Stable Handedness During Infancy Predicts Advanced Language Skills at Two Years of Age

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Background and Aims

- Fluctuations in infant hand use have led many researchers to incorrectly conclude that infant handedness is generally unstable.
- In fact, multiple investigators have now shown that some infants have stable preferences while others have variable trajectories.
- The question posed in this study is whether stable handedness during infancy confers any advantages in development.
- We hypothesized that early hemispheric specialization for motor skills (i.e., stable infant handedness) boosts language acquisition.
- We predicted that children with a stable infant hand preference would have higher language scores as toddlers as compared to children without a stable hand preference during infancy.

Participants

- 38 children (21 females) participated in this longitudinal study.
- Inclusion criteria was a full-term delivery without complications.
- The sample was 65% Caucasian White, 15.8% African American, 13.2% Multiracial, 2.6% Hispanic, and 2.6% Other Race.
- The median family income was $70,000 – $79,999.
- The median education level for parents was a Bachelor's degree.
- Mann-Whitney *U* tests found no effects of income, mother's education level, or father's education level on infant handedness.

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Procedure

- We examined hand use monthly from 6 to 14 months (infant visits; **Fig. 1**) and from 18 to 24 months (toddler visits; **Fig. 2**).
- We collected data on language, cognitive, and general motor skills at 2 years of age using the Bayley third edition (Bayley, 2006). The Bayley composite scales are normed at 100 with a standard deviation of 15.

Fig. 1. The infant handedness measure (Michel et al., 1985) assessed hand use for acquiring objects unimanually and consisted of 22 objects presented singly at the infant's midline (left) and 10 pairs of objects presented dually in line with the infant's shoulders (right). 8 month old pictured.

Fig. 2. The toddler handedness measure (Nelson et al., submitted) assessed hand use for role-differentiated bimanual manipulation in which one hand stabilizes an object for the other hand's action (active hand=preferred hand) and consisted of 29 scorable actions. 18 month old pictured.

Results and Discussion

- Children were grouped by infant handedness status as right-handed (*N*=15) or no hand preference (*N*=23) and by toddler status as right-handed (*N*=29) or left-handed (*N*=8). One child had no preference by 2 years and was not included in the toddler analyses.
- Stable right-handedness in infancy boosted language ability measured at 2 years of age. This finding was not a result of cognitive or motor differences between handedness groups (**Fig. 3**).
- Handedness is neither necessary or sufficient for language acquisition, but the timing of handedness may shift the timing of language skills (**Fig. 4**).
- Overall, these results build on previous literature linking right-handedness and language across the lifespan.

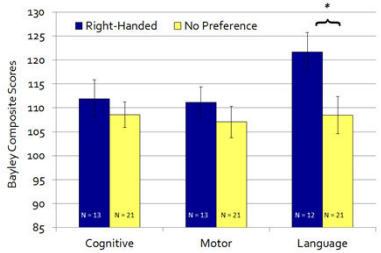

Fig. 3. Mean composite scores for Bayley scales as a function of lateralized children (right-handed) vs. not lateralized (no preference) as infants. *p<0.05.

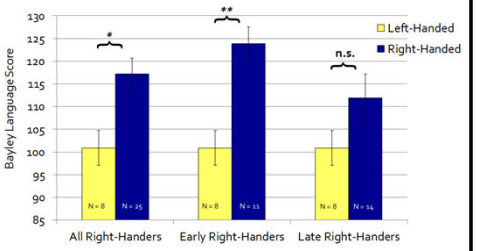

Fig. 4. Language scores of left-handed toddlers vs. (1) all right-handed children, (2) early right-handed children (lateralized as *infants*), and (3) late right-handers (lateralized as *toddlers*). *p<0.05, **p<0.01.