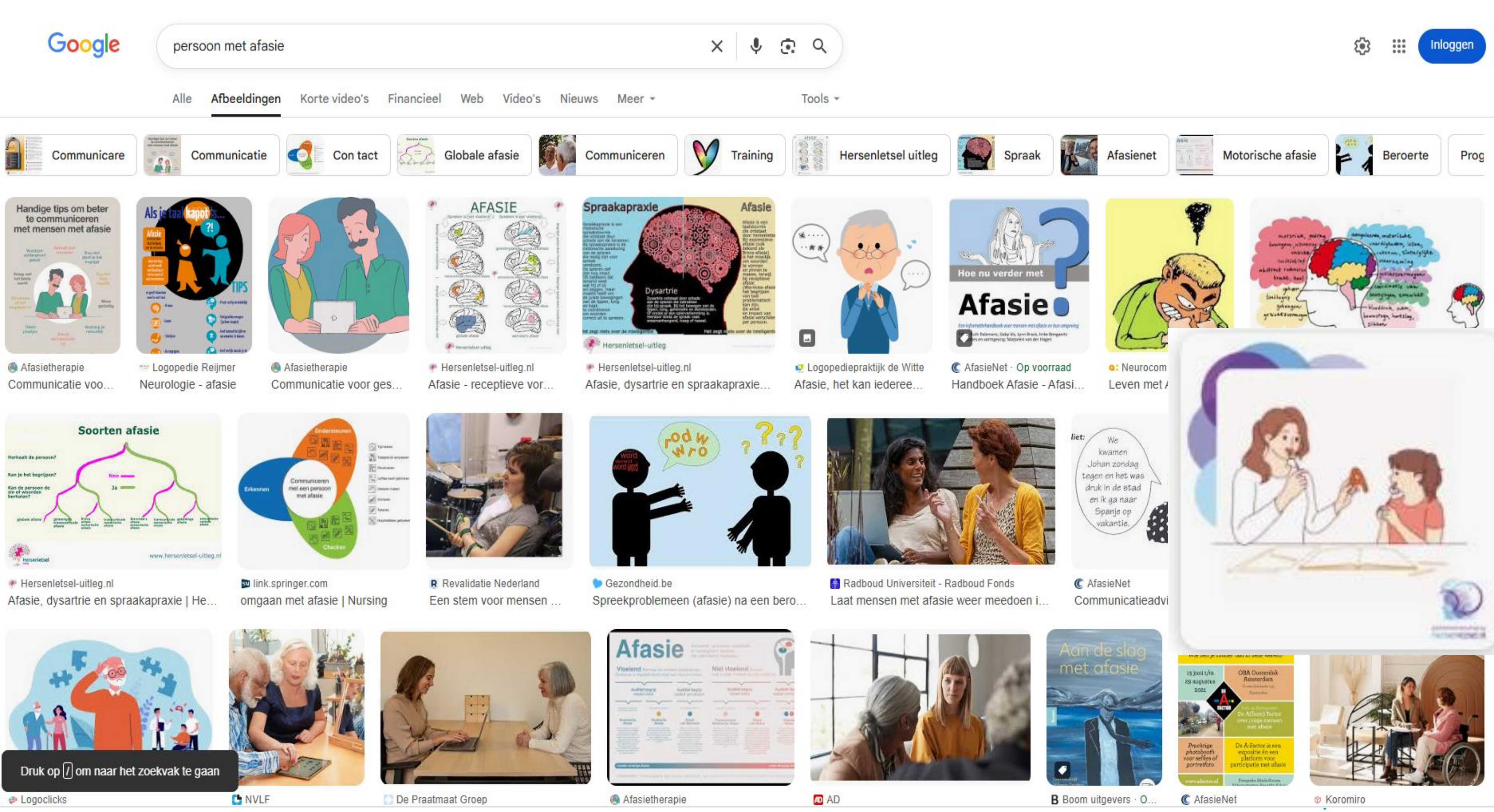
SMTA bij kinderen met verworven spraak- en taalstoornissen

Mirjam van Tellingen, MA

onderzoeker/ klinisch linguïst


Google
persoon met afasie
Inloggen
Alle
Afbeeldingen
Korte video's
Financieel
Web
Video's
Nieuws
Meer
Tools
Communicare
Communicatie
Con tact
Globale afasie
Communiceren
Training
Hersenletsel uitleg
Spraak
Afasienet
Motorische afasie
Beroerte
Handige tips om beter te communiceren met mensen met afasie
Afasietherapie
Communicatie voo...
Logopedie Reijmer
Neurologie - afasie
Afasietherapie
Communicatie voor ges...
AFASIE
Hersenletsel-uitleg.nl
Afasie - receptieve vor...
Spraakapraxie
Afasie
Dysartrie
Hersenletsel-uitleg.nl
Afasie, dysartrie en spraakapraxie...
Logopediepraktijk de Witte
Afasie, het kan iederee...
Hoe nu verder met
Afasie
AfasieNet · Op voorraad
Handboek Afasie - Afasi...
Neurocom
Leven met
Soorten afasie
Hersenletsel-uitleg.nl
Afasie, dysartrie en spraakapraxie | He...
Communiceren met een persoon met afasie
Erkennen
link.springer.com
omgaan met afasie | Nursing
Revalidatie Nederland
Een stem voor mensen ...
Gezondheid.be
Spreekproblemen (afasie) na een bero...
Radboud Universiteit - Radboud Fonds
Laat mensen met afasie weer meedoen i...
We kwamen Johan zondag tegen en het was druk in de stad en ik ga naar Spanje op vakantie.
AfasieNet
Communicatieadvi
Afasie
Aan de slag met afasie
Druk op / om naar het zoekvak te gaan
Logoclicks
NVLF
De Praatmaat Groep
Afasietherapie
AD
Boom uitgevers · O...
AfasieNet
Koromiro

Afasie en spraakapraxie bij jongeren

Video Afasienet

Speech-Music Therapy for Aphasia Apraxia

Combinatie van muziektherapie en logopedie

Individueel

Functioneel relevantie oefenitems

Nieuw gecomponeerde melodieën

De Bruijn et al. (2005); Van Tellingen et al. (2024)

SMTA

Revalidatie Friesland

De Bruijn, et al. (2005)

SMTA

Zingen → Ritmisch spreken → Spreken

Effectstudie SMTA

Vijf volwassenen met spraakapraxie en afasie

Vooruitgang op verstaanbaarheid (ANTAT): 5 van 5

Vooruitgang op begrijpelijkheid (ANTAT): 4 van 5

Significante vooruitgang op AAT en diadochokinese: 5 van 5

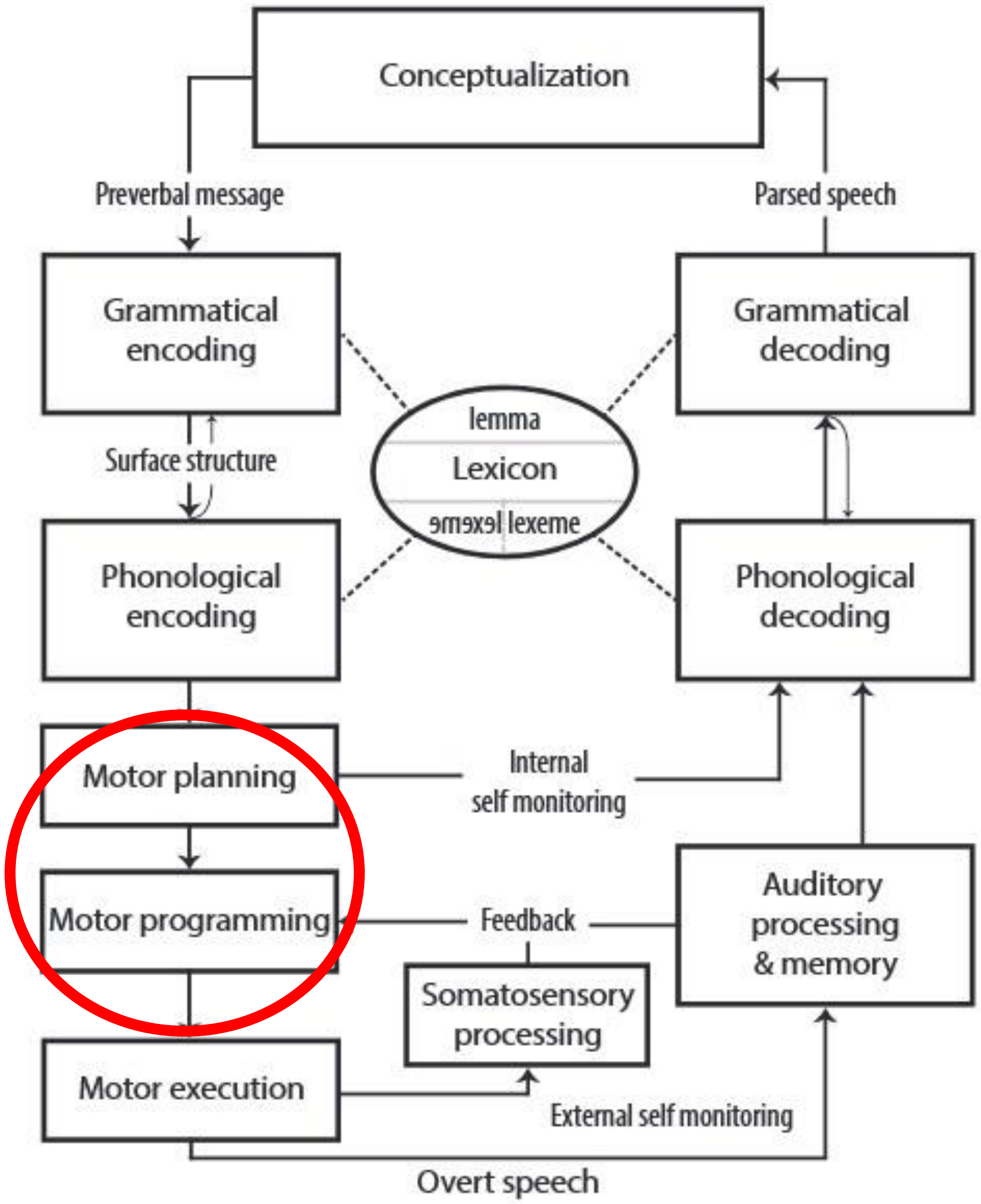
Vooruitgang op DIAS: 4 van 5

Zowel verbetering in **articulatie** als **dagelijkse communicatie**

Hurkmans et al. (2015)

Adult model

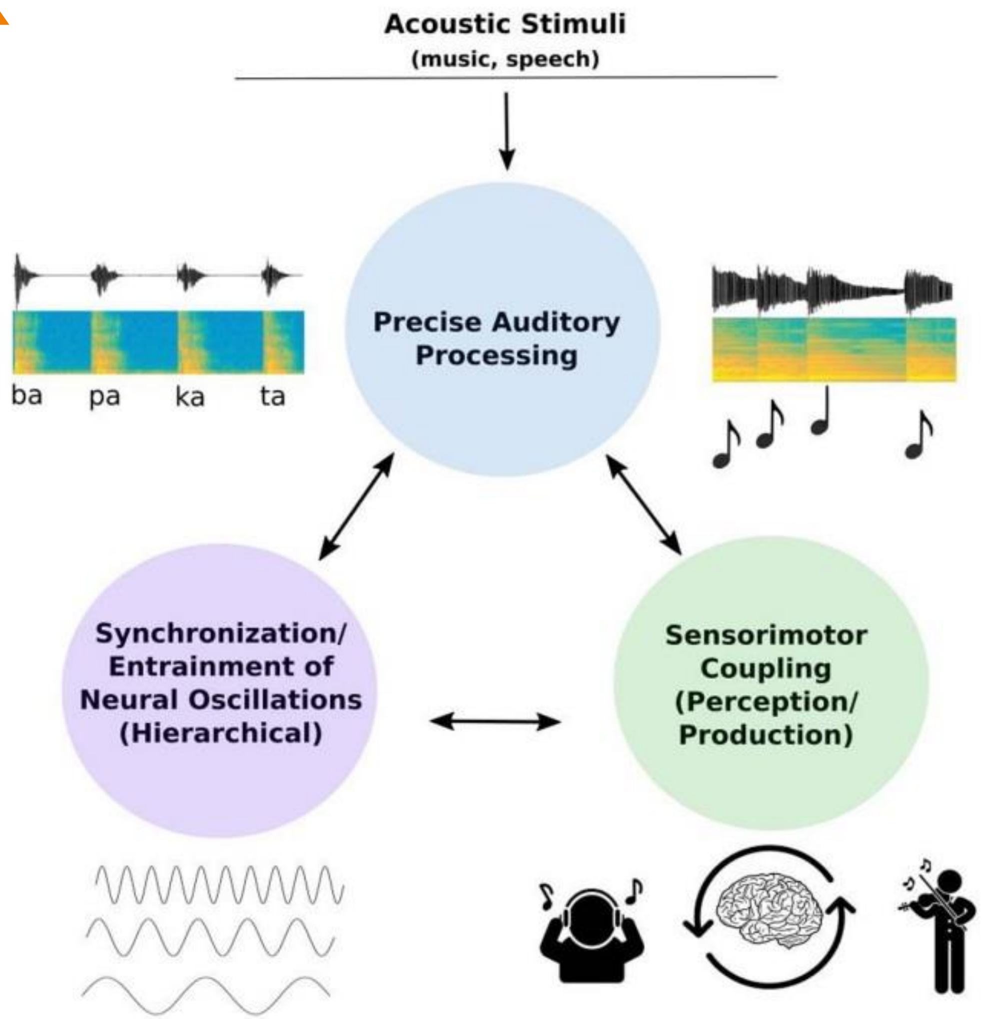
SMTA



Revalidatie Friesland

Hurkmans (2016);
Terband, Maassen en Maas (2016)

