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Language against the odds, or rather not: The weak central coherence hypothesis and language

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ABSTRACT

EV is a child with a talent for learning language combined with Asperger syndrome. EV's talent is evident in the unusual circumstances of her acquisition of both her first (Bulgarian) and second (German) languages and the unique patterns of both receptive and expressive language (in both the L1 and L2), in which she shows subtle dissociations in competence and performance consistent with an uneven cognitive profile of skills and abilities. We argue that this case provides support for theories of language learning and usage that require more general underlying cognitive mechanisms and skills. One such account, the Weak Central Coherence (WCC) hypothesis of autism, provides a plausible framework for the interpretation of the simultaneous co-occurrence of EV's particular pattern of cognitive strengths and weaknesses. Furthermore, we show that specific features of the uneven cognitive profile of Asperger syndrome can help explain the observed language talent displayed by EV. Thus, rather than demonstrating a case where language learning takes place despite the presence of deficits, EV's case illustrates how a pattern of strengths within this profile can specifically promote language learning.

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1. Introduction

1.1. Autistic spectrum disorder, talent and exceptional skills

The profile of cognitive ability in autism spectrum disorder (ASD) is highly variable with approximately one in 10 individuals exhibiting exceptionally high competency in at least one processing domain (Treffert, 2009). For example, Howlin, Goode, Hutton, and Rutter (2009) reported that 17% of their sample of 23 individuals with ASD had exceptional cognitive skill on at least one WISC-IQ subscale, with the highest incidence rates in those 23 individuals demonstrated for Block Design (BD, $n = 9$), Digit Span (DS, $n = 5$), or Arithmetic ($n = 4$). Four of their sample demonstrated exceptional skills on two or more of the measures. As a consequence of the relatively high prevalence of such exceptional skills, there has been a noted shift in perspective towards cognitive neuropsychological theories of ASD that incorporate both cognitive strengths and weaknesses as potential etiological factors (Happé, 1999).

In a similar way to the profile demonstrated for cognitive skills, the linguistic profile of ASD individuals is characterised by varying degrees of structural language competence. Language ability can range from intact, as is the case in Asperger's syndrome, to virtually non-existent (Tager-Flusberg & Joseph, 2003; Volden, Coolican, Garon, White, & Bryson, 2009). The paradox is that problems with pragmatic aspects of language can persist across the ASD spectrum even when structural language is intact (Landa, 2000; Tager-Flusberg, Paul, & Lord, 2005). The strength of relationship between pragmatic and structural aspects of language processing varies across studies. For example, while Brock, Norbury, Einav, and Nation (2008) suggest that the ability to use context in language comprehension correlates strongly with (structural) language competence, Volden et al. (2009) reported that substantial variance in pragmatic skills remains after accounting for the impact of structural language measures. We maintain that a better understanding of the variation observed in the autistic spectrum can be achieved by examining both the covariance and dissociations documented in individual cases and how these skills and deficits cluster within subgroups (for e.g., Asperger syndrome) (Baron-Cohen & Klin, 2006).

The Weak Central Coherence hypothesis (WCC) (Frith & Happé, 1994; Happé & Frith, 2006) provides an interpretive approach for framing these behavioural and cognitive dissociations associated with ASD. According to this framework, ASD can be characterised by a detail-focused processing bias, resulting from superior processing of local information in the context of comparatively poorer processing of global information. The WCC account therefore describes ASD in terms of contrasting profiles of processing skills rather than as resulting solely from processing deficits (Frith & Happé, 1994; Happé & Frith, 2006). The deficits arising from WCC are postulated as independent from those within the domain of social cognition.

Although it is logically transparent how a cognitive style that biases processing in favour of local detail can account for high performance on perceptual tasks such as BD and embedded figures, the potential impact of WCC upon language skills is less straightforward to predict. A detail-focused processing bias in the language domain might be predicted to enhance performance in morphology (e.g., inflectional and derivational paradigms) and other comparatively local (e.g., within/between paradigms and at the level of the phrase) domains, while processing of language that requires more global interpretation would be at risk. Although syntax has been promoted as the core linguistic mechanism, an alternative account based on the ability to integrate semantic information from various sources and at parallel levels (e.g., lexical meaning, contextual information, and grammatical/structural information) has been proposed (van Berkum, Zwitserlood, Hagort, & Brown, 2003; Hagoort, 2005). From this view, both semantic interpretation and inferencing based on context are core linguistic processes. Integration of this type of information in language processing is analogous to processing of global features in the cognitive domain.

Despite disagreement about the components of language that are uniquely linguistic and specific to humans (cf. Hauser, Chomsky, & Fitch, 2002; Pinker & Jackendoff, 2005), including those that are essential for language competence, it is generally agreed that language is combinatorial, and comprised of sound, meaning and patterning (e.g.,"dual patterning", Hockett, 1960). Therefore, both the usage and the comprehension of language depends on the vehicle of sound and on the subsequent mapping of