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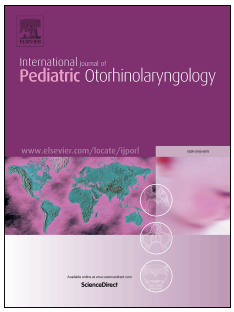

Development and validation of a new scale for assessment of speech stimulability in Persian speaking children

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ABSTRACT

Objectives: Speech and language pathologists need to assess speech stimulability as a crucial component of assessment in clients with speech sound disorders. The purpose of the current survey was to develop and validate an instrument to assess speech stimulability in Persian speaking children.

Methods: The present study was accomplished in two steps. In step I, the test material was developed based on extensive literature review, and five experts were requested to make judgment on the content validity of the test. We evaluated other psychometric properties in step II. A pilot study was performed by the administration of the test on 25 children, and then the correct answer percentages of 100 participants for each item of the Persian test of speech stimulability were calculated. The participants were divided into four groups by six-month intervals. Inter-rater reliability, test-retest, and internal consistency were computed for the reliability measures. Statistical Package for the Social Sciences, version 24.0 (SPSS, Inc., Chicago, IL) was used for the statistical analysis of the data. The significance level was ($P<0.05$).

Results: The final version of the test includes 132 items (consonant and vowel singleton words and sentences). There was no significant difference among experts' judgment in the content validity of the items ($P>0.05$). All of the children could easily repeat the items in the pilot study. The participants were stimulable more than 80% for all of the consonants except /ʒ/ and 100% for the vowels in the items of the final version of the Persian test of speech stimulability. All of the reliability values (inter-rater reliability, test-retest, and internal consistency) were higher than 0.8.

Conclusion: Investigation of psychometric properties of the Persian test of speech stimulability showed that this test is a valid and reliable scale to assess the speech stimulability in Persian speaking children.

Keywords: Children; Assessment; Test; Persian; Stimulability; Speech sound disorders

1. Introduction

Speech Sound disorders (SSD) are defined as a subtype of communication disorders that are characterized by the problem of articulation with one or more speech sounds that continue after a specific age[1, 2]. Children with SSD produce speech sounds less accurately than normally developing peers. There usually is not any obvious cause like neuro-motor, cognitive and sensory complications reported in the literature. The age of the majority of the individuals with SSD is less than 8-years-old; however, this disorder may persist to higher ages[1].

The prevalence of SSD is 10 to 15% in childhood, so the 3 to 6-year-old children are a major part of the clients for speech and language pathology clinics[3].

There are some studies demonstrating that individuals with SSD are at an increased risk for experiencing literacy difficulties in school ages [4-6]. Therefore, speech and language pathologists should perform a detailed and thorough assessment of this population to design the best treatment plan for them[7]. The comprehensive assessment of clients with SSD

includes assessing the speech sound production in the single word and connected speech, orofacial examination, assessing the speech intelligibility and speech stimulability[1].

Stimulability, as a part of the comprehensive assessment in clients with SSD, is defined as the client's ability to modify speech sound errors after the modeling of the clinician[8]. It is proved that speech stimulability is a crucial parameter for a better understanding of the nature of speech sound errors[9]. This concept is so important in both assessment and intervention of persons with SSD and is considered as evidence of the functional and structural integrity of the speech system[10, 11].

Skahan et al reported that speech and language pathologists mostly included stimulability assessment for children with SSD in their assessment processes[3].

Obtained information on stimulability assessment in clients with SSD may be used not only for the selection of treatment goals but also as a prognostic tool in the absence of any intervention procedure[3]. Powell and Miccio reported that there was a positive association between learning of speech sounds and stimulability[12]. Stimulability testing is used to determine if the sound(s) are likely to be acquired without intervention, select appropriate therapy targets and predict improvement in therapy[13]. Several studies have reported that stimulability measures may help clinicians to establish prognosis of clients with SSD[12, 14]. They demonstrated that children with better function in stimulability measurements who did not receive any intervention, show more improvement in speech sound production.

Traditionally, speech and language pathologists have used sound specific measures for the assessment of stimulability. Based on this method, one may be stimulable for example for /r/ but not for /s/, or may be stimulable in word level but not in sentence level[12]. Some attempts have been made to develop and validate the assessment tools for assessing the stimulability. Goldman and Fristoe incorporated the assessment of stimulability in their test "Goldman-Fristoe test of articulation". This task assesses the stimulability in syllable, word and sentence levels[15]. Lowe also included stimulability in word level in his battery "Assessment Link between Phonology and Articulation"[16].

