DOCUMENT SUMMARY

This 2009 paper by Francesca Happé and Pedro Vital explores why savant skills and special talents are significantly more common in Autism Spectrum Conditions (ASC). After reviewing and critiquing cognitive accounts like "theory of mind" and "executive dysfunction," the authors argue that a **detail-focused cognitive style** (related to "weak central coherence") is the most likely predisposing characteristic, or "starting engine," for talent development. They support this with data from a large twin study showing that non-social, detail-focused autistic traits are strongly associated with talent in the general population, suggesting these traits are the key link.

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METADATA

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- murray_2005_research_report_monotropism_autism_attention
- white_2020_research_report_adhd_creativity_conceptual_expansion
- research_report_neurodiversity_human_variation **Supersedes:** N/A

FORMATTED CONTENT

What Aspects of Autism Predispose to Talent?

Abstract

In this paper, we explore the question, why are striking special skills so much more common in **autism spectrum conditions (ASC)** than in other groups? Current cognitive accounts of ASC are briefly reviewed in relation to special skills. Difficulties in **'theory of mind'** may contribute to originality in ASC, since individuals who do not automatically 'read other minds' may be better able to think outside prevailing fashions and popular theories. However, originality alone does not confer talent. **Executive dysfunction** has been suggested as the 'releasing' mechanism for special skills in ASC, but other groups with executive difficulties do not show raised incidence of talents. **Detail-focused processing bias** ('weak coherence', ‘enhanced perceptual functioning')

appears to be the most promising predisposing characteristic, or 'starting engine', for talent development. In support of this notion, we summarize data from a population-based twin study in which parents reported on their 8-year-olds' talents and their ASC-like traits. Across the whole sample, ASC-like traits, and specifically **'restricted and repetitive behaviours and interests'** related to detail focus, were more pronounced in children reported to have talents outstripping older children. We suggest that detail-focused cognitive style predisposes to talent in savant domains in, and beyond, autism spectrum disorders.

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1. Introduction

Special skills, such as lightning multiplication, calendar calculation, perfect-perspective drawing, and absolute pitch, are far more common in **autism spectrum conditions (ASC)** than in any other group examined to date. Estimates suggest that around one in 10 individuals with ASC have a talent out of line with their other abilities, compared with perhaps 0.06-0.1 per cent among those with other developmental or intellectual disabilities. The reason for this association remains unclear.

2. The 'Fractionable Triad'?

Autism is diagnosed on the basis of qualitative impairments in social interaction and communication, with **restricted and repetitive behaviours and interests (RRBIs)**. All three aspects of the autistic 'triad' must co-occur for the diagnosis. However, we have argued that the three parts of the diagnostic triad are in fact fractionable. Very briefly, in population samples, it appears that individual differences in social interaction, communication and RRBIs correlate only moderately, and that largely non-overlapping genetic effects appear to operate on different parts of the triad.

> While we recognize that this 'fractionable triad' view is still a working hypothesis, we take it as a starting point for the present paper: we ask not why ASC is linked to talent, but what (potentially dissociable) aspect(s) of ASC predispose to talent.

3. Current Cognitive Accounts of ASC: 'Starting Engines' for Talent?

(a) Mind-blindness

There is now good agreement that at the heart of ASC lies a difficulty in recognizing and representing mental states, or **"theory of mind"**. Can impaired recognition of mental states help explain the association between ASC and talent?

- First, individuals with ASC may free up mental and time resources that neurotypicals use on social tracking.
- Second, difficulty tracking the mental states of others may contribute to the **originality** expressed in a developing talent. People with ASC may be oblivious to what others think or what is considered the fashionable mode of thought. However, originality of this type does not guarantee talent.
- Third, mind-blindness for one's own mind may be relevant. If people with autism are less self-aware in some ways, this might be advantageous for skills best developed through **implicit learning**.

Mind-blindness, then, may contribute an original world view and might foster skill development, but is unlikely, we would suggest, to act as the starting engine for talent.

