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Development of Life-Worldly Communication Scale for Older Persons: A Pilot Study

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Abstract
Objectives: Our prior study revealed that the speech duration of older people in long-term care facilities in Japan is four minutes in one day, owing to the lack of "life-worldly communications." This study is a pilot study for the development and validation of the Life-Worldly Communication Scale (LWCS) that can efficiently measure the life-worldly communication duration of older people. Methods: The subjects were 65 individuals, 65 years of age or older, who were chosen among people living in long-term care facilities and in home care in Japan. The items of LWCS were generated from related literature. The content validity of LWCS was examined from the content validity ratio. Construct validity of LWCS was verified by exploratory and confirmatory factor analyses. Convergent or discriminant validity was examined from the relation between LWCS and the life-worldly communication time or depression level. Reliability was examined by inspecting internal consistency and stability. Results: The LWCS proved satisfactory in the goodness-of-fit index (GFI = .92, NFI = .91, CFI = .99, RMSEA =.03) by confirmatory factor analysis. Convergent validity of LWCS was supported by a significant correlation between LWCS and the life-worldly communication time ($r = .62$, $P < .001$). Reliability of LWCS was confirmed by internal consistency (Cronbach's α =. 90) and stability (test-retest, $r = .70$, $p < .01$). Conclusions: The reliability and validity of the LWCS were confirmed in the study population. However, the number of items included in each factor was insufficient. Efforts to improve LWCS are needed in the future.

Keywords: Pilot Study, Scale Development, Life-Worldly Communication, Reliability, Validity, Home Care, Nursing Home

1. Introduction

Previous studies on nursing communication with older persons have indicated that communication plays a highly significant role in construction, maintenance and development of relationships between older persons and caregivers (Balzer-Riley, 2012；Littlejohn & Foss, 2008). In particular, communication has a considerable influence on the quality of life (QOL) of older persons living under restricted conditions in long long-term care facilities for older people such as nursing homes (Levy-Storms, Claver, Gutierrez, & Curry, 2011; Wang & Liao, 2019); a lack of communication tends to have adverse effect on depressive states of older people in nursing home

(Boorsma, Joling, Dussel, Ribbe, Frijters &van Marwijk, et al., 2012; Canadian Institute for Health Information,2010; Pei, Yan, Wenjie, Qing & Xiuli, 2015).

However, nursing communication studies reported various problems with regard to how nurses and older people communicate with each other in actual nursing settings. For example, (1) no proper amount of communication is produced between them (Burgio, Allen-Burge, Roth, Bourgeois, Dijkstra, Gerstle, & Jackson, 2001; Norouzinia, Aghabarari, Shiri, Karimi, & Samami, 2016) ; (2) although nurses emphasize the importance of communication as an ideal, nurses' perceived priority for communication is extremely low in actual nursing scenes (McCabe, 2004; Shattell, 2004); (3) a large gap exists between them as to what they expect from communication: older adults expect to have a warm, empathic, sincere and encouraging mutual human connections with nurses, whereas nurses tend to treat older people solely as an object of nursing care and conduct only superficial communication (Bridges & Fuller, 2015; Nakrem, Vinsnes & Seim, 2011).

Despite such high expectations for communication from older adults, previous nursing communication studies paid only scarce attention to how much older people in long-term care facilities need communication, and also lacks the means to examine how and how much older persons contribute to communication, that is, patients' involvement and roles in communication (Caris-Verhallen, Kerkstra & Bensing, 1997; Fleischer, Berg, Zimmermann & Wüste, 2009).

Based upon the understanding of this insufficiency in previous nursing communication studies, we started our research first by aiming to clarify the quantity and characteristics of communication between older adults and care providers in long-term care facilities in Japan: we examined both the quantitative aspects of speaking time and frequency and the qualitative aspect of communication mechanisms. We found that there are two types of linguistic communication produced between nurses and older adults within a day (9 AM to 5 PM). One type of communication is the "task-oriented communication," which is communication between older persons and caregivers concerning various nursing and caregiver tasks, and the other type of communication the "life-worldly communication," which is communication-related to social and existential world for older persons as a human being who lives daily life. We also found that the task-oriented communication accounted for about 80% of the total communication time. The speaking time over one day for an older person in long-term care facilities was extremely little, at four minutes, with the older person's speaking time and frequency being higher with regard to life-worldly communication than to the task-oriented type of communication (Fukaya, Suzuki & Shitita, 2004).

