Open Science in Experimental Autism Research:

A replication study of information transfer within and between autistic and non-autistic people.

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Background
- Successful information sharing depends on successful communication between people
- Autism is clinically defined by social communication deficits[1], including heterogeneous differences in verbal and non-verbal communication. Therefore, autistic people may be expected to be less effective at sharing information, particularly with other autistic people. It may be expected that non-autistic people will be better at communicating with autistic people, as they may be better able to understand other people.
- However, first person accounts from some autistic people state that interacting with other autistic people is easier than interacting with non-autistic people. Our original study[2] compared interaction within and between autistic and non-autistic people.

The original study

- In 2020, we published a study that indicated that it is the mismatch between autistic and non-autistic people, rather than autism itself, that degrades information sharing[2]
- We recruited autistic and non-autistic adult participants (n = 72) in groups of eight, where either (a) all participants were autistic; (b) all participants were non-autistic, or (c) half of participants were autistic and half were non-autistic.
- Each group of 8 participants completed a "diffusion chain"[3] task, which is used to look at the accuracy of information transfer. Participants were allocated a number between 1 and 8. The researcher told participant 1 a story, which had 30 unique details. Participant 1 then told this story to Participant 2; Participant 2 then told the story to Participant 3 and so on. (Figure 1) [4]
- The mixed chains, which alternated between autistic people and non-autistic people, showed a significantly steeper decline in information transfer than the autistic chains and the non-autistic chains (Figure 2).
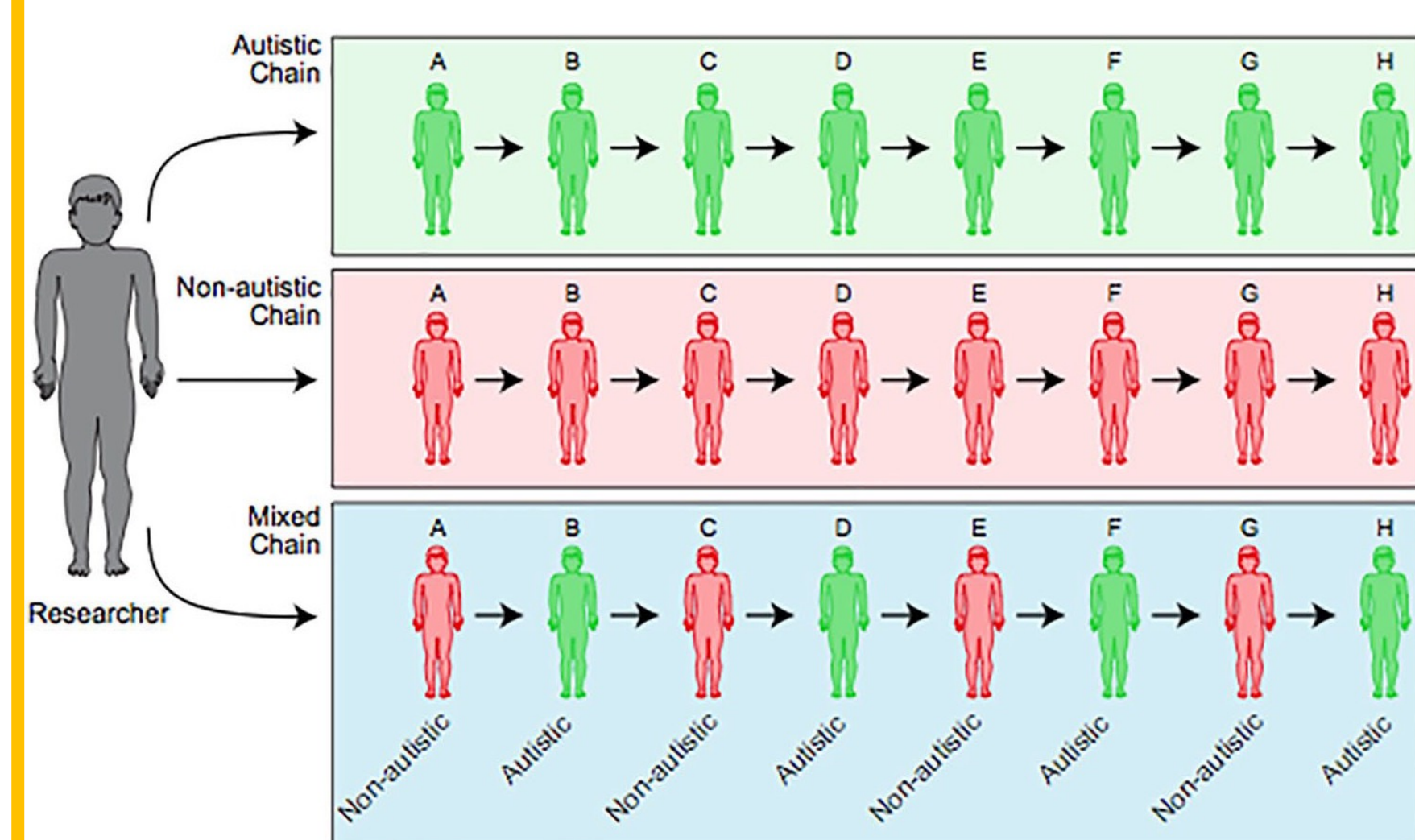

Figure 1. Illustration of the diffusion chain technique, from Crompton et al., 2020