Some researchers have addressed stimulability individually[17, 18]. Glaspey (2006) combined dynamic assessment and stimulability together to develop a new instrument for the measurement of phonological skills[18]. This measure is named "Scaffolding Scale of Stimulability" or (SSS). All of the consonants are elicited in initial and final positions by manipulating the linguistic environment and cues for English-speaking speakers in this scale. Linguistic and cultural issues are crucial concepts in assessing and treating clients in speech and language pathology[19]. Persian speech and language pathologists face a difficult task in evaluation and intervention of clients with SSD, as there are limited data about phonological

skills both for typically developing children and clients with SSD. However, no instrument exists for the assessment of stimulability in Persian. So, we decided to develop and validate an assessment tool that assesses stimulability in consonants and vowels that incorporate both words and sentences for each consonant and vowel.

2. Material and Methods

2.1. Ethical consideration

The current research was approved by the Ethical Committee of Iran University of Medical Sciences (Code no. 1395.9221363201). All of the parents completed the consent form for the recruitment of their children in the research. Children, who did not like to participate in testing, were not included in the study.

2.2. Study design

A Cross-sectional and methodological research was conducted for the development and validation of the Persian test of speech stimulability.

2.3. Participants

One hundred twenty-five typically-developing, monolingual Persian speaking children, in the age range of 3-5 years were included in the current study. Twenty-five children for the pilot study and one hundred children for the administration of the final version of the test included in this study by convenient sampling. Participants were selected from the north, center and south of Tehran city. They were divided into four groups with six months interval: Group 1 (36-41months); Group 2 (42-47 months); Group 3 (48-53 months); and Group 4 (54-59 months). Inclusion criteria were monolingual Persian speaking children with typical language development that were aged between 3-5-year-old. We exclude children who had visual and hearing impairment, delayed speech and language development, cleft lip and palate, autistic spectrum disorders, cerebral palsy, and mental retardation. The screening of these conditions was based on examinations of experienced speech and language pathologists, parents' and teachers' reports in nursery schools, and participants' medical records.

2.4. Development of the test

2.4.1. Item generation

Firstly, the item generation was performed carefully to develop a valid test. Persian consonants and vowels and the positions of their occurrence were determined. We considered three words and three sentences for each consonant except for /ʔ/ in which there was no word for the final position [24]. Vowels cannot occur in the initial position in Persian and there are not

appropriate words with vowels in the final position for all of the vowels [25]. So the vowels were included only in the middle position in this test. We ensured that all the items were culturally appropriate and familiar to 3 to 5-year-old children[15]. With extensive literature review related to stimulability evaluation one or two syllabic words were included as target words in assessment of stimulability in word level. It seemed that children could easily repeat the target words and sentences after examiners because the words had one (CVC) or two syllables (CVCV)[1, 20-22]. All of the sentences had three words, except in cases where we could not include a three-word sentence for that word. This sentence length helped children to imitate the sentences easily. Finally, the Persian speech stimulability test was developed that included 23 singleton consonants, 6 vowel singleton, 48 words, and 55 sentences.

2.4.2. Content validity

We asked the panel comprising of three speech and language pathologists and two linguists, who had studied and worked on speech sound acquisition and (SSD), to review the target words and sentences and respond to the questions with yes/no for questions 1-3 in the questionnaire, which included words and related sentences for each consonant and vowel.

1. Are the target words and sentences suitable for the intended sounds and positions for the assessment of speech stimulability?

2. Are the items familiar to 3 to 5-year-old Persian speaking children?

3. Are the items culturally suitable for Persian speaking children?

4. Do you have any suggestions for the items in general?

The experts' judgments to the characteristics of the items were compared. According to the experts' responses to question 4, some minor changes were applied to the items.

2.5. Step II: Evaluation of other psychometric properties

2.5.1. Pilot study

At first, a pilot study was conducted to investigate whether the items are appropriate for 3 to 5-year-old children. This point was accomplished by administering the test on 25 typically developing children aged 3 to 5-years-old.

2.5.2. Administrating the final version of the Persian test of speech stimulability

The final version of the Persian test of speech stimulability was administrated on 100 typically developing children and the percentage of correct answers for each item in a consonant and vowel singleton, word and sentence level were calculated for each consonant and vowel.

