

# Voice articulation among Serbian CWS and CWNS

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**Introduction:** Research claims that PWS have poorer control over oral praxia (oral motor skills). Therefore, one would expect that PWS exhibit poorer articulation of voices (speech sounds). We noticed that research studies often did not exclude family history in stuttering, medical, neurological and other conditions and states that can interfere with speaking abilities. This is why we decided to study on voice articulation among native Serbian speakers by comparing CWS against CWNS, while being very strict on excluding experimental subjects with any secondary issues.

**Methodology:** The subjects were primary school children, aged 7 to 14. Criteria for including subjects into research were:

- to have Serbian as their first language
- no history of speech or language development disorders
- no diagnosis or conditions that could interfere with speaking abilities
- negative family history in stuttering
- to be right-handers
- to have IQ > 90

The experimental and control group had 31 subjects each, and were matched on the above criteria.

The **experimental group** consisted of children who stutter (**CWS**) who came to treatment for stuttering.

The **control group** consisted of children who do not stutter (**CWNS**).

The *Global articulation test for assessing articulation of voices of Serbian language* was applied by experienced speech and language therapist. For statistical analysis, we adjusted scoring into 4-grade scale: voice omission (1), substitution (2), distortion (3) and correct articulation (4).

**Results** show neither omission nor substitution of voices. 50% of subjects did have distorted articulation (55% in CWS and 45,2% in CWNS). Even though the difference between CWS vs. CWNS is 10%, Fisher's exact test shows no statistically significant difference between two groups in the frequency of distorted voices ( $p=0.80>0.05$ ). Serbian language has 30 voices, and median value for each voice for both groups was statistically examined. A statistically significant difference was found only in articulation of /d/ and /r/ ( $p<0.05$ ).

	Number of distorted voices			Σ
	∅	≤ 3	> 3	
<b>Control group (CWNS)</b>	17	9	5	31
<b>Experimental group (CWS)</b>	14	10	7	31
<b>Σ</b>	31	19	12	62

**Discussion:** The overall results on the Global articulation test were somewhat surprising, because children are expected to master correct voice articulation at the start of primary school (between the age 6,5 and 7) (Vuletic D., 1988).

As for the difference between CWS and CWNS, our overall results are consistent to Cullinan & Springer (1980) and Maske-Cash & Curlee (1995), who also used stringent criteria for including subjects into research.

The difference in articulation of /d/ between the groups did not seem surprising, because /d/ is an explosive voice known to be among most common voices that PWS stutter on. However, we found no difference in articulation of other explosives.

Voice /r/, as articulated in Serbian, is most demanding on articulatory muscles and motor programming, and this can explain the difference we found between two groups.

In **conclusion**, we found no statistically significant differences between school aged CWS and CWNS in overall voice articulation abilities.

The differences between our two groups in articulation of /d/ and /r/ deserve further reflection on what oral motor praxia skills are needed for articulation of these voices.

Also, additional research should be done with larger samples with very stringent criteria for including subjects in order to confirm or disprove our results.

## References:

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