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LING 4230

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Annotated Bibliography

DiStefano, C., Senturk, D., & Jeste, S. S. (2019). ERP evidence of semantic processing in children with ASD. *Developmental Cognitive Neuroscience*, *36*, 100640–100640. https://doi.org/10.1016/j.dcn.2019.100640

This study used EEG to look at the possible neural mechanisms that could underlie language impairment in ASD children. There were three groups of children; verbal ASD, minimally verbal ASD, and typically developing. The children completed a picture-word paradigm in which they passively watched visual stimuli which were pictures of objects paired with auditory stimuli which were either matching or mismatched words. The results of this study were that there was an N400 effect for all groups when there was a mismatch between the visual and auditory stimuli. However, there were longer latencies for both ASD groups but not the controls.

Edgar, E. V., McGuire, K., Pelphrey, K. A., Ventola, P., Noordt, S., & Crowley, M. J. (2024). Early‐ and Late‐Stage Auditory Processing of Speech Versus Non‐Speech Sounds in Children With Autism Spectrum Disorder: An ERP and Oscillatory Activity Study. *Developmental Psychobiology*, *66*(8), n/a-n/a. https://doi.org/10.1002/dev.22552

This EEG study measured cortical responses to speech and non-speech sounds in 14 ASD and 14 typically developing children. All of the participants had English as their first language and didn't have any exposure to Japanese which was used in the experiment to minimize the effect of language familiarity. The participants were asked to listen to Japanese words and they listened to nature sounds as well. The results revealed that both

groups showed a larger response for speech sounds compared to non-speech sounds. However, typically developing children had larger responses to speech sounds in the early stage of processing whereas ASD children showed smaller responses.

Feng, S., Lu, H., Fang, J., Li, X., Yi, L., & Chen, L. (2021). Audiovisual speech perception and its relation with temporal processing in children with and without autism. *Reading and Writing*, *36*(6), 1419–1440. https://doi.org/10.1007/s11145-021-10200-2

This study tested audiovisual speech perception and temporal processing in ASD and typically developing children. The researchers conducted two experiments which were a McGurk task and a simultaneity judgement task. The children gave their responses to the experimenter who recorded their answers by pressing corresponding buttons on a keyboard. The results revealed that ASD children had a weaker McGurk effect which suggests that they have difficulty integrating visual and auditory stimuli. For the simultaneity judgement task which tested temporal processing, the researchers found that ASD children were less acute than typically developing children at detecting audiovisual asynchrony when the visual led the audio.

Gaffrey, M. S., Kleinhans, N. M., Haist, F., Akshoomoff, N., Campbell, A., Courchesne, E., & Müller, R.-A. (2007). A typical participation of visual cortex during word processing in autism: An fMRI study of semantic decision. *Neuropsychologia*, *45*(8), 1672–1684. https://doi.org/10.1016/j.neuropsychologia.2007.01.008

This fMRI study looked at activation associated with semantic categories in 10 ASD males and 10 male controls. Participants indicated whether words were part of a target category by pressing a button. One of the main results was that the ASD group made more errors in the semantic decision task compared to the control group but the ASD group still performed above chance. Also, the researchers found that the ASD group had a large activation in the extrastriate visual cortex which wasn't present in the controls. This

provides further evidence for the hypothesis that those with ASD use more mental imagery to comprehend language.

Jochaut, D., Lehongre, K., Saitovitch, A., Devauchelle, A.-D., Olasagasti, I., Chabane, N., Zilbovicius, M., & Giraud, A.-L. (2015). Atypical coordination of cortical oscillations in response to speech in autism. *Frontiers in Human Neuroscience*, *9*, 171–171. https://doi.org/10.3389/fnhum.2015.00171

This study examined the cortical activity in the auditory and visual cortices of 13 ASD and 13 non-ASD participants. The researchers used both EEG and fMRI to measure activity in the brain while participants watched an audio-visual scientific documentary. One of the main results was that BOLD responses in the visual and auditory areas were present for both groups but were not as prominent for the ASD participants in the auditory cortex. Furthermore, the ASD participants had more BOLD activity in the non-primary visual cortex compared to the controls. Another result was that there was atypical theta tracking in the auditory cortex of ASD participants which is associated with difficulty in syllable parsing.