Neurale mechanismen van ritme en spraak



Fiveash, et al. (2021)

Voordelen van muziek

Revalidatie Friesland

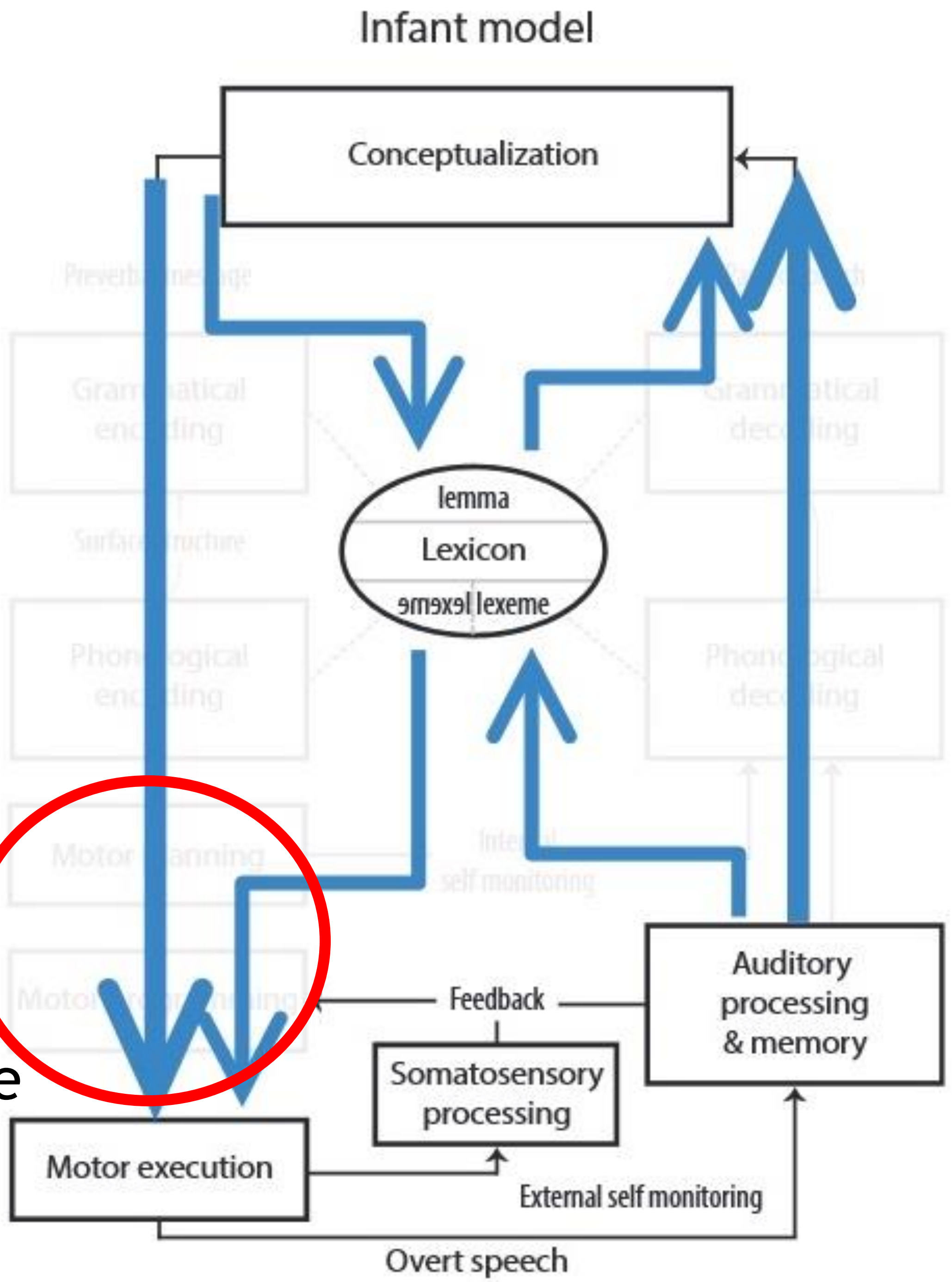
Positieve invloed op stemming en motivatie

Gestructureerde manier om prosodie te benadrukken

Hoog aantal herhalingen op een prettige manier

Merrett, et al. (2014); Patel (2014); Pelliteri (2000)

Spraakapraxie en afasie bij kinderen



Spraakapraxie
Spraakontwikkelingsdyspraxie

Toepassing bij (jonge) kinderen

Doelitems

Structuur in de behandelsessie

Muzikale ondersteuning

Samen zingen

Syllabeniveau

Effectstudie SMTA kinderen

Revalidatie Friesland

Pretest (T1) → Baseline → Behandeling 20 sessies → Posttest (T2) → 2 maanden geen therapie → Follow-up (T3)

Pretest (T1)

- Benoemen
- Imitatie getrainde items
- Verstaanbaarheid
- Spontane spraak
- NonWoord imitatie
- Consistentie
- DDK
- KiddyCAT

Baseline

- MDT
- Controle taak

Behandeling 20 sessies

Wekelijks:

- MDT

Posttest (T2)

- Benoemen
- Imitatie getrainde items
- Verstaanbaarheid
- Spontane spraak
- NonWoord imitatie
- Consistentie
- DDK
- KiddyCAT

Follow-up (T3)

- Benoemen
- Imitatie getrainde items
- Verstaanbaarheid
- Spontane spraak
- NonWoord imitatie
- Consistentie
- DDK
- KiddyCAT

Van Tellingen et al. (2024)

Uitkomstmaten

Revalidatie Friesland

Maat	Taak	Instrument
Percentage Initiële Consonanten Correct (PCCI)	1. Imitatie getrainde items 2. Plaatjes benoemen	1. Individuele taak 2. Computer Articulation Instrument (CAI)
Percentage Vocalen Correct (PVC)	1. Imitatie getrainde items 2. Plaatjes benoemen	1. Individuele taak 2. Computer Articulation Instrument (CAI)
Percentage initiële consonant clusters correct (CCVC)	1. Imitatie getrainde items 2. Plaatjes benoemen	1. Individuele 2. Computer Articulation Instrument (CAI)
Accuraatheid, vloeiendheid en consistentie	Diadochokinese	Modified Diadochokinesis Test
Verstaanbaarheid		Intelligibility in Context Scale - Dutch (ICS-Dutch)

Maassen et al. (2019)
Mcleod et al. (2012)
Hurkmans, et al. (2012)

Peter

Peter
5j6m oud
Spraakontwikkelingsdyspraxie Normale cognitieve ontwikkeling Gemiddeld taalbegrip en woordenschat
20 sessies/ 11 weken
Oefeningen op zinsniveau

j = jaren, m = maanden

Artikel SMTA case study (Engelstalig)

Van Tellingen et al. (2024)