We then investigated, using qualitative analysis method, the interactional functions of these two types of communication, and the following results were obtained. In the task-oriented communication, the nurse exerts control over what the patient should do (say) according to the goals regarding care tasks imposed on them, thereby giving older individuals little opportunity for spontaneous speech. The speech duration of older individuals, thus, markedly decreases in task-oriented communication. In contrast, In the life-worldly communication, older individuals are given opportunities for spontaneous talk by care providers who show sincere and encouraging interests in their stories, and thus the use of the life-worldly communication was found to be highly effective for increasing the amount and frequency of older people's speech (Fukaya, Kitamura, Koyama, Yamakuma & Sato, 2016).

Nevertheless, most nurses in long-term care facilities, because it does not seem to contribute directly to the resolution of health problems, tend to understand the life-worldly communication simply as idle and useless talk (Fukaya, Koyama, Kimura & Kitamura, 2009). The reason for this seems to be that nurse-patients, as well as doctor-patients communication, has been understood on the basis of the assumption that the relationship between healthcare providers and patients must be therapeutic, that is, a relationship strictly for the sake of solving a particular health problem, rather than a relationship between ordinary people (Moore & Kuipers, 1992; Moreira & Rodrigues, 1997; Roter & Larson, 2002).

The life-worldly communication needs to be understood as an inherently vital form of communication that contributes to the construction of a social and existential world for older adults as a human being. In other words, the life-worldly communication, which includes daily conversations and small talk, is crucial part of a process through which one confirms his/her significance as a social being, experiences various emotions, maintains mental

richness and stability, and satisfies essential human needs for interpersonal connections and mutual recognition (Coupland, 2003). The life-worldly communication also has the potential of contributing to the activation of the mind and quality of life of older adults, and a reduction of their feelings of loneliness and isolation. No reliable and valid method for measuring the life-worldly communication time, however, has been developed.

Most older people requiring care in Japan use either long-term care facilities, which provide medical, nursing and rehabilitation services according to the health status of older people, or home care services, which provide medical, nursing, and housekeeping services necessary for the older people at home. Long-term care facilities include medical sanatoriums (a facilities that provide services such as medical treatment and rehabilitation for the purpose of long-term treatment of chronic patients), and nursing homes (a facilities that provide long-term care for older people who have difficulty living at home). It is necessary, thus, to develop the "Life-worldly Communication Scale (LWCS)" that can easily measure life-worldly communication time of older people requiring a long-term care in various living environments. The development of the LWCS would also greatly contribute to the improvement and evaluation of caregivers' communication skills and also to the evaluation of quality of care facilities for older people.

2. Aims

The present study is a pilot study. A pilot study is defined as "a small study for helping to design a further confirmatory study" (Arnold et al. 2009), or "a version of the main study that is run in miniature to test whether the components of the main study can all work together" (Arain, Campbell, Cooper, & Lancaster, 2010). Thus, as a pilot study, this paper aims to design and to examine components of the main study that will develop and validate a scale for measuring the quantity of the life-worldly communication between older adults and care providers. More specifically, the present study aims:

a. to develop the Items of life-worldly communication (LWCS).
b. to examine, using a small set of data, the reliability and validity of the LWCS.

3. Methods

3.1. Item development

3.1.1. Item generation
The LWCS domains were constructed by reviewing the research literature concerning psychological and social communication of older adults in care facilities (Carpiac-Claver & Levy-Storms, 2007; Fleischer, et al., 2009), by examining the components of other communication scales for older person (Gremigni, Sommaruga & Peltenburg, 2008; Wang & Liao, 2019) and the elements that make up the life-worldly communication (Fukaya, et al., 2016). LWCS was hypothesized to have three domains: "topics of lifeworld," "spontaneity of older people," and "attentive attitude of caregivers." The item pool was developed to cover all three domains. The pool of items initially developed should be minimum twice as long as the desired final scale (Kline,2000; Schinka, Velicer, &Weiner, 2012). Twenty one items for LWCS were thus created in consideration of the burden on older people: twelve questions on "topics of life world" (past life experiences, meals, hobbies, etc.), four questions related to "spontaneity of older people" (activeness, desire to talk, hesitance, etc.), and five questions related to "attentive attitude of caregivers" (active listening, speech encouragement, etc.). The 21 items of LWCS were formatted as a self-report questionnaire with a four-point Likert scale assessing the frequency of life-worldly communication with consistent response options (from one: 'never to four: 'very much').

