

Visual Imagery Predicts Semantic Relatedness Judgements in Autistic but Not Neurotypical Adults

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This research was conducted collaboratively by a team that included autistic researchers.

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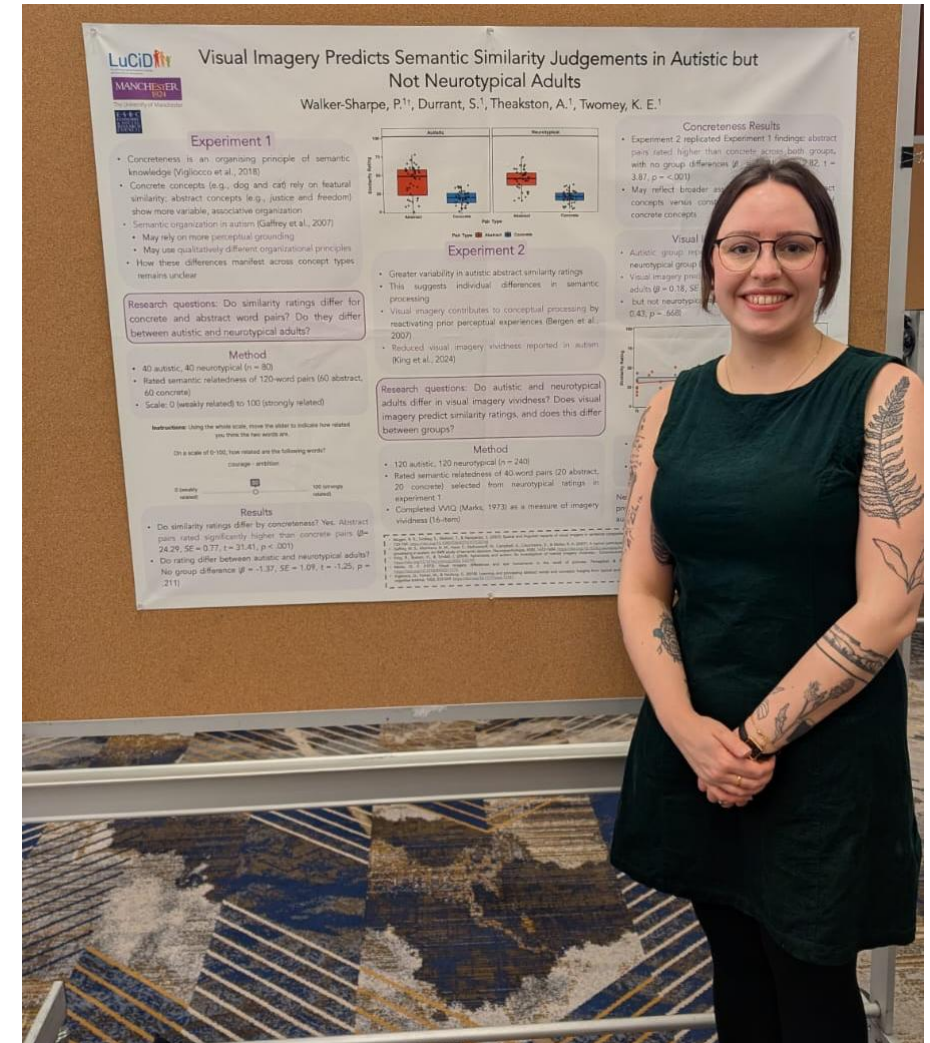


