the participants to compare their current lives with their past states when they were 50 years old, such a retrospective method has been criticized.

Next, Tornstam (1997a, 1997b) develops the original Swedish scale of the Gerotranscendence Scale Type 2 (the GST2) and implements the questionnaire surveys in 1995 ( $N = 2,002$ , 20-85 years old) and in 2001 ( $N = 1,771$ , 65-104 years old). Both explanatory factor analyses reveal the same factor structure, although the factor loadings are slightly different. These factors of the 1995 survey include the Cosmic Dimension (five items), the Coherence Dimension (two items), and the Solitude Dimension (three items), while the factors of the 2001 survey are named as the Cosmic Transcendence, the Coherence, and the Solitude. With regard to the correspondence to his qualitative study (Tornstam, 1989, 2005), the Cosmic Dimension reflects transcendence of time, space and objects, and the Coherence Dimension is derived from ego integrity. The Solitude Dimension is similar to the changed meaning and importance of relations. These contents of the subscales reflect the theoretical definitions based on a qualitative data analysis, and content construct validity is confirmed. As for alpha values of a scalability test, the Cosmic is alpha = .73, the Coherence is alpha = .57, and the Solitude is alpha = .60. Reliability of the GST2 is relatively confirmed, although alpha values of the Coherence and the Solitude should continue to be examined.

According to Cozort (2008), Braam, Bransen, van Tilburg, van der Ploeg, and Degg (2006) revise the Cosmic Transcendence of the GST1 and implement the scale in Dutch for 1,055 older adults in the Netherlands. As a result, the relationships between the Cosmic Transcendence and a sense of meaning in life are stronger among people who are less likely to participate in religious activities.

On the other hand, in the United States, Atchley (1999) revises the English version of the GST2 from 10 items to six items in the 1995 Ohio Longitudinal Study of Aging and Adaptation. Older adults, whose ages are 70 years and older, have difficulties in understanding changed perception of time and space, and the boundary between life and death in their focus groups. After his omission of these items, a factor analysis shows two dimensions including the Gerotranscendence and the Present-moment Orientation. The Gerotranscendence (three items) is Cronbach's coefficient alpha = .66, and the Present-moment Orientation (three items) is alpha = .48. Therefore, the reliability of the scale is not established. Also, the relationship between gerotranscendence and religious commitments is stronger among people who are likely to participate in religious activities, in which the result is opposite to Braam et al. (2006).

### Gerotranscendence Scales in Asia

Wang (2005, 2011) develops the Mandarin version of the GST2, by translating it from English into Mandarin, and 195 older adults (age = 65 years old) answer a questionnaire in nursing homes, assisted living facilities, and a veteran's care home in Taiwan. A confirmatory factor analysis reveals that a two-factor structure is more suitable than a three-factor structure that Tornstam (1997a, 1997b, 2005) reported. The Cosmic Transcendence (five items) is Cronbach's coefficient alpha = .64, and the Coherence (two items) is alpha = .75. The Solitude Dimension is not created with omissions of three relevant items. As for construct validity, Wang (2011) does not examine the relationships between the Mandarin version of the GST2 and other relevant scales concerning depression, life satisfaction, life meaning, and social support. Also, this sample includes only institutionalized older adults with a limited age range, while samples of prior studies are community-dwelling older adults from old age to later life.

Regarding the Japanese version of the GST2, Ishihara and Osada (2011) translate the English version of the GST2 from English into Japanese and conduct a questionnaire survey ( $N = 203$ , the mean age = 66.3 years old,  $SD = 4.2$ ) in Japan. A confirmatory factor analysis does not confirm a model fit to a three-factor structure that Tornstam (1997a, 1997b, 2005) originally reported. Ishihara and Osada (2011) do not create three subscales and examine relationships between only the Cosmic Dimension, PGC Morale Scale (Lawton, 1975; Koyano, Shibata, Haga, & Suyama, 1989), and participants' social characteristics. None of Cronbach's coefficient alphas is indicated. Main reasons of their results are derived from issues of psychological measure development and translation accuracy, because Ishihara and Osada (2011) translate the English version of the GST2 from English into Japanese and do not translate the original Swedish scale of the GST2 from Swedish into Japanese. Also, they do not refer to the detail

measure development procedure including a bilingual researcher's role and the back-translation proceeding. The other reason is considered as their participants' cohorts also include people in their early sixties.

