THE COMPREHENSION OF DISJUNCTION IN CHILDREN WITH DEVELOPMENTAL LANGUAGE DISORDER

Chloé LE LOUËT
Speech & Language Pathology School
Nantes Université

SUMMARY

1. Background
   a. Developmental Language Disorder (DLD)
   b. Interpretation of disjunction
   c. Acquisition of disjunction
2. Our study
   a. Methods
   b. Results
   c. Discussion
3. Contribution to speech therapy
4. Future research

BACKGROUND

DEVELOPMENTAL LANGUAGE DISORDER (DLD)

« Difficulties in the acquisition and use of language resulting from impairments in the comprehension or production of vocabulary, in sentence structure and in discourse » (cf. DSM V, 2013)

At the level of pragmatics, DLD children may:

- Struggle to make conversation (Bishop et al., 2000)
- Have difficulties understanding figurative language (Bishop et al., 2017)
- **Be late in understanding and producing inferences** (Osman et al., 2011 ; Bishop et Adams, 1992)

Non verbal (logical) reasoning is also delayed (Bonti et al., 2021)

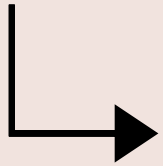
BACKGROUND

INTERPRETATION OF DISJUNCTION

(1) Pierre ate the apple **or** the banana.

Inclusive interpretation : *Pierre ate the apple or the banana, or possibly both.*

Exclusive interpretation : *Pierre ate the apple or he ate the banana, but not both.*



derived as a **scalar implicature,** via a pragmatic reasoning, which leads to the conclusion that the stronger alternative in (2) is *false*

(2) *Stronger alternative*: Pierre ate the apple **and** the banana.

BAKCGROUND

ACQUISITION OF DISJUNCTION

Typically developped children have difficulties with disjunction until age 7 (cf. Braine and Rumain, 1981).

These difficulties have been related to their difficulties deriving scalar implicatures

- Children's alternatives are a subset of the adults' alternatives (Singh et al., 2016)
- Deriving implicatures has a too high cognitive cost for children (Chierchia et al., 2001)

BAKCGROUND

ACQUISITION OF DISJUNCTION

Children's interpretation of disjunction :

- ***Inclusive*** (Chierchia et al., 2004) → children accept disjunction when only one disjunct is true and also when both disjuncts are true.

  Pierre ate the apple. ✓
  Pierre ate the banana. ✓
  Pierre ate the apple and the banana. ✓

- ***Conjunctive*** (Singh et al., 2016 ; Tieu et al., 2017) → children accept disjunction only when both disjuncts are true.

  Pierre ate the apple. ✗
  Pierre ate the banana. ✗
  Pierre ate the apple and the banana. ✓

BAKCGROUND

ACQUISITION OF DISJUNCTION

HOW ABOUT DLD CHILDREN ?

Bishop and Adams, 1992 :

- DLD children can understand and produce inferences but with a delay → like TD children 2-3 years younger

Arosio et al., 2017 :

- DLD children do not present any difficulty with logical operators when there are no implicatures to derive → when they do not have to make inferences
- DLD children can derive implicatures, but with a delay compared to TD children.

OUR STUDY

Research questions:

1. Do DLD children have the same kind of difficulties concerning the interpretation of disjunction as TD children ?

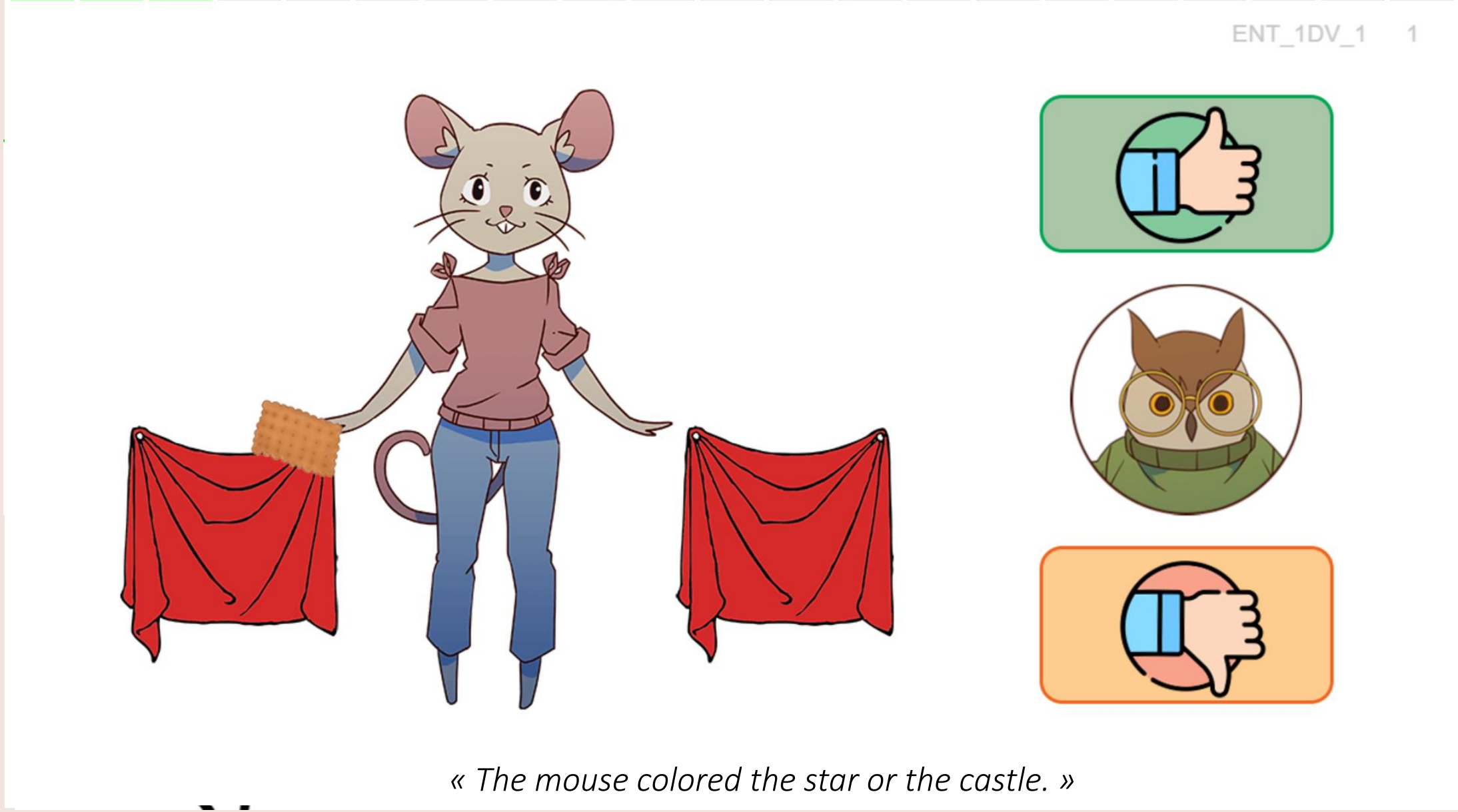
2. Are DLD children's difficulties with disjunction linked to non-verbal reasoning difficulties ?

METHODS : PARTICIPANTS

- 9 DLD children aged from 5 to 11 years old
- Syntactic comprehension similar to 5-year-old TD children at least
- Absence of intellectual deficiency or sensorial trouble

Control group : 74 TD children aged from 5 to 8, tested by Antoine Cochard (Cochard et al., 2023)

METHODS : PROCEDURE



« The mouse colored the star or the castle. »