3.1.2. Expert panel and face and content validity
The domains and 21 question items of the LWCS were reviewed and refined by a panel of four nursing researchers and two sociologists familiar with geriatric nursing. The qualitative responses from the panel deemed LWCS to be valid for measuring life-worldly communication in clinical settings, indicating superficial validity. On whether each item evaluates the content of LWCS, each panel member also evaluated the overall fit of each item and the scale under the two options of "necessary" or "not necessary," providing detailed comments. Based on their evaluations, the content validity ratio (CVR) was calculated. The CVR of each item was 0.67 (three items) or 1.0 (18 items). In the case of six panel members, the CVR needs to be 0.99 or higher (Lawshe,1975), thus the three

items (CVR=0.67: Two items from "topics of life world"; One item from "attentive attitude of caregivers") were excluded and the 18 items were adopted as is shown in Table 1. Some phrases and words were modified based on the comments by the panel members.

Table 1. Items and Item analysis of the LWCS

			M	*SD*	Skewness	Item-total correlation
1. Topics of daily life						
1-1	Past life experiences	How much did you talk about your past work and life experiences?	.75	1.08	1.06	.66**
1-2	Meals	How much did you talk about your meals?	.95	1.07	.57	.68**
1-3	Hobbies	How much did you talk about your hobbies?	.14	.43	3.27	.21
1-4	Family topics	How much did you talk about your family or pet?	.94	1.13	.73	.76**
1-5	Friend/acquaintance	How much did you talk about your friends and acquaintances?	.74	1.09	1.14	.69**
1-6	Societal events	How much did you talk about the recent events? (TV, entertainment, politics, social issues)	.74	1.08	1.16	.68**
1-7	Affections	How much did you talk about your feelings? (Happy, sad, angry, etc.)	1.00	1.05	.51	.74**
1-8	Greetings	How much did you give and receive greetings? (Good morning, afternoon, evening, goodbye, etc.)	2.09	.95	-.76	.62**
1-9	Weather	How much did you talk about the weather and seasons?	1.15	1.12	.37	.67**
1-10	Affairs	How much did you talk about the daily affairs?	1.15	1.09	.35	.68**
2. Spontaneity of older people						
2-1	Activeness	How much did you engage first in conversation with caregiver?	1.48	1.02	.11	.69**
2-2	Desire to talk	How much did you talk to care giver about a topic that you want to discuss?	1.49	1.09	.11	.69**
2-3	Hesitance	How much did you talk to care giver about something that you were concerned about?	1.46	1.13	.07	.73**
2-4	Patients' perception of care providers	Do you think caregivers are always busy?	.90	.29	2.88	.41*
3. Communicational attitude of caregivers promoting the Type-2 utterance						
3-1	Active listening	When you talked with a caregiver, do you think they listened to what you were trying to say?	2.12	1.07	-.97	.64**
3-2	Speech encouragement	When you talked with a caregiver, do you think that they created an atmosphere that made it comfortable to talk?	1.85	1.15	-.46	.69**
3-3	Providing topics	Did caregiver initiate topics that you wanted to discuss?	1.37	1.10	.16	.69**
3-4	Attention to older people	Do you think caregiver were interested in your conversion?	1.82	1.13	-.43	.73**

Note. N=65 LWCS= Life-worldly communication scale.

3.2. Pre-study

LWCS was administered in six older participants to assess how easy the questions were understood and answered. From the feedback received, some revisions were made. The participants were also asked whether the number of questions was appropriate, and they responded that they did not feel overburdened.

3.3. Sampling

Older people in facilities were chosen from a medical sanatorium and a nursing home in Prefecture A, and older people requiring nursing care in communities were chosen among home care service users. The subjects were those who met the following selection criteria and gave consent to participate in the study. Prior to the research, its purpose and method were explained in writing and orally to the older people, and only those who consented to the study in writing participated in the research. We used the following selection criteria: (1) aged 65 years or older requiring nursing care, and (2) having the ability to give consent. The following were excluded: (1) Those who fall into level 3 or above in hearing impairment, (2) who fall into Class 3 of the impairment of voice/language function, both on "Grade table of handicapped failure" issued by *Koseirodosyo* (Japanese Ministry of Health, Labour and Welfare, 2008), (3) who are in an unstable physical condition, (4) who had moderate or severe level of dementia, i.e., who fall under 15 on the Hasegawa dementia scale (HDS-R) (Imai & Hasegawa, 1994).