Peter - spraakkenmerken

Inconsistente spraakproductie

Toenemende problemen bij toenemende complexiteit

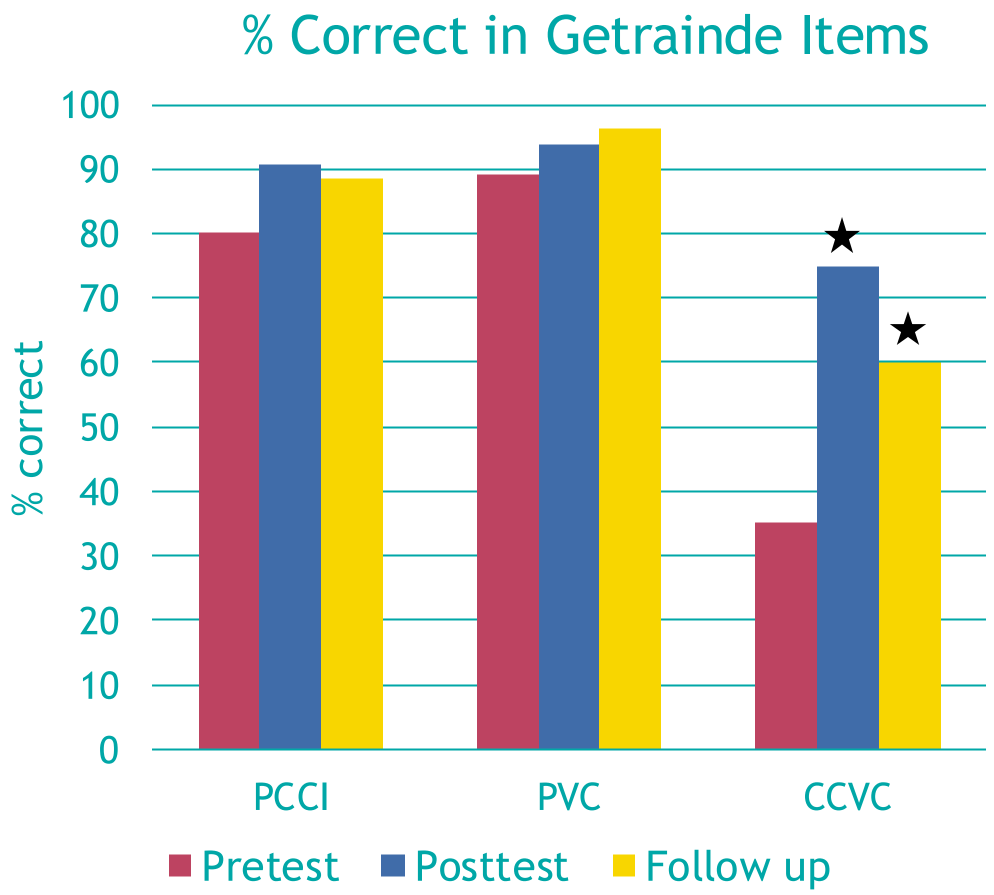
Syllabe segmentatie

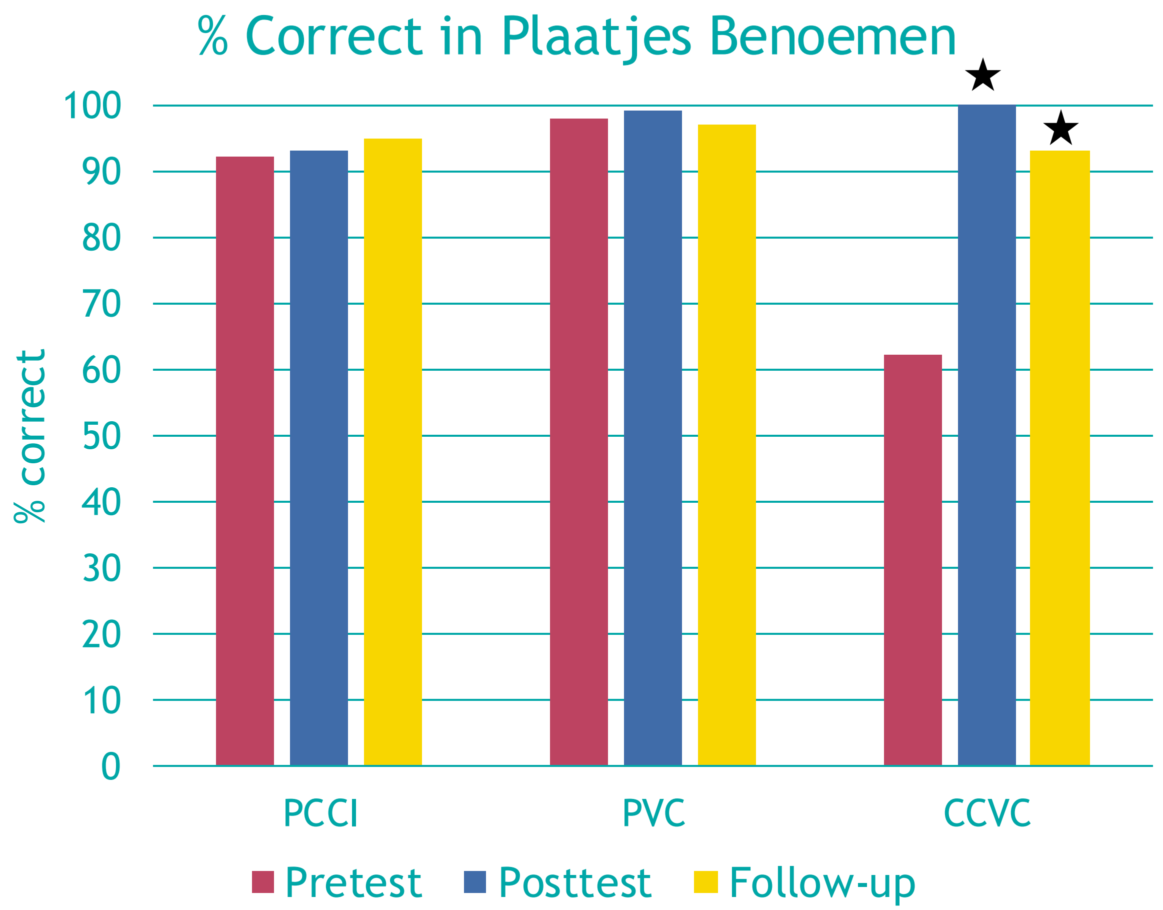
Consonant deleties en substituties

Problemen met stemgeving

Zoekend mondgedrag

Peter - resultaten





PCCI = Percentage Initiële Consonanten Correct
PVC = Percentage Vocalen Correct
CCVC = Percentage Initiële Consonantclusters Correct

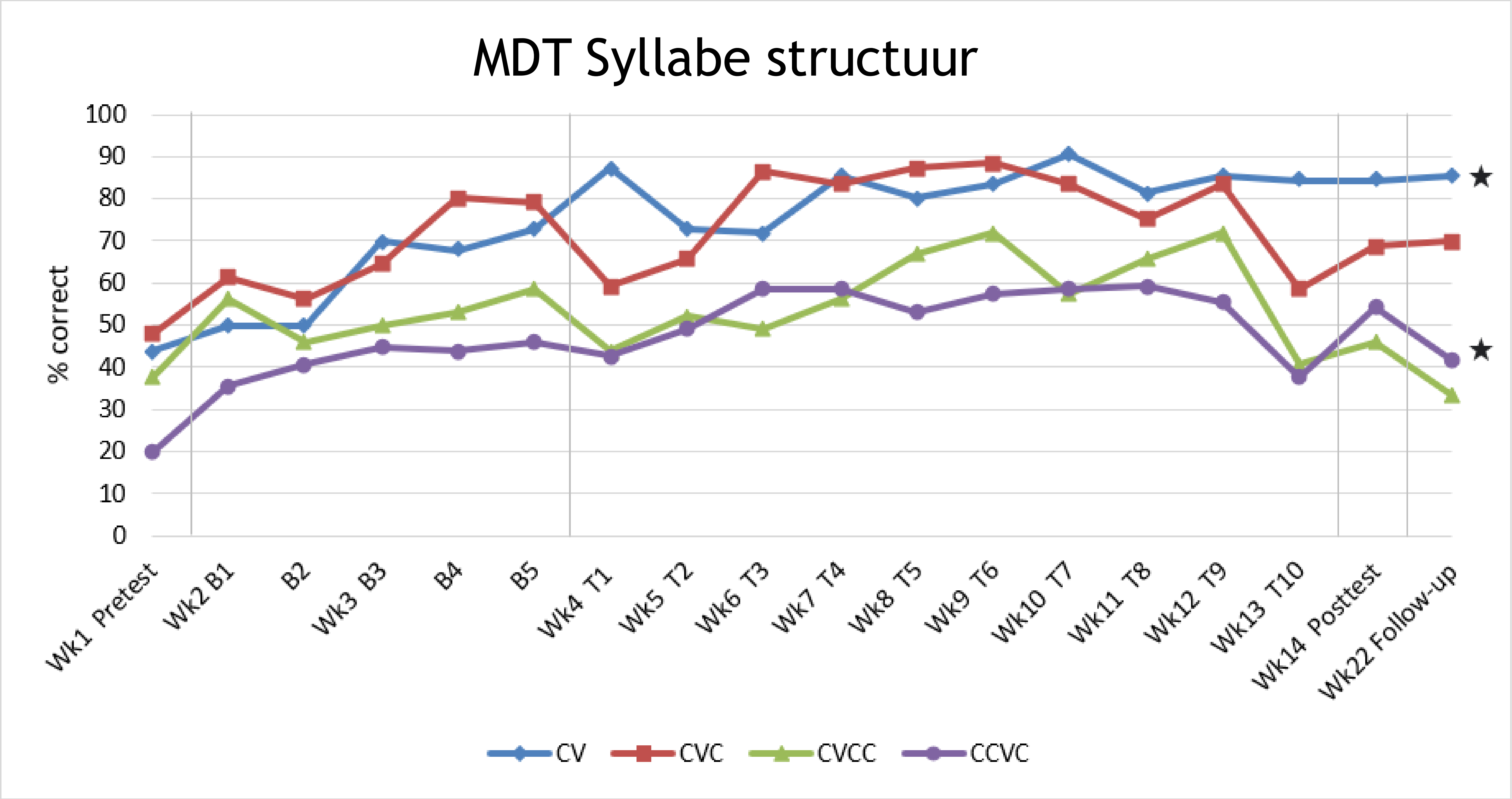
★ = significante verandering

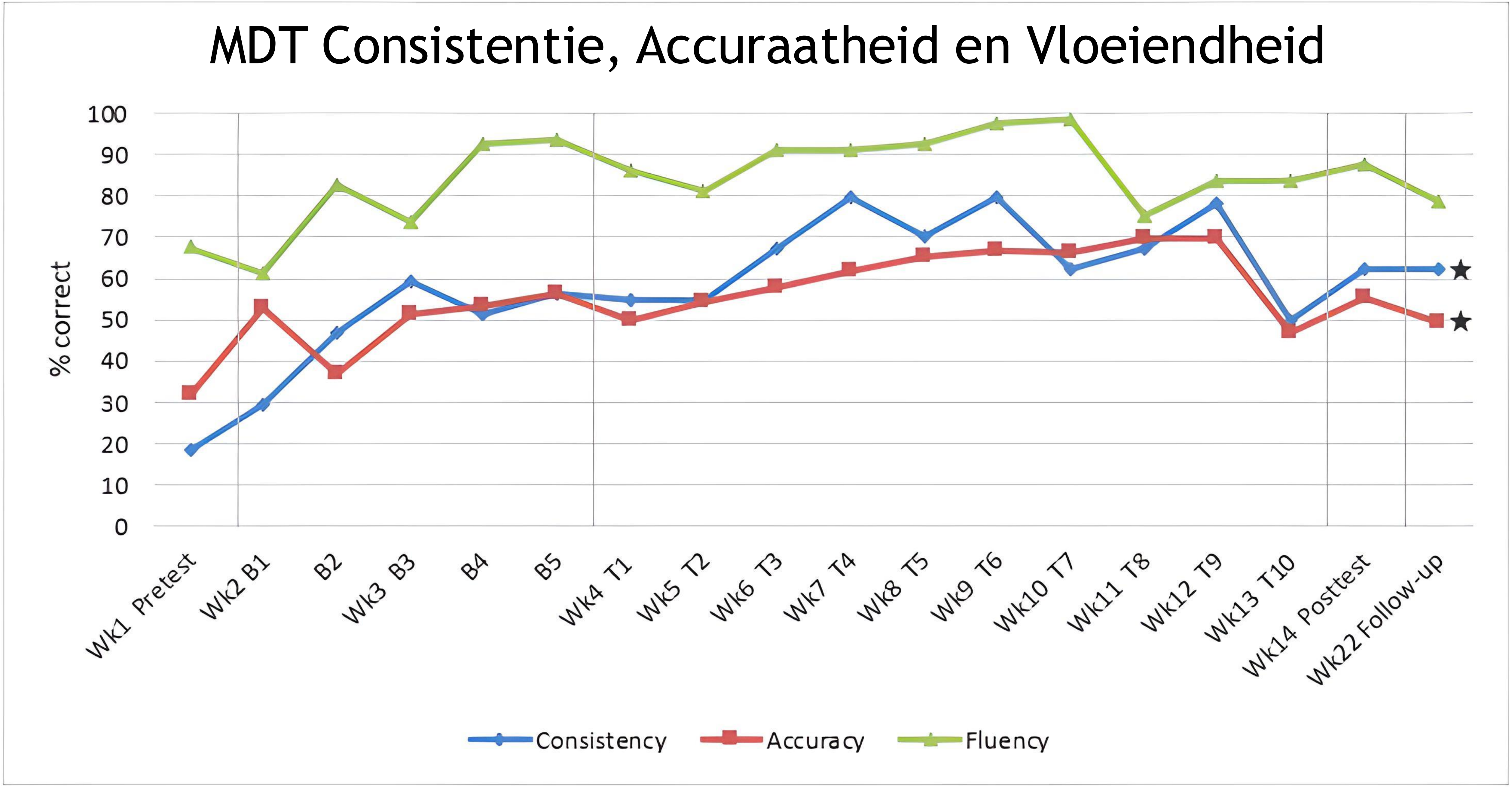
Modified Diadochokinesis Test

Revalidatie Friesland

Nr.	Item	Consistentie	Accuraatheid	Vloeiendheid	Totaal
1.1	Pa pa pa	0-4	0-15	0-5	
1.2	Pa ta ka (p)				
1.3	Da na la (w)				
1.4	Pa po pu (v)				(96)
2.1	Paf paf paf				
2.2	Paf taf kaf (p)				
2.3	Daf naf laf (w)				
2.4	Paf pof puf (v)				(96)
3.1	Paks paks paks				
3.2	Paps pats paks (p)				
3.3	Pats pans pals (w)				
3.4	Paks poks puks (v)				(96)
4.1	Spag spag spag				
4.2	Spag stag skag (p)				
4.3	Stag snag slag (w)				
4.4	Spag spog spug (v)				(96)
	totaal	(64)	(240)	(80)	
	totaal	(p, 96)	(w, 96)	(v, 96)	

Hurkmans et al. (2012)


MDT Syllabe structuur
% correct
100
90
80
70
60
50
40
30
20
10
0
Wk1 Pretest
Wk2 B1
B2
Wk3 B3
B4
B5
Wk4 T1
Wk5 T2
Wk6 T3
Wk7 T4
Wk8 T5
Wk9 T6
Wk10 T7
Wk11 T8
Wk12 T9
Wk13 T10
Wk14 Posttest
Wk22 Follow-up
CV
CVC
CVCC
CCVC


MDT Consistentie, Accuraatheid en Vloeiendheid
100
90
80
70
60
50
40
30
20
10
0
% correct
Wk1 Pretest
Wk2 B1
B2
Wk3 B3
B4
B5
Wk4 T1
Wk5 T2
Wk6 T3
Wk7 T4
Wk8 T5
Wk9 T6
Wk10 T7
Wk11 T8
Wk12 T9
Wk13 T10
Wk14 Posttest
Wk22 Follow-up
Consistency
Accuracy
Fluency

Peter - Verstaanbaarheid

Revalidatie Friesland

	Pretest	Posttest	Follow-up
Peter	3,6	4,0	4,1

Discussie

Positief effect op verstaanbaarheid

Generalisatie naar niet getrainde spraaktaken

Verbetering op maten voor spraakmotorische planning en programmering

Behoud van behandeleffect varieert

Conclusie

SMTA kan ook bij kinderen met verworven spraak- en taalstoornissen worden toegepast.

