Social Concepts in Autism: Desirability & Preference
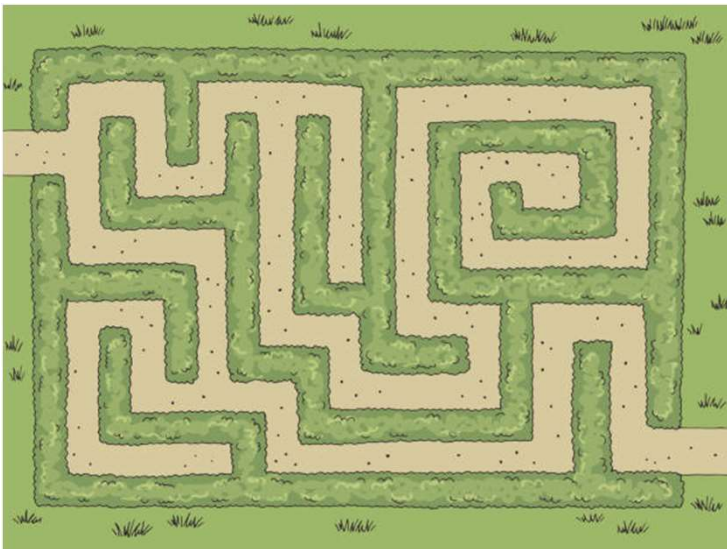
Valentina Petrolini (University of the Basque Country – UPV/EHU)
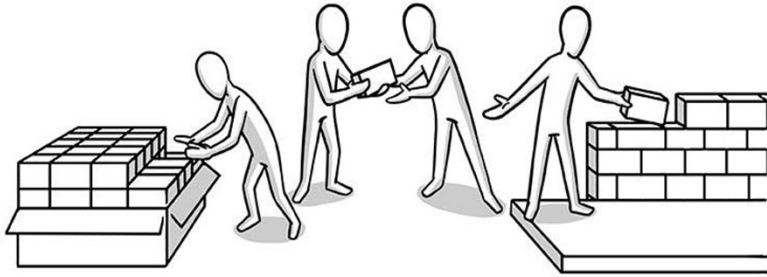
The empirical study presented today is the result of a collaboration between **Lindy Lab (UPV/EHU)** & the **Consciousness Group** (Basque Center on Cognition, Brain, and Language – BCBL)

Roadmap for today

§1. Social difficulties in autism: a bit of history

In his seminal paper, Kanner (1943) describes a group of children who exhibit a peculiar form of **"autistic aloneness"**

E.g., [Donald T.] "was **happiest when left alone**"; "had a **disinclination to play with children**"; [Frederick W.] "almost **ignored other people**"; [Dorothy] "**ignored persons completely except for her mother**"

To counter the idea that autism should be characterized as a form of infant psychosis, Kanner claims that autistic children are **not withdrawing from the social world, but they are rather "born outside of it"**

§1. Social difficulties in autism: a bit of history

Asperger (1947) also notices a **range of peculiar social difficulties** in the children that he observes:

"This disturbance results in **severe and characteristic difficulties of social integration**"

"Gifted, sensitive children who had been **cast out by their peers**"

E.g., [Fritz V.] "**never got on with other children** and, in fact, **was not interested in them**"; [Hellmuth] "clearly did not have any feeling for the fact that he **did not really fit into this world**"

§1. Social difficulties in autism: a bit of history

Bonnie Evans
The metamorphosis of autism
A history of child development in Britain
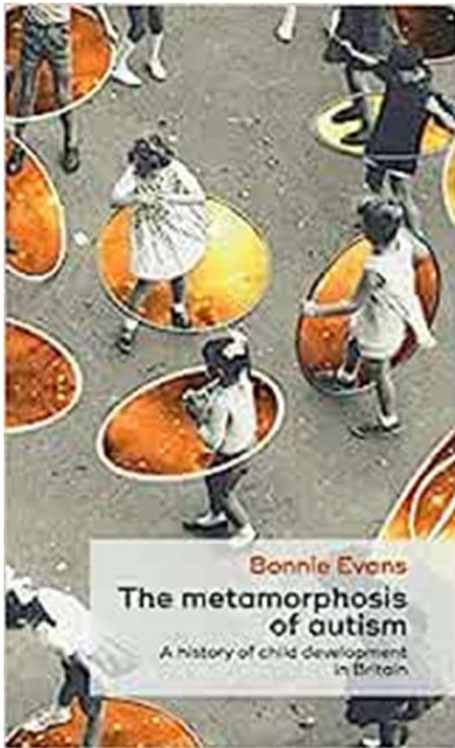
In the 1970s, partially mirroring Chomsky's work on language, **social abilities come to be seen as innate, and deviations from this norm begin to be codified as "social impairments"** in a developmental sense [Evans 2017]

with them . . . I liked things over people and dint care about People at all. (Volkmar & Cohen, 1985, Case Study of Tony W, original spelling maintained, p.48)

what he saw . . . On the other hand, one did not feel that one was being observed in a cold, unemotional manner, like some object; rather one had the impression that he was more or less indifferent. Indeed objects that he wanted were stared at in quite a different way. In this case he gazed spellbound, he noticed small details and could only be distracted with difficulty, if at all. (Bosch, 1970, p.9)