2.5.3. Reliability

2.5.3.1. Inter-rater reliability

Two raters who were expert speech and language pathologists independently transcribed and scored the speech samples of 20 randomly selected children from the example. Then the Cohen's Kappa values were computed for each of the items.

2.5.3.2. Test-retest reliability

Test-retest reliability was computed by the calculation of Cohen's Kappa value for each of the items between two administrations of the Persian test of speech stimulability with two weeks interval. Twenty five children were recruited for the test-retest reliability.

2.5.3.3. Internal consistency

The correlation among the items of the test was obtained for internal consistency.

2.6. Scoring and administration of the test

The Persian test of speech stimulability was implemented by the speech and language pathologist who had experience in assessment and intervention of children with SSD. The assessment was carried out individually for each child. Sampling was administrated in a silent room in nursery schools. The required time for each participant was 15-20 minutes. The examiner and child sat face to face. At first, the examiner explained to the child that they were going to say some sounds, words and sentences. Stimulability was assessed by having children imitate each of the items with the same manner of examiner. Examiner used her right hand to point to her mouth to help the participant to pay attention to visual characteristics of the speech sounds. The assessment of stimulability was done in a single speech sound, word, and sentence for each speech sound, respectively. Examiner had visual cue in each level of stimulability for intended sounds. If the child lost his attention, the examiner modeled the items again. We had the short period of rest for children during evaluation if the child needed to rest. A voice recorder (SONY-ICD-UX560F) and a laptop (ASUS-K45VD) were used to record speech samples for further checking the transcription. The examiner transcribed what the child uttered and recorded it on the recording answer form. If a child could produce the intended sound correctly, score 1 was given to that sound in that speech sound singleton, word or sentence, and if they could not produce it correctly score 0 was given to that speech sound.

2.7. Measures and analysis

Statistical Package for the Social Sciences, version 24.0 (SPSS, Inc., Chicago, IL) was used for the statistical analysis of the data. The one-way ANOVA was used to compare the judgments of

experts for the content validity of the items. Descriptive statistics were used to report the percentage of the correct answers of the participants in the final form of the Persian test of speech stimulability in each level. Cohen's κ was run to investigate inter-rater reliability between two raters and test-retest reliability for the Persian test of speech stimulability. We used the Kuder-Richardson test 21 for the internal consistency reliability. All of the analysis was considered at ($P<0.05$).

3. Results

3.1. Descriptive statistics

Descriptive statistics of the participants are given in Table 1.

3.2. Content validity

As given in table 2, there was not any significant difference between experts' judgments to the questions related to characteristics of the Persian test of speech stimulability ($P>0.05$).

3.3. Pilot study

All of the children could easily imitate almost of the items. So, few items (only 2 items) were replaced by other ones. These two items were two wh-question sentences that children answered these questions and didn't repeat it. So we replaced these items by another items.

3.4. Findings of the administration of the final version of the Persian test of speech stimulability

The results related to administrating the final version of the Persian test of speech stimulability are given in table 3. According to the table 3, twenty out of twenty-three consonants were imitated correctly by 90% or more than 90% of participants in all positions (initial, medial and final) and the three levels (speech sound singleton, words and sentences). One hundred percent of the participants could imitate correctly the /p, b, m, n, d, t, h, ʔ, ʤ, j/ in the three positions and levels. One hundred percent of the participants were stimulable for all of the vowels. The findings related to the vowels are provided in table 4.

3.5. Reliability

3.5.1. Inter-rater reliability

There were the substantial values for the Cohen's Kappa that was used for the inter-rater reliability. The values ranged from 0.82 to 0.93.

3.5.2. Test-retest reliability

The substantial values were obtained for the Cohen's Kappa that was used for the inter-rater reliability. The values ranged from 0.92 to 0.97.

3.5.3. Internal consistency

There was a high correlation among the items of the Persian test of speech stimulability (kr=0.80, P<0.001).

4. Discussion

The aim of the present paper was to develop and investigate the psychometric properties of the Persian test of speech stimulability. As previously mentioned in the introduction, the major caseload of speech and language pathologists who work with pediatrics is children with the age range of 3 to 6 years[3], so we conducted the current research on this age range. Developing a new instrument for the assessment of speech stimulability was the novel aspect of this survey.

