

Disfluency Patterns in Speech of Children With and Without Autism Spectrum Disorder



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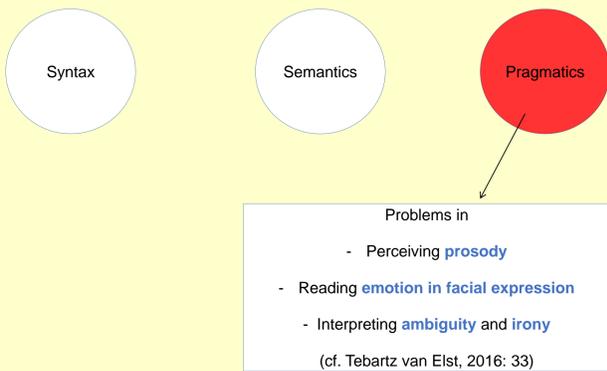
GOAL

- To give an overview of studies investigating the role of disfluencies in speech development with focus on **children with Autism Spectrum Disorder (ASD)**
→ focus on disfluency **production**
- To compare different studies from a **multi disciplinary perspective**, i.e. from **linguistics, medicine, and psychology**
- To explore the nature of the occurrence of disfluencies in children's speech with and without ASD by discussing **frequency** and **types of disfluency**

AUTISM SPECTRUM DISORDER (ASD)

- **Definition:** classification of ASD according to ICD-11 (**World Health Organization, 2018**) and DSM-5 (**American Psychiatric Association, 2013**) as **neurodevelopmental disorder** with severe impairments in domains of
a) **social communication**
b) **restrictive repetitive behaviors / interests**
- **Prevalence:** about 1% (**NICE, 2011: 4**), boys:girls (3,5:1) (**Biscaldi et al., 2012: 500** referring to **Fombonne (2005)**)
- **High-functioning ASD:** ASD without intellectual impairment, but with marked difficulties in **pragmatics**

HIGH-FUNCTIONING ASD AND LANGUAGE



DISFLUENCIES IN SPEECH PRODUCTION – TYPICALLY DEVELOPING CHILDREN

SPEECH PERCEPTION

- Discrimination between **fluent and disfluent speech** samples: using head turn preference with children aged **0;10** (**Soderstrom, Morgan, 2005**)
→ no significant difference in looking time, but tendency for difference in children aged **1;10**
- Use of disfluencies for **prediction of speaker's intended referents** for children by age of **2;4-2;8** (**Kidd et al, 2011**)
→ ability to use disfluencies to infer speaker's intention before labelling of object manifests in the age of **2 years**



SPEECH PRODUCTION

- Use of **uh** and **um** for children aged **3;4-4;11** (**Hudson Kam, Edwards, 2008**); speech elicitation by using story-telling; i.e. describing stories in books
→ no significant differences between **pause + delay vs. pause only**
- Production of **silent pauses, filled pauses, and repetitions** from the age of **2 years** (**Ambrose, Yairi, 1999**)



- Children encounter **disfluencies** more when getting older because of adults using more complex utterances with older children (cf. **Neuberger, Gósy, 2014: 4**)
- Production of disfluencies in children aged **3-4 years** (**Hudson Kam, Edwards, 2008**)
→ longer pauses for **uh / um + pause vs. pause only**; but no difference for duration of **pause** when comparing **uh vs. um**

DISFLUENCIES IN SPEECH DEVELOPMENT – CHILDREN WITH ASD

FREQUENCY OF DISFLUENCIES

- Testing disfluency production for three groups of children aged **4-8 years** (**MacFarlane et al, 2017**):
i) children with high-functioning ASD, ii) children with specific language impairment, iii) control group (typically developed children)
→ children **with ASD** produce higher ratio of **content fillers** compared to control group; but no significant difference for production of **repetitions, revisions, and false starts**

- Elicitation of speech samples for children aged **11 years** during expository discourse task (**Scaler Scott et al., 2014**) in three groups
i) children with high-functioning ASD, ii) stuttering children, iii) control group
→ disfluencies produced by children **with ASD** differ **qualitatively** and **quantitatively** from disfluencies produced by stutters; ASD group shows higher frequency of word-final disfluencies

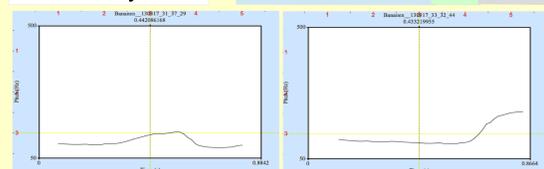
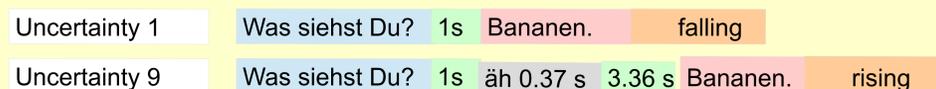
USE OF UM VS. UH

- Disfluency production for children aged **4-8 years** (**Lunsford et al., 2010**); **task:** description of pictures or playing
→ children **with high-functioning ASD** use **um** less often than control group and produce shorter pauses after **um**
- Production of **uh** vs. **um** for subjects with **high-functioning ASD**; aged **8-21 years** (**Irvine et al., 2016**); **task:** describe painting while tapping a keyboard
→ significant less productions of **um** for ASD group compared to control group, but no differences for **uh**
→ conclusion of **Irvine et al. (2016)**: **um** seems to have a **listener-oriented** component, due to problems in pragmatics, it is less used by **subjects with ASD**
- Production of **uh** vs. **um** for children aged **4-8 years** (**Gorman et al., 2016**) for three groups:
i) children with high-functioning ASD
ii) children with specific language impairment
iii) control group
task: play, picture description, story-telling, and conversation
→ significant less productions of **um** for **ASD group** compared to two other groups;
results are in line with findings of **Irvine et al. (2016)**

CURRENT PROJECT ON DISFLUENCY PERCEPTION

MODELING AND PERCEPTION OF UNCERTAINTY (**Bellinghausen et al., 2019**)

- **Stimuli:** utterances generated by **articulatory speech synthesizer** (**VocalTractLab, 2017**);
four one word utterances: **Bananen** (bananas), **Limetten** (miles), **Melonen** (melons), **Tomaten** (tomatoes) + nine wordings as distractors; embedded into short dialogs with starting question **Was siehst Du?** (What do you see?)
- **Independent variables:** i) **intonation** (rising/falling), ii) **pause** (absent vs. 4s), hesitation particle **äh** (uh) (absent, present)
- **Nine levels of intended uncertainty, examples:**



subjects: 36 students (23f, 13m)
task: rating uncertainty on 5-point Likert scale

- **Results:** **additive principle of the disfluency cues:** the more cues are activated, the higher the perceived uncertainty; **in progress:** testing of 28 adults with ASD and 28 control persons; **future work:** testing children with ASD

CONCLUSION

- Different use of hesitation markers: **um** is used less by children with ASD probably due to its listener-orientation
- Possible candidate of linguistic marker for diagnosis of children of ASD

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