Introductions

PhD researcher in Psychology,
University of Manchester

Diagnosed autistic in 2022

Background in Linguistics, Clinical
Linguistics and Psychology



Background

concrete

abstract



cat



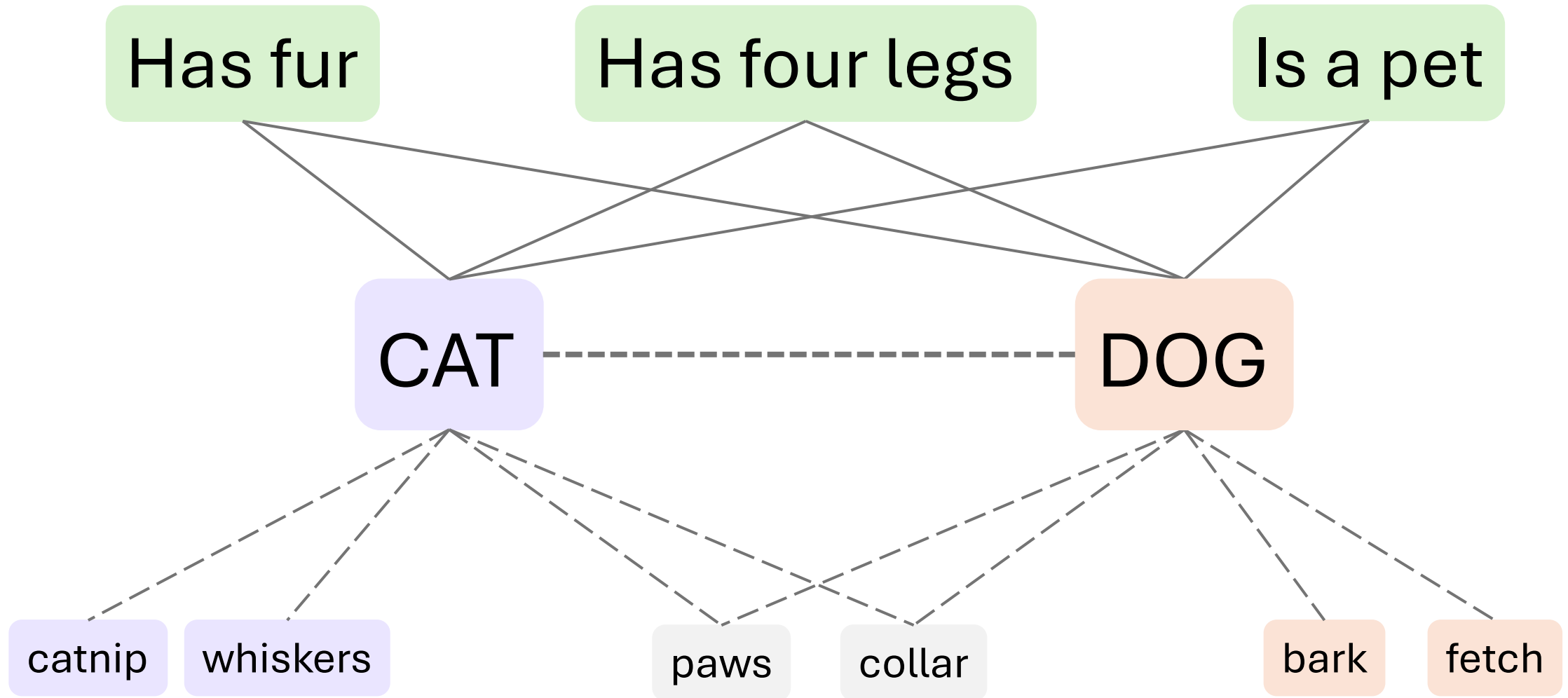
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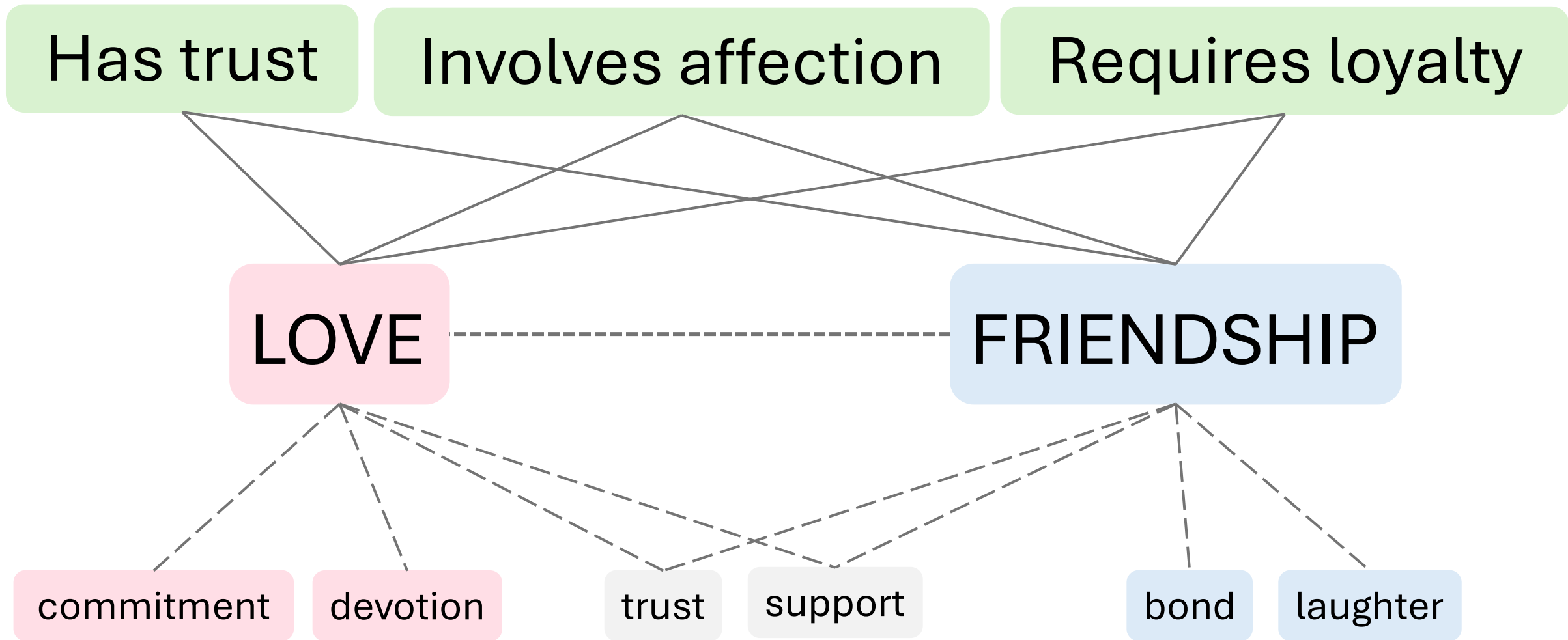
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love