Leeftijd bij NAH is bepalend voor aanpak en doelen stellen.

Bedankt!

Deelnemende kinderen en hun ouders

Logopedisten en muziektherapeuten van Revalidatie Friesland and Rijndam Revalidatie

Joost Hurkmans
Anne Marie van de Zande
Hayo Terband
Ben Maassen
Roel Jonkers

Revalidatie Friesland

university of groningen
faculty of arts

bcn

Rijndam Revalidatie

IOWA

SMTA bij kinderen in Tijdschrift voor Vaktherapie

Contact
m.van.tellingen@revalidatie-friesland.nl

References -1

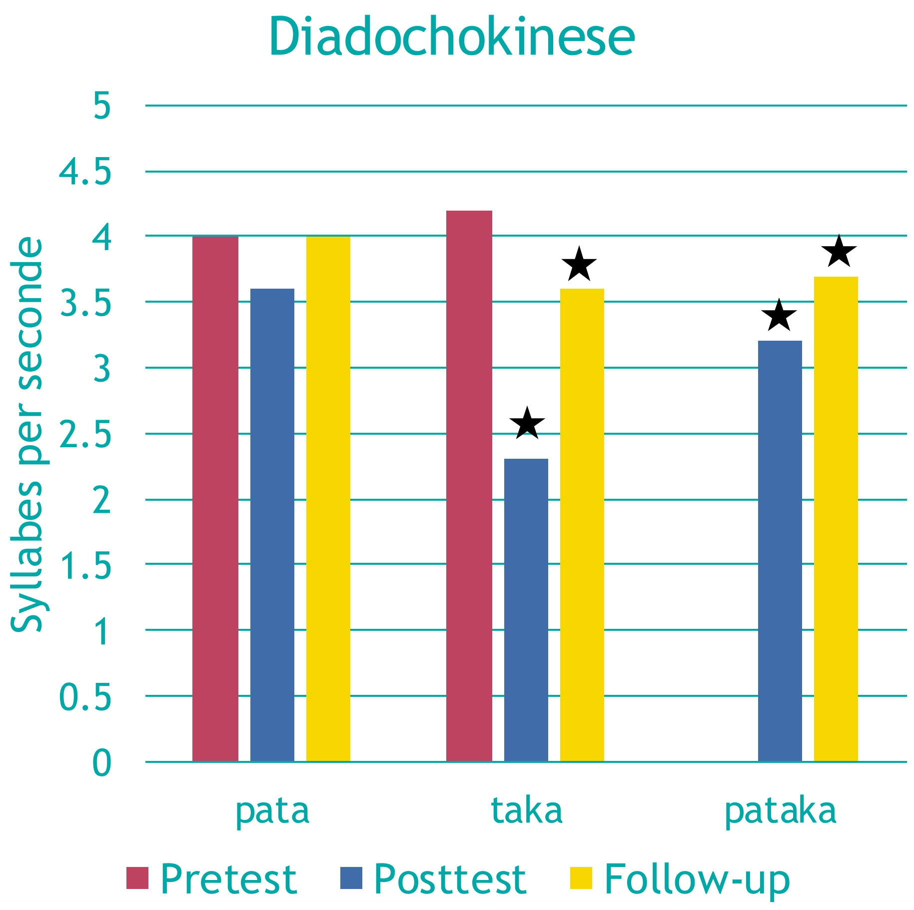
- Albert, M. L., Sparks, R. W., & Helm, N. A. (1973). Melodic Intonation Therapy for Aphasia. *Archives of Neurology*, *29*(2), 130–131. https://doi.org/10.1001/archneur.1973.00490260074018
- American Speech-Language-Hearing Association. (2007). Childhood apraxia of speech [Technical report]. https://www.asha.org/ policy/tr2007-00278/
- Baas, B. S., Strand, E. A., Elmer, L. M., & Barbaresi, W. J. (2008). Treatment of severe childhood apraxia of speech in a 12-year-old male with CHARGE association. Journal of Medical Speech-Language Pathology, 16(4), 181-190.
- Beiting, M. (2022). Diagnosis and Treatment of Childhood Apraxia of Speech Among Children With Autism: Narrative Review and Clinical Recommendations. Language, Speech, and Hearing Services in Schools, 53(4), 947–968. https://doi.org/10.1044/2022_LSHSS-21-00162
- De Bruijn, M., Zielman, T., & Hurkmans, J. J. S. (2005). *Speech-Music Therapy for Aphasia (SMTA)*. Revalidatie Friesland.
- Chenausky, K. V., Baas, B., Stoeckel, R., Brown, T., Green, J. R., Runke, C., Schimmenti, L., & Clark, H. (2023). Comorbidity and Severity in Childhood Apraxia of Speech: A Retrospective Chart Review. Journal of Speech, Language, and Hearing Research, 1–13. https://doi.org/10.1044/2022_JSLHR-22-00436
- Fiveash, A., Bedoin, N., Gordon, R. L., & Tillmann, B. (2021). Processing rhythm in speech and music: Shared mechanisms and implications for developmental speech and language disorders. *Neuropsychology, 35*(8), 771–791. https://doi.org/10.1037/neu0000766
- Hurkmans, Jonkers, R., Bruijn, M. de, Boonstra, A. M., Hartman, P. P., Arendzen, H., & Reinders-Messelink, H. A. (2015). The effectiveness of Speech–Music Therapy for Aphasia (SMTA) in five speakers with Apraxia of Speech and aphasia. *Aphasiology*, *29*(8), Article 8. https://doi.org/10.1080/02687038.2015.1006565
- Lerdahl, F., & Jackendoff, R. (1983). A generative theory of tonal music (Repr.). MIT Press.
- Maassen, B., Van Haaften, L., Diepeveen, S., Terband, H., Van den Engel-Hoek, L., Veenker, T., & De Swart, B. (2019). *Computer Articulatie Instrument*. Boom Uitgevers.
- McLeod, S., Harrison, L. J., & McCormack, J. (2012). *Schaal voor Verstaanbaarheid in de Context [Intelligibility in Context Scale: Dutch]. (J.C. van Doornik-van der Zee & H.R. Terband, Trans)*. Charles Sturt University. Retrieved from http://www.csu.edu.au/research/multilingual-speech/ics

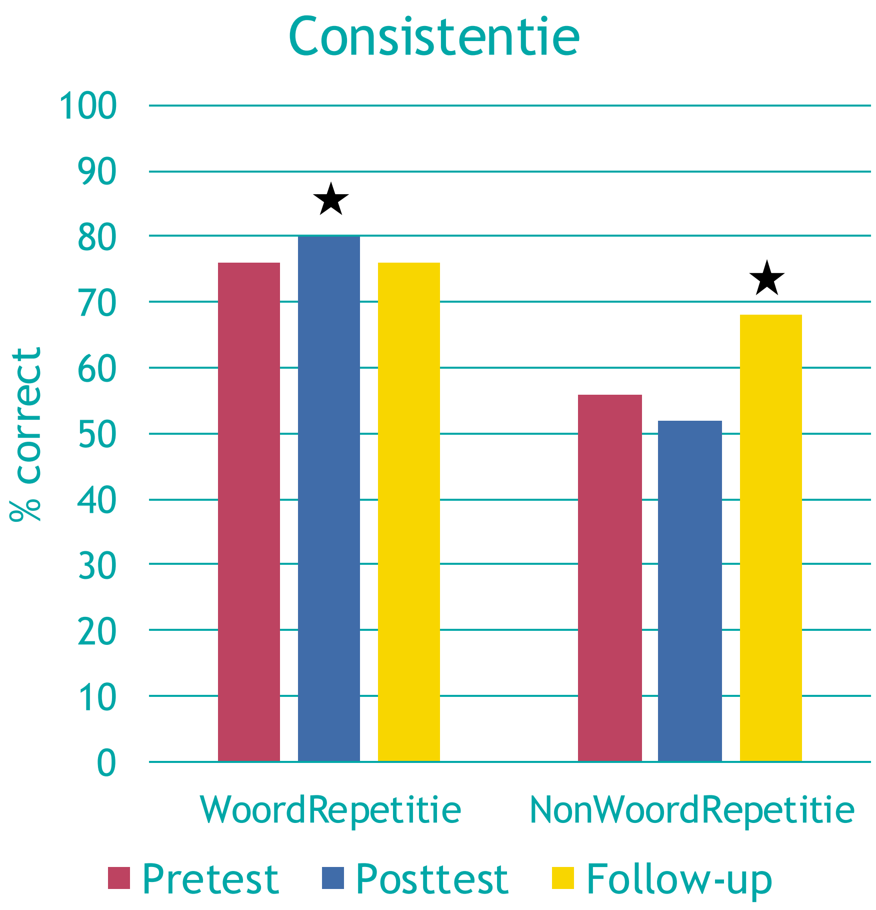
References - 2

- Merrett, D. L., Peretz, I., & Wilson, S. J. (2014). Neurobiological, cognitive, and emotional mechanisms in melodic intonation therapy. *Front Hum Neurosci*, *8*(JUNE), Article JUNE. https://doi.org/10.3389/fnhum.2014.00401
- Patel, A. D., & Daniele, J. R. (2003). An empirical comparison of rhythm in language and music. Cognition, 87(1), Article 1. https://doi.org/10.1016/S0010-0277(02)00187-7
- Pellitteri, J. (2000). THE CONSULTANT'S CORNER: 'Music Therapy in the Special Education Setting'. *Journal of Educational and Psychological Consultation*, *11*(3), 379–391. https://doi.org/10.1207/S1532768XJEPC113&4_06
- Shriberg, L. D., Strand, E. A., Jakielski, K. J., & Mabie, H. L. (2019). Estimates of the prevalence of speech and motor speech disorders in persons with complex neurodevelopmental disorders. Clinical Linguistics & Phonetics, 33(8), 707–736. https://doi.org/10.1080/02699206.2019.1595732
- Terband, H., Maassen, B., & Maas, E. (2016). Toward a Model of Pediatric Speech Sound Disorders (SSD) for Differential Diagnosis and Therapy Planning. In P. van Lieshout, B. Maassen, & H. Terband (Eds.), *Speech Motor Control in Normal and Disordered Speech: Future Developments in Theory and Methdodology* (pp. 81). [Chapter 4]. ASHA Press
- Thomas-Stonell, N., Oddson, B., Robertson, B., Walker, J. & Rosenbaum, P. (2012). The FOCUS©-34: Focus on the
- Outcomes of Communication Under Six. Vertaald met goedkeuring door *Singer, I., Zuiker, R., Klatte, I., Gerrits, E.*
- *(2016).* Holland Bloorview Kids Rehabilitation Hospital, Toronto, ON.
- van Tellingen, M., Hurkmans, J., Terband, H., van de Zande, A. M., Maassen, B., & Jonkers, R. (2024). Speech and Music Therapy in the Treatment of Childhood Apraxia of Speech: An Introduction and a Case Study. *Journal of Speech, Language, and Hearing Research*, 1–19. https://doi.org/10.1044/2023_JSLHR-22-00619