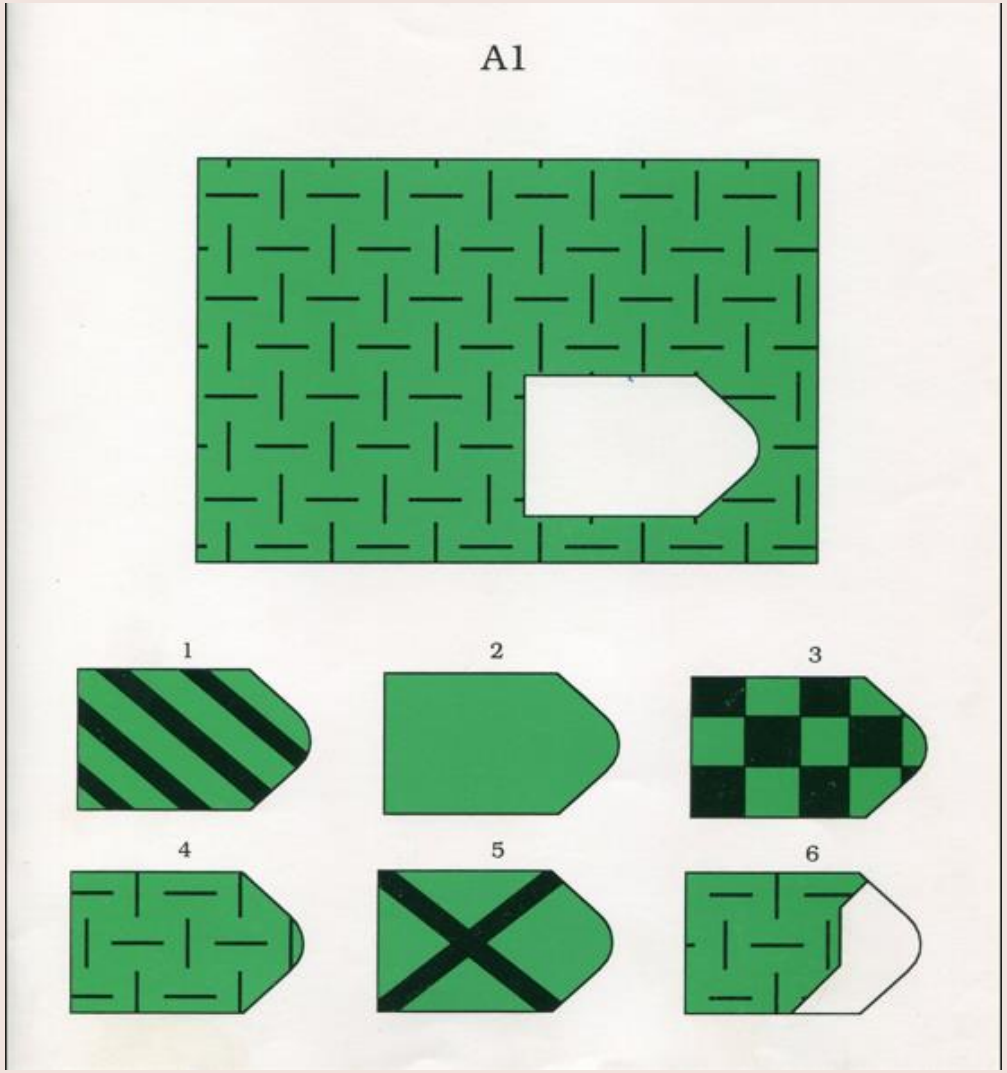
METHODS : PROCEDURE

Expected patterns of answers

	Exclusive	Inclusive	Conjunctive
1 DT	Yes	Yes	No
2 DT	No	Yes	Yes

METHODS : PROCEDURE

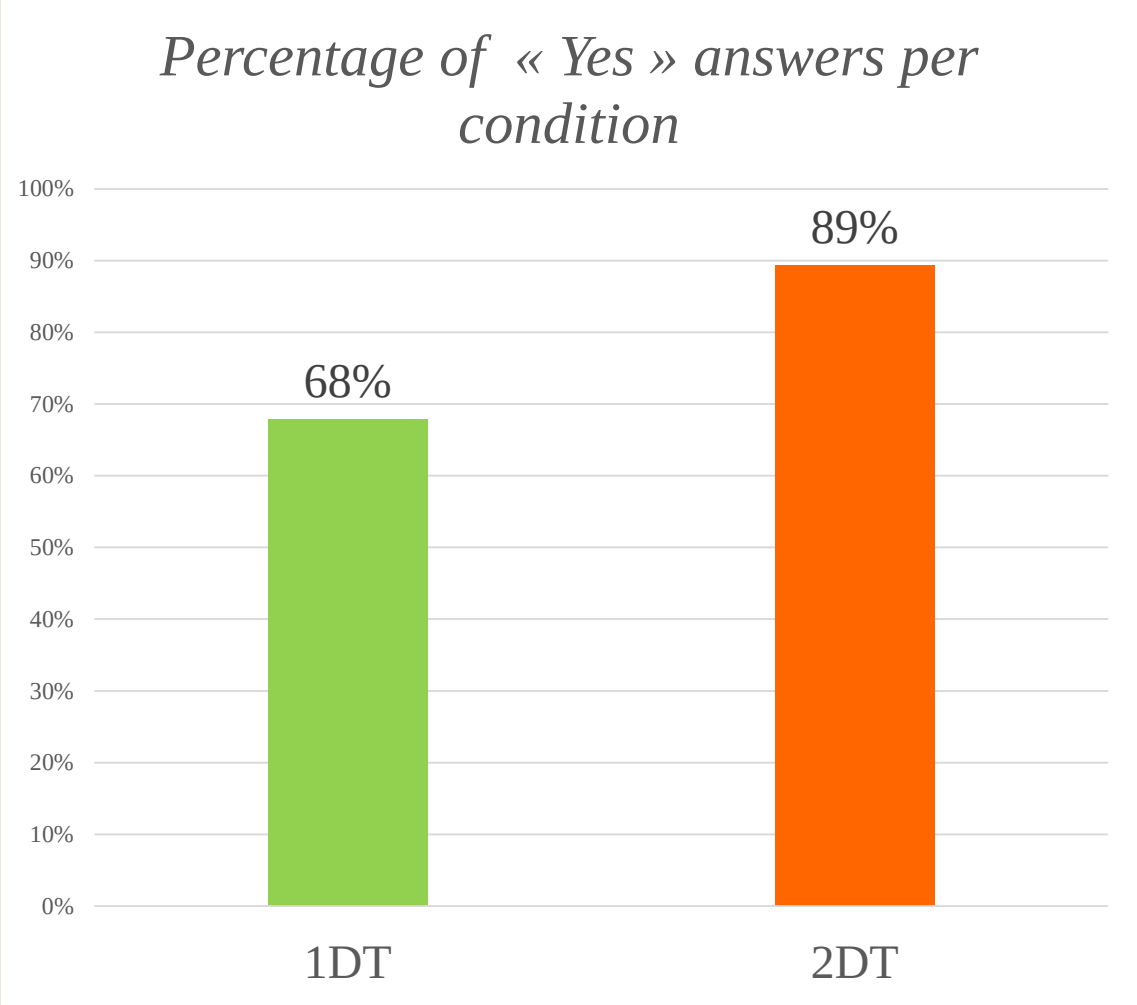
Raven's Progressive Matrices



Shape completion

→ choose among 6 pieces the one which completes the shape

RESULTS



Results of 7 children (2 DLD children discarded)

RESULTS

TRUTH VALUE JUDGEMENT TASK

DLD children

DLD children	Profile
Participant 2 (7 yo)	Conjunctive
Participant 3 (8 yo)	Exclusive
Participant 5 (11 yo)	Inclusive
Participant 6 (6 yo)	Inclusive
Participant 8 (8 yo)	Conjunctive
Participant 9 (8 yo)	Inclusive
Participant 10 (8 yo)	Inclusive

- 4 « inclusive » children
- 2 « conjunctive » children
- 1 « exclusive » child

RESULTS

TRUTH VALUE JUDGEMENT TASK

TD children (control group)

Age group	Exclusive	Inclusive	Conjunctive
5 yo (T = 21)	11	4	6
6 yo (T = 18)	12	4	2
7 yo (T = 27)	18	2	7
8 yo (T = 10)	8	0	0

→ TD children have an adult interpretation of disjunction at age 8.

→ At age 8 (and even later), DLD children still interpret disjunction in a non-adult way.

RESULTS

RAVEN'S PROGRESSIVE MATRICES

- 2 participants within the norm
- 2 participants with minor difficulties
- 5 participants with major difficulties

- The only child with an exclusive interpretation of disjunction has very poor results at this task

- The two participants within the norm in the RPM task interpret disjunction in a non-adultlike way

→ There is no apparent relation between non-verbal reasoning impairment and difficulties in interpretating disjunction.

DISCUSSION

RESEARCH QUESTIONS

1. Do DLD children have the same kind of difficulties as TD children concerning the interpretation of disjunction?

→ **Yes, DLD children show the same kind of patterns but their acquisition is delayed.**

2. Are DLD children's difficulties with disjunction linked to non-verbal reasoning difficulties?

→ **No evidence**

DISCUSSION

Strengths of our study

- The first study which gives interest on the interpretation of disjunction in DLD
- Creation of a specific and adapted test for DLD children