- This indicates that autistic social behaviour can include effective social communication, and suggests that social difficulties in autism are contextual, not absolute.
- These results challenge the diagnostic criteria of inherent social deficits in autism. A replication study is essential to examine the robustness of this effect in a larger and more diverse sample.
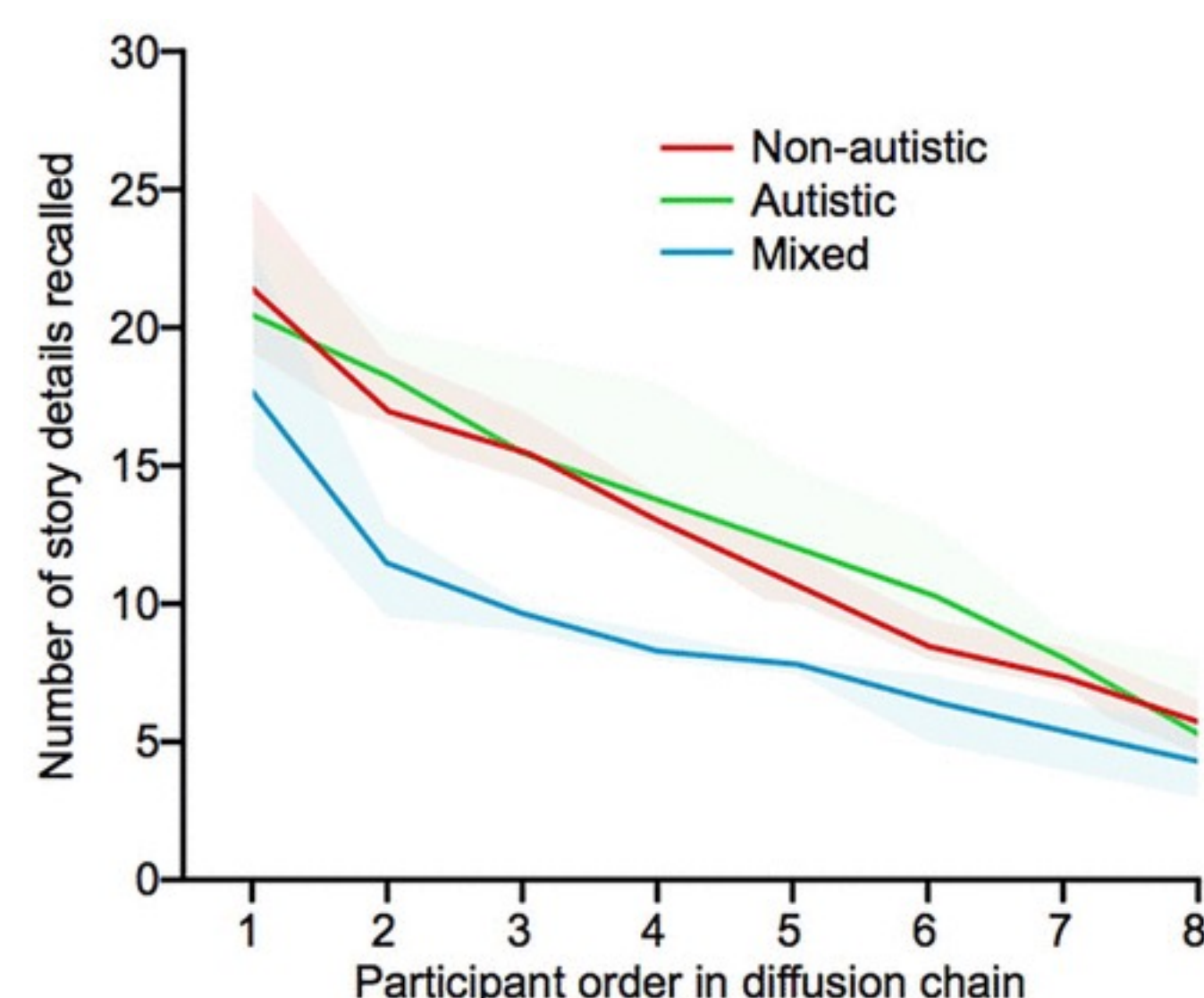

Figure 2: Mean and range of story details (out of 30) transferred in the diffusion chain, by group and position from Crompton et al., 2020

The current study

- We are about to start an open-science replication of this study to find out whether these findings are replicable in a new sample.

The new sample
- A larger sample size (n = 324), across three international sites allows us to recruit a more diverse sample.

The replication
- Will use the same protocol as the original study, though chains will have only 6 participants rather than 8 as the original study found participants 7 and 8 in each chain did not share significant amounts of information. Additionally, we will use a new story (of comparable difficulty and length) for the task, as the original one was published as supplementary material in the original study. Participants must not have had prior access to the story – the only information they should get is during the diffusion chain task itself.

What's new in the design?
- Diagnostic disclosure: participants in just half of the chains will be informed whether they are interacting with an autistic or non-autistic person. This will test whether being aware of someone's diagnosis affects how people share information
- Factual vs fictional information: participants will complete two chains – one for fiction and one for factual information. This will test whether communication efficacy for autistic and non-autistic people differs depending on the type of information.

What's new in the analysis?
- The original study used regression to examine the effect of chain type (autistic, non autistic, mixed) and participant position (1-8) on information transfer. We will replicate this analysis method, with additional post-hoc analysis potentially including (a) non-linear regression (b) interactions between chain type and participant position and (c) computing Bayes Factors for normally distributed differences between means.

Open Science
- We have a registered report currently under review. All protocols, anonymized data, and analysis will be shared on the OSF

Developing our Open Science Practices
Though there is a growing movement in behavioural and brain sciences towards more transparent research, there is little Open Science autism research. This is the first Open Science endeavor of this team. We look forward to the opportunity to discuss our proposed work as part of this conference, and to enhance our learning of Open Science practices ahead of commencing data collection in Summer 2022.

References
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