

# Longitudinal developmental trajectories of young autistic children: influence of culture, diet, pretend play, and various activities

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## ABSTRACT

Humans are extremely sensitive to cultural circumstances of their early childhood. In a series of studies, we explored the developmental trajectories of children with autism over a span of three years, focusing on five outcome measures reported by parents: language comprehension, expressive language, sociability, sensory awareness, and overall health. In a study of diet and food consumption (N= 5,553), gluten-free diet was associated with 1.5-fold greater improvement of language comprehension ( $p < 0.0001$ ) 1; meat- and eggs-eating was associated with 1.6-fold greater improvement of language comprehension ( $p < 0.0001$ ); vegetable-eating was associated with 1.5-fold greater improvement of language comprehension ( $p < 0.0001$ ) and 1.2-times greater improvement of expressive language ( $p = 0.0137$ ). Consumption of fast carbohydrates - sweets and bread - was associated with a significant and consistent health score decline ( $p < 0.0001$ ) 1. In a study investigating the effect of passive video and television watching (N= 3,227), shorter video and television watching were associated with 1.4-fold greater improvement in language comprehension ( $p = 0.0128$ ) 2. In a study of the effect of pretend play (N= 7,069), pretend play was associated with 1.9-fold greater improvement of language comprehension ( $p < 0.0001$ ) and 1.4-fold greater improvement of expressive language ( $p < 0.0001$ ) 3. In a study of the effect of joint-engagement (N=12,081), high joint-engagement was associated with 1.4-times greater improvement of language comprehension ( $p = 0.0019$ ), 1.5-times greater improvement of expressive language ( $p < 0.0001$ ), and 1.5-times greater improvement of sensory awareness ( $p = 0.0248$ ) 4. In a study of the effect of sleep (N=8,540), moderate and severe sleep problems were associated with significant health decline ( $p < 0.0001$ ) and lower sociability improvement ( $p = 0.0426$ ) 5. In a study of the effect of a gamified language comprehension exercise (N=6,454), engaging with the exercises was associated with 2.2-times greater improvement of language comprehension ( $p < 0.0001$ ) and 1.4-times greater improvement of expressive language ( $p = 0.0144$ ) 6. In a study of language acquisition critical period, autistic children learning-rate declined exponentially

several years earlier than in typical children, (N=15,183). The short language acquisition critical period makes autistic children especially vulnerable to the impact of early experiences.