Masui et al. (2010) developed their original Japanese Gerotranscendence Scale to evaluate specific trends of psychosocial development among the oldest old in Japan. At first, in-person interviews with older adults ( $N = 20$ , 81-106 years old) are conducted based on the interview guideline (Tornstam, 1997a), and 13 categories are selected from the data analysis. Masui and her colleagues (2010) develop the Japanese Gerotranscendence Scale of 41 items and implement a questionnaire survey by in-person interviews with older adults ( $N = 155$ , 85-99 years old) and mail surveys with older adults ( $N = 345$ , 65-92 years old) in Tokyo.

An explanatory factor analysis finds an eight-factor structure with the omission of 12 items, and each subscale includes three or four items. Appreciation to others is Cronbach's coefficient alpha = .72, Introversion is alpha = .57, Transcendence from dualism is alpha = .57, Religious/Spiritual attitudes is alpha = .60, Freedom from social selves is alpha = .53, Basic security is alpha = .53, Altruism is alpha = .50, and Acceptance realities is alpha = .46. Reliability of the scale is not confirmed because of each lower Cronbach's coefficient alpha. Conceptual construct validity is referred to the relationships between the original concepts (Tornstam, 1997a), 13 categories and eight subscales of Masui and her colleagues (2010). However, relationships with other relevant scales are not indicated, although a questionnaire consists of the scales concerning depression and morale. Nakagawa, Masui, Kureta, Takahashi, and Gondo (2011) suggest that researchers should develop the scale with the reliability and validity that can clarify psychosocial development among the oldest old according to the empirical data analyses based on a new theoretical framework.

Summarizing these theoretical reviews of aging from old age to later life, researchers need to create a new theoretical framework that can address psychosocial development among the oldest old with a different perspective. Although a perspective of progressive aging is dominant in the United States and parts of Europe, Asian countries have long considered that aging is a natural process among human beings, and that Asians accept physical, social, and psychological declines more than most Americans and Europeans. Also, appropriate measures with psychometric properties should be developed to assess lifespan development among the oldest old in diverse countries. In particular, it is better to translate with accuracy the original scale of the GST2 from Swedish into Japanese in order to reflect its contents and sociocultural contexts in Sweden as well as integration of Western and Eastern philosophies. Researchers also need to reexamine a factor structure of the GST2 and to improve reliability of the scale, such as internal consistency of the Dimensions of Coherence and Solitude.

## Present Study

Taking the above issues into consideration, this is the first study to develop the Japanese version of the GST2 by translating the original scale of the GST2 from Swedish into Japanese. This study also examined reliability and validity of the scale among older adults in Japan. We regard gerotranscendence as a positive human development among the oldest old and consider that gerotranscendence can give new meanings to aging when healthy people try to accept their declines, future health problems, and potential disabilities. In terms of this concept, we can make great progress to understand how older adults' view changes and address psychological ways to adjust to physical, social, and psychological declines.

## METHODS

### Participants

The participants were 525 community-dwelling older adults in the central region of Japan. This sample consisted of two groups including 502 older adults at the Senior Citizen College in Nagoya City, and 23 older adults of each community lifelong learning institute in Aichi, Gifu, and Shizuoka Prefectures. At the Senior Citizen College, teachers asked 1,123 older adults to participate in an international research project on lifespan development among older adults in each meeting of the first- and second-year students. Five hundred seventy-three older adults who agreed to participate in the survey answered a questionnaire and returned their written questionnaires by mail to the first author. However, the questionnaires of 48 respondents were excluded because of more than one-third missing items of one scale.

As another resource, the first author asked students in her course at a university in Shizuoka Prefecture to invite their grandparents to participate in an international project on lifespan development among older adults. Twenty-three students who agreed brought a questionnaire to their grandparents who belonged to each lifelong learning institute in communities. Their grandparents who agreed answered it and sent written questionnaires to the first author by mail. Their questionnaires did not have more than one-third missing items of one scale and were adopted as a data. The total number of this sample was 525 participants (Male = 260, Female = 265). The age range was from 60 to 94 years old, and the mean age was 69.78 years old ( $SD = 4.77$ ). The respondent rate was 50.93% at the Senior Citizen College, 100% at other lifelong learning institutes (students' grandparents), and the total respondent rate was 53.07%.

