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Subjective Language Complaints: Are They Reflected in Objective Language Test Performance?

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Objectives: Subjective language complaints (SLCs) are frequently reported among the elderly. However, SLCs and their relationship with various language functions have not been extensively investigated. The purpose of this study was two-fold: to explore whether SLCs can be related to performance in various objective language tests and to determine which demographic variables are associated with SLCs. **Methods:** This study gathered responses from 376 elderly participants (mean age, 74.21±6.56 years) to two questions regarding SLCs and demographic information. We also analyzed the relationship between SLCs and verbal fluency, sentence comprehension, and naming ability (15-item Korean version of the Boston Naming Test [K-BNT-15]) with multiple regression analysis. **Results:** The data revealed that SLCs are associated with K-BNT-15 performance. Such demographic variables as age, education, depressive symptoms, and job status were related to SLCs. **Conclusion:** The results indicate that SLCs reflect a difficulty in word retrieval, which is one of the most frequently reported language complaints of the elderly; however, varying linguistic exposure and social interaction through education and employment may reduce the perceived language decline.

Keywords: Aging, Cognitive complaints, Language complaints, Language performance, Language tests

Language is a complex system of communication encompassing various skills, such as lexical abilities, discourse production, oral and written comprehension, and metalinguistic processes (Au, Albert, & Obler, 1989). Since language comprises such a broad scope of abilities, age-related changes in language have been reported in areas, such as naming, fluency, reading comprehension, and discourse.

Many studies have compared language changes among older adults with those of young adults. Adverse changes in language skills experienced by the elderly are referred to as 'decline' and have been investigated with regard to language production and comprehension. One of the most frequently reported declines in normal elderly subjects is a difficulty in undertaking such tasks as picture naming, definition naming, and discourse (Burke & Shafto, 2004; Mortensen, Meyer, & Humphreys, 2006). In addition, elderly adults show decreased language comprehension in reading due to either an inability to register new information or slow processing speed (Hannon & Daneman, 2009).

The average elderly person may be aware of such a decline and complain of changes in their language skills. These complaints lead to dissatisfaction with one's language abilities. Although language ability is critical in daily life and communication, most research concerning complaints among the elderly has focused on memory or cognitive aspects of the problem rather than language ability per se. Subjective memory complaints (SMCs) or subjective cognitive complaints (SCCs) among the elderly have been investigated through self-assessment of one's memory or cognitive functions. SMCs may have clinical implications as an early sign of fu-

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ture cognitive impairment (Gallassi et al., 2010; Jonker, Geerlings, & Schmand, 2000; Mitchell, 2008). Previous studies have attempted to determine the validity of SMCs or SCCs for mild cognitive impairment (MCI) screening for dementia or MCI screenings among normal elderly populations (Gallassi et al., 2010; Jonker et al., 2000). Likewise, language impairment can be detected through self-assessment of one's language skills and it will have clinical implications if it is related to naming ability or cognition.

Self-assessment of the language performance of elderly adults has been used as a part of self-assessed cognition (Schinka, Brown, & Proctor-Weber, 2009; Slavin et al., 2010) or as a measuring tool of second language proficiency (Gollan, Weissberger, Runnqvist, Montoya, & Cera, 2011). There is only one study that has examined the relationship between self-assessed language complaints (i.e., subjective language complaints [SLCs]) and performance on neuropsychological tests among the normal elderly (Martins, Mares, & Stilwell, 2012). The neuropsychological tests were verbal fluency, naming, episodic memory tests, and tests associated with executive and attention functions. This study also reported that SLCs were related to demographic information and depressive symptoms. The questions used to assess SLCs in the study concerned gender, depressive symptoms, living status (i.e., living alone), and included a category fluency test and memory test. However, the questions investigating language complaints in the study focused only on naming ability. Although naming difficulty is one of the most frequently reported complaints among normal elderly populations (Burke & Shafto, 2004), the questions may not sufficiently reflect broader language complaints. Moreover, the objective language tests utilized by Martins et al. (2012) only focused on language production, thereby excluding language comprehension measures. Language evaluations and questions pertaining to language ability complaints should embrace the overall scope of one's language ability.