§1. Social difficulties in autism: a bit of history
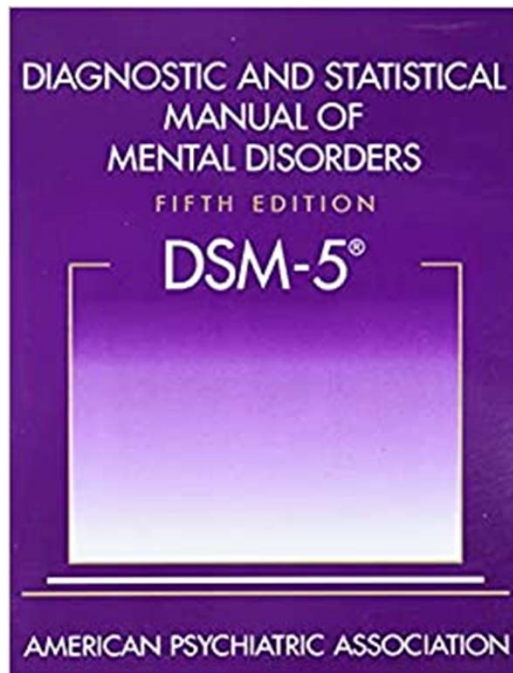
The **social leg of the current diagnostic criteria for autism** (the other leg being Restrictive and Repetitive Behavior, Interests, or Activities)

A. Persistent deficits in social communication and social interaction across multiple contexts

Ex: rarely uses language to communicate; does not respond when spoken to; does not use gestures like pointing or waving; does not show interest in friends; does not engage in imaginative play, etc.

§2. Two competing theories:

Cognition
vs
Motivation

Once established that autism is characterized – among other things – by **social difficulties**

It's not fully clear **what the nature of such difficulties might be.**

Two competing theories on the market:

- **Social cognition issues**: difficulties in **understanding and/or interpreting other people's mental lives** (thoughts, emotions, motivations, etc.)
- **Social motivation issues**: **reduced motivation towards social interaction**, which results in fewer interaction opportunities

§2. Social Cognition

MINDBLINDNESS
AN ESSAY ON AUTISM AND THEORY OF MIND

Simon Baron-Cohen
foreword by Leda Cosmides and John Tooby

Baron-Cohen's Cognitive Theory in a nutshell [1988]

- Social issues in autism arise from **difficulties in understanding other people's mental states**

- Other people's mental states cannot be observed directly, but need to be **inferred through specific abilities – e.g., theory of mind**

- Beliefs and desires are by definition **intentional (i.e., "about something")** and therefore especially useful to understand and predict social behavior

§2.
Social Cognition

Image: Triangle Business Journal

Dawson's early view [2004] focused on a wider range of cognitive difficulties in autism, mostly revolving around the notion of **social attention:**

- **Social orienting:** ability to spontaneously grasp and respond to social stimuli in one's environment, e.g. name calling.

- **Joint attention**: ability to coordinate attention with a social partner, e.g. by sharing, following, or directing the other person's attention.

- **Attention to the distress of others**

§2. FPAs addressing social cognition issues

(Grandin)

"**I did not know that eye movements had meaning until I read *Mind Blindness* by Simon Baron-Cohen**. I had no idea that people communicated feelings with their eyes.
I also did not know that people get all kinds of little emotional signals which transmit feelings. My understanding of this became clearer after I read *Descartes' Error* by Antonio Damasio"

("Social Problems: Understanding Emotions and Developing Talents")

§2. Disclaimer:

Social Cognition Under Fire

Some of the **assumptions and results underpinning cognitive theories have been called into question** in recent years. A non-exhaustive list:

- The link between **theory of mind abilities** and **social interaction** is far from clear [Gernsbacher & Yergeau 2019]
- Emphasis has **shifted away from belief-desire psychology** towards cognition/emotion interaction [Pessoa 2013]
- Unclear whether **social attention behavior** (e.g., initiation of JA) is caused by **cognitive** or **motivational** factors [Falck-Ytter et al., 2022]

§2.
Social Motivation

Chevallier et al.'s motivational theory in a nutshell [2012]

- **Social difficulties in autism** relate primarily to **diminished social motivation**, i.e., "disrupted social interest"

- **Social cognition issues** are the **consequence**, rather than the cause, of diminished social motivation – fewer opportunities to interact with others and develop the relevant skills.

- Motivation includes **orienting**, experiencing pleasure in interactions (**reward**), and seeking to foster them (**maintaining**).

