



Numerical Estimation:



Do Individuals with Autism Demonstrate Superior Abilities?

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Background

- While there are clinical reports suggesting that individuals with autism have superior quantification abilities, there is little empirical research on the issue.
- Several studies have looked at the counting, mathematical and subitizing abilities of individuals with autism and found mixed results with respect to whether they demonstrate any superiority
- Estimation is a critically important skill that pervades everyday life, yet there is no research on this ability with individuals who have autism
- Research with typically developing children shows that they initially represent numbers logarithmically. Younger children tend to exaggerate the magnitude of smaller numbers and compress the magnitude of larger numbers

Questions

- How do individuals with autism compare to a matched control population on their ability to do mathematical estimations?
- Are there any group differences in whether numbers are represented in a linear or logarithmic manner?

Participants

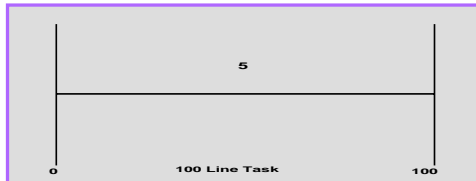
- Individuals with autism were diagnosed using both the ADOS and ADI-R and were of normal intelligence (I.Q.'s > 80).
- Control groups were matched on full scale I.Q. and age
- Participants ranged in age from 16 to 50 years.

Procedure

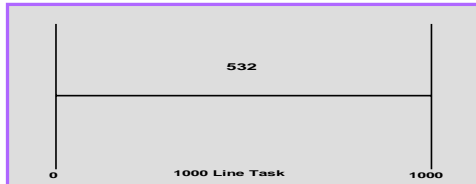
- All participants were presented with a number line on a computer screen. Three different conditions were tested (24 trials for each):
 - 100 Number Line (0 to 100)
 - 1000 Number Line (0 to 1000)
 - Odd Number Line (0 to 1396)
- They were then presented target numbers and asked to place the computer mouse on the line in a position that best represented the target number

Example Number Lines

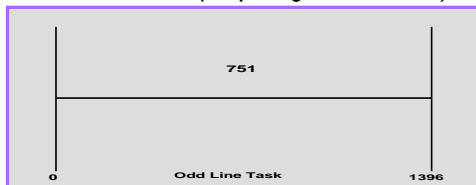
100 Number Line (sample target number of 6)



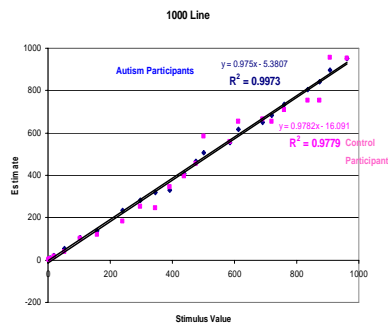
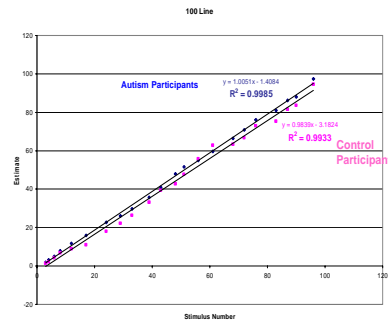
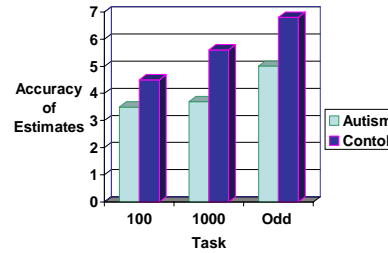
1000 Number Line (sample target number of 532)



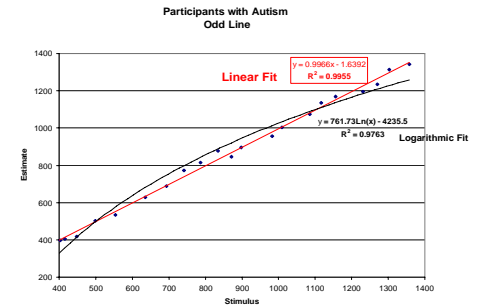
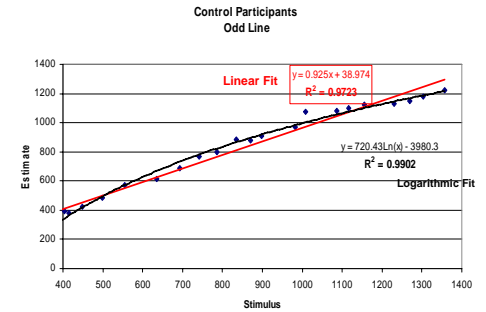
Odd Number Line (sample target number of 751)



Results



Results



Conclusions

- Individuals with autism do seem to have a superior ability in numerical estimation.
- Individuals with autism were more accurate and more linear in estimates than control participants, especially for the 1000 and odd number lines.
- Control participants represented the odd line more logarithmically. They tended to exaggerate small numbers and condense large numbers.
- In contrast, participants with autism represented the odd number line in a very linear and accurate manner.
- An interesting possibility is that individuals with autism also represent sensory information in a linear not logarithmic manner.

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