

Jack, A., Bonvillian, J.D., and Herbert, R.C. *Gestural Imitation Accuracy Associated with Language Ability in Children with Autism*. Paper presented at the 2009 Clinical AAC Research Conference in Pittsburgh, PA.

Gestural Imitation Accuracy Associated with Language Ability in Children with Autism

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Document Abstract

Gestural imitation ability and communication skill were examined in 14 children with autism and 17 typically developing children. Children with autism were found to display impaired performance on the imitational task relative to the comparison group, experiencing particular difficulty replicating the handshape and location aspects of gestures, and often omitting the second gesture of two-movement sequences. Moreover, the accuracy with which children with autism imitated gestures robustly predicted teacher-rated expressive and receptive language and communication ability, such that children who made more formational errors on the imitational task also received lower language scores.

Research Description

There is an increasing body of evidence that children's gestural imitation may facilitate their language development. Infants' gestural inventory, for example, is positively correlated with later receptive language outcome (Watt, Wetherby, & Shumway, 2006); moreover, infants who receive training in the use of symbolic gestures often show an advantage in verbal language acquisition over peers without such training (Goodwyn, Acredolo, & Brown, 2000). Children with autism spectrum disorders (ASDs) frequently exhibit an imitational deficit; this deficit appears to be greater for gestures than for object-oriented actions (Williams, Whiten, & Singh, 2004). The present study was designed to assess individual factors related to the accuracy with which children on the autism spectrum completed a gestural imitation task. It was hypothesized that greater gestural imitation accuracy would be positively correlated with both expressive and receptive language ability.

Fourteen children with ASD (3 – 16 years) and 17 typically developing preschoolers (2 – 5 years) completed a gestural imitation task. Additionally, teachers rated the functional communication abilities of the students with ASD. Both groups of children were presented with modeled gestures that varied in handshape, movement type, location relative to the body, and sequence length, and asked to imitate these gestures. Teachers of children with ASD rated their students' expressive and receptive language skills on a five-point Likert scale, with "1" representing profound impairment and "5" an age-typical level

of ability. These ratings were determined collaboratively by at least two primary instructors. All 17 comparison children exhibited age-typical language; they were not rated.

Children with ASD made significantly ($t = -2.41, p < .05$) more formational (handshape, movement, and location) errors during the imitation task ($M = 10.29, SD = 6.02$) than did typically developing children ($M = 5.82, SD = 3.76$). As shown in Figure 1, the ASD group displayed considerably more variability in imitation performance as well. Children with ASD were also significantly ($t = -2.28, p < .05$) less likely to imitate the second gesture presented to them in two-gesture sequences ($M = 2.36, SD = 2.44$) than were comparison children ($M = 0.71, SD = 1.31$). However, as shown in Figure 2, they were just as likely as controls to imitate the first or only gesture in a sequence.

Children's imitation error rates were regressed on their mean language scores (average expressive and receptive ratings). A clear, linear relationship is visually apparent in Figure 3. In fact, gestural imitation ($b = -0.79$) accounted for nearly 60% of the variance in ASD children's language scores (adj. $R^2 = 0.59$), which was highly significant ($F(13) = 19.38, p = .001$). Among children with ASD, age was essentially uncorrelated with language score or performance in the imitational task ($r = 0.17, p = .61$ and $r = -0.08, p = 0.8$, respectively), suggesting that maturational factors played little role in mediating the relationship between language skill and imitational ability.

A sample of children with ASD displayed impaired performance on a gestural imitation task relative to a typically developing comparison group. Moreover, the accuracy with which children with ASD imitated gestures predicted teacher-rated expressive and receptive language ability. This finding complements those from typically developing populations that suggest that gestural imitation is associated with language development. Future research should explore whether providing gestural imitation training to children as a component of a broader therapeutic program has beneficial effects on expressive language development.

References

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Figure Captions

Figure 1. Frequency of errors committed by formational type. Boxes enclose scores from 25th to 75th percentile, with a line representing the median. Bars extend to scores of up to 1.5 times the interquartile range.

Figure 2. Frequency with which children omitted either the first or second gesture of the modeled sequence from their imitational attempts.

Figure 3. The frequency of ASD children's formational errors on the imitation task, plotted against average language score. The solid line depicts the linear regression of imitational errors on language ability; dashed lines indicate its 95% confidence interval.