The required sample size of a pilot study for a scale development is sufficient to be 30-40 (Hertzog.2008; Johanson & Brooks, 2010). Thus, 70 subjects were targeted in consideration of refusal rate and sample attrition rate. As a result, the participants were a total of 65 older persons, at three medical sanatoriums (17 participants), four nursing homes (24 participants), and in home care (24 participants).

3.4. Measures

3.4.1. Basic attributes of older persons
Researchers have used medical records to gather data on sex, age, FIM(Functional Independence Measure) (Gerrard, Goldstein, Divita, Ryan, Mix, & Niewczyk, et al., 2013), and degree of cognitive impairment (HDS-R) (Imai & Hasegawa, 1994). The reliability and validity of these scales (FIM and HDR-S) have been verified.

3.4.2. Life-worldly communication time
All of the communication that occurred between 65 survey participants and caregivers during one whole day (9 AM to 5 PM), was tape-recorded. Verbatim transcripts were created from the recorded contents of the communication, and were then classified into task-oriented and life-worldly communication using a "Types of communication between caregiver and older people" created and ascertained by our previous research (Fukaya, et al., 2004)(Table 2). According to the type of communication of older people, communication time was calculated by counting two Japanese letters written in the transcripts as one second.

Table 2. Types of communication between caregiver and older people

Type	Primary category	Secondary category	Actual examples
Task oriented communication	Promotion of behavior	Behavioral commands	Lift your leg. Stay here please.
		Behavioral entreaties	Here's your meal. Would you turn on your side.
		Confirmation of behavior completion	Have you drunk it? Have you finished rehab?
		Behavioral evaluation or praise	You did well. You stood up well.
	Assistance behavior	Explanation of assistance behavior	Let's look at your abdomen. I've come to take your temperature.

		Announcement of the start and end of assistance behavior	We'll move up. Yes, we're finished.
		Evaluation and understanding of assistance behavior	Are you sitting properly? Feeling more comfortable now?
	Questions and explanations about daily schedule and activities	Explanation and instruction of daily schedule	Today is rehab day. Now we're going to the bath.
		Question and evaluation of finished activities	Was rehabilitation tough? Have you finished your bath?
	Questions and explanations about physical condition	Questions on physical condition	Did you sleep well? Do you want to urinate?
		Explanations of physical condition	It's turned red. Your blood pressure is …
		Confirmation of symptoms	Does your head hurt? Is it itchy?
	Questions on wishes and desires	Questions about wishes and desires	Do you want some tea? Do you want to watch tv?
	Warning to be careful	Warning to be careful	The tea is hot! It's slippery, so be careful.
	Calling out	Calling out	Mr. / Mrs. (name)
	Others	Confirmation and acceptance of talk from residents	Is that so? Yes, I understand.
		Expressing feeling and emotion of caregivers	That's a problem. That makes me nervous.
		Soliloquizing	What shall I do? Let's do it. Let me see.
Life worldly communication	Greetings	Greetings	Good morning. I'm leaving now.
	Topics from resident's life history	Topics about the past life experiences	Talk about previous job. Talk about cooking best dishes.
		Talking about hobby or preference	Your hobby was ikebana, wasn't it? Do you like sushi?
		Talking about family, friends and pets	It's tough for your son. It was your grandchild yesterday?
	Topics on social and natural surroundings and events	Talking about social events and news	In yesterday's Sumo…It's the election soon.
		Talking about the season and the weather	It's cherry blossom season. It looks like it's about to snow.
	Topics on psychological state	Understanding and talking of psychological state	-- is a worry, isn't it. Today's a happy day isn't it.
	Others	Confirmation and acceptance of talk from residents	Yes, I understand how you feel.
		Expressing feeling and emotion of caregivers	I don't feel this is a big problem. Wow, that is wonderful.
		Soliloquizing	OK, now it's the hard part. How can I do it.

3.4.3. Depression

The Center for Epidemiological Studies Depression Scale (CES-D) (Radloff ,1977) was used as a scale to measure depression of the participants. CES-D has long been applied to various individuals, and its reliability and validity are verified (Shima, Shikano, Kitamura & Asai, 1985).

3.5. Ethical approval

Ethical approval was obtained from Tokai University's Ethics Review Committee (No. 12-26) and Kanto Gakuin University Committee for Ethics in Research Involving Human Subjects (H2014-2-4).