Some developers of instruments for the assessment of children with SSD included stimulability in their assessment package but have not reported psychometric properties for this measure. For example, Goldman and Fristoe incorporated stimulability in the Goldman-Fristoe test of articulation but introduced it as a task and did not give an explanation about the psychometric properties of this measure[15].

Content validity of the Persian test of speech stimulability was shown by the non-significant difference between the experts' judgments about the items. This procedure has been used in similar studies related to validation instruments for the assessment of children with SSD[7, 23]. Abou-Elsaad et al and Ahmadi et al also compared the percentage of the experts' judgments to the test's items of their tests for the investigation of the content validity[23, 24]. We included only familiar and culturally appropriate items for the Persian test of speech stimulability. These criteria have been considered in several instruments for the assessment of SSD [23-25].

The Persian test of speech stimulability was administrated on 25 typically developing children as the pilot study. The pilot study is considered a study with a small sample size that helps the researchers know the problems that will be faced in their study[26]. Performing the pilot study could answer the following questions: 1. Are the items suitable for the target population or not? 2. Are the items of the Persian test of speech stimulability correctly defined for the 3 to 5-year-old Persian speaking children? The participants in the pilot study could imitate almost all of the items except a few items that were replaced by other ones.

A hundred percent of the participants could imitate /p, b, m, n, d, t, h, ʔ, ʤ, j/ correctly, and 90% of the participants could imitate /p, b, h, t, d, f, v, ʤ, m, n, k, g, s, z, ʃ, ʔ, ʧ, j / correctly in all positions (initial, medial and final) and all levels (consonant singleton, words and sentences) in

the Persian test of speech stimulability. It was found that visibility is a factor that is highly associated with stimulability. Consonants with higher levels of visibility were imitated more easily by the children[27].

Miccio et al demonstrated that children with typical phonological development acquired consonants that were stimulable within a period of a few months[11]. It seems that stimulable sounds will be acquired naturally and will not require intervention. Tyler and Macrae also reported a similar finding. They showed that there was a significant relationship between stimulability and phonetic inventory size[28]. High percentages for the correct answers of the speech stimulability test may imply that Persian speaking children with typical development phonology have acquired or will acquire intended consonants in a short time period. This conclusion is in line with the Ahmadi et al study[24]. They investigated the phonetic acquisition of 400 typically developing children who aged between 36 to 60 months and reported all of the consonants with 90% criterion except /s/; /z/, /ʒ/, and /r/ have been acquired up 42 months by Persian speaking children.

The internal consistency of the Persian test of speech stimulability was shown by a high value for the Kuder-Richardson 21. This finding shows that all of the items of this instrument highly correlated with each other and measure the single behavior[29]. There were substantial values for the inter-rater reliability. This finding shows that we can expect similar results over multiple administration of this instrument. This finding is in agreement with some studies. Also the high values were computed for the test-retest reliability. The obtained high values for test-retest reliability imply that this instrument can measure stimulability stably[29].

There were some limitations in the current study that should be taken into consideration. First, only 125 children participated in the current research. Recruitment of children with a larger sample size certainly provides a more precise understanding of speech stimulability in Persian speaking children. Second, we did not incorporate clients with SSD in the current study. Third, this instrument was validated only for 3 to 5-year-old children and other age groups were not studied. Further studies are needed to incorporate children with various types of SSD (articulation disorders, phonological disorders, and developmental apraxia of speech) and across a wider age range for studying the stimulability in Persian speaking children. Finally, the socioeconomic status of the participants and its association with speech stimulability in Persian speaking children were not investigated in this paper. There is evidence for an association between speech stimulability and the socioeconomic status in the literature[27]. It is recommended to conduct a study about the effects of socioeconomic status on speech stimulability in Persian speaking children with and without SSD.

5. Conclusion

Accurate development, investigation of different types of validity, and satisfactory values for reliability measures for the Persian test of speech stimulability proved that this scale is a valid and reliable instrument for the assessment of speech stimulability. Future studies are needed to administrate the Persian test of speech stimulability on various groups of children with SSD in the Persian speaking population.

