

Letitia R. Naigles (Ed.), *Innovative Investigations of Language in Autism Spectrum Disorder*. Washington, DC: American Psychological Association / Berlin: Walter de Gruyter, 2017. Pp. 253. ISBN 978-311-040-978-9 (Hb), 311-040-978-X (E-Book)

This edited volume, *Innovative Investigations of Language in Autism Spectrum Disorder*, consists of a rich set of eleven chapters by up-and-coming and established researchers from different fields, ranging from linguistics, psychology, and cognitive science to public health. The volume illustrates how language can shed new light on Autism Spectrum Disorder (henceforth 'ASD') and, in turn, how findings on autism itself can reveal new ways of thinking about language. The volume is timely and up-to-date, combining general overviews of the state-of-the-art with original research by the authors. Following the latest tendencies in the field, this publication addresses the redefinition of ASD in the 5th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (APA, 2013). This new definition, which triggered a heated debate, removes language deficits as a diagnostic criterion for autism, reducing its core symptoms to impairments in social communication and interaction as well as repetitive behavior and rigid interests. This implies an understanding of autism as mostly affecting pragmatics, and to a much lesser extent the structural components of language (i.e., phonology, lexicon, morphology, semantics, and syntax). Research presented in this volume provides further supporting evidence for this redefinition with discussions of relevant studies and new original findings.

This exquisite compilation contributes to building a more comprehensive picture of language and communication in autism, exploring its distinct underlying mechanisms. In doing so, the volume covers a large scope. Fundamental issues are addressed, including: the intricate interplay between syntax and pragmatics; the interaction between language and other cognitive domains, such as theory of mind and working memory; as well as the comparison between autism and related disorders. Additionally, the authors investigate key research questions in linguistics, developmental psychology, and cognitive science, as well as the complex interplay between verbal language and non-verbal cognition. The volume can be divided into five parts, comprising literature overviews and original research. Chapters 1 to 5 outline prior studies on lexical semantics and basic rules and constraints of syntax, mostly through eye-tracking experiments. Chapter 6 explores the complexity of phonology and the acquisition of syntax through the authors' original research. Chapters 7 and 8 present new studies on the syntax–pragmatics interface and deficits in theory of mind. Chapters 9 (an overview) and 10 (original research) investigate pragmatic skills through focusing on children's narrative abilities. The chapter that closes the volume, Chapter 11, reviews experiments on

language comprehension and production in children with ‘optimal outcomes’, that is, children originally diagnosed with ASD who no longer carry the diagnosis (Fein et al., 2013).

Chapter 1 by Courtenay Frazier Norbury outlines the application of eye-tracking to research on language processing in ASD. Eye-tracking serves as a window to language comprehension through measuring visual attention. It offers real-time eye-movement data, based on: fixation duration (looking time), latency of fixation, and switches. Eye-tracking can thus help reveal the factors that affect the great variation in language ability among individuals with ASD. This chapter discusses the most important findings on: word learning, sentence comprehension, and social communication. The studies reviewed consistently suggest that: (i) gaze-following patterns are similar during word learning in children with and without ASD; (ii) the integration of vision and language is vigorous in children with ASD, who seem to comprehend sentences in a qualitatively similar manner as typically developing children; and (iii) children with ASD who make frequent and longer eye contact with their interlocutors produce fewer atypical utterances. This chapter also illustrates that eye-tracking can uncover both typical and atypical looking patterns in language acquisition of children with ASD. Specifically, their eye-movement patterns are similar to those of controls. The sole difference lies in the impact of the social and communicative challenges that characterize autism. In all, using this relatively new technique yields new insights into the language processing mechanisms that underlie autism.

Chapter 2 by Edith L. Bavin and Emma K. Baker provides a literature on language processing strategies and constraints in ASD, specifically on the nature and causes of its universal and unique characteristics. Since structural priming has proven to impact processing time, the authors discuss a few pivotal priming studies to discern whether children with ASD can be primed by verbs, nouns, or semantic category labels (e.g., *fruit*). Experimental evidence consistently demonstrates that verbs, nouns, and category labels in a sentence can prime children with ASD to predict a target word. Although children with ASD do show slower processing than controls, some priming studies show that their semantic organization of language input remains intact. As for constraints on sentence processing, a large number of studies discovered the effect of lexical biases, especially with verbs – hearing a transitive verb frequently leads listeners to predict that an object will follow. Listeners’ knowledge of the semantics of the primed verb and of the syntactic construction it appears in may also impact their predictions. Consistent findings indicate that there is a verb bias in sentence processing, since verbs constrain processing for children with ASD, compared with controls. Level of attention and chronological age also seem to be influencing factors or covariates, something that deserves further investigation.