Limitations of our study

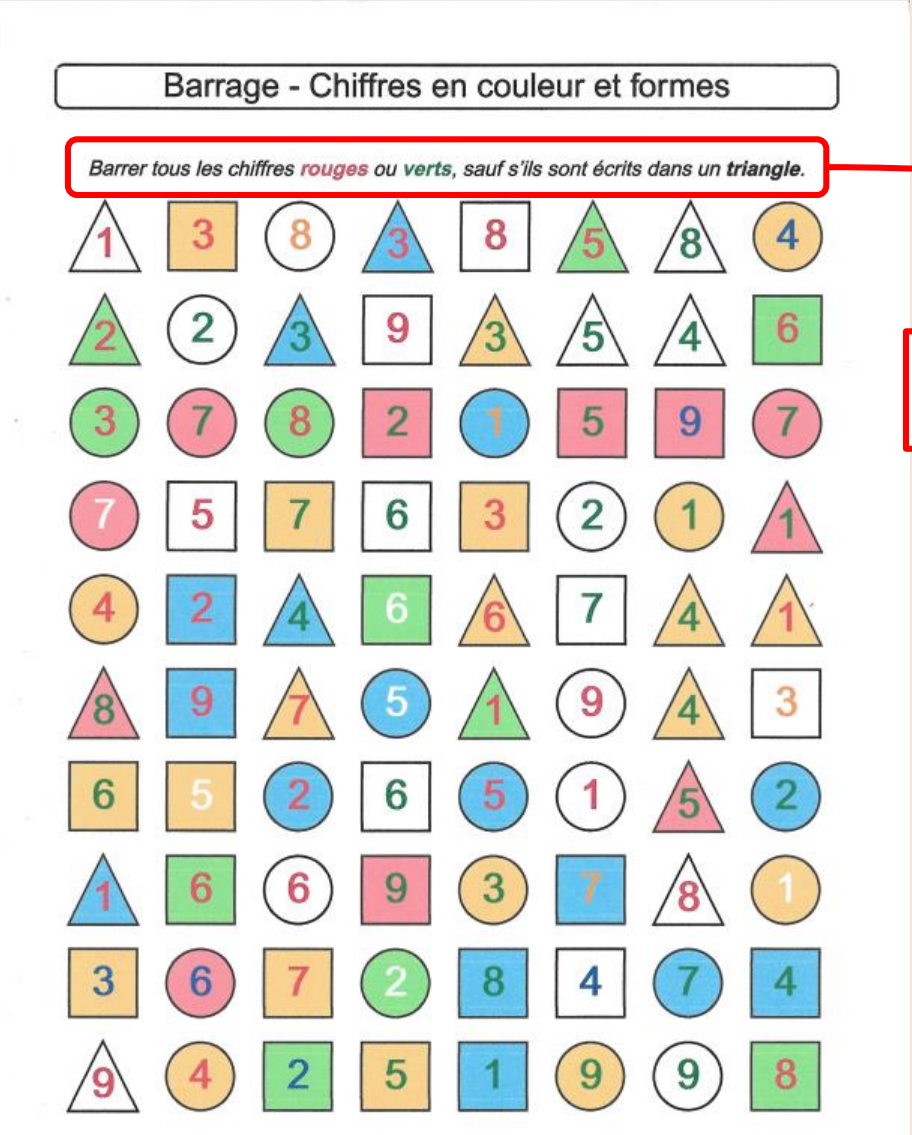
- The experimental group was too small
- Large difference in size between DLD and TD group

CONTRIBUTION TO SPEECH THERAPY

- Modify existing speech therapy procotols by adding new tasks meant to improve pragmatic competence (production and comprehension of inferences)

- Paying particular attention to the instructions and the sentences used in language tests

CONTRIBUTION TO SPEECH THERAPY



*Barrer tous les chiffres **rouges** ou **verts**, sauf s'ils sont écrits dans un **triangle**.*

'Cross out all the red or green numbers, except if they are written in a **triangle**.'

FUTURE RESEARCH

- Collect more data from DLD population to confirm our results

- Test older DLD participants (aged 12 to 15)
  → to observe if, at those ages, they access the adult interpretation of disjunction

- Examine the interpretation of other scalar terms (i.e. *some*) in DLD population

ACKNOWLEDGEMENTS

I would like to thank all the children that have participated to this study, their parents and also their speech therapists.

I would like to especially thank Antoine Cochard for his help in the realization of this study and also Oana Lungu for her major help in the preparation of this presentation.

