

A breakthrough discovery of three language comprehension mechanisms in autism

New study discovers three mechanisms of language comprehension paving the way for improving therapy and enhancing outcomes in individuals with language deficits

BOSTON, MA, UNITED STATES, April 11, 2024 /EINPresswire.com/ -- The common intuitive belief

“

It was a discovery moment when neurological predictions were found to be exactly supported by empirical data.”

Dr. Andrey Vyshedskiy

is that language comprehension development follows a linear trajectory: children acquire one grammatical rule at a time. Over 20 years ago, [Dr. Andrey Vyshedskiy](#), a neuroscientist from Boston University, predicted that instead of linear development, language unfolds in three steps corresponding to three language comprehension mechanisms of increasing complexity. The [new study](#) of over 31000 autistic individuals, published today in the journal *npj Mental Health Research*, validates this

prediction. The implications of this discovery are important for philosophy, paleoanthropology, linguistics, clinical medicine, and for improving [language therapy interventions](#) for children with autism.

Philosophy: The traditional definition of language is highly ambiguous. For some philosophers, “language” is equivalent to a “communication system.” Others argue that “language” must be defined more narrowly, in a way that is unique to humans. The results of the new study streamline terminology for describing different language comprehension mechanisms. The ensuing discussion of which language comprehension mechanisms are unique to humans and which are shared with other apes is expected to be most interesting.

Paleoanthropology: The question of when and how archaic humans acquired language is hotly debated. The new empirically-identified language comprehension mechanisms open the door to questions of when each of the three mechanisms was acquired and what evolutionary forces influenced this process.

Linguistics: Mainstream linguistics assumes that grammatical language comprehension is mediated by disjointed mechanisms learned gradually one rule at a time. The alternative generative syntax hypothesis suggests that language comprehension can be simplified into a binary framework, encompassing Merge and non-Merge operations. The findings of the new

study show the existence of three separate language comprehension mechanisms, an observation that contradicts current linguistic theories.

Clinical medicine: Language comprehension in children is commonly assessed based on vocabulary. This evaluation method can grossly misrepresent the child's actual language comprehension progress. Moreover, it encourages therapists to focus on vocabulary training at the expense of exercises that build full language comprehension. The new study provides evidence for creating new assessments evaluating the three mechanisms of language comprehension. These assessments are poised to improve language therapy interventions and enhance outcomes for individuals with language deficits.

Autism: The current practice of characterizing children's communication ability only in terms of their speech (i.e., verbal, nonverbal, or minimally verbal) is insufficient and one-sided. The new results show that communication abilities can vary independent of verbal abilities. For example, nonverbal children with full syntactic language comprehension have normal ability to communicate albeit nonverbally, while verbal children lacking syntactic language comprehension do not have a normal ability to communicate by any means. The new study demonstrates that the three identified language comprehension mechanisms are neurologically and clinically distinct from the speech ability. A combined two-dimensional language characterization in terms of both language comprehension and verbal level will result in better identification of children's communication ability and lead to more children reaching their full linguistic potential.

Andrey Vyshdeskiy
Boston University
+1 617-817-1916
vysha@bu.edu

Visit us on social media:

[Facebook](#)
[LinkedIn](#)
[YouTube](#)

This press release can be viewed online at: <https://www.einpresswire.com/article/702623702>



Are there distinct levels of language comprehension in autistic individuals – cluster analysis

Check for updates

Andrey Vyshdeskiy¹, Rohan Venkatesh² & Edward Khokhlovich²

Autism is a neurodevelopmental condition characterized by deficits in social communication. We assessed 14-language comprehension abilities in 31,845 autistic individuals 4 to 21 years of age using parent-generated reports. Data-driven cluster analysis identified three distinct levels of language comprehension: (1) individuals in the command-language-phenotype were limited to comprehension of simple commands; (2) individuals in the modifier-language-phenotype showed additional comprehension of color, size, and number modifiers; (3) individuals in the most-advanced syntactic-language-phenotype added comprehension of spatial prepositions, verb tenses, flexible syntax, possessive pronouns, and complex narratives. The observation of three distinct language levels was consistent across different age groups. Autistic individuals' communication level is currently commonly characterized as nonverbal, minimally-verbal, or verbal. This one-dimensional description is not ideal for characterizing an individual's communication ability. In fact, a nonverbal individual with syntactic-language-phenotype may have normal ability to communicate albeit nonverbally, while a verbal person with command-language-phenotype does not have a normal ability to communicate by any means. Identification of the three distinct language-comprehension-phenotypes provides an opportunity to enhance characterization of individuals' communication level. A composite description in terms of both, verbal abilities and a language-comprehension-level, will not only be more precise, but can improve language therapy by focusing it on both aspects of language development.

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition marked by impairments in social communication and restricted, repetitive patterns of behavior¹. Evidence from multiple studies suggests that language deficits may be a core component of autism^{2,3}. Moreover, language comprehension is usually more impaired than expressive language^{4,5}. Despite these observations, communication level in individuals with ASD is commonly (albeit more informally than formerly) characterized in terms of their verbal level (nonverbal, minimally verbal, or verbal), and their language comprehension ability is left unclassified. If there was a clear and objective way to classify an individual's language comprehension level, such a classification system could improve descriptions of individual's communication skills, facilitate their language therapy, and improve outcomes.

Over a decade ago a parent-reported language comprehension survey Mental Synthesis Evaluation Checklist (MSEC) was developed by our group with a specific goal: to target higher aspects of language^{6,7}. MSEC uses the following questions to assess language comprehension: (1) [My child] Understands simple stories that are read aloud; (2) Understands elaborate

story tales that are read aloud (i.e., stories describing FANTASY creatures); (3) Understands some simple modifiers (i.e., green apple vs. red apple or big apple vs. small apple); (4) Understands several modifiers in a sentence (i.e., small green apple); (5) Understands size (can select the largest/smallest object out of a collection of objects); (6) Understands possessive pronouns (i.e., your apple vs. her apple); (7) Understands spatial prepositions (i.e., put the apple ON TOP of the box vs. INSIDE the box vs. BEHIND the box); (8) Understands verb tenses (i.e., I will eat an apple vs. I ate an apple); (9) Understands the change in meaning when the order of words is changed (i.e., understands the difference between 'a cat ate a mouse' vs. 'a mouse ate a cat'); (10) Understands explanations about people, objects or situations beyond the immediate surroundings (e.g., "Mom is walking the dog." "The snow has turned to water").

The MSEC survey was administered along with several other surveys within an app, which is popular among individuals with ASD (approximately 65% of app users are diagnosed with ASD). Over 100,000 parents responded to the survey between 2015 and 2022. The language

¹Boston University, Boston, MA 02215, USA. ²Independent researcher, Newton, MA 02459, USA. ³E-mail: vysha@bu.edu

New study discovers three mechanisms of language comprehension paving the way for improving therapy and enhancing outcomes in individuals with language deficits

EIN Presswire's priority is source transparency. We do not allow opaque clients, and our editors try to be careful about weeding out false and misleading content. As a user, if you see something we have missed, please do bring it to our attention. Your help is welcome. EIN Presswire, Everyone's Internet News Presswire™, tries to define some of the boundaries that are reasonable in today's world. Please see our Editorial Guidelines for more information.

© 1995-2024 Newsmatics Inc. All Right Reserved.