Chapter 3 by Letitia R. Naigles and Deborah Fein provides an overview of eye-tracking experiments on the early comprehension of semantic concepts and syntactic rules in autism. This chapter first describes a modern technique for assessing language comprehension: the Intermodal Preferential Looking. Originally designed for testing language comprehension in typically developing infants and toddlers, this eye-tracker operates in a setting requiring low social demands. This makes it particularly suitable for studying children with ASD, who have a short attention span, as vastly shown by the volume editor and first author of this chapter in prior studies. The chapter surveys comprehension studies on three grammatical constructions: SVO word order, *wh*-questions, and aspect markers. Three word-learning principles are discussed: (i) noun bias (i.e., an early conceptual predisposition to treat novel words as mapping onto static objects rather than actions); (ii) syntactic bootstrapping (i.e., the acquisition of part of a word's semantics based on their position in a sentence); and (iii) shape bias (i.e., using a novel word for a novel shape or extending the use of that novel word to new objects with the same shape). English-speaking children with ASD are proven capable of understanding the SVO word order at two to three years of age, and show reliable comprehension of *wh*-questions and grammatical aspect at an average age of four. Furthermore, English-speaking children with ASD show a noun bias at around two years of age, but not a shape bias. Their Hebrew-speaking peers demonstrate syntactic bootstrapping at around five years of age. Hence, ASD involves both strengths and weaknesses. Non-social techniques, like the Intermodal Preferential Looking, also appear as helpful methods for assessing language comprehension and related cognitive processing in autism.

Chapter 4 by Andrea McDuffie and colleagues reviews four recent comparative studies of word-learning difficulties and deficits between two neurodevelopmental disorders related to autism: non-syndromic ASD and fragile X syndrome. Non-syndromic ASD is characterized by core impairments in social communication as well as repetitive and stereotyped behaviors. Fragile X syndrome is characterized by cognitive delays and attentional difficulties. Four experimental studies are discussed that compare specific types of social cues used by children of these two groups to support their learning of novel words. Children with fragile X syndrome appear to have a less severe degree of autism than children with non-syndromic ASD. Children with non-syndromic ASD who have a lower level of autism also perform better, with longer gaze durations to the target object in eye-tracking experiments, indicating better word-learning. Hence, different learning processes may underlie a way of learning novel words through association; different types of social cues may be used to support word learning. Associative learning may in fact be a relative strength in word learning for children with fragile X syndrome, who by contrast show delay when using or

relying on the speakers' eye-gaze for referential intent. However, children with non-syndromic ASD had particular difficulty in using their interlocutors' emotional reactions, both positive (excitement) and negative (disappointment), in label-object mapping tasks.

Chapter 5 by Aparna Nadig and Janet Bang contributes to the classical, decades-long debate of the nature and nurture components of language development by synthesizing work on the effects of parental input in autism. The focus is on the lexical and syntactic features of parental input, and their relative impact on later child language production. Empirical data show no significant lexical differences (word tokens, types, frequency, lexical and contextual diversity) between the responses of parents of children with ASD and those of controls. As for syntactic features, parents of children with ASD do seem to produce a significantly lower percentage of and less diverse *wh*-questions. Despite these structural differences in parental input, parents of children with ASD appear to be as verbally and gesturally responsive as parents of typically developing children. Critically, a direct positive association seems to exist between specific linguistic information in parental input and the subsequent use of related features by children with ASD. Complex lexical and advanced syntactic input also seems closely linked to better language production in children with ASD from six months to as late as sixteen years of age. This entails that nurture-related factors enhance the importance in predicting language development in autism. In sum, the parental input that children diagnosed with ASD receive appears as responsive to their attention and needs as that of controls. This leads to positive effects on children's later development in both language comprehension and production.

