Understanding of linguistic scales In speakers with Williams Syndrome

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Williams Syndrome: Cognitive profile

Williams Syndrome (WS) is a genetic disorder that results in an uneven cognitive profile with relative strength in language and severe deficits in numerical and spatial cognition (Bernardino et al., 2013; Landau & Hoffman, 2012). Individuals with WS show mild to moderate intellectual disability with mean IQ of approximately 60 and range between 20 and 106 (Ewart et al., 1993).

The status of their linguistic skills has been widely debated. Unlike other populations with comparable levels of intellectual disability, the Williams Syndrome group often shows fluent speech and deep abstract knowledge of complex syntactic principles (Musolino et al. 2010).

This work focuses on their semantic knowledge. We ask whether adolescents with WS show the knowledge of scalar terms similar to the one in typically developing children matched by mental age (MA) and typical adults.

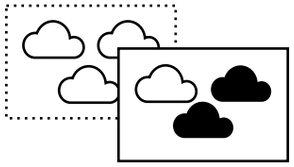
Semantic reading of scalar terms

The use of scalar terms (1), words such as *some, not all, or,* and numerals, such as *two, three*, commonly trigger and implicature that a stronger terms on the scale (2) does not apply (Horn, 1972).

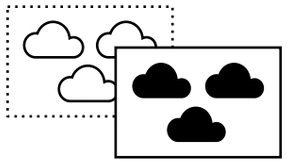
(1) Some of the clouds are black.
(2) Not all of the clouds are black.

Scalar terms rarely appear in contexts where a stronger terms could have been used (van Tiel, Franke, Sauerland, 2021). Yet, speakers accept the semantic, or logical, meaning of these terms when the context is appropriate (Goodman & Stuhlmüller, 2013). We use prediction contexts to test whether individuals with WS also show this deep semantic knowledge.

I bet that some of the clouds will turn black. Ok, let's see.
I said that some of the clouds will turn black. Am I right?



Truthconditional trials
Yes: correct response
No: error



Entailment trials:
Yes: semantic response
No: pragmatic response

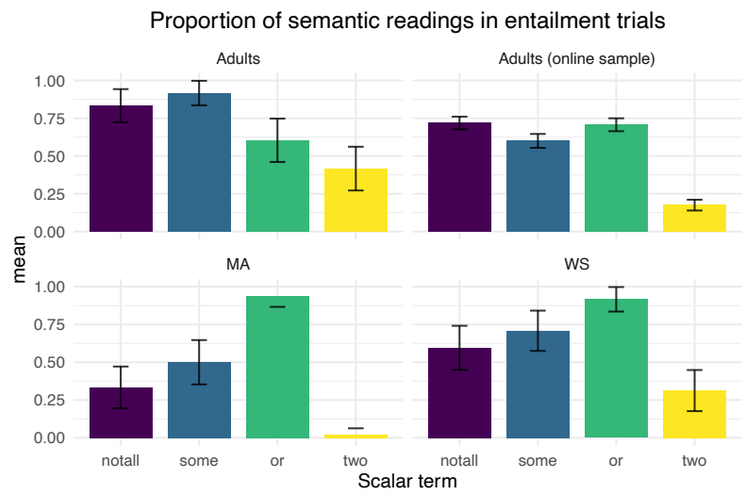
- 12 speakers with WS
  - mean age = 16,4 (year, month), SD = 11.07 months, age range = 11,10-21,11
- 12 children matched by MA
  - mean age = 6,1, SD = 3.3 months, age range = 5,2-7,8
- 12 Typical adults
- Additional online sample: 100 typical adults

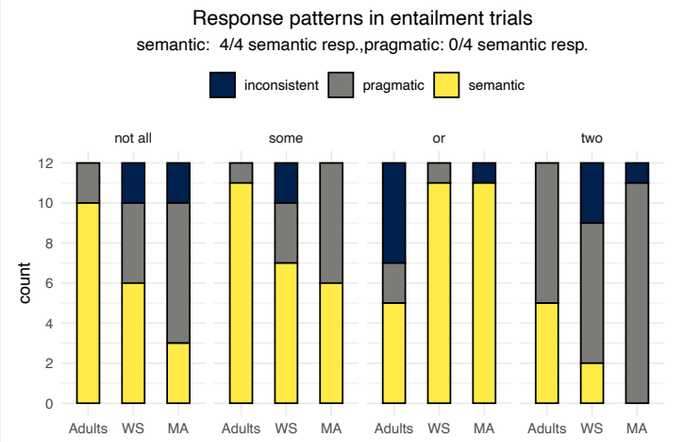
Truthconditional trials

Group	all	not all	some	or	two	**mean**
Adult	1	0.969	0.990	0.990	1	**0.991**
WS	0.951	0.844	0.948	0.958	0.969	**0.936**
MA	0.972	0.896	0.958	0.938	1	**0.955**
mean	0.975	0.903	0.965	0.962	0.990	0.960

WS vs. MA (b=0:8287;SE =0.9275; z=0.893; p=0.3716)
WS vs. Adults (b = 2.2902; SE = 1.0411; z = 2.200; p = 0.0278).

Entailment trials





WS vs. MA* (b = 1.128; SE = 0.515; z= 2.191; p = 0.028)
WS vs. Adults (b = 0.436; SE = 0.52; z = 0.839; p = 0.402)

Conclusion

- Individuals with WS have the knowledge of truth-conditional meaning of scalar terms
- Their acceptance rate of semantic responses is more similar to that of adults than of children
- They do not show an exceptional pattern of semantic readings
- All groups reject the semantic reading of *two* as 'two and possibly more'

Selected references

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