BIBLIOGRAPHY

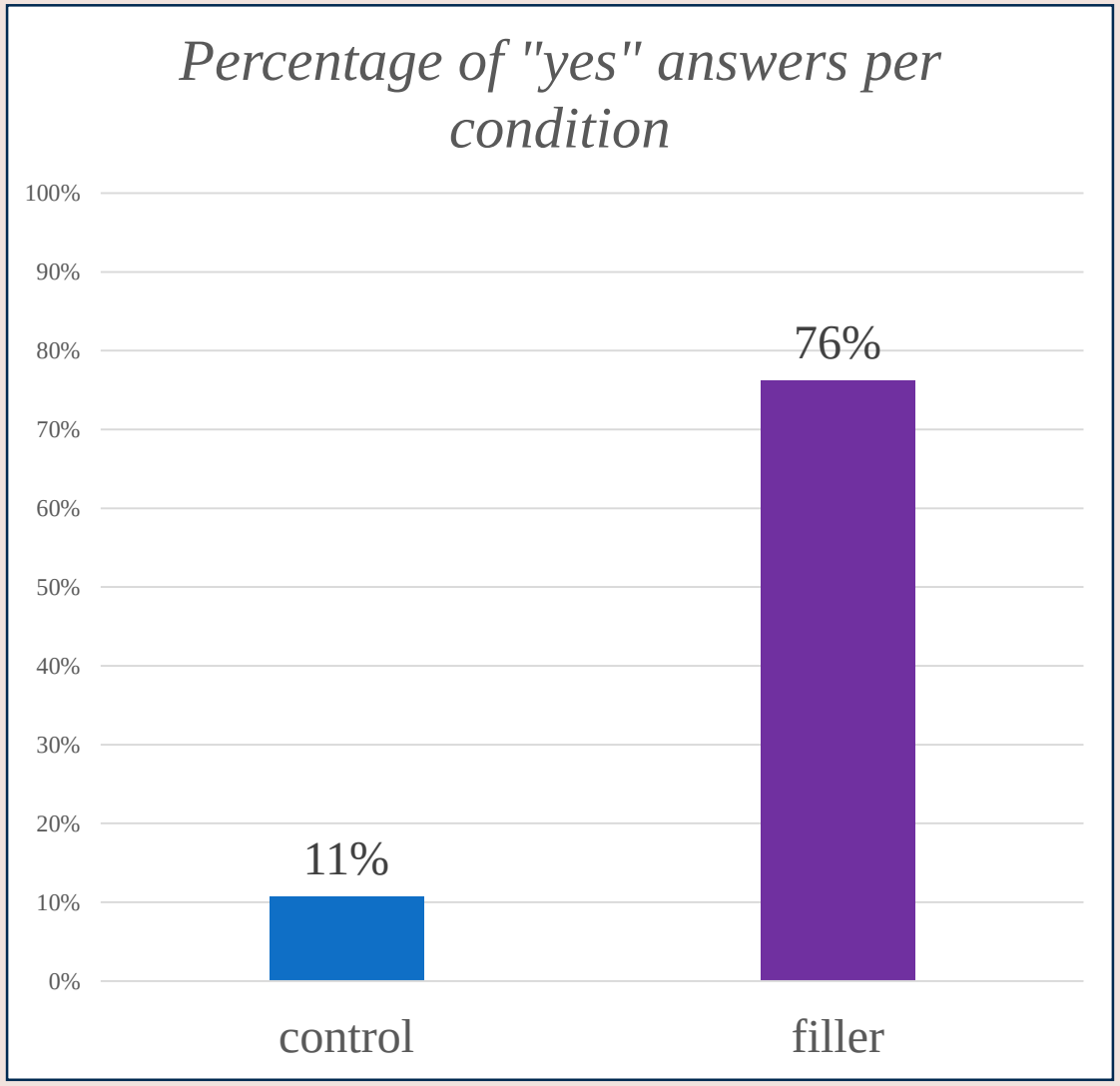
- American Psychiatric Association, Crocq, M.-A., Guelfi, J. D., Boyer, P., Pull, C., & Pull-Erpelding, M.-C. (2016). *DSM-R ® : Manuel diagnostique et statistique des troubles* mentaux (5e éd.). Elsevier Masson.
- Arosio, F., Foppolo, F., Pagliarini, E., Perugini, M., & Guasti, M. T. (2017). Semantic and Pragmatic Abilities Can Be Spared in Italian Children with SLI. *Language Learning and Development*. https://doi.org/10.1080/15475441.2017.1308254
- Bishop, D., & Adams, C. (1992). Comprehension Problems in Children With Specific Language Impairment : Literal and Inferential Meaning. *Journal of Speech and Hearing Research*, *35*, 119-129.
- Bishop, D. V. M., Chan, J., Adams, C., Hartley, J., & Weir, F. (2000). Conversational responsiveness in specific language impairment : Evidence of disproportionate pragmatic difficulties in a subset of children. *Development and Psychopathology*, *12*, 177-199.
- Bishop, D. V. M., Snowling, M. J., Thompson, P. A., Greenhalgh, T., & the CATALISE-2 consortium. (2017). Phase 2 of CATALISE: a multinational and multidisciplinary Delphi consensus study of problems with language development : Terminology. *Journal of Child Psychology and Psychiatry*, *58*(10), 1068-1080. https://doi.org/10.1111/jcpp.12721
- Bonti, E., Kamari, A., Sofologi, M., Giannoglou, S., Porfyri, G.-N., Tatsiopoulou, P., Kougioumtzis, G., Efstratopoulou, M., & Diakogiannis, I. (s. d.). Similarities and Differences in the Learning Profiles of Adolescents with SLD and SLI in Mathematics—A Preliminary Analysis. *Brain Sciences*, *11*(7), 850. https://doi.org/10.3390/ brainsci11070850
- Brain, M. D. S., & Rumain, B. (1981). Development of Comprehension of « Or » : Evidence for a Sequence of Competencies. *Journal of Experimental Child Psychology*, *31*, 46-70.
- Chierchia, G., Crain, S., Guasti, M. T., Gualmini, A., & Meroni, L. (2001). The acquisition of disjunction : Evidence for a grammatical view of scalar implicatures. *In Proceeding of BUCLD25*, 157-168.
- Chierchia, G., Guasti, M. T., Gualmini, A., Meroni, L., Crain, S., & Foppolo, F., (2004). Semantic and pragmatic competence in children's and adults' comprehension of or. In Ira A. Noveck & Dan Sperber (Eds.), Experimental Pragmatics (pp. 283–300). Palgrave Macmillan UK.
- Cochard, A. (en préparation). Development of Logical Language: Case Studies in L1 French. Thèse de doctorat, co-tutelle entre Nantes Université et University of Groningen.