§2. FPAs addressing social motivation issues

Some qualitative studies on friendship in autistic children report higher **preference for being alone** and **dissatisfaction with social relationships**

[e.g., Calder et al. 2013: child: *"Sometimes I want to play by myself"*; parent: *"I think if he had a choice, he would probably choose to play by himself mostly"*; teacher: *"He doesn't seek out other children"*]

Yet, such preference and dissatisfaction are often motivated by **social exclusion** [e.g., *"They talk in their private little groups and I'm not in it. I don't really care … I don't mind if they do that … actually, I get a bit upset …"*]

§2. FPAs addressing social motivation issues

Reddit forums

Some people report **diminished social motivation**:

For me at least, that was the case as a kid. I had no interest in other kids, I just wanted to be left alone doing my thing (rocking, arranging toys, hyperfocusing on something).

Others push back saying that they **crave social connection, but find it very difficult to pursue in a NT social world**:

When I was younger (teens and 20s) I tried very hard indeed to be social. And kept trying, no matter how many times I hurt myself, until I just couldn't do it anymore.
So no lack of motivation for me.

§2.
Social Motivation Under Fire

Recent criticism **against the idea that autistic people would lack social motivation**

[Jaswal & Akhtar, 2019]

"If you **expect** socially interested people to behave in certain ways (e.g., to engage in eye contact), **you might infer that someone who does not do so (or who does so infrequently) is aloof and uninterested**" [J&A 2019]

Being versus appearing socially uninterested: Challenging assumptions about social motivation in autism

Vikram K. Jaswal[a] and Nameera Akhtar[b]

§2.
Cognition versus Motivation

Wrapping-up

As it often happens in autism research, things are **complicated**:

- **Theoretical assumptions** about which abilities are social, what should be interpreted as cognitive or motivational, etc.

- Due to the **heterogeneity** of the autism spectrum, **FPAs support one theory over the other** with no cohesive picture

Experimentally: **How can we pry apart abstract understanding of social stimuli and being motivated towards them?**

§3. Our study

The image database

Goal of the study:

To better understand **how social concepts are grasped by autistic and non-autistic individuals**

Resources:

Novel database of 60 images depicting abstract social concepts **varying in social desirability**

i.e., 30 prosocial and 30 antisocial images (developed by Soto and colleagues)

Wide application potential across cultures and languages

§3. Our study

The database

How the database was built:

List of concepts taken from a previous study on abstract adjectives [Anderson 1968]

30 images representing **high social desirability** & 30 images representing **low social desirability**

Each image represents a concrete experience associated with the concept

E.g., "aggressive"; "generous"

§3. Our study

The database
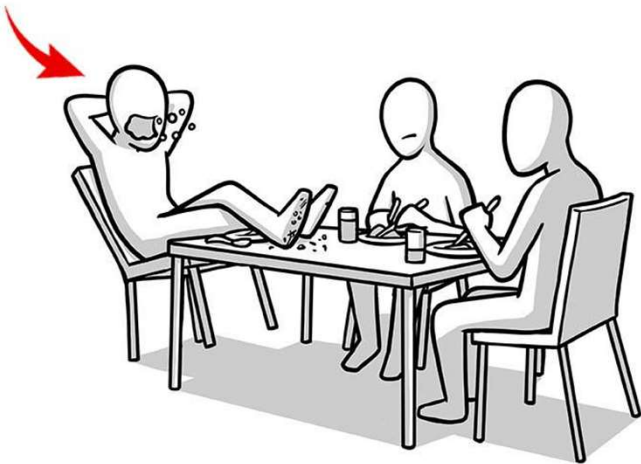
Features of each image

- **Homogenous black-and-white drawings** to avoid diverting the viewer's focus
- Human figures depicted as **gender-neutral without eyes, and the lowest possible degree of detail**

- Relevant social information was indicated through **bodily postures and gestures**
- **A red arrow** indicated the protagonist whose behavior refers to the target concept [e.g., "impolite"]