Demographic variables included in the aforementioned study were age, gender, education level, Geriatric Depression Scale (GDS) score, and existence of household company (Martins et al., 2012). Aside from education level, all of these were associated with SLCs. However, socio-economic status (SES), such as job and income level, may also be an important indicator, as elderly persons with a job or high income may be more likely to participate in active communication. Social participation is associated with communicative activities among the normal elderly, which in turn are directly linked with language performance (Cruice, Worrall, & Hickson, 2005).

Therefore, the purpose of our study is to investigate 1) whether SLCs concerning overall language abilities may be related to one's objective language performance and 2) which demographic and SES variables are associated with SLCs.

METHODS

Participants

A total of 440 community-dwelling elderly adults residing in Korea were recruited from December 2011 to December 2012. Of these, 64 subjects were excluded due to abnormal Mini-Mental State Examination (MMSE) scores based on criteria of age and education (Han et al., 2008). Thus, 376 participants took part in the present study (age, 74.21 ± 6.56 years; education, 6.91 ± 4.56 years). Of the 376 participants, the number and the percentage by age groups were as follows: 3 (0.8%) for 55-59 years; 88 (23.4%) for 60-69 years; 209 (55.6%) for 70-79 years; 70 (18.6%) for 80-89 years; 6 (1.6%) for 90-94 years. All participants answered pre-evaluation questions in order to screen for hearing and vision. Participants had no history of neurological or psychiatric disorders. All participants provided written informed consent before participating in the study. This research complied with all applicable ethical rules and regulations and was approved by the Institutional Review Board of Severance Hospital (IRB No. 1-2011-0061).

Procedures

The study collected demographic information about the participants including their age, gender, years of education, job status, income level, and number of family members. Participants were asked if they had a current job. Income was divided by seven levels according to monthly earnings (1, none; 2, less than KRW 500,000; 3, less than KRW 1,000,000; 4, KRW 1,000,000-2,000,000; 5, KRW 2,000,000-3,000,000; 6, KRW 3,000,000-4,000,000; 7, more than KRW 4,000,000). The number of family members referred to the number of persons who were living together. Participants undertook the MMSE and the 15-item version of the GDS after complet-

ing the demographic questionnaire. Two groups were categorized by the GDS cut-off score (i.e., 5 points) as subjects with depressive symptoms and those without (Nyunt, Fones, Niti, & Ng, 2009).

SLCs were assessed through two questions about present complaints (SLC1) and complaints worsening over time (SLC2): "How satisfied are you with your speaking/listening/reading/writing abilities?" and "How do you rate your speaking/listening/reading/writing abilities as compared with one year ago?" Each question was rated as 'very dissatisfied' (0 points), 'dissatisfied' (1 point), 'neutral' (2 points), 'satisfied' (3 points), or 'very satisfied' (4 points). The total score for the two questions ranged from 0 to 8, with lower points implying more complaints.

Language abilities were assessed through the 15-item Korean version of the Boston Naming Test (K-BNT-15) (Kim & Kim, 2013), verbal fluency ('animal naming'), and a sentence comprehension test. K-BNT-15 scored 0 for each 'error' and 1 for each 'correct' response. Verbal fluency was assessed through 'animal naming', wherein participants were asked to name as many animals as possible within 30 seconds (Kim, Kim, Kim, & Heo, 2011). The total score of verbal fluency represents the number of animals uniquely named. The sentence comprehension test was composed of 12 items in which participants listened to a sentence read at a natural speech rate and were asked to choose one corresponding picture among four pictures. Twelve sentences of varying complexity were scored as 0 for each 'error,' and 1 for each 'correct' response.

Statistical analyses

The total score of SLCs was used for statistical analysis. The relationship between SLCs and language ability was assessed through multiple regression analysis. The dependent variables of the regression analysis consisted of the K-BNT-15, verbal fluency, and sentence comprehension test. The independent variables were age, education, gender, depressive symptoms, and SLCs. First-order partial correlation analysis was used in order to investigate whether SLCs were associated with age while controlling for level of education, and whether SLCs were associated with level of education while controlling for age. Second-order partial correlation was used in order to find out the correlation between SLCs and income level while controlling for age and education level (Lee & Lim, 2011). An independent *t*-test was then employed in order to determine whether gender, job status, number of family (i.e., living alone or living together), and depressive symptoms are related to SLCs.

RESULTS

Of the 376 participants, 105 (27.9%) were men and 65 (17.3%) were currently employed. According to income level, 111 (27.2%) received less than KRW 500,000 per month; 63 (15.4%) answered they had no income. Half (50.0%) had GDS scores 5 and under. About one-third of participants (31.1%) were living alone. Demographic information, SLC scores, and language test results are provided in Table 1.