BIBLIOGRAPHY

- Cochard, A., Demirdache, H. & van Hout, A. (2023). Interpreting Disjunction Across Positive and Negative Contexts: Evidence from Child French. *Proceedings of the 47th Annual Boston University Conference on Language Development*, Somerville: Cascadilla Press.
- Grice, P. (1975). Logique et conversation. *Communications*, *30*, 57-72.
- Osman, D. M., Shohdi, S., & Aziz, A. A. (2011). Pragmatic difficulties in children with Specific Language Impairment. *International Journal of Pediatric Otorhinolaryngology*, *75*, 171-176. https://doi.org/10.1016/j.ijporl.2010.10.028
- Singh, R., Wexler, K., Astle, A., Kamawar, D., & Fox, D. (2016). Children interpret disjunction as conjunction: Consequences for theories of implicature and child development. *Natural Language Semantics*, *24*, 305–352. https://doi.org/10.1007/s11050-016-9126-3
- Tieu, L., Romoli, J., Zhou, P., & Crain, S. (2016). Children's Knowledge of Free Choice Inferences and Scalar Implicatures. *Journal of Semantics*, *33*, 269-298. https://doi.org/10.1093/jos/ffv001
- Tieu, L., Yatsushiro, K., Cremer, A., Romoli, J., Sauerland, U., & Chemla, E. (2017). On the Role of Alternatives in the Acquisition of Simple and Complex Disjunctions in French and Japanese. *Journal of Semantics*, *34*, 127-152. https://doi.org/10.1093/jos/ffw010

THANK YOU FOR YOUR ATTENTION !

DLD children	Profile	Expected profile according chronological age
Participant 2 (7 yo)	Conjunctive	Non exclusive
Participant 3 (8 yo)	Exclusive	Exclusive
Participant 5 (11 yo)	Inclusive	Exclusive
Participant 6 (6 yo)	Inclusive	Non exclusive
Participant 8 (8 yo)	Conjunctive	Exclusive
Participant 9 (8 yo)	Inclusive	Exclusive
Participant 10 (8 yo)	Inclusive	Exclusive


Percentage of "yes" answers per condition
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
11%
76%
control
filler