§3. Our study

The database

"How well does the image illustrate the meaning of the word you have chosen?" "Is this concept socially acceptable?"
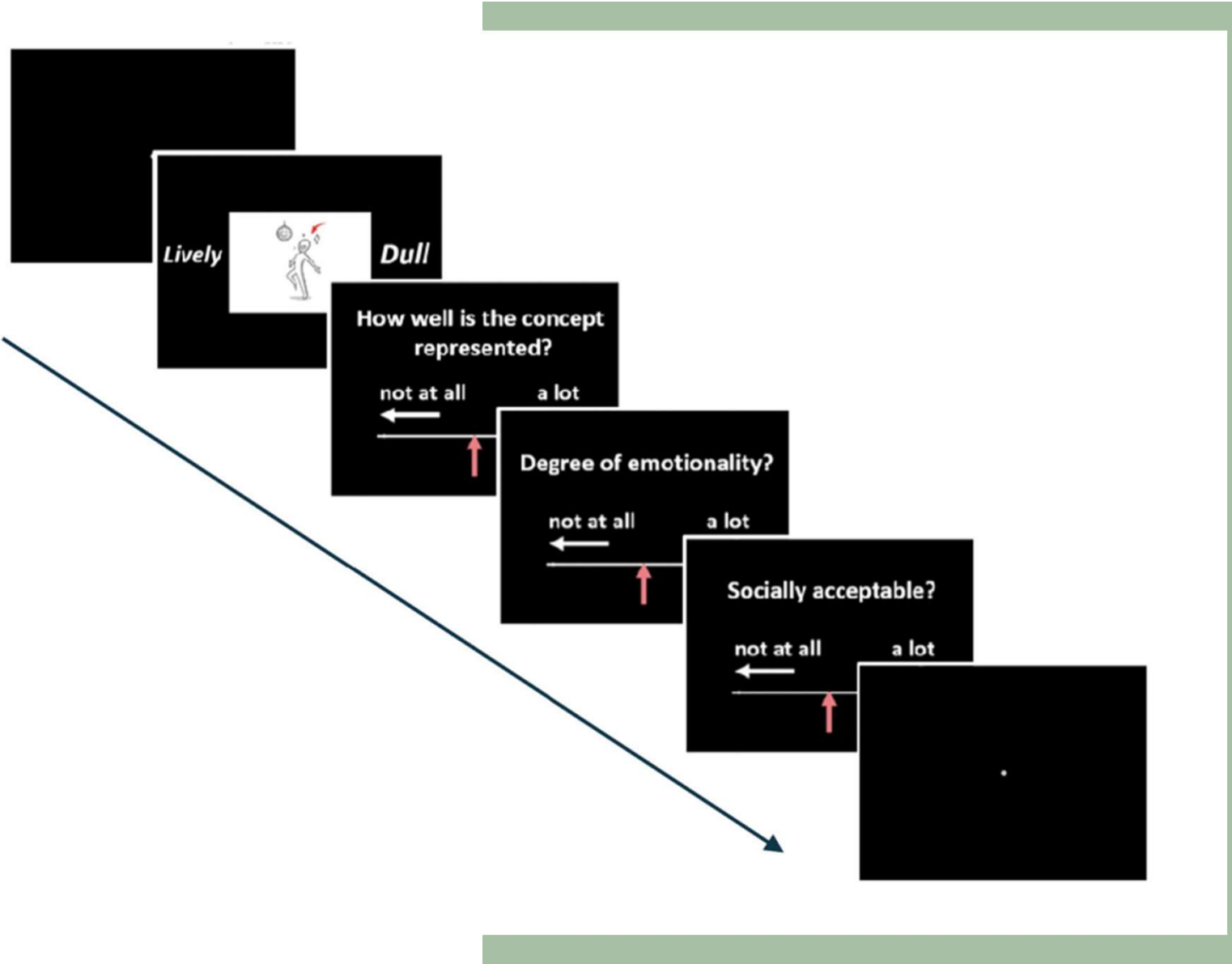
Validation of the database

Semantic decision task

Participants were shown a single image centered in the middle of the screen.

Two words appeared, one referred to the intended **target-concept plus a distractor word referred to another word from the database of opposite social desirability**.

Participants had to decide which of the two provided concepts was depicted in the presented image.

§3. Our study

## Validation of the database – Results
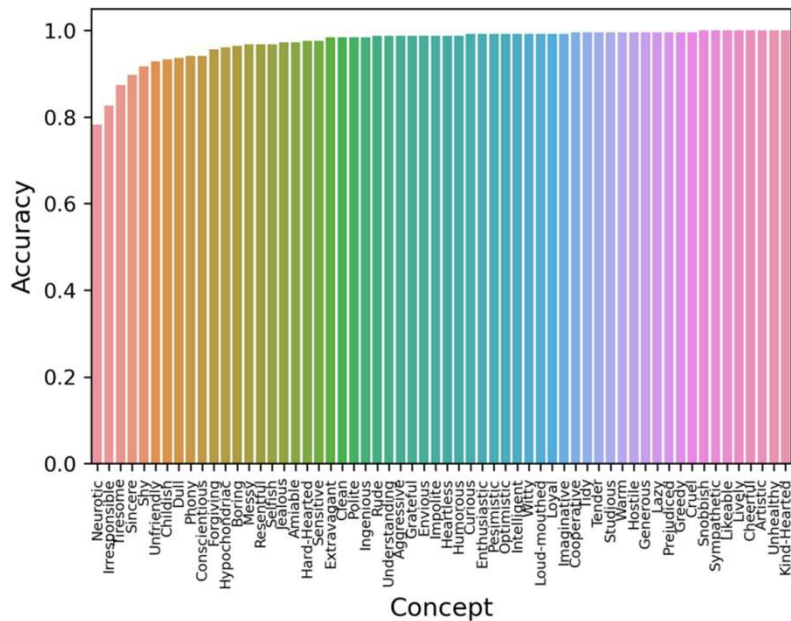
n = 228 participants

The **mean probability that the target concept was selected was very high**, except for one adjective ["neurotic"]

Semantic relatedness ratings between the selected word concept and the image were consistently high across participants

(slightly higher for socially desirable items)