3.6. Data analysis

The item analyses were conducted as follows: a normality test, check of response skewness, check of correlations between items, and item–total correlation test for ensuring that only parsimonious, functional, and internally consistent item are ultimately included（Thurstone,1947; Boateng, Neilands, Frongillo, Melgar-Quiñonez, & Young, 2018）. Exploratory and confirmatory factor analyses were used to verify the construct validity. Exploratory factor analysis was conducted to extract domains of the LWCS. A further confirmatory factor analysis was performed to confirm the suitability of the hypothesized models. The reliability of the LWCS was assessed by (a) investigating the scale's internal consistency using Cronbach's alpha (a reliability coefficient) and (b) investigating its stability using the test-retest correlation coefficient. The convergent validity of the LWCS was examined from the correlation between the LWCS and life-worldly communication time. Discriminant validity was examined from the correlation analysis between the LWCS and CES-D. SPSS version 24 and Amos 23 were used for data analysis.

4. Results

4.1. Characteristics of study participants

The participants were 27 men (41.5%) and 38 women (58.5%). The average age was 84.00 years ($SD = 6.61$). Of the participants, 45 (69.2%) did not have dementia (HDSR score≧20), and 20 (30.8%) had mild dementia (16≦HDSR≦20). Meanwhile, 17 participants (26.2%) had depression (CES-D score≧16). Regarding ADL state, 23 participants (35.4%) were ambulatory, and 42 (64.6%) were wheelchair bound.

We examined the difference in the characteristics of older people, by comparing three types of residence groups. As a result, there was no significant difference between groups in age, sex, HDSR, and FIM. However, there were significant differences among the three groups of residence in the life-worldly communication time , CES-D、and LWCS.［Life-worldly communication time: $F(2,62) =14.72$, $P<.000$, CES-D: $F(2,62) = 4.66$, $P<.05$, LWCS: $F(2,58) = 6.04$, $P<.01$］. Multiple comparisons with Bonferroni (5% level) showed the following results. Regarding life-worldly communication time: Home care ($M = 3468.1$, $SD = 3703.3$) > Nursing home ($M = 378.9$ sec; $SD = 559.1$) > Medical sanatorium ($M = 161.4$, $SD = 196.8$). Regarding CES-D: Nursing home ($M = 14.79$, $SD = 10.26$) > Medical sanatorium ($M = 10.41$, $SD = 5.71$) > Home care ($M = 7.67$, $SD = 7.12$). Regarding LWCS: Home care ($M = 14.45$, $SD = 7.04$) > Nursing home ($M = 8.67$, $SD = 4.99$) or Medical sanatorium ($M = 8.47$, $SD = 6.64$, see Table3).

Table3. Characteristics of study participants by residences

		n	*M(SD)*	95% Cl LL	UL	*F*	*p*
Age	Medical sanatorium	17	83.06(8.25)	78.82	87.30	1.32	
	Nursing home	24	85.78(6.37)	83.03	88.54		
	Home care	24	82.96(5.36)	80.69	85.22		
	Total	65	84.00(6.61)	82.35	85.65		
HDSR	Medical sanatorium	17	23.47(3.76)	21.54	25.40	0.84	
	Nursing home	24	20.63(7.72)	17.36	23.89		
	Home care	24	21.48(7.97)	18.03	24.92		
	Total	65	21.69(6.99)	19.94	23.43		

FIM	Medical sanatorium	17	73.88(28.33)	59.32	88.45	0.11	
	Nursing home	24	78.79(22.54)	69.27	88.31		
	Home care	24	77.54(21.83)	68.32	86.76		
	Total	65	77.05(23.63)	71.19	82.90		
CESD	Medical sanatorium	17	10.41(5.71)	7.47	13.35	4.66	**
	Nursing home	24	14.79(10.26)	10.46	19.12		
	Home care	24	7.67(7.12)	4.66	10.67		
	Total	65	11.02(8.59)	8.89	13.14		
Life-worldly communication time	Medical sanatorium	17	161.4(196.8)	60.19	262.51	14.72	***
	Nursing home	24	378.9(559.1)	142.82	615.02		
	Home care	24	3468.1(3703.3)	1904.37	5031.88		
	Total	65	1462.65(2729.28)	786.36	2138.93		
Task oriented communication time	Medical sanatorium	17	252.2(329.8)	82.65	421.76	1.81	
	Nursing home	24	588.7(557.6)	353.24	824.18		
	Home care	24	882.8(1599.3)	207.39	1558.19		
	Total	65	609.28(1058.50)	347.00	871.57		
LWCS	Medical sanatorium	17	8.47(6.64)	5.05	11.89	6.04	**
	Nursing home	24	8.67(4.99)	6.56	10.77		
	Home care	24	14.45(7.04)	14.45	7.04		
	Total	65	10.51(6.69)	8.79	12.22		

Note. ***= $p<.001$. **= $p<.01$. *= $p<.05$. LWCS= Life-worldly communication scale.