(b) Executive Dysfunction

The umbrella term **executive function** covers areas of top-down control that are strikingly impaired in ASC, such as planning, shifting from old patterns, and generating new responses. Is executive dysfunction a predisposing factor for talent? Snyder has suggested that reduced frontal function may "release" special skills. However, executive dysfunction occurs in many other clinical groups (e.g., ADHD) not characterized by a raised incidence of special skills. Good data on the relationship between executive function performance and talent are lacking.

(c) Detail-focused cognitive style

The suggestion that ASC is characterized by a different cognitive style has aimed from the outset to explain islets of ability. **Central coherence** refers to the tendency in typical individuals to process incoming information in context for meaning, preserving gist and gestalt form at the expense of detail. People with ASC, the theory suggests, have instead a processing bias towards detail and featural information, or **"weak coherence"**.

> How might a tendency to process featural rather than configural information predispose to the development of specific talents? The suggestion is that attention to detail and tendency towards exemplar-based memory, rather than prototype extraction, is the starting engine for talent in the savant domains.

- **Musical Talent:** Musical savants appear universally to have **absolute pitch**. It has been argued that absolute pitch is easy for young children to acquire because music is processed with more attention to the exact notes and less attention to the relationships between them. The detail-focused processing bias in ASC, which lasts throughout life, makes it easy to establish stable pitch-label representations.
- **Artistic Talent:** The ability to attend to details, to break the gestalt into parts, is probably helpful in achieving realistic-looking drawings. A trick used in teaching accurate drawing is to copy pictures turned upside down, which disrupts configural processing.
- **Calendar Calculation:** The starting point may be the discovery of small day-date regularities.

A testable hypothesis is that the individuals with ASC most likely to develop talents are those that show superior local processing without any impairment of global processing.

4. Exploring the Relationship Between Aspects of Autism and Talent

O'Connor and Hermelin, founders of the modern interest in special skills, noted that a strong tendency towards repetitive behaviour and preoccupation characterized those with savant skills regardless of their diagnosis. This highlights non-social ASC-like traits.

(a) What aspects of autistic-like traits are associated with talent in the general population?

In a large population-based study of 8-year-old twins (the Twins Early Development Study, TEDS), we examined the relationship between parent-rated ASC-like traits and parent-reported special abilities.

- The results showed that ASC-like traits were significantly more pronounced in children who were said to have a special skill than in children not so rated.
- This was particularly due to higher ratings on the **'RRBIs'** items (d=0.6), while social and communication items had small effects.
- Ratings of RRBI were significantly higher regardless of the area of talent (maths, music, art, memory).
- Regression analyses suggested that the items that most differentiated children with 'special gifts' had to do with **detail focus** (noticing and remembering details others miss; d=0.7).

These results were unchanged when excluding children who met diagnostic criteria for ASC. Interestingly, within the ASC subgroup, while social and communication impairments were somewhat reduced in those with special skills, **RRBIs were raised** in the special skills ASC group.

Lastly, twin analyses suggest that the association between non-social ASC-like traits (RRBIs) and reported special skills is in large part due to **shared genetic effects**. Put simplistically, some genetic factors that predispose to ASC-like traits (and specifically RRBIs) also predispose to talent.

5. Conclusions

> In this paper, we have suggested that it is not autism per se that predisposes to talent, but rather the **detail-focused cognitive style (weak coherence)** that is characteristic of, but not confined to, ASC. Attention to detail, exemplar-based memory encoding, and veridical (not context-distorted) representation is proposed to be the starting engine for talent.

Our prediction would be that where savant-like talents are found, these will be linked to a detail-focused cognitive style, regardless of diagnostic group. Because this cognitive style is extremely common in ASC, the incidence of savant skills and talents is raised.

We have also suggested that mind-blindness, while not the starting engine, may act to enhance talent. Reduced social influence and concern over others' views, as well as time devoted to talent rather than socializing, are obvious contributors. The combination of detail focus as a starting engine and reduced mentalizing as 'fuel' may give a special flavour, independence and true originality to talent in ASC that is hard to find in other groups.