Kana, R. K., Keller, T. A., Cherkassky, V. L., Minshew, N. J., & Just, M. A. (2006). Sentence comprehension in autism: thinking in pictures with decreased functional connectivity. *Brain*, *129*(9), 2484–2493. https://doi.org/10.1093/brain/awl164

This fMRI study examined brain activity during sentence comprehension for 12 ASD and 13 typically developing adolescents. Participants were presented with high imagery and low imagery sentences on a screen and were asked to push a button indicating if the sentences were true or false. The researchers found that there was more activation in the parietal and occipital regions for the ASD participants. This suggests that they used more visual imagery compared to the control group to aid in their understanding of the sentences. Additionally, there was greater lingual gyrus activation in the ASD group

during the low imagery sentences which also supports the idea that the ASD participants rely more on visualization to help them understand language.

Knaus, T. A., Silver, A. M., Lindgren, K. A., Hadjikhani, N., & Tager-Flusberg, H. (2008). fMRI activation during a language task in adolescents with ASD. *Journal of the International Neuropsychological Society*, *14*(6), 967–979. https://doi.org/10.1017/S1355617708081216

This study used fMRI to assess activation in the brain during a language task. There were 12 ASD and 12 typically developing adolescents who completed a response-naming task. During this task, participants read three word phrases which described an item and they had to choose out of two options which word matched what they thought of. The results showed that there wasn't a correlation between the left frontal and temporal language areas in the ASD participants. This suggests that there is less efficient connectivity for the ASD group in comparison to the controls.

Righi, G., Tenenbaum, E. J., McCormick, C., Blossom, M., Amso, D., & Sheinkopf, S. J. (2018). Sensitivity to audio‐visual synchrony and its relation to language abilities in children with and without ASD. *Autism Research*, *11*(4), 645–653. https://doi.org/10.1002/aur.1918

This study tested audio-visual processing in children using eye-tracking. There were 45 ASD children and 32 typically children who completed several trials of a preferential looking paradigm. Two videos were played simultaneously in each trial with one having audio-visual synchrony and the other being asynchronous. The researchers found that typically developing children consistently preferred looking at the synchronous videos. On the other hand, ASD children didn't demonstrate a reliable preference for the synchronous or asynchronous videos which suggests that those with ASD have difficulty detecting the temporal characteristics of the audio signal.

Ronconi, L., Vitale, A., Federici, A., Pini, E., Molteni, M., & Casartelli, L. (2020). Altered neural oscillations and connectivity in the beta band underlie detail-oriented visual processing in autism. *NeuroImage Clinical*, *28*, 102484–102484. https://doi.org/10.1016/j.nicl.2020.102484

This study used EEG to investigate whether detail-oriented visual perception corresponds to oscillations in the beta frequency band. There were 22 ASD participants and 22 neurotypical participants who performed an orientation discrimination task. There were several trials in which they had to identify the target letter's (T) orientation when it was by itself and when surrounded by multiple (Hs) in various rotations. The main result of this study was that there was overconnectivity in occipitotemporal regions in ASD children but not in neurotypical children.

Stevenson, R. A., Baum, S. H., Segers, M., Ferber, S., Barense, M. D., & Wallace, M. T. (2017). Multisensory speech perception in autism spectrum disorder: From phoneme to whole‐word perception. *Autism Research*, *10*(7), 1280–1290. https://doi.org/10.1002/aur.1776

This study explored multisensory integration of speech with whole-words and at the phonemic level. There were 25 ASD and 27 typically developing children who completed a speech-in-noise paradigm. Participants watched audiovisual recordings where tri-phonemic nouns were presented by a female speaker. There were three conditions which were visual-only, auditory-only, and audiovisual. The participants typed what they heard for each word. The researchers found that ASD children had deficits in all three conditions compared to the typically developing children. Also, they had deficits for both whole-words and phonemes. These results provide further evidence that those with ASD have decreased speech perception abilities.