4.2. Item reduction analysis

The results of item analysis based on responses from 65 people to each question are shown in Table 2. The bias in distribution of responses of each question item was examined with the floor effect (<0 = mean value-SD) or the ceiling effect (>3 = mean value + SD), and with response skewness. As the floor effect was found in four items, namely, "past life experiences," "hobbies," "friend/acquaintance," and "societal events," and the ceiling effect was found in two items, namely, "greetings" and "patients' perception of care providers," a total of six items were excluded.

A cross-correlation analysis of the question items was performed to check their discriminatory power. Two questions ("hesitance" and "active listening") were excluded because a high correlation was found both between the items ("desire to talk" and "hesitance") ($r = 0.75$, $p <0.01$) and between the items ("speech encouragement" and "active listening") ($r = 0.74$, $p <0.01$). An item-total correlation test was conducted to check the correlation between each item and the total score of 10 items. Item-total correlation > .03 is required (Cristobal, Flavian, & Guinaliu, 2007), and as a result, all 10 items showed a significant correlation greater than $r =.62$.

4.3. Construct validity

4.3.1. Extraction of factors
Domains of LWCS were extracted by factor analysis with the Promax rotation of the likelihood method (Table 4). Kaiser-Meyer-Olkin (KMO) and Bartlett's tests were conducted to examine the suitability of samples. As the KMO value was .86, and Bartlett's tests of sphericity reached statistical significance (*p<.000*), it was judged that this sample met the criteria for factor analysis (Taherdoost, Sahibuddin & Jalaliyoon, 2014). The total variance explained by LWCS showed two common factors with an eigenvalue greater than 1.0. Initial eigenvalues were 5.20 for factor 1, and 1.21 for factor 2. The cumulative proportion of these two factors after Promax rotation was 56.26%.

The two common factors were named based on the interpretation of the meaning of the question items contained in each factor. Factor 1 (items 2-2, 1-9, 2-1, 1-6, 1-3, 1-2, and 1-8: 47.20% variance explained) measured "topics desired by older people." Factor 2 (items 3-2, 3-3 and 3-4: 9.06% variance explained) measured "speech encouragement by the staff." Although factor 2 ("speech encouragement by the staff") was not very high in the contribution rate, it was important because it was supposed to be an element that encourages older people to talk.

Table 4. Factor loading for Exploratory factor analysis with Promax rotation of LWCS

Scale	Component	
	1	2
LWCS2-2 Desire to talk	0.84	-0.04
LWCS1-9 Affairs	0.82	-0.09
LWCS2-1 Activeness	0.71	-0.04
LWCS1-6 Affections	0.65	0.10
LWCS1-3 Family	0.62	0.19
LWCS1-2 Meals	0.59	0.10
LWCS1-8 Weather	0.40	0.24
LWCS3-4 Attention to the elderly	-0.08	0.97
LWCS3-3 Providing topics	0.08	0.72
LWCS3-2 Speech encouragement	0.05	0.71
Eigenvalue	5.20	1.21
Cumulative proportion of variance explained	47.20	56.26
Kaiser-Meyer-Olkin (KMO)	0.86	
Bartlett's test of sphericity $\chi 2$=325.51 df=45 Sig=0.000		

Note. N=65.   Extraction Method = Likelihood Method.   Rotation Method = promax with Kaiser Normalization. LWCS = Life-Worldly Communication Scale

4.3.2. Test of dimensionality

The result of an exploratory factor analysis showed that the factor load of item 1-9 "weather" was lower than that of other items, resulting in the interim LWCS having nine items. The construct validity of LWCS was examined by a confirmatory factor analysis for the two-domain model ("topics desired by older people" and "speech encouragement by the staff") extracted by the exploratory factor analysis. However, its goodness of fit (GFI =. 97, NFI =. 89, CFI =. 89, RMSEA =. 08) was slightly insufficient.