All participants were healthy older adults who could independently live in local cities and took courses voluntarily at the lifelong learning institutes in their communities. The main mission of the Senior Citizen College was to educate

future community leaders, and older adults were expected to be community leaders in each ward of Nagoya City. Half of older adults enrolled with recommendations from each ward, and the other half of older adults were selected by official lottery for their enrollments. Other participants also enrolled in their lifelong learning institutes if their courses could accept older adults, and/or they could meet the requirements of these courses.

The social characteristics of this sample are shown in Table 1. As for marital status, 73.9% of the participants were married, 18.5% were widowed, 5.0% were divorced, and 2.5% were never married. As for children, 91.8% had children, and the mean number of children was 2.03 ( $SD = .92$ ); 75.6% had grandchildren, and the mean number of grandchildren was 2.45 ( $SD = 2.08$ ). The mean years of their education was 13.11 years ( $SD = 2.72$ ), and the mean years of their past jobs was 32.38 years ( $SD = 16.14$ ). As for employment, 85.7% of the participants did not have any current jobs, 4.2% had full-time jobs, and 9.3% had part-time jobs. As for living arrangement, 17.7% of the participants lived by themselves, and 81.3% lived with their families. With regard to housing, 96.8% of the participants lived in their own homes, and 2.5% lived in support apartments.

This study was approved by the institutional review board of the Senior Citizen College. The participants voluntarily signed the informed consent form if they agreed. The project members kept written questionnaires and their data were coded with specific IDs and passwords to exclude personal identifying information.

## Measures

The participants answered a self-reported questionnaire which consisted of the Japanese versions of the Gerotranscendence Scale Type 2 (Tornstam, 1997a, 1997b, 2005), the Life Satisfaction Index-A (LSI-A: Neugarten, Havighurst, & Tobin, 1961; Koyano, 1989, 1990), Integrity (seven items) of the Erikson's Psychological Stage Inventory (EPSI: Rosenthal, Gurney, & Moore, 1981; Nakanishi, Mizuno, Furuichi, & Sakata, 1985; Nakanishi & Sakata, 2001), the Center for the Epidemiologic Studies Depression Scale (CES-D: Radloff, 1977; Shima, Shikano, Kitamura, & Asai, 1985; Shima, 1998), support exchanges (11 items) of the Intergenerational Support Scale (ISS: Fingerman, Miller, Birditt, & Zarit, 2009; Hoshino, Zarit, & Nakayama, 2009a, 2009b), the IADL Section of the OARS Multidimensional Functional Assessment Questionnaire (Fillenbaum, 1998; Hoshino, Zarit, & Nakayama, 2009a, 2009b), 14 items of the Short-Form-36 Health Survey Version 2 (Medical Outcomes Trust, Health Assessment Lab, & Quality Metric Inc., 2002; Quality Metric Inc., & Fukuhara, 2002), and questions about the participants' social characteristics. However, this study dealt with only the Japanese versions of the GST2, the LSI-A, Integrity of the EPSI, and questions about the participants' social characteristics.



Table 1. The Participants' Social Characteristics

Social characteristics	<i>N</i> (Proportion)	<i>M</i> ( <i>SD</i> )
<b>Marital status</b>		
Married	388 (73.9%)	
Never married	12 (2.5%)	
Widowed	97 (18.5%)	
Divorced	26 (5.0%)	
No answer	1 (0.2%)	
<b>Children</b>		
Yes	482 (91.8%)	
No	43 (8.2%)	
The number of children		2.03 ( 0.92)
<b>Grandchildren</b>		
Yes	397 (75.6%)	
No	128 (24.4%)	
The number of grandchildren		2.45 (2.08)
Years of education		13.11 (2.72)
Years of job careers		32.38 (16.14)
<b>Current job</b>		
Unemployed	450 (85.7%)	
Full-time job	22 (4.2%)	
Part-time job	49 (9.3%)	
No answer	4 (0.8%)	
<b>Living arrangement</b>		
Living alone	93 (17.7%)	
Living with families	427 (81.3%)	
Living with others	4 (0.8%)	
No answer	1 (0.2%)	
<b>Housing</b>		
Living in their own home	508 (96.8%)	
Support apartment	13 (2.5%)	
Community-based shared house	3 (0.6%)	
No answer	1 (0.2%)	

