Hyporesponsiveness to Social and Nonsocial Sensory Stimuli in Children with Autism, Children with Developmental Delays, and Typically Developing Children

Children with autism tend to respond to sensory stimuli (sights, smells, noises, tastes, textures, movement) differently from typically developing children. Researchers group their responses into two patterns: hyperresponsiveness and hyporesponsiveness. Hyperresponsiveness is an exaggerated response to a sensory stimulus, like an intense dislike of noise or an avoidance of touch. Hyporesponsiveness is a lack of response or a diminished response to a sensory stimulus, like not responding to one’s name or a diminished response to pain. Both patterns are reported in children with autism, but hyporesponsiveness is more common.

Extreme hyporesponsiveness to social stimuli could cause a child to miss out on learning opportunities, since much of what we learn as children depends on paying attention to others, especially their communication. Not responding to social cues is often one of the earliest signs of autism. Researchers debate whether this tendency toward hyporesponsiveness is a general way of responding to all stimuli, or if it is limited to stimuli occurring in a social context.

Specific research questions:

1. How well does hyporesponsiveness measured in a lab match the parent’s description of the child’s behavior?
2. Does mental age (intelligence compared to peers) affect a child’s level of hyporesponsiveness?
3. Do children with autism, children with developmental delay (DD), and typically developing children have different levels of hyporesponsiveness?
4. Does the context (social vs nonsocial stimuli) affect a child’s level of hyporesponsiveness?
5. Is hyporesponsiveness connected to problems with joint attention (sharing attention with someone else) or language?

178 children participated in the study: 63 with autism, 47 with DD, and 68 typically developing. The children were evaluated on their sensory responses to tactile (touch), auditory (hearing), and visual stimuli in both social and nonsocial contexts. The children were also evaluated for their cognitive abilities, language abilities (both speaking and understanding), and joint attention (both responding to and initiating).
Results:

1. The children’s behavior in the lab was very similar to what their parents reported.

2. The children’s level of hyporesponsiveness tended to *decrease* with age.

3. There were mental age differences in the level of hyporesponsiveness in children with autism, children with DD, and typically developing children. At a mental age of 6 months, the autism group was significantly more hyporesponsive. By the mental age of 5 years, there were no differences between the groups. (Remember that mental age is not the same as actual age.)

4. Children in all groups who had poorer joint attention showed a higher level of hyporesponsiveness in social and nonsocial contexts. This was more common in children with a lower mental age.

5. Only the autism group showed a connection between high levels of hyporesponsiveness and poor language. This connection did not change with context (social vs non-social).

The results indicated that *mental age* seems to affect sensory responses more than *context* (social vs non-social). Hyporesponsiveness is related to mental age: low mental age produced hyporesponsiveness in both social and nonsocial contexts, and higher mental age produced more responsiveness. It is possible that measuring hyporesponsiveness may be useful to identify very young children at risk for autism, but it will become less effective as the child ages.

The findings are also relevant to the effect of hyporesponsiveness on social-communication. Hyporesponsiveness is linked to low joint attention in all children leading to the conclusion that responding appropriately to both social and nonsocial stimuli is important for developing joint attention. Also noted was the finding that children with autism continue to have problems with joint attention at older mental ages than children with DD or typically developing children. This suggests that other factors, like motivation, may be inhibiting their development of joint attention.

Hyporesponsiveness in infants at risk for autism likely worsens the typical deficits of autism—especially social communication. Unlike the other groups, the autism group failed to attend to auditory stimuli (sound), the main source of language learning. It appears that children with autism have widespread problems with sensory processing and/or attention that cause hyporesponsiveness to both social and nonsocial stimuli.

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For more information about The Sensory Experiences Project please visit our website: [http://www.med.unc.edu/sep](http://www.med.unc.edu/sep)