According to the answers from each SLC question, 58 (15.4%)

Table 1. Subject characteristics

Characteristic	Value
Age (yr)	74.21 ± 6.56 (57-94)
55-59	3 (.8)
60-69	88 (23.4)
70-79	209 (55.6)
80-89	70 (18.6)
90-94	6 (1.6)
Male	105 (27.9)
MMSE	25.38 ± 3.47 (18-30)
Education (yr)	6.91 ± 4.56 (0-18)
Having a job	65 (17.3)
Income level per month (KRW thousand)	
None	63 (15.4)
< 500	111 (27.2)
< 1,000	44 (10.8)
1,000-2,000	44 (10.8)
2,000-3,000	21 (5.1)
3,000-4,000	4 (1.0)
> 4,000	7 (1.7)
GDS	6.05 ± 3.80 (0-15)
GDS ≤ 5	188 (50.0)
Living alone	117 (31.1)
Family members	1.09 ± 1.12 (0-5)
Language complaints	
SLC1	2.47 ± 1.00 (0-4)
SLC2	1.53 ± .77 (0-4)
Total SLCs	4.00 ± 1.37 (0-8)
Language tests	
K-BNT-15	9.91 ± 3.35 (1-15)
Verbal fluency	9.26 ± 2.81 (0-22)
Sentence comprehension	9.13 ± 2.16 (2-12)

Values are presented as mean ± SD (range) or number (%).
MMSE = Mini-Mental State Examination; GDS = Geriatric Depression Scale; SLC1 = subjective language complaint (SLC) about present language abilities; SLC2 = SLC about worsening language abilities over time; total SLCs = total score of SLCs; K-BNT-15 = 15-item Korean version of the Boston Naming Test.

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complained about their present language abilities (i.e., they answered 'very dissatisfied' or 'dissatisfied' about their language abilities). In addition, 172 (45.7%) thought their language abilities were worse than one year earlier (Table 2).

Table 2. Answers on each SLCs question

	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
SLC1	8 (2.1)	50 (13.3)	143 (38.0)	107 (28.5)	68 (18.1)
SCL2	31 (8.2)	141 (37.5)	186 (49.5)	11 (2.9)	7 (1.9)

Values are presented as number (%).
SLC = subjective language complaint; SLC1 = SLC about present language abilities; SLC2 = SLC about worsening language abilities over time.

Multiple regressions were examined, to investigate the relationship between SLCs and performance on language tests. Table 3 indicated that, when controlling for age and education, SLCs were significantly associated with K-BNT-15 (R^2 change = .010, p = .018). However, SLCs were not associated with the verbal fluency or sentence comprehension test.

With respect to correlation analysis, age was negatively correlated with SLCs (p = .012, r = -.130), while education was positively correlated with SLCs (p = .002, r = .157). However, income level was not correlated with SLCs.

The results of the independent t-test analysis showed that elderly

Table 3. Relationship between objective language performance and SLCs

Language test	Regression step		R^2 change	Variable coefficients		
				B	SE	p-value
K-BNT-15	Step 1	Education	.513**	.377**	.033	.000
	Step 2	Education	.079**	.316**	.032	.000
		Age	-	-.150**	.022	.000
	Step 3	Education	.010*	.304**	.032	.000
		Age	-	-.143**	.022	.000
		Total SLCs	-	.250*	.105	.018
Verbal fluency	Step 1	Education	.336**	.207**	.030	.000
	Step 2	Education	.048**	.167**	.030	.000
		Age	-	-.097**	.021	.000
Sentence comprehension test	Step 1	Education	.475**	.225**	.022	.000
	Step 2	Education	.034**	.201**	.022	.000
		Age	-	-.063**	.015	.000
	Step 3	Education	.010*	.226**	.025	.000
		Age	-	-.064**	.015	.000
		Gender	-	.546*	.242	.025

SLC = subjective language complaint; K-BNT-15 = 15-item Korean version of the Boston Naming Test; Total SLCs = total score of SLCs.
*p < .05, **p < .01.