### *Gerotranscendence*

The Gerotranscendence Scale Type 2 (Tornstam, 1997a, 1997b, 2005) included 10 items, which consisted of three subscales: The Cosmic Dimension; the Coherence Dimension; and the Solitude Dimension. Response options were on a 4-point scale with 1 representing “*disagree*,” and 4 representing “*agree*.” With regard to development of the Japanese version, first a Japanese researcher of Swedish Language who had studied in Sweden translated the original GST2 from Swedish into Japanese and independently back-translated it. Second, the translator and the first author examined translation accuracy and appropriateness of translated contents that could convey Professor Lars Tornstam’s concepts and its scale, bibliographical backgrounds, and sociocultural contexts among older adults in Sweden and Japan. Third, Professor Tornstam allowed us to use the translated version from Swedish into Japanese as a Japanese version of the GST2. As supplementary procedures, the researcher of Swedish Language translated the English version of the GST2 from English into Japanese as well and independently back-translated it. The researcher and the second author examined the correspondence between the Swedish scale and the English version. Also, the translator and the first author examined translation accuracy between the Japanese version from the Swedish scale and the Japanese version from the English scale.

### *Life Satisfaction*

The Life Satisfaction Index-A (LSI-A: Neugarten, Havighurst, & Tobin, 1961; Koyano, 1989, 1990) was used to examine construct validity of the Japanese version of the GST2. The LSI-A included 20 items, and response options were on a 3-point scale with 1 representing “*agree*,” 2 representing “*disagree*,” and 3 representing “*don’t know*.”

### *Integrity*

The integrity (seven items) of the Erikson’s Psychological Stage Inventory (EPSI: Rosenthal, Gurney, & Moore, 1981; Nakanishi, Mizuno, Furuichi, & Sakata, 1985; Nakanishi & Sakata, 2001) was also used for establishment of construct validity of the scale. The EPSI (Rosenthal, Gurney, & Moore, 1981) evaluated psychosocial development from infancy to young adulthood, and the Japanese Version (Nakanishi, Mizuno, Furuichi, & Sakata, 1985; Nakanishi & Sakata, 2001) was expanded to estimate psychosocial development from adulthood to later life. The Japanese version consisted of 56 items, and seven items of integrity were used in this questionnaire. Response options were on a 5-point scale with 1 representing “*disagree*,” and 5 representing “*strongly agree*.”

### *Social Characteristics*

Ten items concerning the participants' social characteristics were comprised of age, gender, marital status, children, grandchildren, education career, job career, living arrangement, and housing (see Table 1). Marital status was categorized as "1. married," "2. never-married," "3. widowed," and "4. divorced." The numbers of their children and grandchildren were asked, and the participants answered their years of education from elementary school through graduate school. They also wrote the length of their careers, and their current job status was categorized as "1. unemployed," "2. full-time job," and "3. part-time job." Living arrangement was comprised of "1. living alone," "2. living with families," and "3. living with others." Housing was categorized as "1. their own home," "2. support apartment," and "3. community-based shared house."

### **Data Analysis**

An exploratory factor analysis was conducted to confirm the factor structure of the Japanese version of the GST2. Cronbach's coefficient alpha was calculated to examine the internal consistency as reliability of the scale. Pearson's correlations were accounted for the establishment of construct validity of the scale. The SPSS Version 15 was used for the analyses.

## **RESULTS**

### **Factor Analysis of the Gerotranscendence Scale Type 2 Japanese Version**

An exploratory factor analysis found the three-factor structure of the Japanese version of the GST2, based on the factor loadings = .400 or over (see Table 2). These factors were named as the Cosmic Dimension, the Coherence Dimension, and the Solitude Dimension, as originally had been reported by Tornstam (1997a, 1997b, 2005). Although "item 1. Being at peace and philosophizing by myself is important for my well-being" had belonged to the Solitude Dimension in the Swedish scale of the GST2 (Tornstam, 1997a, 1997b, 2005), the factor loading of this factor analysis yielded to the Cosmic Dimension, and the item 1 was excluded from the Japanese version of the GST2.