Revalidatie
Friesland

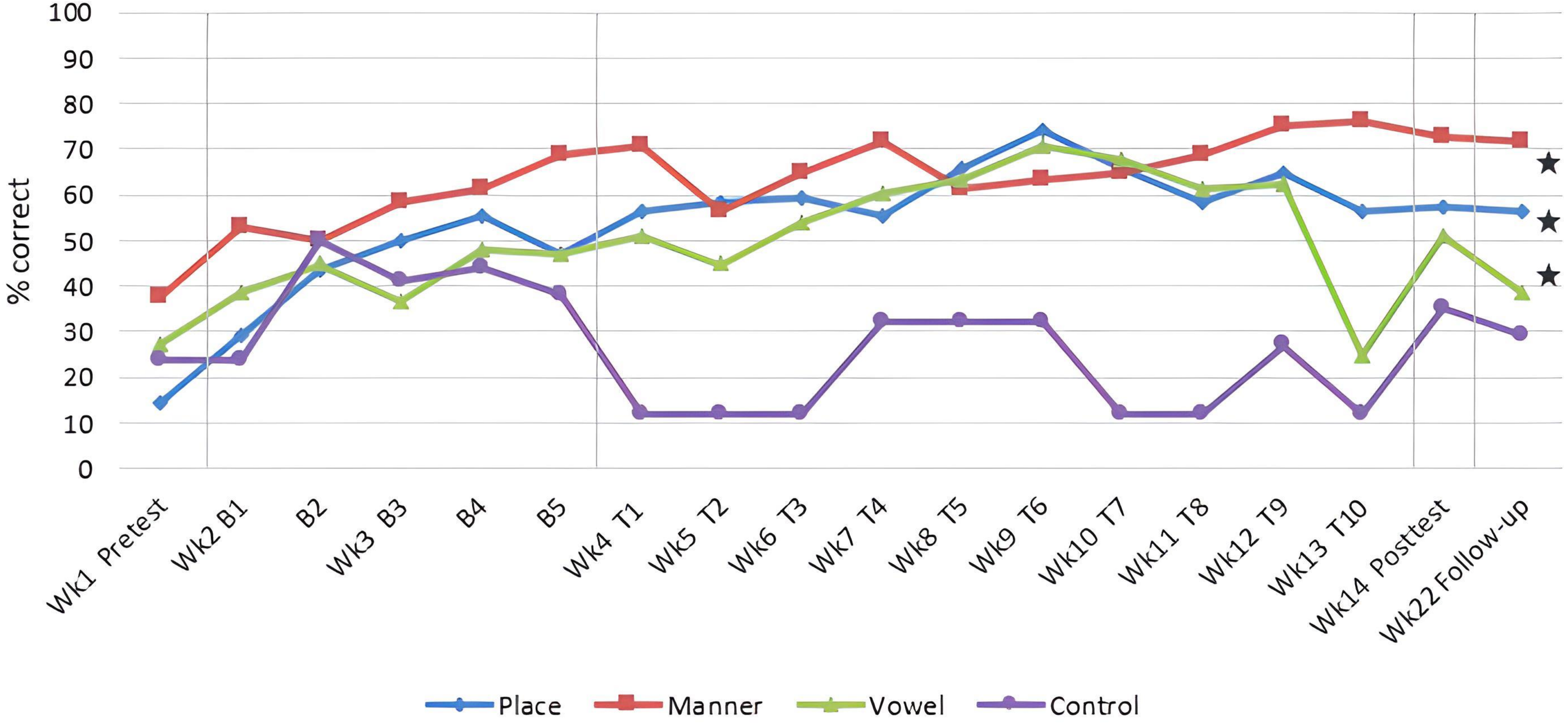
Peter - resultaten





★= significante verandering

MDT Plaats, Manier, Vocaal



CAS and comorbidity

CAS is more prevalent in children with complex neurodevelopmental disorders.

75% of children with CAS also experience intellectual disability.

Children with CAS + neurodevelopmental disorder are rarely included in treatment studies.

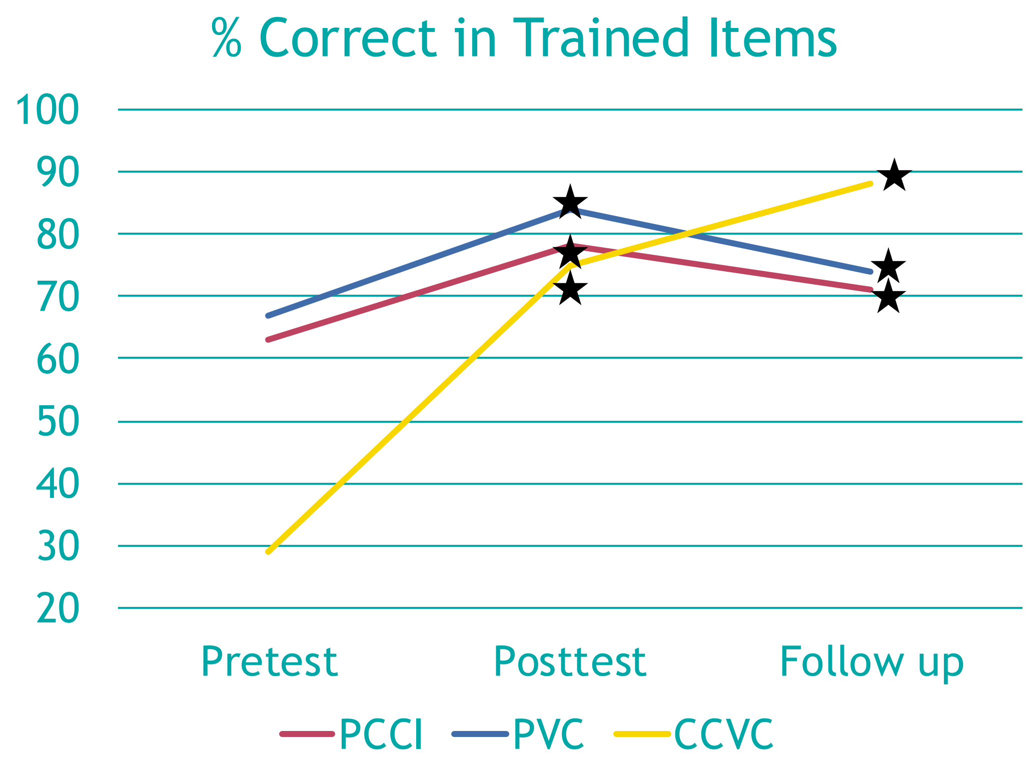
Baas, et al. (2008)
Beiting, et al. (2022)
Chenausky, et al. (2023)
Shriberg, et al. (2019)

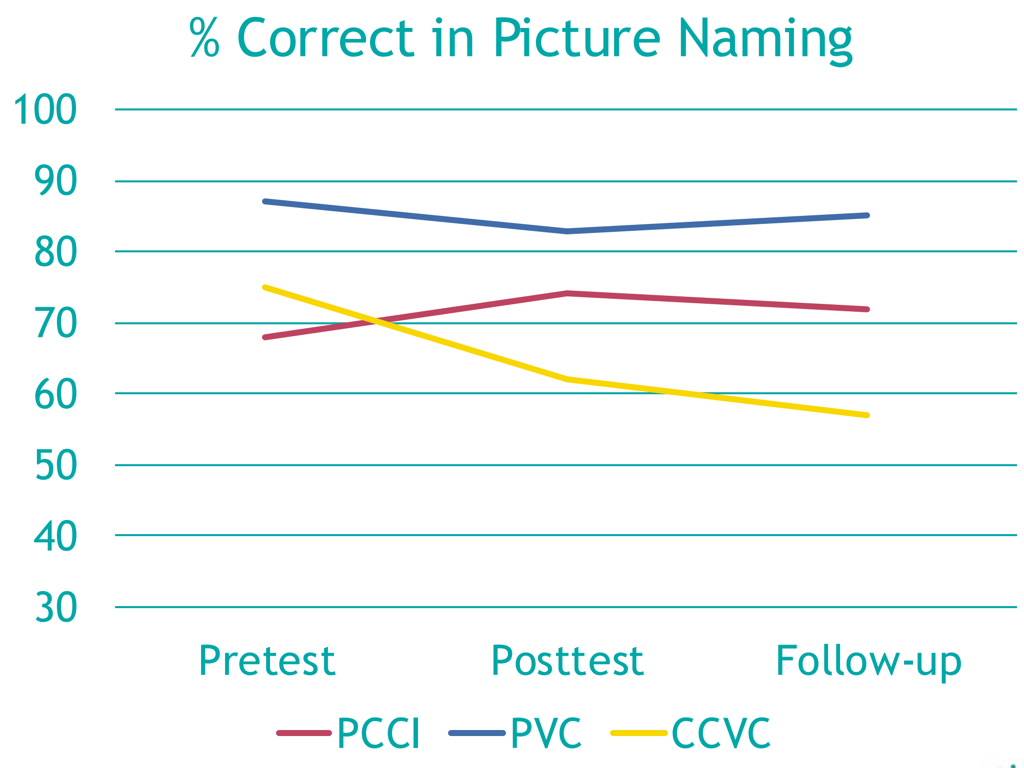
Participants

Tom*	Anna	Sara	Maria
10y6m	5y9m	10y2m	9y11m
CAS+ intellectual disability (severe)	CAS+ intellectual disability (moderate)	CAS+ severe intellectual disability (severe)	CAS+ intellectual disability (mild)
20 sessions/ 11 weeks	20 sessions/ 10 weeks	20 sessions/ 11 weeks	20 sessions/ 10 weeks
Short sentences	Short sentences	Words	Sentences

y = years, m = months
* All participants were assigned pseudonyms

Results - Tom

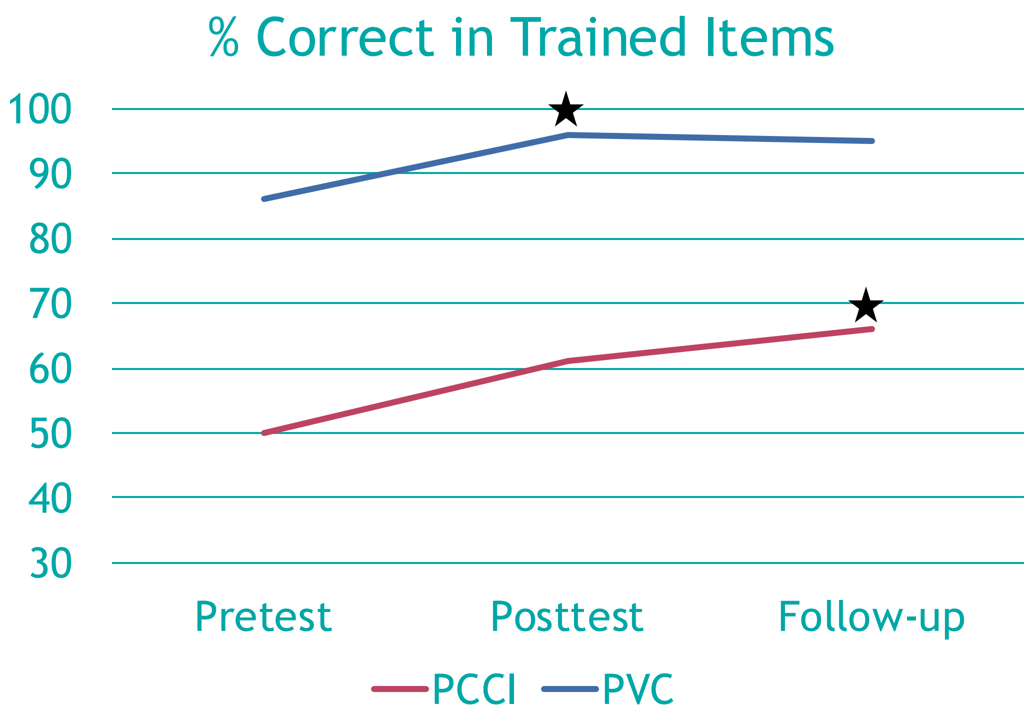


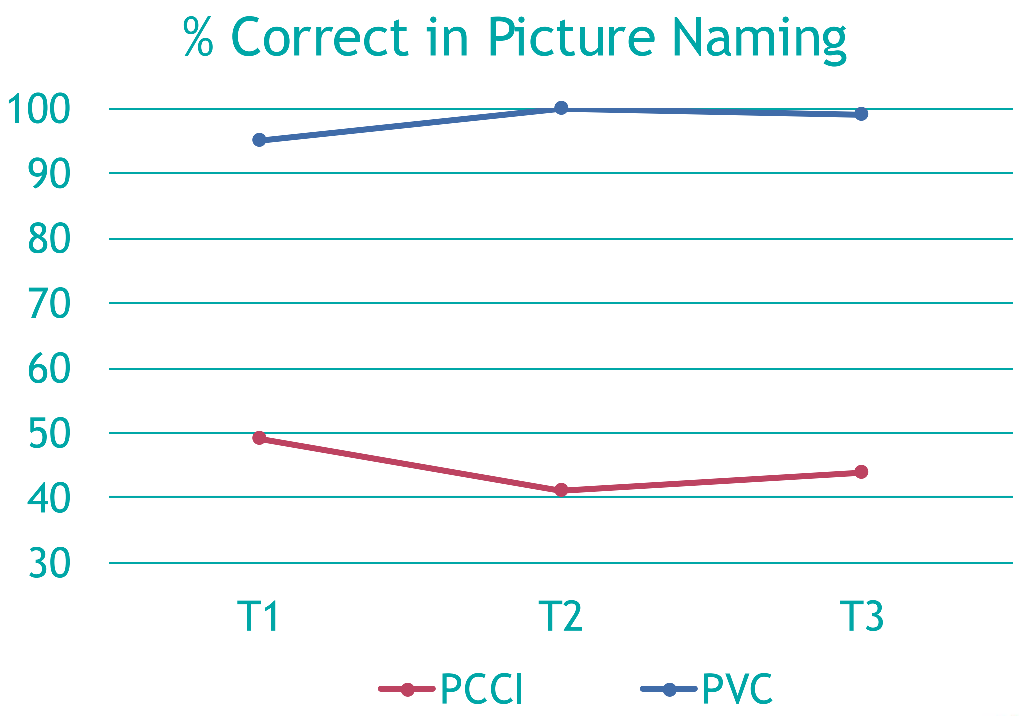


PCCI = Percentage Initial Consonants Correct
PVC = Percentage Vowels Correct
CCVC = Percentage of initial consonantclusters correct