§4. The Tasks

Odd-one-out (Desirability)
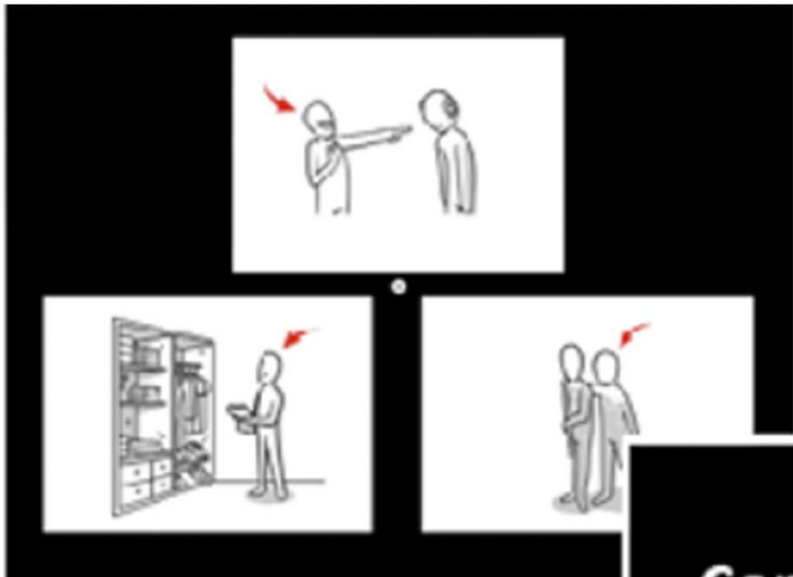
Three images were simultaneously displayed on the screen.

Two images were selected from the same social desirability status, whereas the third image was the odd-one-out.
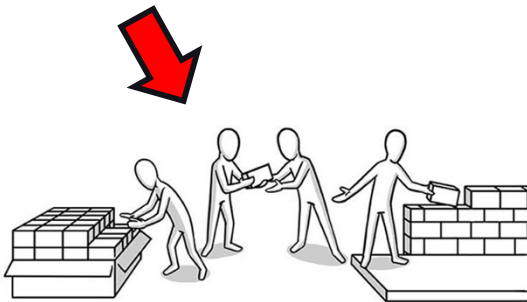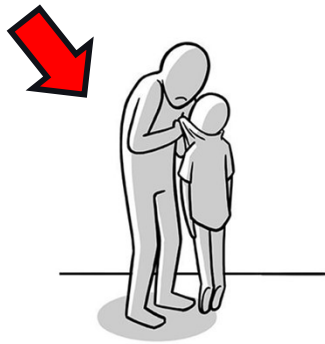
Participants were asked to **indicate the odd-one-out and self-rate confidence** in their decision (metacognitive portion)

60 single trials in randomized order with each of the 60 images being the odd-one-out across the trials

Confidence of decision?