Table 4. SLC scores according to gender, job status, family, and depressive symptoms

	N	SLC1	p-value	SLC2	p-value	Total SLCs	p-value
Gender							
Men	105	2.64 ± .98	.044*	1.53 ± .82	.916	4.17 ± 1.40	.126
Women	271	2.41 ± 1.01		1.52 ± .74		3.93 ± 1.36	
Job status							
Having a job	65	2.71 ± .91	.022*	1.60 ± .77	.200	4.31 ± 1.24	.017*
No job	287	2.39 ± 1.03		1.47 ± .75		3.86 ± 1.39	
Family							
Living alone	117	2.39 ± 1.02	.369	1.43 ± .71	.099	3.82 ± 1.32	.114
Living with others	251	2.49 ± .99		1.57 ± .79		4.06 ± 1.39	
GDS							
≤ 5	188	2.72 ± .91	.000**	1.69 ± .72	.000*	4.41 ± 1.19	.000**
> 5	188	2.22 ± 1.03		1.36 ± .78		3.59 ± 1.42	

SLC = subjective language complaints; SLC1 = SLC about present language abilities; SLC2 = SLC about worsening language abilities over time; total SLCs = total score of SLCs.
*p < .05, **p < .01.

persons without a current job had more language complaints than those with a job ($p = .017$). Subjects with depressive symptoms also reported more complaints than those without symptoms ($p < .001$). Although present complaints about language abilities were reported more by women than men ($p = .044$), there was no significant gender difference in total for the SLCs. There was also no significant difference in SLCs between elderly people living alone and those living with others (Table 4).

CONCLUSION

This study is noteworthy in that it is the first attempt to investigate the association between overall language complaints of the normal elderly and their objective language performance. The most notable result of our study is that SLCs among the normal elderly were associated with the K-BNT-15 performance. This means that the overall language complaints of normal elderly persons prominently reflect one of those most frequently reported among the elderly, namely, a difficulty in word retrieval (Burke & Shafto, 2004; Martins et al., 2012). Word retrieval within the confrontation naming task requires perception of picture stimuli, semantic identification of the stimuli, lexical retrieval, and phonological access to the target names (Grossman et al., 2004; Seidenberg, Geary, & Hermann, 2005). Reduced word retrieval ability might result from semantic degradation, loss of lexical forms, or impaired access to phonological forms (Goral, Spiro, Albert, Obler, & Connor, 2007; Verhaegen & Poncelet, 2013). Thus, the confrontation naming task assesses language-specific impairment in word retrieval in a sensitive way. Impairment of confrontation naming ability has also been reported in patients with early stages of dementia. Patients with Alzheimer's disease commonly complain of the tip-of-the-tongue (TOT) phenomenon and decreased naming ability. These problems result from concept-specific loss of information from semantic memory (Bayles, Tomoeda, Kaszniak, & Trosset, 1991), and this impairment has been confirmed through qualitative analyses of patients' semantic errors (Kim, Kim, & Na, 1997). Similarly, age-related decline in the ability to name objects or picture stimuli could be perceived by normal elderly persons as a decline in language ability.

SLCs were not associated with verbal fluency performance. The verbal fluency task assesses not only language ability, but also such cognitive functions as initiation, working memory, and executive functions (Auriacombe, Fabrigoule, Lafont, Jacqmin-Gadda, & Dartigues, 2001; Goral et al., 2007). The verbal fluency test is divided into categorical and phonemic fluency, and the 'animal' category is most frequently used (Tombaugh, Kozak, & Rees, 1999). However, the verbal fluency test, which requires people to retrieve words within a time limit, creates a demanding scenario that may not be reflective of real-life situations. In daily life, one must recall and name objects or pictures, and elderly adults who experience TOT in this situation perceive a decline in their language abilities. In addition, object naming requires much more precise word retrieval than verbal fluency tests. During verbal fluency test, a subject may switch between categories upon retrieval difficulties.

Performance in the sentence comprehension test was also not related to SLCs. The comprehension abilities of healthy elderly people in the auditory sentence comprehension task have been reported to be either well maintained (Wingfield & Grossman, 2006) or to be declined (DeDe, 2013), depending on several factors, such as age-related slowing, working memory, hearing declines, speech speed, and the syntactic complexity of sentences. As in word level performance, sentence comprehension tasks also require different processes, such as perception of speech sound, rapid identification of words, establishment of structural relations between words, and integrating incoming words with what has already been heard (Burda, 2011; Wingfield & Grossman, 2006). Two questions of this current study about SLCs comprised tasks requiring speaking, reading, listening, and writing, and, thus, might not reflect the specific decline in auditory sentence comprehension ability among elderly adults. We also excluded elderly persons with a decline in hearing through a screening questionnaire and maintained the normal speed of natural speech when conducting the task.