24 - 27 June 2025
International Clinical Phonetics & Linguistics Association
University of Patras, GREECE

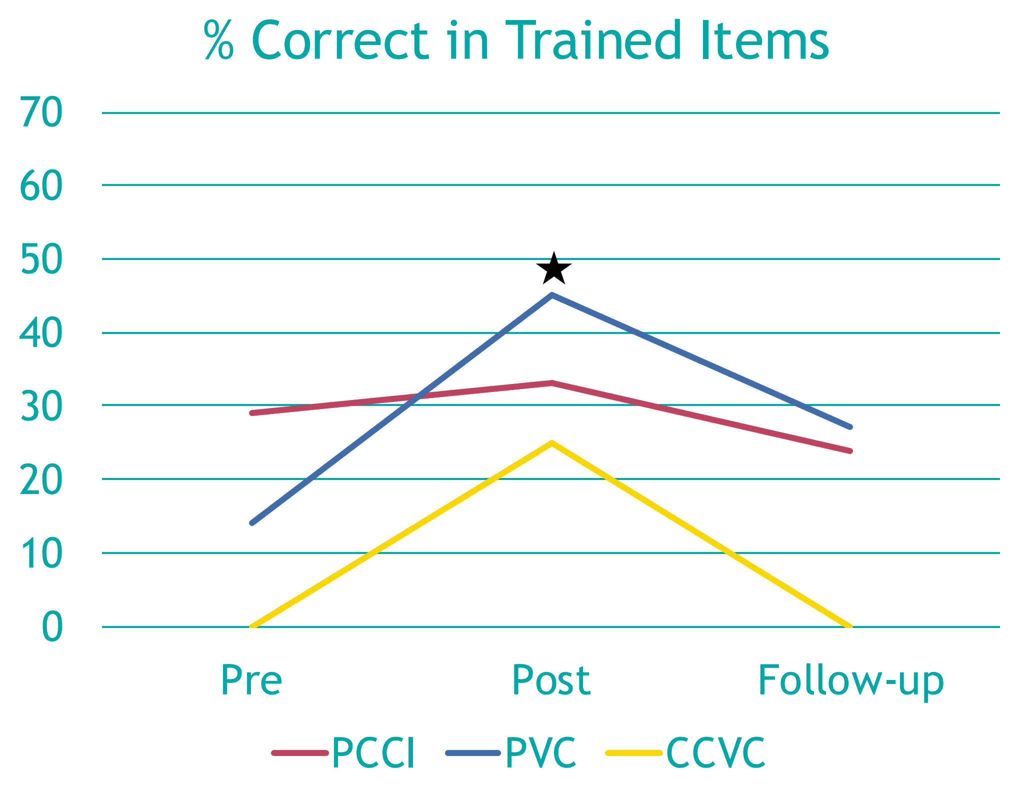
Results - Anna

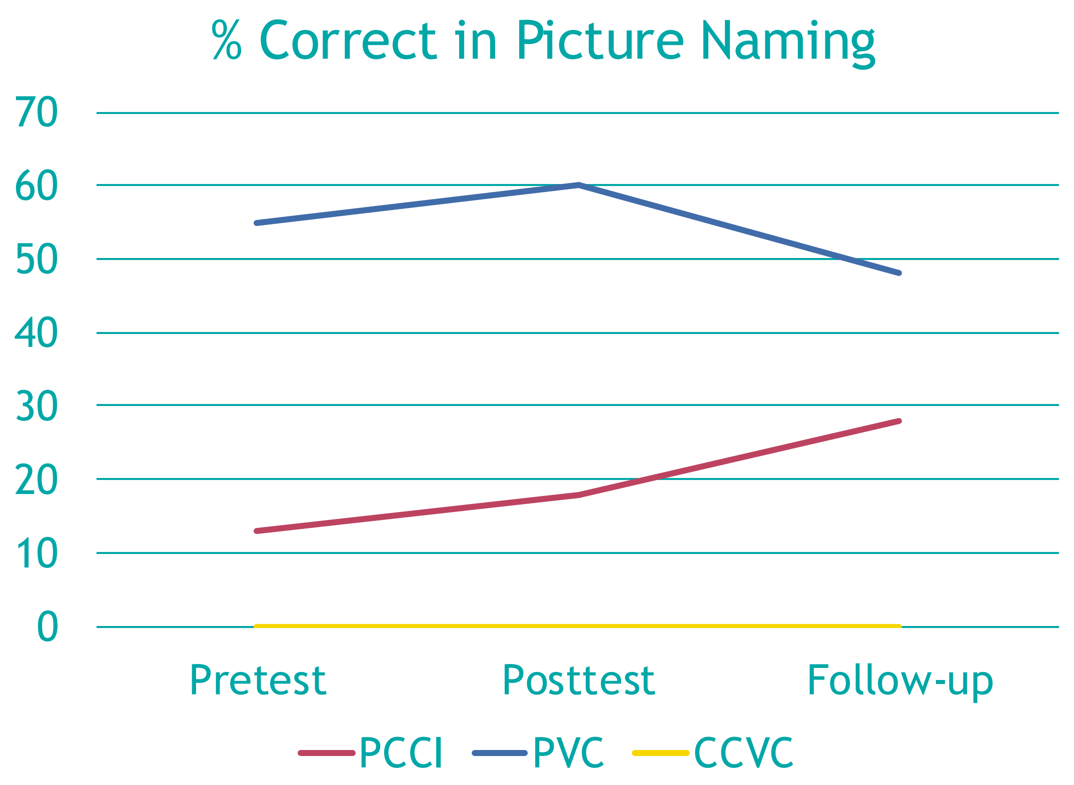




PCCI = Percentage Initial Consonants Correct
PVC = Percentage Vowels Correct
CCVC = Percentage of initial consonantclusters correct

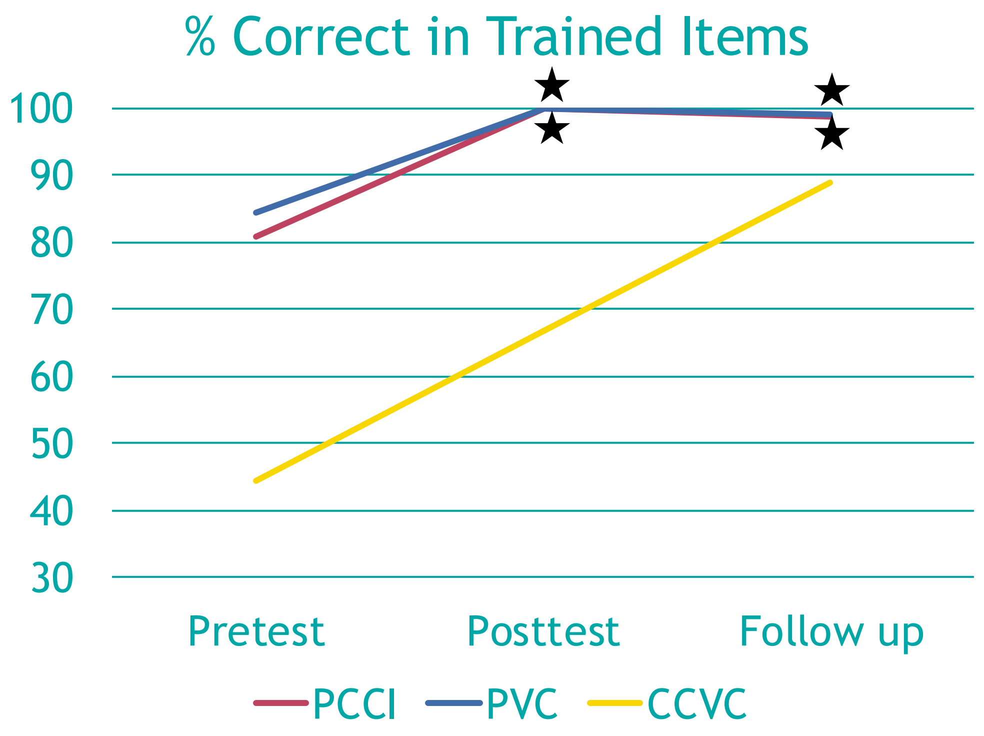
Results - Sara

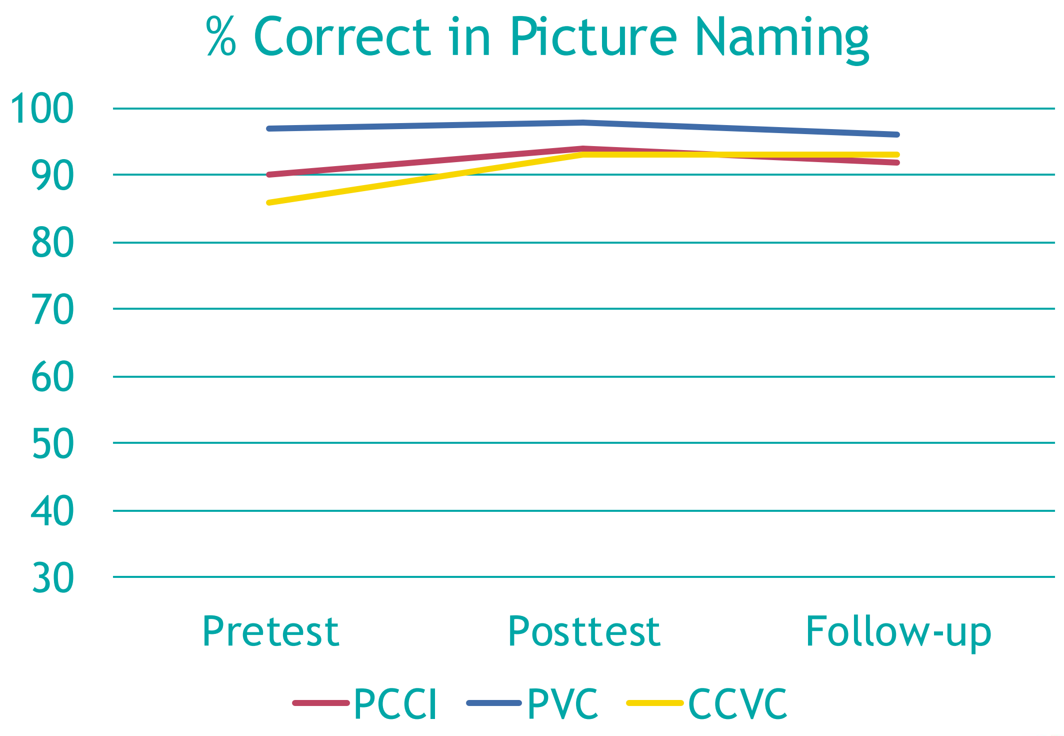




PCCI = Percentage Initial Consonants Correct
PVC = Percentage Vowels Correct
CCVC = Percentage of initial consonantclusters correct

Results - Maria





PCCI = Percentage Initial Consonants Correct
PVC = Percentage Vowels Correct
CCVC = Percentage of initial consonantclusters correct

Results - Intelligibility in Context

	Pretest	Posttest	Follow-up
Tom	3,4	3,9	m.d.
Anna	3,1	m.d.	3,6
Sara	2,7	3,0	m.d.
Maria	3,9	4,9	4,6

m.d. = missing data

Results - Communicative Participation

	Pretest	Posttest	Follow-up
Tom	m.d.	m.d.	m.d.
Anna	m.d.	m.d.	m.d.
Sara	84	115★	134★
Maria	177	190★	198★

★ = clinically relevant change (FOCUS-34 manual)

m.d. = missing data

Discussion

All children with CAS+ neurodevelopmental disorders improved on speech production in trained functionally relevant words and sentences.