Guess   Sure
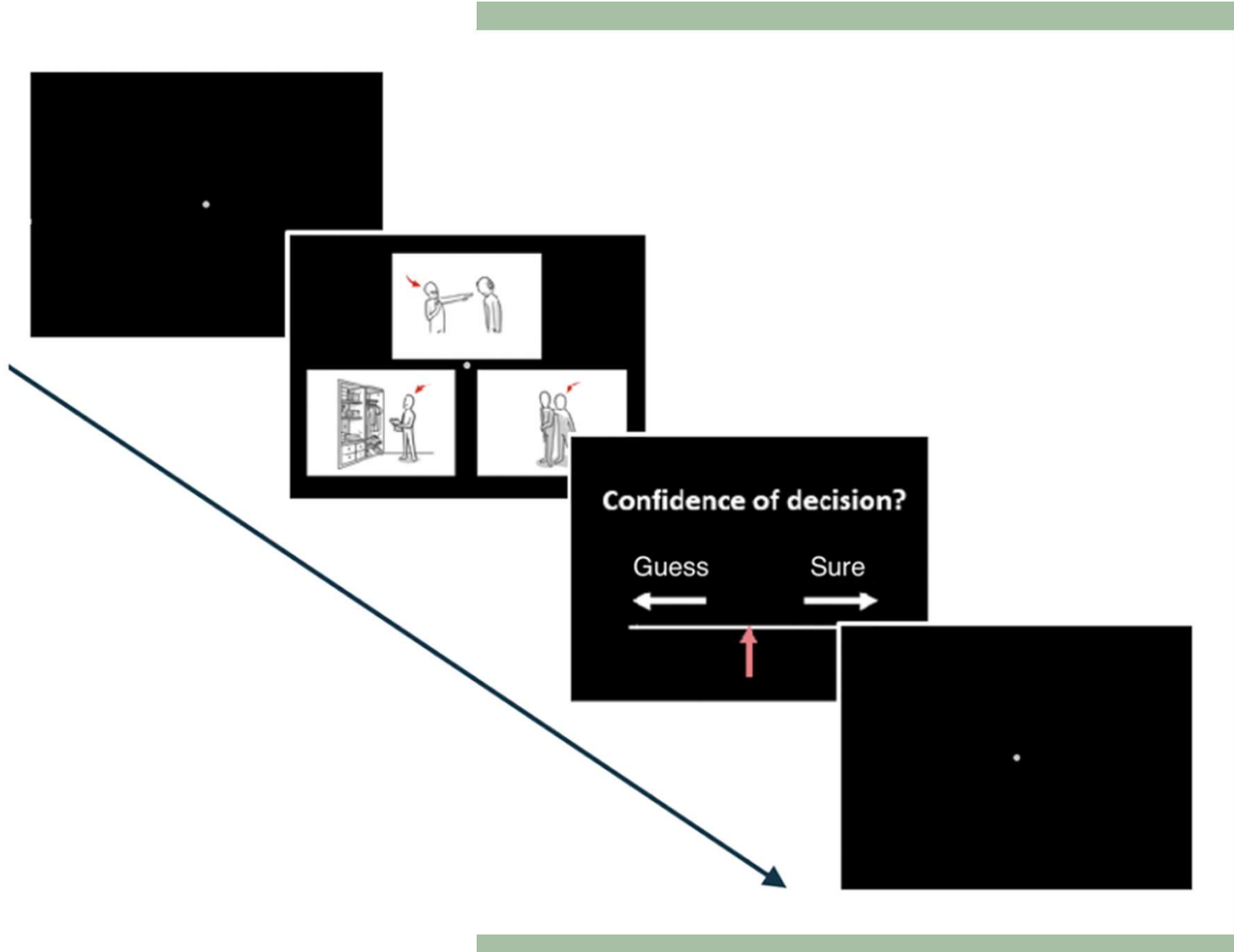
§4. The Tasks

Preference

Two images were simultaneously displayed on the screen.

Participants were asked to **select one person out of the two images** – i.e., one prosocial and one antisocial, randomized in order.

Adult participants were also asked to make a follow-up, finer-grained rating using a ten-point scale ranging from "not at all" to "a lot".

The preference task comprised 30 trials in randomized order.

§5. Methods

Adult Participants

Neurotypical

n = 228 participants, mean age: 41 (n = 139 females)

Recruited on **Prolific**: a) English as a first language, b) no literacy difficulties, no mild cognitive impairments (MCI) or dementia, and d) normal or CTN vision.

Autistic

n = 50 participants recruited on Prolific, mean age: 33 (n = 33 females)

Received an autism diagnosis as children or adults

§5. Methods

Participants – Children

Neurotypical

n = 29 children recruited at a local school in the Basque Country, age range: 4-6 yo

Tasks were administered in a school facility by a MA student & a Lindy Lab member

Autistic

n = 16 children, age range: 4-9 yo (VMA matched as closely as possible to the NT sample: 3,2 - 7,6).

Tasks were administered at Lindy Lab by a RA.

§5. Methods

Participants

1	I prefer to do things with others rather than on my own
2	I prefer to do things the same way over and over again
3	If I try to imagine something, I find it very easy to create a picture in my mind
4	I frequently get so strongly absorbed in one thing that I lose sight of other things
5	I often notice small sounds when others do not

Autism Spectrum Quotient (AQ)

Self-administered questionnaire used to measure the degree to which adults show autistic traits.
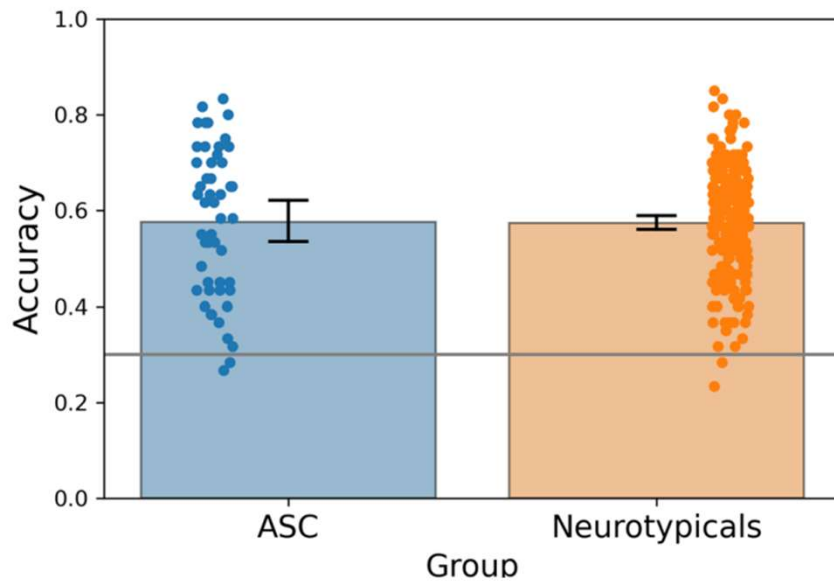
Adult participants completed the AQ.