Chapter 6 by Laurice Tuller and colleagues explores formal aspects of language in French-speaking children with ASD exhibiting language delays, compared with children without ASD but with Specific Language Impairment. The chapter systematically analyzes the similarities and differences in language difficulties between these two groups through an original study by the authors. Four measures of complexity are examined: phonology, morphosyntax, spontaneous production, and non-verbal cognition. Specific tests were used: a picture pointing task, a word repetition task, a sentence completion task, and the classical picture-prompt-with-question task. The results consistently show language difficulties in the speech of both children with ASD and those with Specific Language Impairment. Both groups appeared to apply similar strategies to avoid syllabic complexity. Notably, the children with ASD produced many more non-target answers (e.g., answering the question "What does the cowboy do?" with "He is a hero" instead of "He rides a horse"), probably related to their pragmatic impairment. Children with ASD did however display intact morphosyntactic knowledge in the production of pronominal clitics and clausal embedding. In spontaneous

speech, children with ASD showed greater difficulties with derivational complexity than children with Specific Language Impairment. No significant relation was found between linguistic and cognitive abilities in either group. This contrasts with the results from the normal control group. The findings presented in this chapter further support prior research on the intactness of the structural components of language in autism, which contrasts with deficits in pragmatics.

In Chapter 7, Vikki Janke and Alexandra Perovic explore the interplay between advanced syntax and primary pragmatics in autism. The focus is on control constructions involving a main clause and a non-finite or an infinitival embedded clause. Two types of relations are examined: (i) obligatory control, in which the *EMPTY CATEGORY* (i.e., the phonetically silent subject in the embedded clause) is *SYNTACTICALLY* restricted to a designated argument in the main clause (e.g., “Harry tried [[*EMPTY CATEGORY*] to feed the owl]”); and (ii) non-obligatory control, in which the argument is *PRAGMATICALLY* regulated. This second type includes long-distance control (i.e., the referent of the *EMPTY CATEGORY* is ambiguous, e.g., “Harry said to Luna that [[[*EMPTY CATEGORY*] flying the broom ...]”) and verbal gerund subject control (i.e., the *EMPTY CATEGORY* can be an unmentioned sentence-external referent, e.g., “[[*EMPTY CATEGORY*] Reading the book slowly] made the class sleepy”). These constructions are studied under different amounts of discourse pressure: (i) no prime (i.e., the test sentences appear in isolation and with no discourse-based topic); (ii) weak prime (i.e., the discourse topic has been weakly established); and (iii) strong prime (i.e., the discourse topic has been strongly established). As for obligatory control relations, children with ASD performed as excellently as controls in the comprehension of both subject and object control (e.g., “Homer tried [[*EMPTY CATEGORY*] to wash Bart]”; “Marge persuaded Homer [[*EMPTY CATEGORY*] to drive the car]”), both groups ignoring pragmatic cues. In the verbal gerund subject control condition, a weakly established topic proved strong enough to guide or influence their choice of referent, just as under strong prime. In long-distance control, only the strong prime condition swayed interpretation towards the topic in both the ASD and the control group. Thus, certain aspects of advanced syntactic structures remain intact in autism, and some aspects of primary pragmatics may not be that delayed.

Chapter 8 by Stephanie Durrleman-Tame and colleagues presents two original studies on the relation between syntactic competence and non-verbal cognition in autism. Study 1 explores the impact of the knowledge of complementation (i.e., in both comprehension and production) on Theory of Mind performance (i.e., the ability to attribute mental states to others), tested only verbally. This is then compared to the role of Executive Functioning (i.e., the cognitive and supervisory attention system). Study 2 investigates

whether the influence of mastery of complementation extends from verbal to non-verbal Theory of Mind performance. Study 1 revealed no significant difference in the production or comprehension of complement clauses between children with ASD and controls. Most importantly, a significant positive correlation was observed between complement knowledge and Theory of Mind, but no connection was found with any Executive Functioning index (e.g., working memory). Study 2 concludes that mastery of complementation impacts both verbal and non-verbal Theory of Mind in the ASD population. However, there was no connection between mastery of complementation and non-verbal Theory of Mind performance in controls. Overall, these two empirical studies suggest that competency in grammatical complementation is closely linked to both verbal and non-verbal Theory of Mind. Children with ASD seem to use good performance in complementation as an adaptation strategy to compensate for Theory of Mind deficits.