The Cosmic Dimension included five items, such as "item 5. I can feel strong presence of people who are elsewhere"; "item 4. I feel a strong connection with earlier generations"; and "item 8. I feel connected with the entire universe." The Coherence Dimension consisted of two items: "item 10. My life feels chaotic and disrupted" (the reverse item); and "item 2. The life I have lived has coherence and meaning." The Solitude Dimension was comprised of two items: "item 7. I like to be by myself better than being with others"; and "item 9. I like meetings with new people" (the reverse item).

Table 2. Exploratory Factor Analysis of the Japanese Version of the GST2

Items/Factor loadings	F 1	F 2	F 3	M	(SD)
<b>Factor 1: The Cosmic Dimension</b>					
5. I can feel a strong presence of people who are elsewhere.	<b>.748</b>	-.088	-.057	2.27	(0.87)
4. I feel a strong connection with earlier generations.	<b>.740</b>	.004	-.058	2.57	(0.85)
8. I feel connected with the entire universe.	<b>.695</b>	.175	-.034	2.74	(0.80)
6. I feel that I am a part of everything alive.	<b>.664</b>	.206	-.066	2.65	(0.80)
3. Sometimes I feel like I live in the past and present simultaneously.	<b>.611</b>	-.030	.019	1.95	(0.78)
<b>Factor 2: The Coherence Dimension</b>					
10. My life feels chaotic and disrupted.	-.152	<b>.856</b>	-.088	2.84	(0.80)
2. The life I have lived has coherence and meaning.	.280	<b>.728</b>	-.209	2.82	(0.66)
<b>Factor 3: The Solitude Dimension</b>					
7. I like to be by myself better than being with others.	.114	-.127	<b>.849</b>	2.06	(0.80)
9. I like meetings with new people.*	-.234	-.099	<b>.789</b>	2.01	(0.73)
1. Being at peace and philosophizing by myself is important for my well-being. <sup>a</sup>	.406	.324	.255	3.12	(0.77)

**Note:** The GST2 = The Gerotranscendence Scale Type 2; \* = the reverse-coded item.

<sup>a</sup>Item 1. Being at peace and philosophizing by myself is important for my well-being" was in the Solitude Dimension of the Gerotranscendence Scale Type 2 (Tornstam, 1997a, 1997b, 2005).

### **Reliability of the Gerotranscendence Scale Type 2 Japanese Version**

Cronbach's coefficient alpha was computed to examine reliability of the Japanese Version of the GTS2 (see Table 2). The Cosmic Dimension was alpha = .75, the Coherence Dimension was alpha = .59, and the Solitude Dimension was alpha = .61. These values were similar to Tornstam (1997a, 1997b, 2005), while the alpha values of the Coherence and Solitude Dimensions were not higher due to the numbers of these items. As a result, the reliability of the scale was confirmed, although the internal consistency of the Coherence and Solitude Dimensions should continue to be examined.

### **Validity of the Gerotranscendence Scale Type 2 Japanese Version**

Pearson's correlation coefficient was calculated to examine construct validity of the Japanese version of the GST2 (see Table 3). Relationships between the total scale, the Cosmic Dimension  $\text{®} = .88, p < .001$ ), the Coherence Dimension  $\text{®} = .41, p < .001$ ), and Solitude Dimension  $\text{®} = .21, p < .001$ ) each had positive correlation. Although a relationship between the Cosmic Dimension and the Coherence Dimension was a positive correlation  $\text{®} = .15, p < .001$ ), a relationship between the Cosmic Dimension and the Solitude Dimension was a negative correlation  $\text{®} = -.10, p < .001$ ). Relationships between the Japanese versions of the GST2 and Integrity of the EPSI each had significant correlation. The total scale was  $r = .19 (p < .001)$ , the Cosmic Dimension was  $r = .09 (p < .05)$ , and the Coherence Dimension was  $r = .60 (p < .001)$ , while the Solitude Dimension had a negative correlation  $\text{®} = -.28, p < .001$ ). Relationships between the Japanese versions of the GST2 and the LSI-A each had significant correlation except the Cosmic Dimension. Although the total scale  $\text{®} = .07, p < .10$ ) and the Coherence Dimension  $\text{®} = .40, p < .001$ ) positively correlated to the LSI-A, the Solitude Dimension  $\text{®} = -.32, p < .001$ ) negatively correlated to the LSI-A. These findings indicated that the construct validity of the scale was also established.