According to the results of the correlation analysis between SLCs and demographic factors, age and education level were related to the SLCs of elderly adults. This was a surprising finding, as a previous study (Martins, Mares, & Stilwell, 2012) reported a contrary result regarding the education factor. Elderly individuals were asked if they had SLCs with regard to reading and writing (general literacy). Educated participants demonstrated not only literacy but also cognitive abilities in coping with language performance tasks

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(Ardila et al., 2010; Nitrini et al., 2004). Thus, those participants with a relatively high educational level tended to be satisfied with their language performance.

Language complaints were also associated with the presence of depressive symptoms. This result corresponds with previous studies in its finding that elderly persons with depression are more likely to have complaints regarding cognition, memory, or language (Martins et al., 2012; Slavin et al., 2010). However, in order to differentiate actual language complaints due to declines in language performance from those complaints stemming from depression, we must screen elderly adults with language complaints for depression.

In addition, job status (i.e., having a job) was found to be related to SLCs. This is because elderly persons with a job are more able to participate in social activities than those without a job. Active social participation increases communication abilities and language-related exposure (Cruice et al., 2005; Noble, Houston, Kan, & Sowell, 2012). Working elderly adults experience social participation and linguistic exposure that are likely to help them maintain their language skills, and in turn this might increase their satisfaction with their language abilities.

In conclusion, language complaints can reflect objective language performance (as in the confrontation naming task), and demographic factors can be associated with self-assessed language ability among the normal elderly. The clinical implications from the current study are that SLCs reflect a difficulty in word retrieval, which is one of the most frequently reported language complaints of elderly adults, and that varying linguistic exposure and social interaction through education and employment may affect perceived language decline among the normal elderly.

Nevertheless, this study has some limitations that must be considered when interpreting these results. First, the questionnaire used to self-assess language complaints includes only two questions that range over the whole field of language abilities. It is suggested that future studies about SLCs subdivide each area of speaking, listening, reading, and writing and find out which modalities are more related with language abilities and cognitive functions. Second, the number of participants of this study is not strictly controlled by age groups or education level. This study was an exploratory study rather than a confirmatory study to find out whether SLCs are reliable or not and whether clinicians can benefit from asking broad questions about perceived language performance to the elderly.

The findings of this study are significant in that questions easily asked in a clinical setting (i.e., regarding the perceived language decline of elderly adults) have a correlative value with objective language tests. When assessing language abilities of elderly adults, broad questions related to language complaints may be useful in addition to objective language tests.

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국문초록

노년층의 주관적 언어호소: 객관적 언어 수행을 반영하는가?

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배경 및 목적: 주관적 언어호소(subjective language complaints, SLCs)는 노년층에서 자주 보고되고 있으나, SLCs와 여러 언어 기능 사이의 관계는 연구되지 않았다. 이에 본 연구는 SLCs가 여러 객관적 언어 검사의 수행력과 관계가 있는지, 그리고 SLCs가 어떤 인구통계학적 요인들과 관련되는지 알아보고자 한다. 방법: 376명의 정상노년층(평균 연령 74.21 ± 6.56)을 대상으로 두 개 질문으로 이루어진 SLCs와 인구통계학적 정보를 수집했다. 또한, 본 노년층의 생성이름대기, 문장 이해하기, 한국판 보스톤 이름대기 검사 단축형(15-item Korean version-the Boston Naming Test, K-BNT-15) 결과와 SLCs의 관계를 다중회귀를 통해 분석하였다. 결과: SLCs는 K-BNT-15 결과를 반영할 수 있었으며, 노년층의 나이, 교육연수, 우울증, 직업유무와 관련이 있었다. 논의 및 결론: 본 결과는 SLCs가 노년층에서 가장 자주 호소되는 단어인출의 어려움을 반영하며, 교육과 직업을 통한 언어적 노출 및 사회적 상호작용이 노년층의 언어감퇴에 대한 인식에 영향을 미칠 수 있다는 점을 시사한다.

핵심어: 노화, 인지호소, 언어호소, 언어수행, 언어검사

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