friendship

?





Semantic Processing in Autism

- Autistic people tend to make **more unexpected word associations** (Battaglia, 2012)
- Spontaneous speech includes **unexpected word choices** and **unconventional phrasing** (Zane & Grossman, 2024)
- Autistic semantic networks tend to be more **tightly organised** within categories (Kenett et al., 2016)
- In verbal fluency tasks autistic people tend to stick to **smaller, more specific clusters** (Ehlen et al., 2020)
- These differences appear from early in language development: a **different path from the start**, not a delayed version of the neurotypical one (Haebig et al., 2025)

Perception may shape meaning differently in autism

- Autistic brains show **stronger activation in sensory and visual areas** during language tasks (Gaffrey et al., 2007)
- This suggests meaning may be processed more through **sensory experience** in autism
- Concrete concepts are organised around **perceptual features**; abstract concepts rely more on **linguistic and associative organisation**
- This means concrete and abstract associative relationships may look qualitatively different in autism
- Not degraded, but **organised differently**, more strongly anchored in perceptual experience

Study 1

Research Questions

1. Do relatedness ratings differ for concrete and abstract word pairs?
2. Do they differ between autistic and neurotypical adults?

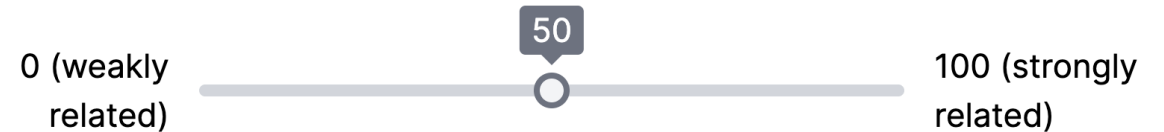
Method

- 40 autistic adults, 40 neurotypical adults
- Saw 120 word pairs (half concrete, half abstract)
- Rated how related each pair felt, from weakly to strongly related

Instructions: Using the whole scale, move the slider to indicate how related you think the two words are.

