Do Hungarian preschoolers understand number words *exactly*?

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Non-exact interpretation of numerically modified NPs (NumNPs)

(1) *If anyone knocks down five pins, he will get a prize.*

↓

'at least five pins'

- those knocking down more than five pins will also get a prize

(Horn 1972)

Children's non-adult-like interpretation of NumNPs

- children prefer the 'exactly' reading of numerals
- they have difficulties with the 'at least' interpretation

(Musolino 2004)

Hungarian facts for adults

- In Hungarian word order greatly affects the interpretation of numerals.

(2) *János öt bábut talált el.*
John five pins knocked down
John knocked down **exactly** five pins.

(3) *János el- talált öt bábut.*
János down knocked fives pins
John knocked down **at least** five pins.

(É. Kiss 2010)

Experiment 1

How do Hungarian preschoolers interpret number words?

(4) Kapjanak cukorkát azok a macik, …
Those bears shall get a candy who…

(a) … három málnát szedtek.
three raspberries picked
OV → 'exactly three'

(b) … szedtek három málnát.
picked three raspberries
VO → 'at least three'

Results:
Children overwhelmingly (100%) preferred the 'exactly' interpretation irrespective of word order.

Possible reasons for children's non-adult-like behaviour

(i) misinterpretation of the task
- children might have thought that they were tested on counting
- the did not consider the 'meaning' of the whole NumNP in the context at hand but simply looked for the amount the numeral denoted

(ii) inability to decompose sets
- children might not be able to decompose a larger set into smaller subsets, though it is essential for solving the task

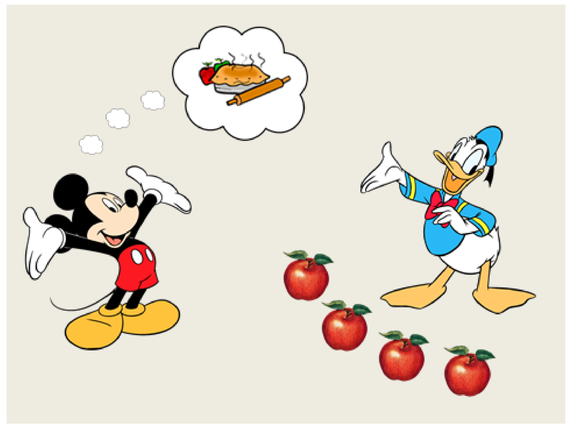
Experiment 2

Do Hungarian preschoolers always understand number words 'exactly'?

- The context made it clear that the purpose of the game was completely unrelated to counting.

Participants:
36 children (19 girls, 17 boys), mean age: 5 years 4 months
Control group: 24 adults

Stimuli:



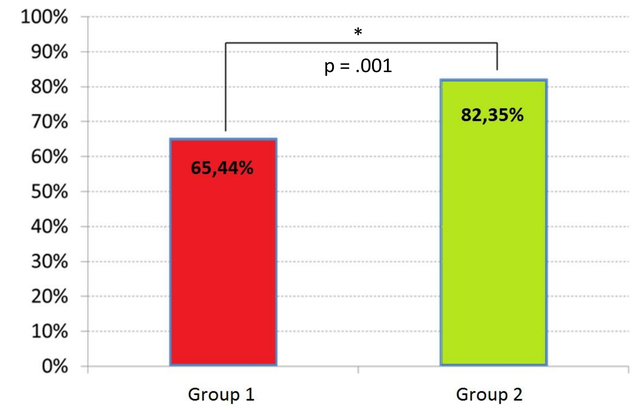
Mickey needs three apples.

Group 1 – question with numeral
Van Donaldnak három almája?
*Does Donald have **three apples**?*

Group 2 – question with *enough*
Van Donaldnak elég almája?
*Does Donald have **enough** apples?*

Predictions
- if children are indeed unable to decompose sets into smaller units, then they will perform equally poorly in both groups (since in both groups the task requires them to decompose sets)
- if, however, there are other factors (related specifically to numbers) responsible for children's difficulties with the 'at least' reading, then they will perform significantly worse in Group 1

Results
The proportion of 'Yes' responses in Group 1 and Group 2.



The number of 'Yes' responses was significantly lower in Group 1 than in Group 2.

Discussion
- the option that children cannot decompose sets into smaller sets can be ruled out (they performed very well in Group 2)
- it is more likely that in children the mapping between the representation of numerals and the representation of sets is not yet complete
- they already know what amount each number word (at least up to 10) refers to but they do not yet recognize how these amounts are related to each other, i.e. having e.g. four apples entails having three, two, etc. apples, too

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