## **DISCUSSION**

### **Psychometric Property of the Gerotranscendence Scale Japanese Version**

#### *Factor Structure*

An exploratory factor analysis of the Japanese Version of the GST2 revealed the same three-factor structure which had been reported by Tornstam (1997a, 1997b, 2005) with the omission of item 1. These factors were named as the Cosmic Dimension, the Coherence Dimension, and the Solitude Dimension. Item 1 had

Table 3. Correlations between the Japanese Versions of the GST2, the EPSI, and the LSI-A

	The GST2	The Cosmic Dimension	The Coherence Dimension	The Solitude Dimension	The EPSI
The Cosmic Dimension	.88***				
The Coherence Dimension	.41***	.15***			
The Solitude Dimension	.21***	-.10*	-.24***		
The EPSI	.19***	.09*	.60***	-.28***	
The LSI-A	.07†	.06	.40***	-.32***	.57***

**Note:** The GST2 = The Gerotranscendence Scale Type 2; The EPSI = Integrity (seven items) of the Erikson's Psychological Stage Inventory; The LSI-A = The Life Satisfaction Index-A.  
†  $p < .10$ , \*  $p < .05$ , \*\*\*  $p < .001$ .

belonged to the Solitude Dimension in the Swedish scale of the GST2 (Tornstam, 1997a, 1997b, 2005), while the factor loading of this factor analysis yielded to the Cosmic Dimension.

Tornstam (1989, 2005) first defines the concept of gerotranscendence, based on literature reviews, and the primary concept of gerotranscendence includes the following components: An increasing feeling of cosmic communication with the spirit of universe; A redefinition of perception of life and death; A decrease in interests in superfluous social interaction; and An increase in meditation. Second, Tornstam (1996a, 1996b, 1997a, 1997b) organizes the concept structure of gerotranscendence based on a qualitative data analysis of the interviews. The Cosmic Dimension includes the subcategories: Connection to earlier generations; Life and death; and Mystery in life. The Dimension of the Self consists of the subcategories: Self-confrontation; Development of body-transcendence; Self-transcendence; and Ego-integrity. The Dimension of Social and Personal Relationships is comprised of the subcategories: Changed meaning and importance of relations; and Everyday wisdom.

However, item 1 is considered as meditation, and has the possibility of relating to all Dimensions above and their subcategories: for example, Mystery in life of the Cosmic Dimension; Self-confrontation of the Dimension of the Self; and Everyday wisdom of the Dimension of Social and Personal Relationships. In this study, the factor loadings of item 1 were the Cosmic Dimension = .406, the Coherence Dimension = .324, and the Solitude Dimension = .255. Although Tornstam (1997a, 1997b, 2005) reports that item 1 belongs to the Solitude Dimension, this study found that item 1 indicated the highest factor loading in the Cosmic Dimension, and that it also showed the modest factor loading in the Coherence Dimension. Therefore, it is appropriate for us to omit item 1 because of the overlapping in contents of more than two factors.

#### *Reliability of the Scale*

The Cosmic Dimension was Cronbach's coefficient alpha = .75, the Coherence Dimension was alpha = .59, and the Solitude Dimension was alpha = .61. These alpha values were similar to Tornstam (1997a, 1997b, 2005). Internal consistency was confirmed, although the Coherence and the Solitude Dimensions should continue to be examined by conducting additional questionnaire surveys among older adults in Japan.

Tornstam (1997a, 1997b, 2005) implements the Swedish questionnaire surveys in 1995 and 2001, and each explanatory factor analysis finds the same factor structure. With regard to alpha values of a scalability test, the Cosmic was alpha = .73, the Coherence was alpha = .57, and the Solitude was alpha = .60. As Ponterotto and Ruckdeshel (2007) and Ponterotto and Charter (2009) suggested, the number of the question items strongly relate to the reliability of the scale, and that researchers may anticipate internal consistency prior to the

development of the scale. Therefore, the preparation of a higher number of items would have contributed to improving internal consistency and establishing reliability of the GST2.