Generalisation to unrelated speech tasks is limited.

Improvement on measures of intelligibility and functional communication suggests that training functionally relevant utterances with SMTA could improve communication in daily live.

Limitations

Most outcome measures are not validated for use in children with intellectual disability.

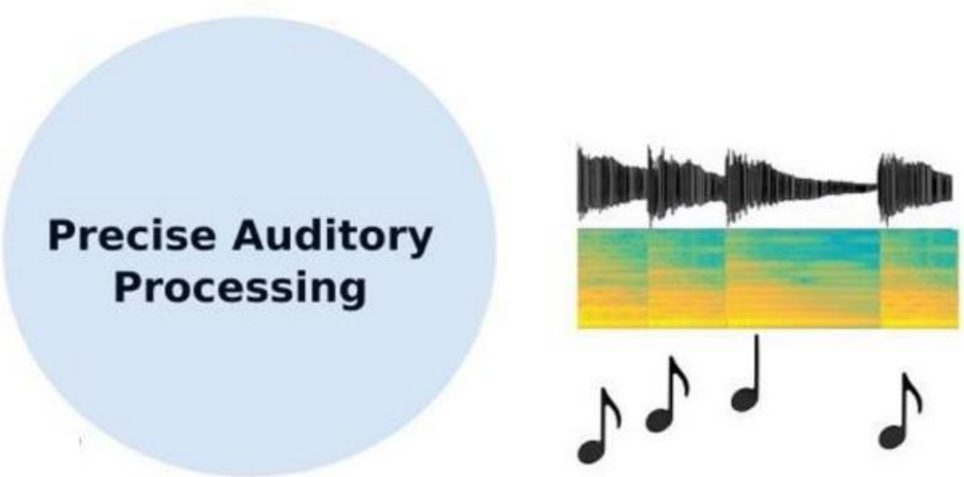
Attention, concentration and being able to perform specific tasks may impact scores.

Conclusion

Training functionally relevant items with SMTA can improve communication in daily live for children with CAS and intellectual disability, a group that is rarely included in treatment studies, but comprises a large part of the clinical workload of SLP's.

1. Precise auditory processing

Training with the more stable and regular rhythm of music can stimulate the processing of the more irregular rhythm of speech.

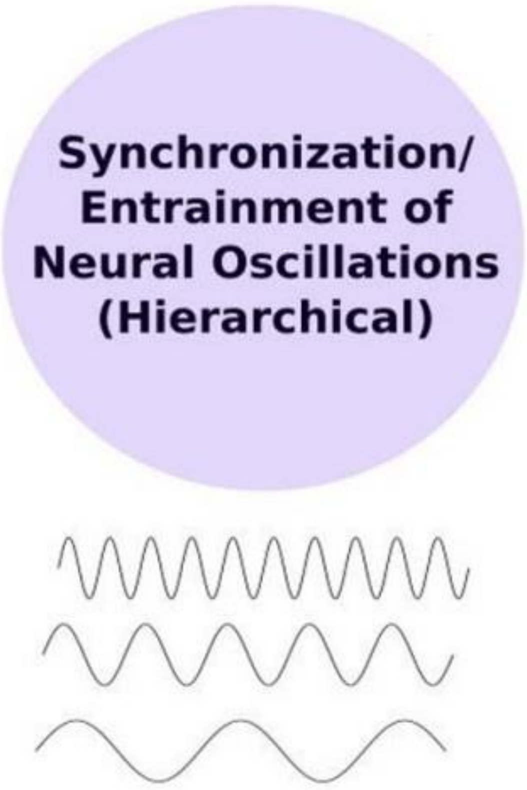


Fujii & Wan (2014)
Fiveash, et al. (2021)

2. Entrainment

Neural oscillations entrain in phase to external rhythmic stimuli.

Neural oscillations entrain at different hierarchical levels, e.g. phrase, syllable and segment.

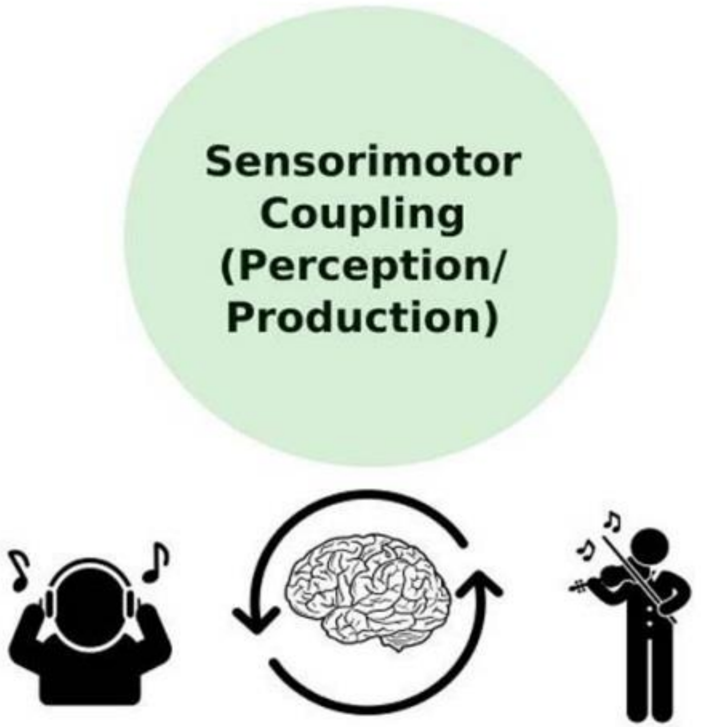


Fiveash, et al. (2021)

3. Sensorimotor coupling

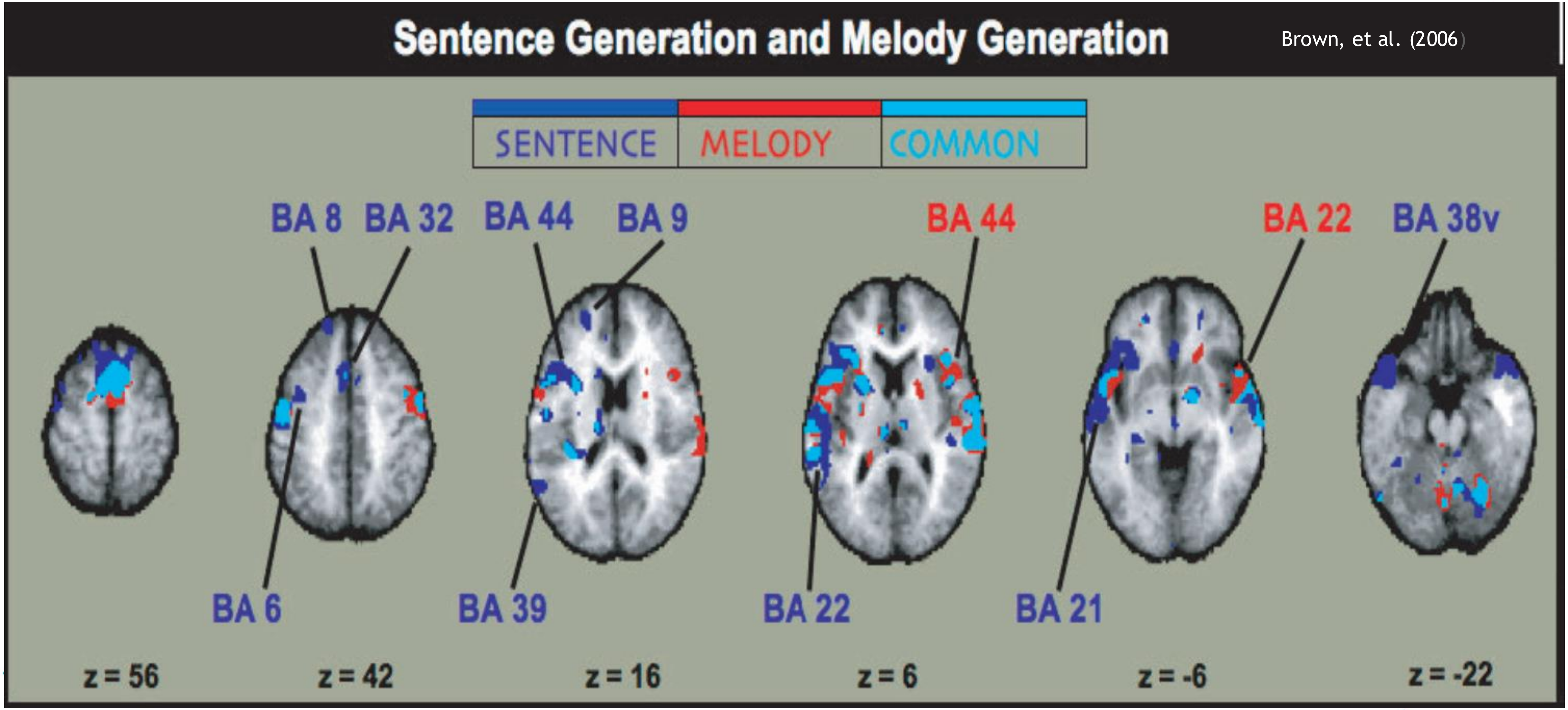
Listening to speech and/or music activates areas within the motor cortex.

Neural oscillations in motor and auditory cortex align to enhance perception.



Fiveash, et al. (2021)

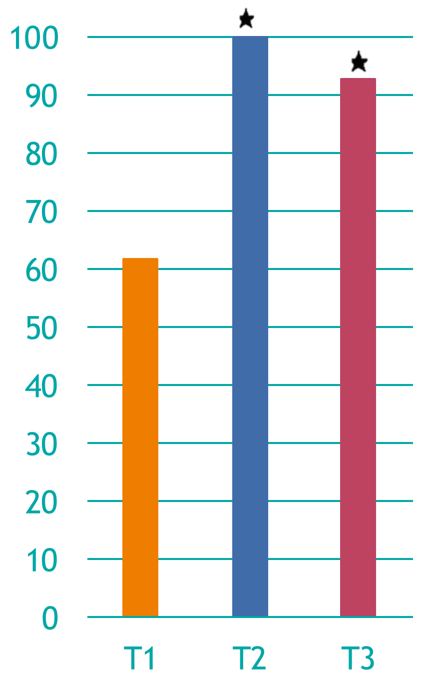
Processing similarities



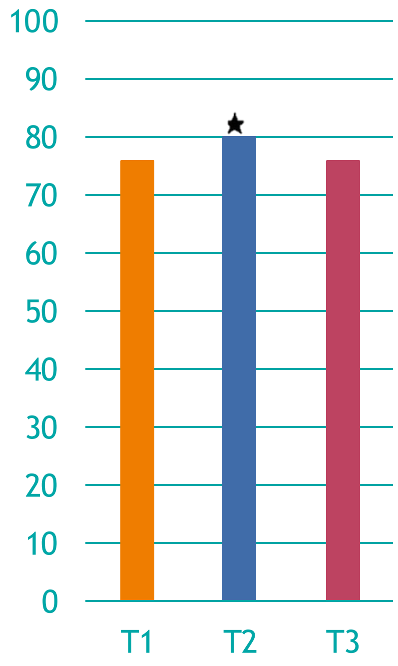
Case study: Peter

Dutch-speaking boy with CAS aged 5;8 (years;months).