The AQ contains a total of **50 statements with four response options** (from def agreed to def disagreed)

Total of points determines **individual AQ score** (26 point being the cutoff)

- 79.3% of autistic people score 32 or higher
- Most non-autistic males score 17 on average
- Most non-autistic females score 15 on average

§5. Results

Odd-one-out

- Both neurotypical participants and autistic participants performed consistently above the 0.33 chance level. **Level of performance was comparable** (although far from ceiling → possible ambiguity in the task)

- In the NT sample, **no correlation between AQ scores and performance**

- Results are similar also in the **metacognitive** portion of the task – i.e., self-confidence in one's decision

[NB: Children did not complete this task]

§5. Results

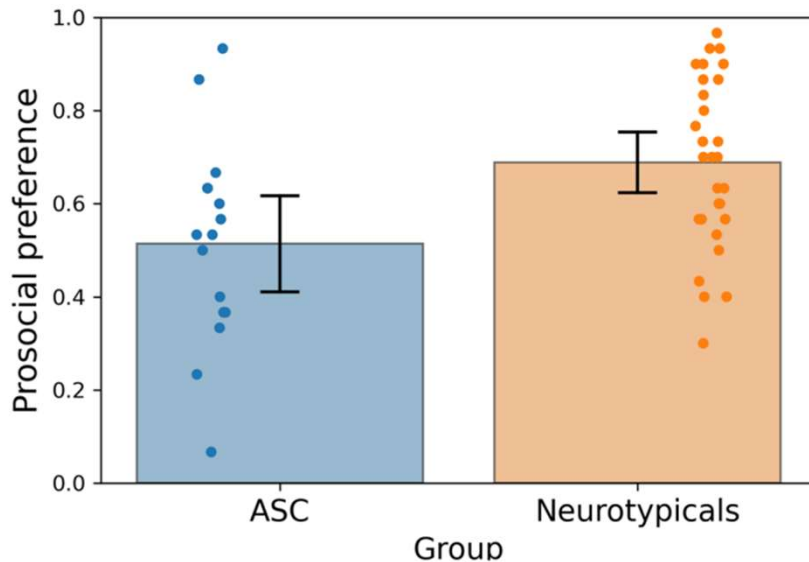## Preference
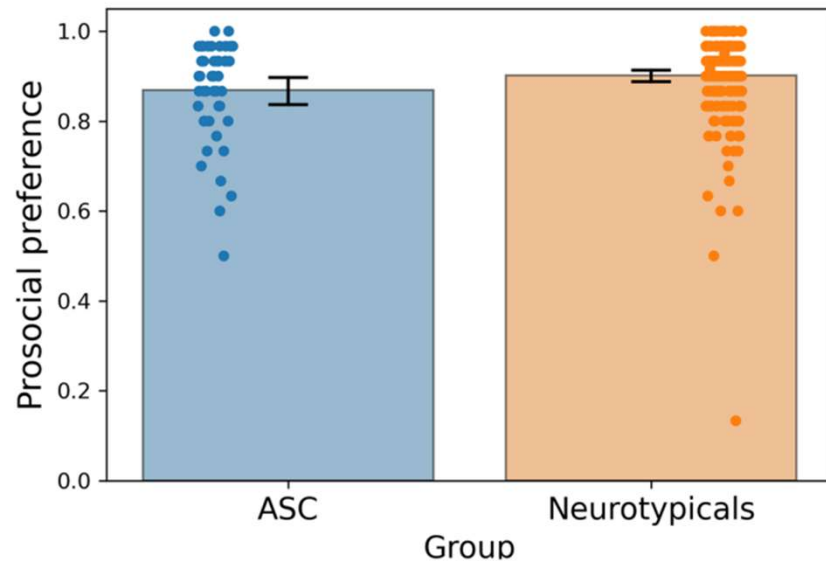
Neurotypical adults

- Significant **negative correlation between the AQ score and the probability of a preference for the protagonist of a socially desirable concept**
= NT participants with higher AQ-scores were **more likely to select the item associated with lower social desirability**

Autistic adults

Lower probability to select prosocial images with respect to non-autistic participants

§5. Results

Preference

Autistic children

In line with the pattern observed in adults, autistic children showed a **significantly lower preference bias for socially desirable images compared to the neurotypicals**

Bottom line:

A preference bias away from prosocial concepts that was linked to individual autistic traits in NTs, and was more prominent in autistic participants both in adults and children

§5. Results

Gender Effects

Exploratory data

Recent research **points to the existence of a female autism phenotype** [Baldwin & Costley, 2016; Bargiela et al., 2016]

- Performance in the odd-one-out task and the preference task differed between autistic men and women, **with men being less accurate in the odd-one-out task and showing a less pronounced pro-social bias compared to women.**

[These analyses were not performed in the children sample since there were only three females in the autistic group.]

§5. Bonus Track

The "esta bien" task

One more task that did not make it into the paper: the "Esta bien" task

Participants were shown **one image, and were asked to assess whether the action observed in that image was *good* or not.**

Again, one specific person was marked by a red arrow to minimize distractions.