#### *Validity of the Scale*

The total scale of the Japanese version of the GST2 each had positive correlation with the Cosmic Dimension, the Coherence Dimension, and the Solitude Dimension. Also, the Cosmic Dimension positively correlated with the Coherence Dimension, while the Cosmic Dimension negatively correlated with the Solitude Dimension. In addition, the total scale and subscales each had significant correlation with Integrity of the EPSI. The total scale, the Cosmic Dimension, and the Coherence Dimension positively correlated to the EPSI, while the Solitude Dimension negatively correlated to the EPSI. The total scale and the Coherence Dimension each had positive correlation with the LSI-A, while the Solitude Dimension had a negative correlation with the LSI-A. Hence, construct validity of the scale was also established.

As the Coherence Dimension relates to perceived life consistency and identity, it clearly has positive correlations between the Coherence Dimension, the Integrity of the EPSI and the LSI-A. Since the participants may think that items of the Solitude Dimension mean involvements with social relationships, their responses might be different from the gerotranscendence theory. This sample may regard the Solitude Dimension as disengagement, and correlations between the Solitude Dimension, the total scale, the EPSI, and the LSI-A each had negative correlation.

Tornstam (2005) summarizes relationships between gerotranscendence, life-satisfaction, and fear of death from Swedish questionnaires. The 1995 data shows a significant positive correlation between the Coherence Dimension and life-satisfaction, and a significant negative correlation between the Solitude Dimension and life-satisfaction. The Coherence Dimension is significantly negatively correlated to fear of death. The 2001 data indicates a significant positive correlation between the Cosmic Dimension and life-satisfaction, and a significant positive correlation between the Coherence Dimension and life-satisfaction. The 2001 sample consists of older adults and the oldest old, although the 1995 sample also includes younger generations. In addition, questions concerning life-satisfaction and fear of death are each one item with a 5-point scale only. Hence, our findings support construct validity of the scale.

#### **Commonalities and Differences Among Older Adults in Sweden and Japan**

Hoshino (2012) clarifies the commonalities and differences of sociocultural support models for healthy aging among older adults and immigrants in the United States, Sweden, and Japan based on a qualitative data analysis of the



interviews with experts of gerontology in the three countries. Content analysis finds four dimensions and 20 categories. Sweden and Japan are considered as homogeneous societies having longevity. However, the United States has been a diverse immigrant society, and its life expectancy is shorter than that of Sweden and Japan.

With regard to differences between Sweden and Japan, all immigrants can access a universal health care system in Sweden. Aging assistance technology relates to healthy aging of older Swedes as well as immigrants. Identity formation is solid, and cultural identity emphasizes homogeneity. The basic attitude toward aging is neutral or positive, although they may have negative attitudes toward end-of-life issues regardless of religious activities. In Japan, there is the transition among older Japanese from traditional family care to social and health services, although immigrants may have difficulties in accessing these services, because they may face language barriers and historically, Japanese society may not be open to immigrants. Cultural identity focuses on homogeneity, and Japanese people primarily aim to attune to others rather than create their unique identity (Hoshino, 2001). The basic attitude toward aging is neutral or positive, and they may have neutral or negative attitudes toward end of life issues. Most of the Japanese traditionally do not express specific religious beliefs and believe in nature, general gods, and their ancestors.

Summarizing the above comparative study, even if the GST2 can be applicable for older adults in Sweden and Japan, we should consider sociocultural contexts in each lifespan development and environment. Both groups may be familiar with the concept of gerotranscendence, which means changed space and time perceptions beyond individuals' lives. However, older adults in Sweden have their definite identity, while older adults in Japan do not tend to show such identity formation. In the future, we should examine relationships between gerotranscendence and these factors, such as social policies for elderly care, identity formation, religious beliefs, and basic attitudes toward aging, life and death, and diversity.

## CONCLUSION

The GST2 is applicable not only for older adults in Sweden but also for older adults in Japan. The Japanese version of the GST2 had a three-factor structure, which Tornstam (1997a, 1997b, 2005) had reported, with omission of item 1. Reliability and validity of the scale were confirmed, although internal consistency of the Coherence and Solitude Dimensions should continue to be examined. This study supports use of the Japanese version of the GST2 as a measure of lifespan development among the oldest old in Japan. Future research is needed to clarify if the GST2 is applicable for diverse older adults in global super aging societies.

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