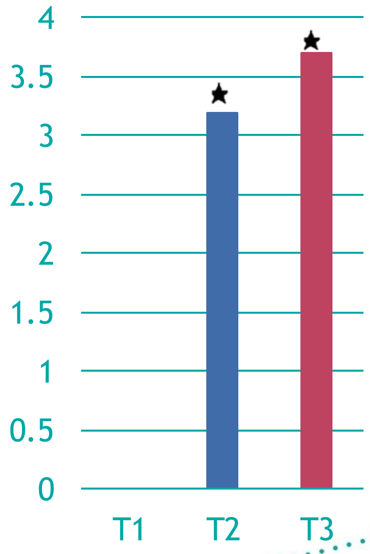
CCVC in picture naming



Consistency



Maximum repetition rate /pataka/



Van Tellingen et al. (2024)

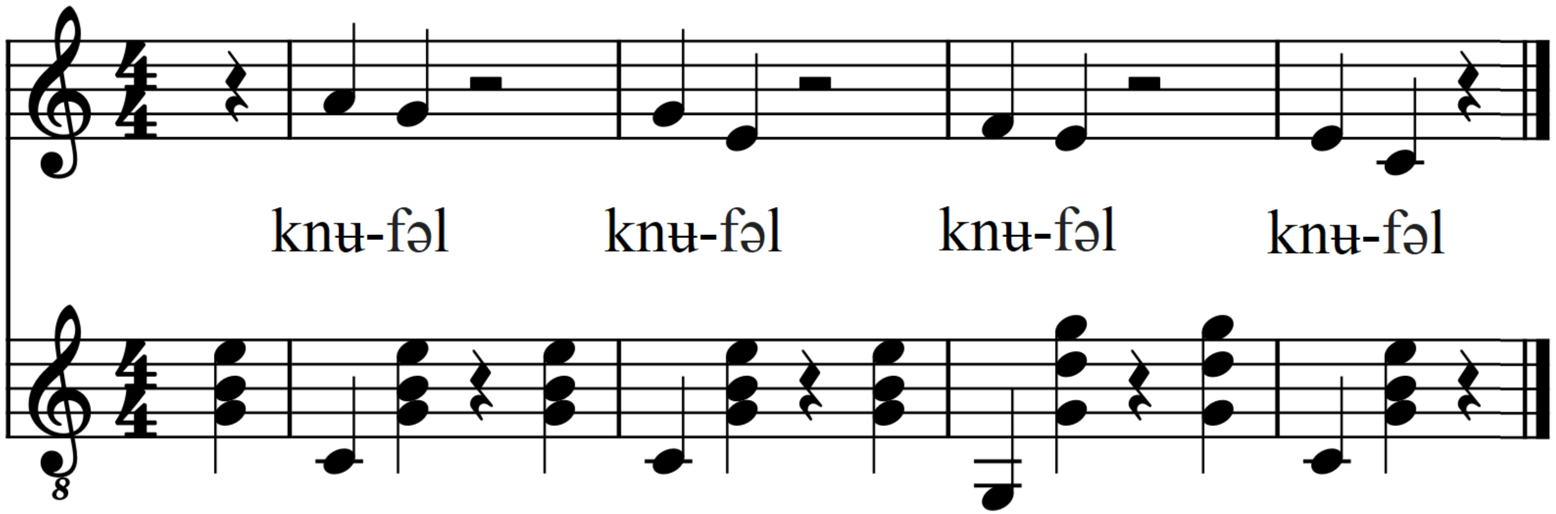
Example

Peter has no consonantclusters

in his speech at 5;8 years old.

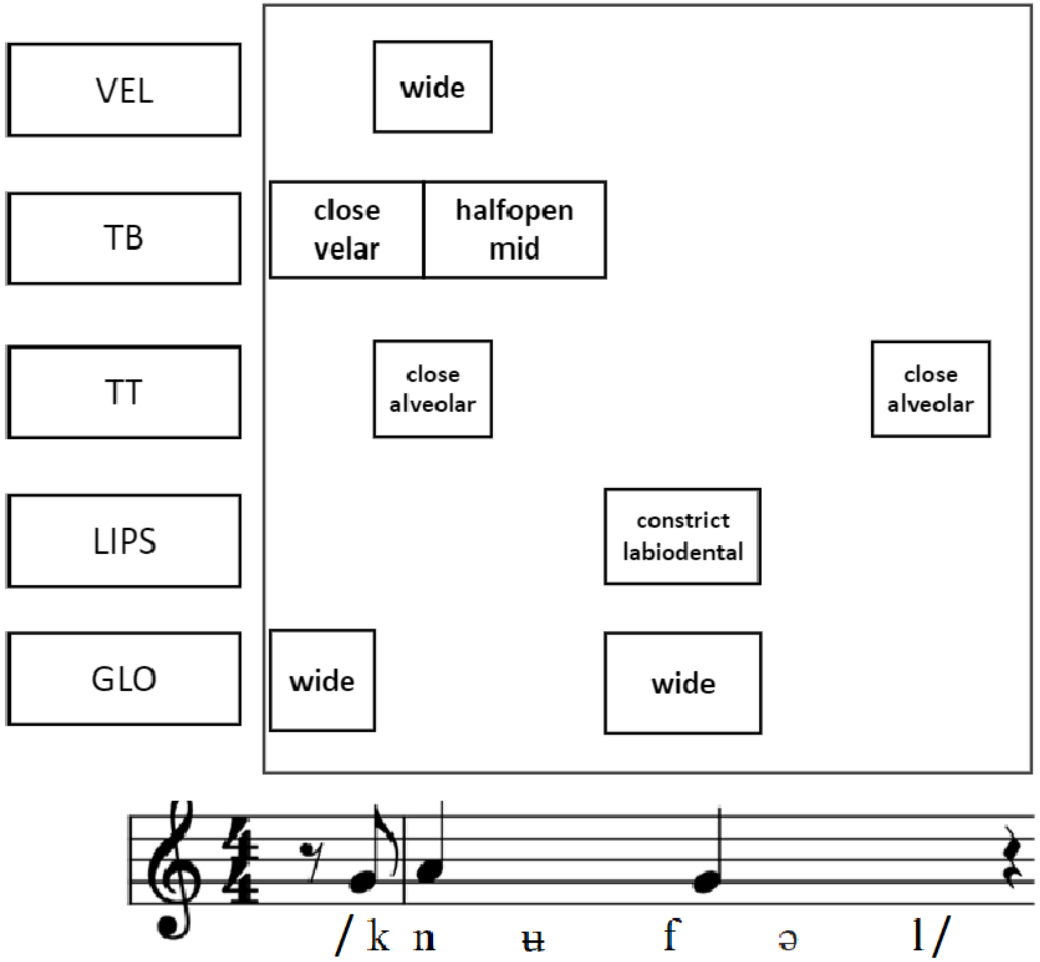
“Knuffel”

(Plush toy)



Van Tellingen, et al. (2024)

Example



Van Tellingen, et al. (2024)

Acoustic parameters

Speech	**Music**
Duration	Rhythm
Pitch	Melody
Intensity	Dynamics

Hurkmans, et al.(2015)
Terband, et al. (2019)

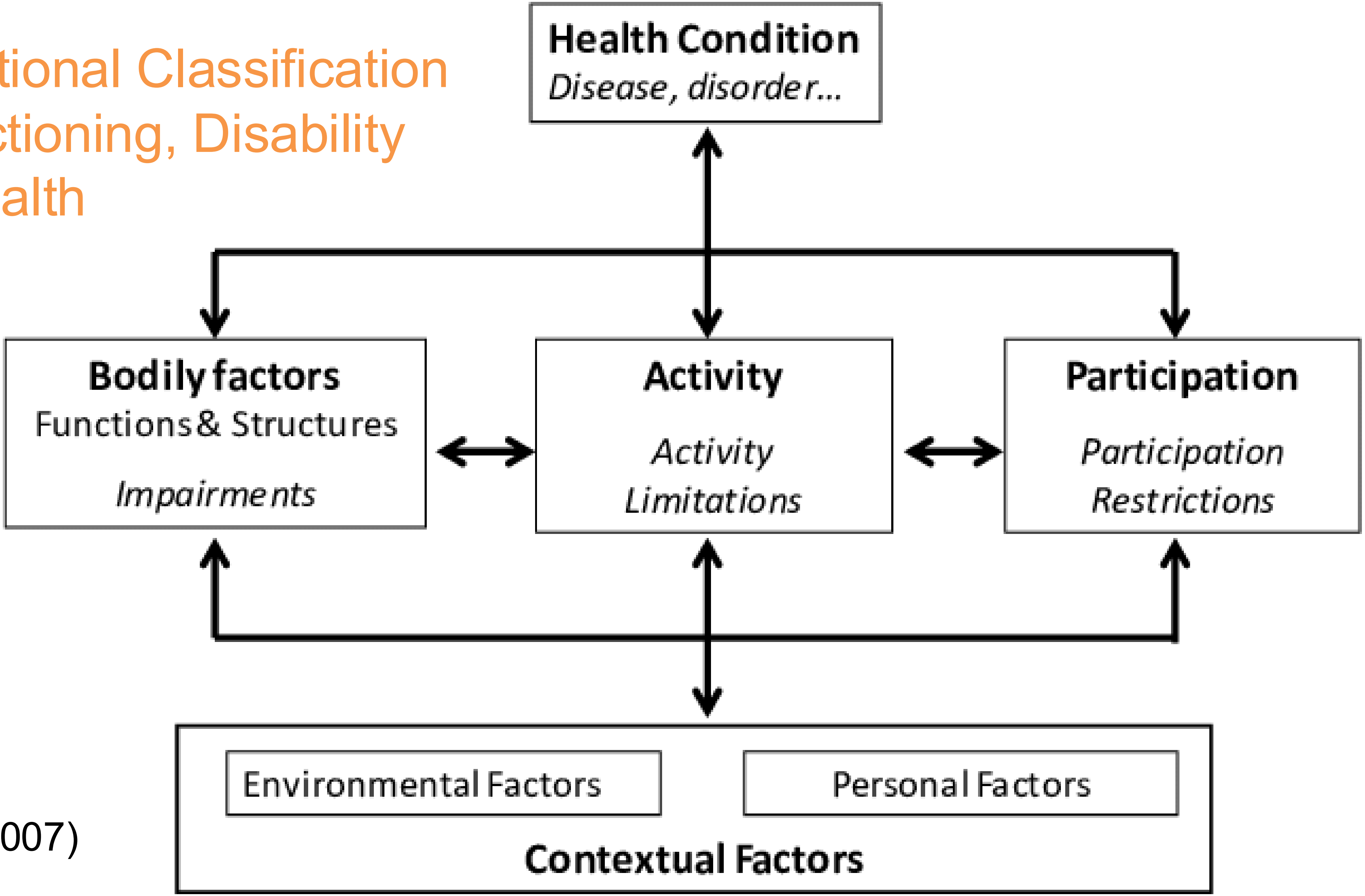
Revalidatie Friesland

Why speech-music therapy?

We need the best of both worlds to provide the best tailored treatment for children with motor speech disorder.

Van Tellingen, et al. (2023)

International Classification of Functioning, Disability and Health



WHO (2007)

Modified Diadochokinesis Test

Item		Consistency	Accuracy	Fluency	Total structure
pa pa pa		0-4	0-15	0-5	
pa ta ka	(p)	0-4	0-15	0-5	
da na la	(m)	0-4	0-15	0-5	
pa po pu	(v)	0-4	0-15	0-5	(CV, 96)
paf paf paf		0-4	0-15	0-5	
paf taf kaf	(p)	0-4	0-15	0-5	
daf naf laf	(m)	0-4	0-15	0-5	
paf pof puf	(v)	0-4	0-15	0-5	(CVC, 96)
paks paks paks		0-4	0-15	0-5	
paps pats paks	(p)	0-4	0-15	0-5	
pats pans pals	(m)	0-4	0-15	0-5	
paks poks puks	(v)	0-4	0-15	0-5	(CVCC, 96)
spag spag spag		0-4	0-15	0-5	
spag stag skag	(p)	0-4	0-15	0-5	
stag snag slag	(m)	0-4	0-15	0-5	
spag spog spug	(v)	0-4	0-15	0-5	(CCVC, 96)
Total		(64)	(240)	(80)	
Total p/m/v		(p,96)	(m,96)	(v,96)	

(Hurkmans, et al., 2012)

Revalidatie Friesland

Disclosure of speaker's interests
No (potential) conflict of interests
No relations that could be relevant for the meeting
• Sponsorship or research funds: No • Payment or other (financial) remuneration: No • Shareholder: No • Other relation: No