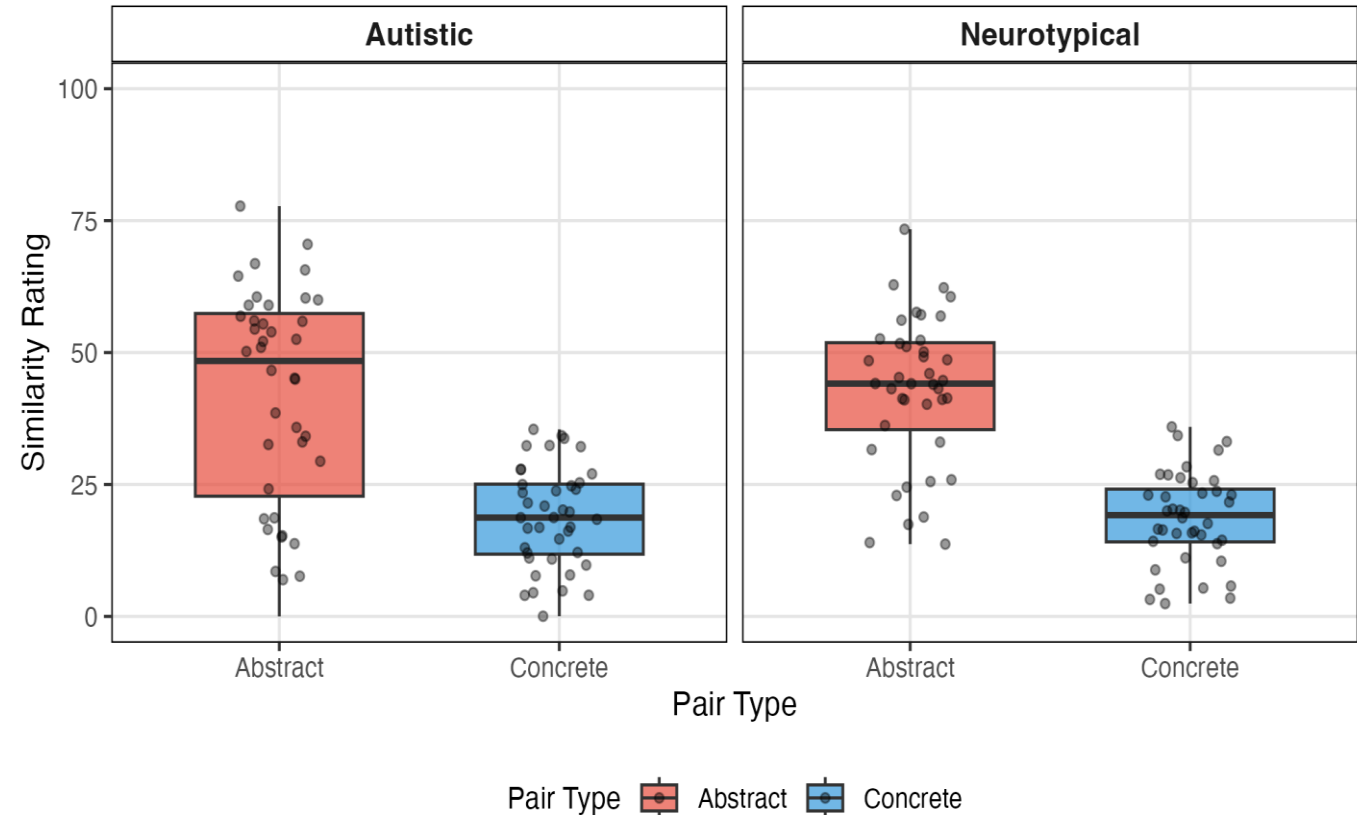
On a scale of 0-100, how related are the following words?

courage - ambition



Results

- Do similarity ratings differ by concreteness? **Yes. Abstract pairs rated as more related than concrete pairs.**
 - Abstract concepts may simply have more flexible, wide-ranging associations
 - Concrete concepts are more anchored to specific physical features
- Do rating differ between autistic and neurotypical adults? **No. Both groups rated word pairs similarly.**



Study 2

Background

- Autistic adults showed **more variability** in how they rated abstract word pairs – which suggests that individual differences matter
- **When we think about a word, we often mentally ‘see’ something** (Moulton & Kosslyn, 2009) – and how vivid that mental image is may shape how we judge meaning and relatedness
- Autistic people tend to report less vivid visual imagery (King et al., 2024)
- Concrete words are **easier to picture**, as they refer to things you can see
- Abstract words are **harder to picture**, as they refer to ideas rather than things

Research Questions

1. Does vividness of visual imagery affect how adults judge relatedness?
2. Is this different for autistic and neurotypical adults?