Chapter 9 by Inge-Marie Eigsti and Jillian M. Schuh reviews studies on language processing in autism, including an in-depth discussion of working memory during communicative interaction. The current understanding of different aspects of language development in autism is first examined, encompassing formal aspects (i.e., phonology, morphology, and morphosyntax) as well as function-related ones (i.e., pragmatics). Specifically, there seem to be no deficits in sound categorization or production. Morphological differences between children with and without ASD are identified in some aspects of word learning, such as shape bias and semantic priming. Other studies show not only delayed but also different developmental patterns in morphosyntax in ASD. Furthermore, individuals with ASD are reported to show significant impairments in pragmatics, at all functional levels and at all chronological ages. The studies reviewed show that referential communication skills (i.e., the ability to track common ground) appear impaired rather than absent in autism. Other studies using eye-tracking techniques show that Executive Functioning is critical in referential communication, while working memory capacity may constrain Theory of Mind performance (e.g., perspective taking). Hence, deficits in working memory influence pragmatics in ASD, particularly negatively affecting communicative performance in complex social interactions.

Chapter 10 by Lesley Stirling and colleagues presents two original studies on the written narrative abilities of children with autism. The research, inspired by a previous autism case study of story retells, mainly deals with the structure and complexity of written story retellings. The focus is on: (i) the type of story retells (**DIRECT RETELLS**: retelling the stimulus story as accurately as possible vs. **ALTERNATIVE RETELLS**: involving major or pervasive minor changes in structure) and (ii) the story's level of completeness (**FINISHED** vs. **NOT FINISHED**). Study 1 explores the narrative abilities of

148 normal primary school children as the normative background; Study 2 examines written narrative data of 35 children with ASD attending mainstream primary school. Elicitation tasks were used, mainly the StoryLincs Internet-based story-elicitation software. The data were analyzed quantitatively (i.e., total number of words, number of different words, type–token ratio, and Index of Productive Syntax score, for grammatical complexity) as well as qualitatively (i.e., ability and readiness to take the viewpoint of multiple story characters, direct vs. alternative retelling, completeness, creativity). The quantitative results showed that children with ASD generally lagged behind the normal group in the use of more complex syntactic constructions in their writing. The qualitative analysis revealed significant differences in story retells between children with and without ASD, particularly in aspects of perspectivization and in sensitivity to story events, children with ASD also producing more alternative retells than controls. Thus, children with ASD may not only show a developmental delay in their written narrative abilities, but may also have different learning needs.

The last chapter of the volume, Chapter 11 by Joyce Suh and colleagues, investigates the positive effects of intervention on later performance. A review is provided of studies on children once diagnosed with ASD, who after intense therapy manage to achieve a language level that is close to that of normal controls. The chapter first discusses language functioning in such children with so-called optimal outcomes, namely academic reading and writing skills, story structure, and category knowledge. An overview is also provided of studies on potential mechanisms of language acquisition and predictors of symptom remission (i.e., weak central coherence and tone discrimination) as well as studies of compensatory mechanisms (e.g., personality, verbal memory, brain connectivity). Children with optimal outcomes perform within the average range in almost all standardized general language ability measures. These studies also suggest that detail-oriented perception and cognition, that is, a lack of global–local focus (i.e., seeing the trees instead of the forest) may be useful indexes of symptom remission in these children. Other studies indicate that, in children with optimal outcomes, initially having stronger verbal memory skills may become an early compensatory advantage for language acquisition. Similarities with typically developing children point to a relative intact functioning in children with optimal outcomes, particularly in the performance of good story structure and typical tone discrimination skills. However, the optimal outcome population still exhibit some atypical features of ASD, like idiosyncratic expressions and categorical induction.

This edited volume offers a particularly comprehensive picture of language in autism. Both the studies discussed and the new research presented show that language in autism involves a dissociation of grammatical knowledge



and communicative function (i.e., form and function), which is consistent with the ground-breaking findings by Tager-Flusberg (1994, 2000). This entails that formal structure remains intact in autism, despite a delay in some grammatical aspects. Atypical language processing or deviant production patterns only become manifest in functional pragmatics, such as social communication and interaction. The volume is further notable in its broad scope of topics and empirical methods. It covers general language abilities and social conversational interactions, formal structure and functional language use, as well as the functional link between grammatical competence (e.g., mastery of complementation) and overall non-verbal cognition (e.g., theory of mind). Comparisons are made between children with and without ASD, as well as between ASD and other disorders involving language delay. This succeeds in accounting for superficial language phenomena and revealing the underlying linguistic and cognitive operations or patterns that characterize individuals with autism, in order to discern the characteristics and principles of their language development. Equally importantly, a wide combination of methods is discussed, from standardized assessments, elicitation tasks, and analysis of spontaneous speech to modern technology. This compilation thus provides new insights by exploring linguistic questions through laboratory experiments with advanced instruments, a growing tendency in autism research.

