

**Supplemental Material S1.** General information about intelligibility and orofacial specificities of the four speakers with Down syndrome (DS).  
VCV = vowel–consonant–vowel.

	DS1	DS2	DS3	DS4
<b>Age/gender</b>	19, female	21, male	24, female	30, male
<b>Acoustic evaluation of VCVs by expert phoneticians<sup>1</sup></b>				
<b>Percentage of correct identifications</b>	96%	85%	56%	78%
<b>Self-evaluation of speech intelligibility (interview of the person with DS by the experimenter)</b>				
<b>How do people understand you?<sup>2</sup></b> 1 ( <i>really bad</i> ) to 4 ( <i>perfect</i> ) imaged scale	Not available	4/4 (family) 1/4 (strangers)	2/4 (family) 1/4 (strangers)	3/4 (family) 1/4 (strangers)
<b>Evaluation by parents (extracted from parental survey)</b>				
<b>Dental anomalies</b>	Alignment, super-numerary	Alignment, narrow palate	Alignment, super-numerary	Alignment
<b>Orofacial Surgery</b>	Amygdales	None	None	Amygdales
<b>Quality of speech communication</b> 1 ( <i>really bad</i> ) to 4 ( <i>perfect</i> )	4/4 (family) 2/4 (strangers)	4/4 (family) 3/4 (strangers)	2/4 (family) 1/4 (strangers)	3/4 (family) 3/4 (strangers)
<b>Issues with consonants</b>	Sometimes	Often	Very often	Very often
<b>Issues with vowels</b>	Sometimes	Sometimes	Very often	Sometimes
<b>Evaluations of bucco-facial praxies by the experimenters/students in speech pathology<sup>3</sup></b>				
<b>Tongue</b>	Protrusion	+	+	±
	Reach lip corners/palate scan	+	+	–
	Upward to the nose	±	–	–
	Backwards to the chin/claps	+	+	+
	Tooth scan	+	+	±
	Clicks (tongue tip)	±	–	±
	Tongue back to produce [krrr]	±	±	±
<b>Lips</b>	Pursed	+	+	–
	Smile stretch	+	+	+
	Upper lip covered by lower lip	+	+	–
	Kiss	±	+	±
	Vibration	±	+	–
	Tonicity (/p/ sound)	+	+	±
<b>Cheeks</b>	Both side puff with and without resistance	+	+	–
	Left–right alternate puff	–	–	–
<b>Jaw</b>	Maximal opening	+	+	+
	Clench	+	undo	+
	Bits opposite lip	+	+	±
<b>Breath</b>	Blow in a straw	+	+	±

<sup>1</sup>Nine expert phoneticians transcribed VCVs produced by speakers with DS based on the acoustic recording only. The percentage of correct identifications was averaged over the nine experts to get an idea of the auditory intelligibility of the speakers.

<sup>2</sup>Questions were orally asked to the person and she answered by selecting an item on a visual four-step scale: very happy green smiley (score: 4), happy yellow smiley (score: 3), unhappy orange smiley (score: 2), or very unhappy red smiley (score: 1).

<sup>3</sup>The praxies were scored on a three-step scale with movement impossible to make (–), movement poorly realized (±), or movement well realized (+). Items with the same scores are grouped for space reasons.