

The 'Google' theory of autism -- a new approach to the enigma

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What hides behind the enigma of autism? Dr. John Skoyles of University College London, in a paper published this September in *Autism Research and Treatment*, identifies the type of information used to process synonyms and context in search engines such as Google. Without this information, individuals with autism experience themselves, other people and the world in an overly literal manner.

Search engines face the problem that keywords only link to pages containing them and not ones containing related synonyms. Search engines get around this by extracting hidden higher-order associations—that is the [information](#) about how words are similar in their first-order or direct associations with other words. This enables search engines to link synonyms and generally make keyword searches context sensitive. Research suggests human cognition also creates context sensitivity during its development by extracting higher-order associations. Dr Skoyles argues that an impairment in higher-order associations makes a good candidate for the unknown neurodevelopmental deficit behind [autism](#).

His starting point is the connection between autism and the impaired processing of context. This inability has been linked to autism since the condition was first identified in 1943 by Leo Kanner. But further research on this link has been hampered by a lack of understanding as to the information processing that enables context sensitivity. This has now been solved by a computational technique created for linking synonyms in keyword searches called Latent Semantic Analysis (LSA). It does this

by extracting the context information contained in higher-order associations. Initially developed to aid keyword searches, LSA is now used to model many aspects of language including how children learn unfamiliar words from the context provided by familiar ones. Dr. Skoyles suggests LSA and its creation of context from higher-order associations provides a fresh insight into the atypical cognition of those with autism.

LSA researchers note higher-order associations exist not just between words but any entity processed by cognition. Moreover, the extraction of information from higher-order associations is computationally more complex than that of direct (or first-order) associations. The implication of this according to Dr. Skoyles is that the brain specializes its processing of higher-order associations in areas separate to those used for everyday cognition and the processing of first-order associations. Furthermore due to such specialization, these processes are shared between different areas of cognition. Dr Skoyles then asks what would happen if higher-order processing in infants and children was impaired? Everyday cognition would still be possible since it could use the information extracted from first-order associations. But this would result in the development of cognition that was literal, unadaptive and insensitive to context. Critically, as a consequence of impairing processes that are specialized and shared, this would result in developmental problems affecting otherwise unrelated cognitions including social interaction, stress regulation and language

Dr. John Skoyles notes that linking autism to specialized higher-order information processes that are separate to everyday cognition fits in with what is known about the brain. The human brain massively transfers information to and from specialized areas. Memories do not arise in the cerebral cortex but depend upon consolidation during sleep after processing in the hippocampus. Transfer also occurs during the processing of motor movements and higher cognition through the white

matter loops that exist between the cerebral cortex and the cerebellum and the basal ganglia. Autism is increasingly being linked to impairments in such brain connectivity.

Dr John Skoyles does not view himself as proposing a new theory of autism so much as asking researchers involved with autism to look into LSA and ask about its implications for [cognitive](#) development and atypical cognition. “All I want is researchers to check out the informational ideas that underlie LSA and consider whether these processes might not be those impaired in individuals with autism.” Moreover, “There is a need to ask what happens when these processes get impaired in children.” He notes “Such impairment could be predicted to developmentally result in atypical cognition across sociability, awareness of minds, sense of security, perception, motor control and language. Where in development is this missing higher-order information impairment impairing context processing—if not right before us in autism?”

More information: Skoyles, J.R. (2011). Autism, Context/Noncontext Information Processing, and Atypical Development. *Autism Research and Treatment*, Volume 2011. [doi:10.1155/2011/681627](https://doi.org/10.1155/2011/681627)

Website detailing the approach: www.human-existence.com/autism.html

Dr. John Skoyles Wikipedia:

[en.wikipedia.org/wiki/John_Skoyles_\(scientist\)](https://en.wikipedia.org/wiki/John_Skoyles_(scientist))

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