Nevertheless, the broad scope of the volume is not just an asset, but may also be a weakness. Some technical terms and methodological techniques may pose a challenge to non-specialists. For instance, the description of the genetic differences between non-syndromic ASD and fragile X syndrome in Chapter 4 and the detailed discussion on the neural circuitry of language processing in Chapter 11 may come across as rather specialized for non-experts. As for the subjects in the studies presented, they are mostly speakers of Indo-European languages, particularly English-speaking children, only Chapter 6 being on French speakers and one study mentioned in Chapter 3 being on Hebrew speakers. A volume that aims at addressing universal features of autism would have benefitted greatly from including studies on individuals with ASD speaking a larger set of languages. Particularly, since the volume pays considerable attention to pragmatics, one would expect studies on children with ASD acquiring context-dependent languages. For instance, Mandarin Chinese, as opposed to English, French, or other Indo-European languages, shows a highly underspecified grammar and a lexicon full of homophones, a particularly indirect pragmatics with a large frequency of indirect speech acts, as well as a discourse-dependent writing system (with no spaces between words or other markers of syllable or word unity). There is however no mention of any of the many studies of Mandarin-speaking children with ASD.



In sum, this volume is well structured and suitable for readers from different research fields. Despite the exceptions mentioned above, the volume generally does not require specialized prior knowledge of ASD. Covering a large scope of hot topics and providing an overview of the most important and interesting findings in the past few decades, the volume may be used as an introduction to autism for newcomers to the field. Furthermore, each chapter suggests helpful directions for future research. For example, in Chapter 1 the author makes the case for more attention to eye-tracking studies with low verbal and even non-verbal individuals with ASD, and more cross-disorder comparisons, given the wide language variation in different developmental disorders. Chapter 2 is a call for further processing research on complex sentences; Chapter 6 proposes more cross-linguistic research; Chapter 8 advocates for more precise linguistic factors correlated to Theory of Mind performance; and Chapter 11 posits that deeper exploration of the mechanisms driving impressive behavioral improvements in language and communication will be critical in autism research to come. Non-trivially, the findings presented in the volume will undoubtedly prove useful to clinical professionals in developing new applications for diagnosis and treatment.

This up-to-date, comprehensive, and comprehensible edited volume combines cross-field knowledge, bridging the gap between theoretical linguistics, neuroscience, and experimental psychology. With the most controversial topics addressed and the latest and most fascinating findings discussed, this fine publication will be interesting and helpful to students, researchers, and practitioners alike.

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Paul Chilton and Monika Kopytowska (Eds.), *Religion, Language, and the Human Mind*. New York: Oxford University Press, 2018. Pp. Iii+483. ISBN 978-0-19-063664-7 (Hb)

*Religion, Language, and the Human Mind* is an edited collection addressing the interface between language, cognition, and the many dimensions of religious experience. Composed of seventeen chapters divided into three distinct parts, along with a 'Preface' and an extensive 'Introduction' by the editors, the volume collates original research from linguistics, the cognitive and brain sciences, and religious studies.

Language is integral to the proliferation of religious belief, the maintenance of religious authority, the composition of religious texts and doctrines, and the widespread practice of religious ritual and prayer. Nevertheless, it remains a relatively neglected area of study in linguistics. However, as the editors note in the 'Introduction', the connection between religious traditions and the study of language is an ancient one, as is the more general connection between academic traditions and religious traditions.

Earlier works do exist where religious language is treated seriously as an object of linguistic study. Crystal (1965; this volume) advanced the field of 'theolinguistics', and more recent studies by Downes (2011), Howe and Green (2014), and Charteris-Black (2016) have made important contributions. What makes this volume unique by comparison is the focus on religious language accompanied by a manifest commitment to interdisciplinarity from a "broad cognitive perspective" (p. xxiv). The editors describe the development of the volume as a "collective intellectual experience rather than a mere collecting of papers" (p. vii). This is evidenced by the quality of each individual piece and the sense that the overall package (including the beautiful jacket image by David Chick) has been carefully crafted and refined.

Rather than organise the chapters by discipline, the volume curates three independent strands. Part I reviews the contemporary study of religious language before and after the 'cognitive turn' in the human sciences. Both cognitive and linguistic aspects of religion are investigated from different theoretical, disciplinary, and methodological perspectives. Part II follows with an emphasis on the centrality of metaphor in religious discourses and