This task was only completed by the children samples (n = 29 NTs + n= 16 AUT)

[plan is to run this with a larger sample]

Group: asd

Group: neurotypical

"Esta bien" Task – Preliminary results

- Autistic participants exhibited **a higher tendency to label antisocial images as "good"** with respect to neurotypical participants
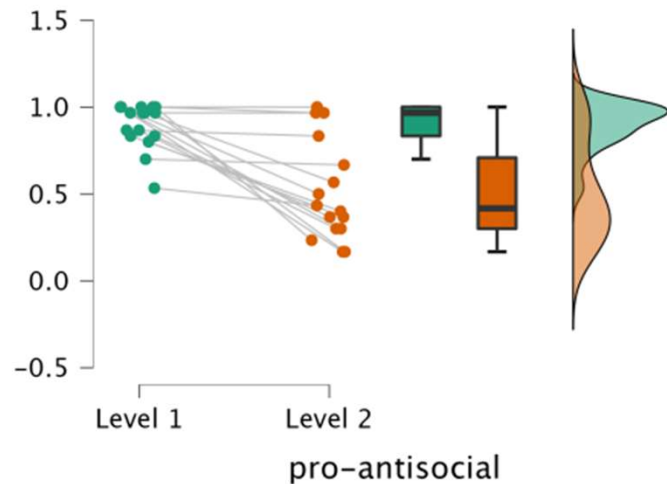
[see Level 2 on the plots]

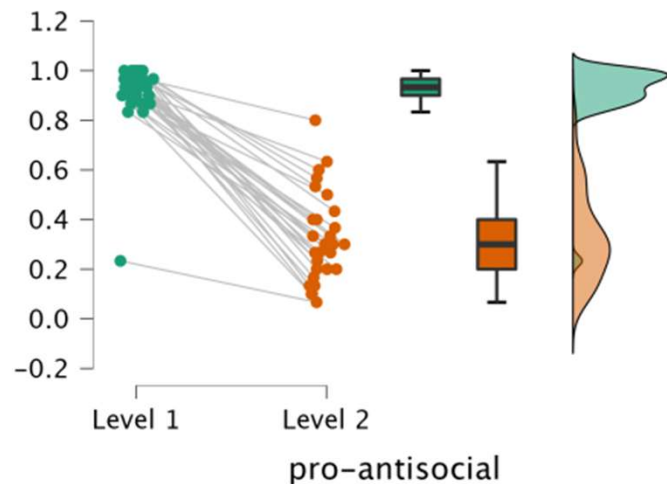- **No significant differences** in the assessment of **prosocial** images

[see Level 1 on the plots]

[similar trend that we observed with the two groups of adult subjects]

§6.
Discussion

Recap of results

- The **image database** consistently captures the **meaning of social concepts along with their desirability.** A tool for future studies with children and/or populations with atypical linguistic development.

- **Odd-one-out task** (measuring social desirability) showed **no difference between NT and AUT samples**, also in its metacognitive component

- **Preference task** (measuring social preference) showed a **bias away from prosocial images in the AUT population and in NTs who scored high in the AQ.**

§6.
Discussion

Cognition vs Motivation

What the results tell us about the competing theories

By administering the odd-one-out task and the preference task to the same group of (adult) participants, we aimed to **pry apart social cognition** – i.e., *"Which one of these images is socially (un)desirable?"* **and social motivation** – i.e., *"Which one of these images do I subjectively prefer?"*

- **Evidence for social motivation theory** (i.e., lower likelihood to select prosocial images) **BUT:**
- **Social cognition seems to be preserved** (i.e., no difference in performance in the odd-one-out task)

§6.
Discussion

Cognition vs Motivation

"Social motivation theories are partially vindicated by our results,

although our pattern of results also suggests that

diminished social motivation does not necessarily imply diminished social cognition."

[Soto et al., 2024, p. 12]

§6.
Discussion

Beyond the bias

The bias away from prosocial images **does not imply an inherent lack of interest in social situations**

Autistic individuals may experience the social world as stressful for a variety of reasons (i.e., they may perceive it as unfamiliar, uncertain, unsatisfying), and thus avoid social situations accordingly.

[Gadsby 2021: *"It's not that I don't like people, I just find being social really, really exhausting"* [p. 256]

§6. Discussion

Gender effects

Autism in Females

Exploratory gender effects – i.e., higher prosocial bias that we uncovered in female participants – corroborate the idea that **autistic females may exhibit a different diagnostic profile**.

One of the characteristic features of the female profile would be **higher social motivation and greater ability to form social relationships, which seems to be true of females regardless of their diagnostic status** [Hiller et al., 2014; Sedgewick et al., 2019]

[More research is needed to get a better grasp of this different diagnostic presentation]

§6.
Limitations

Autism Quotient

Controversial whether the AQ appropriately measures autistic traits in the general population

(e.g., **gender-related concerns** have been raised about the items – see Belcher et al. 2023)

Moreover, scoring high in the AQ ≠ receiving an autism diagnosis

BUT:

At least in our study, adult AUT participants had a higher AQ score compared to NT participants

§6.
Limitations

Our sample(s)

- Our total sample was **uneven in terms of verbal and cognitive skills**: adults had typical skills, while children had a wide variety of verbal and cognitive skills

- The **NT sample size was much bigger** (n = 228) because it was also used to validate the image database

- In the adult AUT sample, our **sex ratio was skewed towards females**: general trend observed in online studies on autistic adults, which tend to attract more female participants (possibly an effect of late diagnosis)

Comments, questions, thoughts?

Feel free to email us!

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Want to read the full paper?