Therefore, as shown in Figure1, the confirmatory factor analysis was performed the assumed three-domain model ("topics of life world," "spontaneity of older people," and "attentive attitude of caregivers"). As a result, the goodness-of-fit index showed sufficient values (GFI =. 92, NFI =. 91, CFI =. 99, RMSEA =. 03). The standardized factor loadings of paths from three factors to each item were all highly significant (p <.001), ranging from .68 to .93, and a significant covariance relation among three factors ranging from .57 to .81 (p <.001) was also found. However, in this model, only two items were included in the latent factors for "spontaneity of older people."
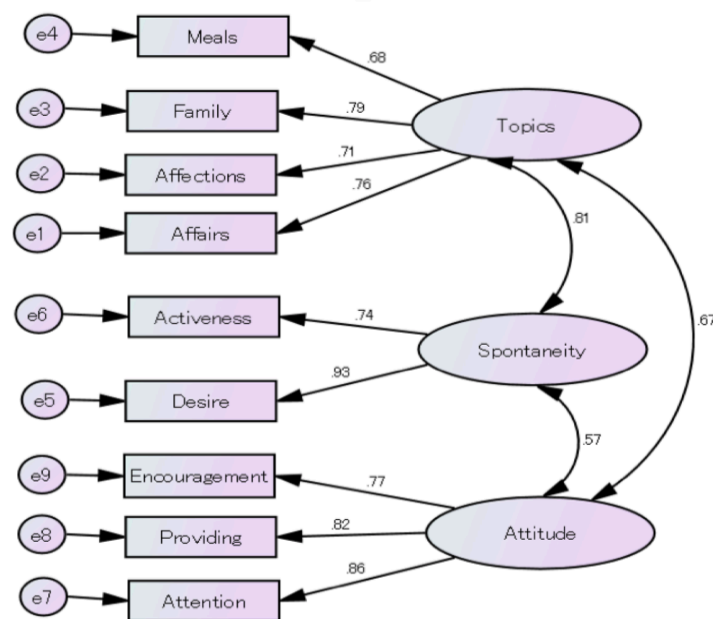
Figure1.
Result of Confirmatory Factor Analysis of LWCS(Standardized esimate)
GFI=.92 NFI=.91 CFI=.99 RMSEA=.03

4.4. Convergent validity

The convergent validity of LWCS was examined from the relation between life-worldly communication time and LWCS. The relevance between LWCS and life-worldly communication time as actual measurement value was the most important to prove the convergent validity of LWCS. A significant correlation was found between LWCS and life-worldly communication time ($r =. 62, p <.001$).

The relation between LWCS and life-world communication time was analyzed by residences. There was no significant association with $r =.42$ ($p = 0.07$) in a medical sanatorium, but there was a significant moderate correlation between the LWCS and life-worldly communication time in a nursing home and in home care. (Table 5).

Table 5. LWCS Convergent validity and Discriminant validity

Investigation Item	n	LWCS	
		Pearson's correlation coefficient	p
Life-worldly communication time Total	65	0.62	***
Medical sanatorium	17	0.45	0.07
Nursing home	24	0.62	***
Home care	24	0.60	**
CES-D	65	-0.30	*

Note. ***= $p<.001$. **=$p<.01$. *= $p<.05$

CES-D= Center for Epidemiologic Studies Depression Scale. LWCS= Life-worldly communication scale.

4.5. Discriminant validity

The discriminant validity of LWCS was examined from the relation between LWCS and CES-D. There was also a significant inverse correlation between LWCS and CES-D ($r = -.30$, $p <.05$, see Table 5).

4.6. Test of reliability

To investigate the reliability of LWCS, Cronbach's alpha reliability coefficient was used to check the scale's internal consistency, and the test-retest correlation coefficient to analyze its stability. The nine question items had a Cronbach's alpha of .90. The reproducibility of each item was ascertained by the correlation between test-retest. Using a three-week interval between test and retest, we obtained a result of $r =.70$ ($p <.01$), indicating the acceptable level of stability.

5. Discussion

5.1. Construct validity

The construct validity of the LWCS was verified by a confirmatory factor analysis. When developing a scale, at least three or more items are required for a factor, given that a factor containing only two items will be defined by only a single correlation (MacCallum, Keith, Zhang & Hong, 1999). The originally presumed three-factor model had a strong goodness of fit, but the number of items included in the latent factors (spontaneity of older people) did not reach the required three items. One of the reasons for this outcome was the lack of the number of items prepared. LWCS was found to have minimum required items (about twice as much as the final scale) (Kyriazos & Stalikas, 2018) while it is also pointed out that required number of items should be 3 to 4 times more than the final scale (DeVellis, 2012; Streiner, Norman, & Cairney, 2015). Therefore, the construct validity is necessary to reexamine it by increasing the number of items in the future.