Method

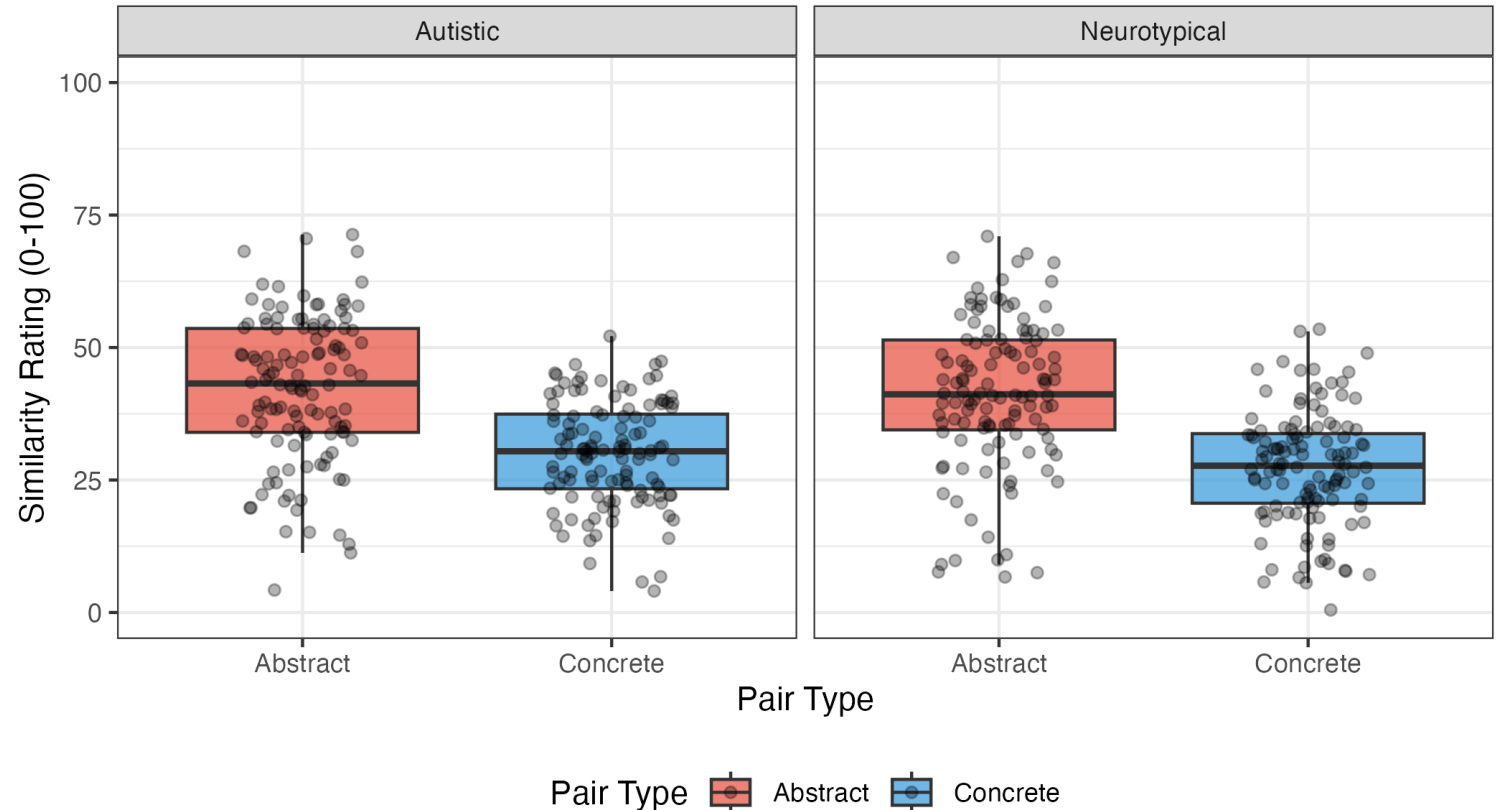
- 120 autistic, 120 neurotypical
- Same relatedness rating task – 40 word pairs (half concrete, half abstract)

Word Type	Word Pair	Neurotypical Rating
Abstract	Profitability-Incarnation	Weakly related
Concrete	Plaza-Teardrop	Weakly related
Abstract	Courage-Ambition	Strongly related
Concrete	Organ-Bacteria	Strongly related

- Also completed a short questionnaire measuring how vividly they experience mental images

Results: Concreteness

- Study 2 replicated Study 1. Abstract word pairs were rated as more related than concrete word pairs across both groups.