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Table 1: Descriptive statistics of the participants in terms of age and gender (n=125). (Percentages for each group shown in parentheses)

Age group	Girl	Boy	N(total)
36-41 months	15(12)	15(12)	30(24)
42-47months	18(14.4)	15(12)	33(26.4)
48-53months	15(12)	14(11.2)	29(23.2)
54-59months	17(13.6)	16(12.8)	33(26.4)
Total	65(52)	60(48)	125(100)

Table 2: Comparing the experts' judgments to the characteristics of Persian test of speech stimulability in terms of percentage

Experts	Suitability of the items for assessment of stimulability	The familiarity of the items	Suitability of items culturally
Expert1	94±2.3	94±2.3	97±1.6
Expert2	92±2.6	97±1.6	96±1.9
Expert3	91±2.8	96±1.9	97±1.6
Expert4	89±3.1	91±2.8	98±1.3
Expert5	92±2.6	87±3.3	97±1.6
F	0.42	2.55	0.14
P	0.79	0.38	0.98

F = Repeated measures one-way ANOVA; P > 0.05 (non-significant).

Table 3: Percentage of correct answers for each item in consonant singleton, word and sentence level in Persian test of speech stimulability

Assessed Consonant	Consonant Singleton	Initial Position		Medial Position		Final Position	
		SIWL	SISL	SIWL	SISL	SIWL	SISL
/b/	100	100	100	100	100	100	100
/p/	100	100	100	100	100	100	100
/t/	100	100	100	100	100	100	100
/d/	100	100	100	100	100	100	100
/k/	95	95	94	93	93	93	94
/g/	96	95	93	93	93	100	92
/x/	100	99	100	100	100	100	100
/G/	92	92	90	94	92	89	89
/m/	100	100	100	100	100	100	100
/n/	100	100	100	100	100	100	100
/s/	95	95	95	98	97	98	97
/z/	94	94	95	99	97	97	97
/ʃ/	99	99	99	100	99	99	99
/ʔ/	100	100	100	98	97	-	-
/ʤ/	100	100	100	100	100	100	100
/ʧ/	100	100	100	99	99	99	99
/r/	90	89	90	92	92	85	84
/l/	100	100	100	99	100	100	100
/f/	100	100	100	100	100	100	100
/v/	99	99	99	96	96	96	96
/h/	100	100	100	100	100	100	100
/j/	100	100	100	100	100	100	100
/ʒ/	50	50	51	53	53	50	48

SIWL=Stimulability in word level; SISL: Stimulability in sentence level

Table 4: Percentage of correct answers for each item in vowel singleton, word and sentence level in Persian test of speech stimulability

Assessed vowels	Vowel singleton	Medial position	
		SIWL	SISL
/i/	100	100	100
/ɑ/	100	100	100
/e/	100	100	100
/o/	100	100	100
/u/	100	100	100
/æ/	100	100	100

SIWL=Stimulability in word level; SISL: Stimulability in sentence level

Appendix1: Persian test of speech stimulability

1	b	باز	در باز بود.
		سبد	سبد روی میز است.
		لب	جوجه لب ندارد.
2	p	پول	آقا پول دارد.
		شامپو	مامان شامپو خرید.
		توپ	دختر توپ دارد.
3	t	توپ	دخترتوپ دارد.
		موتور	پسر موتور دارد.
		فوت	پسر شمع فوت کرد.
4	d	در	در باز است.
		بادام	پسر بادام خرید.
		باد	باد آمد.
5	k	کیف	کیف گم شد.
		شکر	مامان شکر خرید.
		نوک	جوجه نوک دارد.
6	g	گل	گل سفید بود.
		نگاه	پسر نگاه کرد.

		سگ	سگ بازی می‌کند.
7	m	میز	گل روی میز بود.
		دامن	زن دامن دارد.
		گم	کیف گم شد.
8	n	نوک	جوجه نوک دارد.
		انار	بابا انار خرید.
		زن	زن دامن دارد.
9	f	فوت	پسر شمع را فوت کرد.
		سفید	گل سفید بود.
		کیف	کیف گم شد.
10	v	ورزش	بابا ورزش کرد.
		دیوار	دیوار کج بود.
		گاو	گاو شیر می‌دهد.
11	s	سگ	سگ بازی میکند.
		پسر	پسر نگاه می‌کند.
		خیس	شلوار خیس شد.
12	z	زن	زن دامن دارد.
		بازی	سگ بازی می‌کند.
		باز	در باز بود.
13	q	قاب	قاب روی دیوار است.
		چاقو	چاقو تیز است.
		باغ	باغ میوه دارد.
14		لب	جوجه لب ندارد.