The paths from "topics of daily life" showed significantly high factor loadings to "meals," "family," "affections," and "affairs" ($r \geq .68$, p <.001). The research conducted by *Naikakufu* (Cabinet Office of Japan; 2014) revealed that the daily pleasures of older people, in descending order, are as follows: TV/radio, newspapers, chatting, travel, and being with family at home. Among the four items constituting "topics of daily life," three items, excluding "affections," are among these daily pleasures of older people, and thus are considered to be the topics, or objects, that are of a high level of interest and concern to them. However, further discussion is necessary whether the topics preferred by older people differ depending on the culture in which older people and care providers live in and communicate with each other.

5.2. Convergent validity

Convergent validity is the extent to which a construct measured in different ways yields similar results (Boateng, et al., 2018). The convergent validity of the LWCS was further examined from the relation between the LWCS and the measured values of the life-worldly communication time. The main purpose of this scale was to measure easily and efficiently the life-worldly speech duration of older adults. The most important aspect of validation is the process of communicating the impact of the measured attributes on the test score, rather than the relationship between the measured attributes and other attributes (Borsboom, Mellenbergh & van Heerden, 2004).

A significant moderate correlation of $r =. 62$ (p <.001) was found between the LWCS and life-worldly speech duration in older adults. In addition, there was a significant difference in life-worldly communication time (home care > nursing home > medical sanatorium) by residence, and LWCS also showed a significant difference among the three groups of residence. These results indicate that the measured values of life-worldly speech duration were reflected onto the LWCS to a considerable extent, suggesting a sufficient convergent validity of LWCS. Since the representativeness of the survey subjects is not guaranteed in this study, it is necessary to obtain more samples from each residence in the main study.

5.3. Discriminant validity

The discriminant validity of LWCS was examined in terms of association between LWCS and CES-D, and there was a slightly significant negative correlation ($r = -.30$, $p <.05$). It is reported that the lack of reliable and intimate relationships between older people and care providers in facilities, tend to increase the rate of depression （Mechakra-Tahiri,2009; Østbye, et al., 2004）and that the lack of meaningful and constructive communication tends to promote the sense of loneliness and depression （Theurer, Mortenson, Stone, Suto, Timonen, & Rozanova, 2015). Thus, the weak negative correlation found between LWCS and CES-D is considered to be due to the fact that daily lack of life-worldly communication can affect depressive states.

5.4. Reliability

We examined the reliability of LWCS based on internal consistency among scale items and the reproducibility (stability) of the scale. Internal consistency, as measured by Cronbach's α, was .90 for nine items, showing sufficient consistency（DeVellis, 2012；Kline, 2000）.

Reproducibility, as tested by test-retest, was $r =.70$ ($p <.01$). Regarding the validity of the test-retest reliability coefficient, in the case of academic research, its reliability coefficient is sufficient if it ranges between $r = .70$ and $r = .80$ (Kaplan,2005). Therefore, this scale was found to have an acceptable level of stability.

5.5. Limitations

The limitations of this study are the issues with the method of sampling and the number of samples. The samples in this study were extracted by non-random sampling. Therefore, there is a possibility that the sample may be biased. Regarding the sample size for factor analysis, it is recommended that the number of samples should be at least 100(Gorsuch,1992) to avoid bias and statistical risks. Therefore, it is necessary to examine the validity of larger samples in the future.

6. Conclusions

LWCS resulted in a "9 items-3 domains" model （" topics of life world," "spontaneity of older people," and "attentive attitude of caregivers"), which was supported by the CFA (GFI =. 92, NFI =. 91, CFI =. 99, RMSEA =. 03). However, the number of items included in each factor was insufficient. Convergent validity of LWCS was supported by a significant correlation between LWCS and the life-worldly communication time ($r = .62$, $P <.001$). Communication time and LWCS were significantly higher in home care than long-term care facilities, and communication time was reflected in LWCS. Reliability of LWCS was confirmed by internal consistency (Cronbach's α =. 89) and stability (test retest, $r =.70$, $p <. 01$). The reliability and validity of the provisional LWCS in this study indicates the feasibility of future full-scale development studies.

7. Conflict of Interest

The author(s) declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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