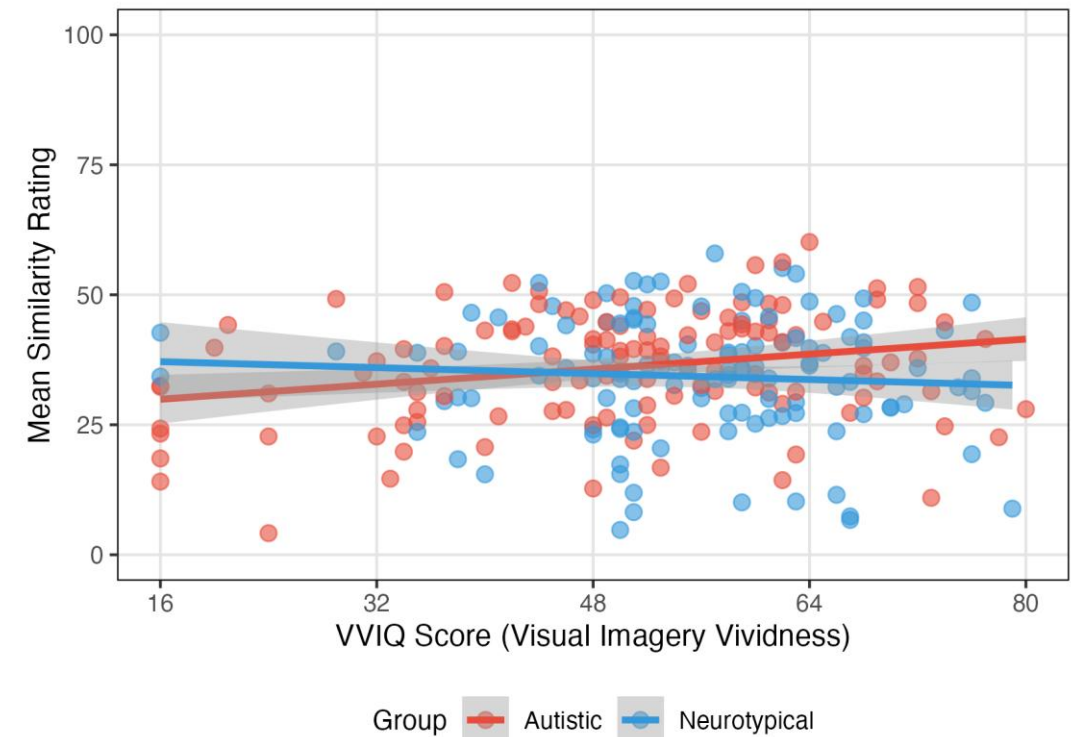


Results: Visual Imagery

- Autistic group reported less vivid visual imagery than neurotypical adults
- Does vividness of visual imagery affect how adults judge relatedness? **No.** Overall there was no relationship between imagery vividness and relatedness ratings.

However...

- Is this different for autistic and neurotypical adults? **Yes.** The more vivid the mental imagery, the higher autistic adults rated word relatedness – but this pattern was not found in neurotypical adults.



Summary

- Both groups showed similar relatedness judgements

...yet appear to arrive there through **distinct pathways**

- Autistic adults reported less vivid mental imagery

...but the more vivid their imagery, the more related they rated words to be

- This suggests autistic semantic processing **may be more strongly rooted in perceptual experience** (for both concrete and abstract concepts)
- Neurotypical adults appear to draw on **alternative strategies** that don't rely on visual imagery

Conclusions & Future Directions

Equivalent performance does not mean equivalent processing. Future research should focus less on *whether* semantic organisation differs and more on *how* semantic knowledge is accessed.

Considerations...

- The imagery measure was self-report – lower scores may reflect differences in the monitoring of internal states rather than imagery itself (Williams et al., 2023)
- We didn't measure inner speech, which may also shape how people judge word relatedness (Williams et al., 2016)

Next Steps...

Does visual imagery play a similar role in other areas of autistic cognition?

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