	l	هلو	هلو زرد بود.
		پول	بابا پول دارد.
15	r	راه	بابا راه می‌رود.
		کره	دختر کره خورد.
		در	در باز بود.
16	ʃ	شام	بچه ها شام خوردند .
		ماشین	ماشین بوق دارد.
		موش	موش دم دارد.
17	x	خیس	شلوار خیس شد.
		نخود	آش نخود دارد.
		نخ	نخ پاره شد.
18	ʒ	ژله	ژله نرم است.
		مژه	نی نی مژه دارد.
		رژ	مامان رژ دارد.
19	ʔ	آش	آش نخود دارد.
		ساعت	مامان ساعت دارد.
20	ʤ	جیب	شلوار جیب دارد.
		اینجا	غذا اینجا بود.
		کج	دیوار کج بود.
21	ʧ	چای	مامان چای می-ریزد.
		قیچی	قیچی تیز است.
		پیچ	بابا پیچ خرید.

22	h	حال	مریض حال ندارد.
		ماهی	ماهی در آب است.
		ماه	ماه سفید است.
23	y	یخ	یخ آب شد.
		پیاز	مامان پیاز خرید.
		چای	مامان چای می ریزد.
24	α	چای	مامان چای می ریزد.
25	i	پیچ	بابا پیچ خرید.
26	æ	کج	دیوار کج بود.
27	u	موش	موش دم دارد.
28	e	پسر	پسر نگاه می‌کند.
29	o	نوک	جوجه نوک دارد.

Table 1: Descriptive statistics of the participants in terms of age and gender (n=125). (Percentages for each group shown in parentheses)

Age group	Girl	Boy	N(total)
36-41 months	15(12)	15(12)	30(24)
42-47months	18(14.4)	15(12)	33(26.4)
48-53months	15(12)	14(11.2)	29(23.2)
54-59months	17(13.6)	16(12.8)	33(26.4)
Total	65(52)	60(48)	125(100)

Table 2: Comparing the experts' judgments to the characteristics of Persian test of speech stimulability in terms of percentage

Experts	Suitability of the items for assessment of stimulability	The familiarity of the items	Suitability of items culturally
Expert1	94±2.3	94±2.3	97±1.6
Expert2	92±2.6	97±1.6	96±1.9
Expert3	91±2.8	96±1.9	97±1.6
Expert4	89±3.1	91±2.8	98±1.3
Expert5	92±2.6	87±3.3	97±1.6
F	0.42	2.55	0.14
P	0.79	0.38	0.98

F = Repeated measures one-way ANOVA; P > 0.05 (non-significant).

Table 3: Percentage of correct answers for each item in consonant singleton, word and sentence level in Persian test of speech stimulability

Assessed Consonant	Consonant Singleton	Initial Position		Medial Position		Final Position	
		SIWL	SISL	SIWL	SISL	SIWL	SISL
/b/	100	100	100	100	100	100	100
/p/	100	100	100	100	100	100	100
/t/	100	100	100	100	100	100	100
/d/	100	100	100	100	100	100	100
/k/	95	95	94	93	93	93	94
/g/	96	95	93	93	93	100	92
/x/	100	99	100	100	100	100	100
/G/	92	92	90	94	92	89	89
/m/	100	100	100	100	100	100	100
/n/	100	100	100	100	100	100	100
/s/	95	95	95	98	97	98	97
/z/	94	94	95	99	97	97	97
/ʃ/	99	99	99	100	99	99	99
/ʔ/	100	100	100	98	97	-	-
/ʤ/	100	100	100	100	100	100	100
/ʧ/	100	100	100	99	99	99	99
/r/	90	89	90	92	92	85	84
/l/	100	100	100	99	100	100	100
/f/	100	100	100	100	100	100	100
/v/	99	99	99	96	96	96	96
/h/	100	100	100	100	100	100	100
/j/	100	100	100	100	100	100	100
/ʒ/	50	50	51	53	53	50	48

SIWL=Stimulability in word level; SISL: Stimulability in sentence level

Table 4: Percentage of correct answers for each item in vowel singleton, word and sentence level in Persian test of speech stimulability

Assessed vowels	Vowel singleton	Medial position	
		SIWL	SISL
/i/	100	100	100
/ɑ/	100	100	100
/e/	100	100	100
/o/	100	100	100
/u/	100	100	100
/æ/	100	100	100

SIWL=Stimulability in word level; SISL: Stimulability in sentence level