Fine Motor Skill Predicts Growth in Expressive Vocabulary from 12 to 24 Months

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Background and Aims

- Changes in motor ability can set off a cascade of changes across other cognitive systems. For example, individual differences in motor skills in infancy have been linked to language outcomes.
- Walking onset predicts immediate increases in expressive vocabulary, regardless of onset age. Similarly, in a sample of infants at high risk for ASD, greater fine motor skill from 12 to 18 months was predictive of larger expressive vocabulary at 36 months.
- Understanding how motor skills contribute to language growth during a critical period for language development such as the "word spurt" can help researchers identify infants at risk for language issues, and help generate novel interventions..
- **Aim**: Investigate the predictive abilities of motor skills towards language growth over 12 to 24 months.

Methods

- **Participants:** 104 typically developing infants (51% male) participated in the current study. Data are from larger a longitudinal study on individual differences in social development.
- **Measures and Time Points:**

1) Mullen Scales of Early Learning (MSEL) The MSEL contains 5 subscales: gross motor (GM), fine motor (FM), visual reception (VR), receptive language (RL), and expressive language (EL).
2) McArthur Bates Communicative Development Inventories (CDI) assess expressive vocabulary and gesture.

- **Analyses:** Expressive vocabulary growth was calculated via linear slopes across 12, 18, and 24 month CDI language time points. A multiple regression analysis was conducted with 12-month MSEL GM and FM standard scores predicting CDI expressive vocabulary growth from 12 to 24 months, with infant sex, maternal education, MSEL VR, RL, EL scores, and CDI gesture scores at 12 months included as covariates. Missing data was addressed utilizing full information maximum likelihood estimation.

Results

Table 1. Multiple Regression with Maternal Education, Gross Motor Score, and Fine Motor Score on Productive Vocabulary Growth

Predictor	B	SE B	β
Maternal Education	-9.68	8.96	-0.13
Sex	3.69	21.17	0.02
VR Score	-0.27	1.13	-0.04
RL Score	-1.93	1.84	-0.17
EL Score	2.21	1.39	0.27
CDI Gesture Score	2.15	1.26	0.25
GM Score	-0.28	0.85	-0.05
FM Score	2.09	1.09	0.27*

* $p < .05$

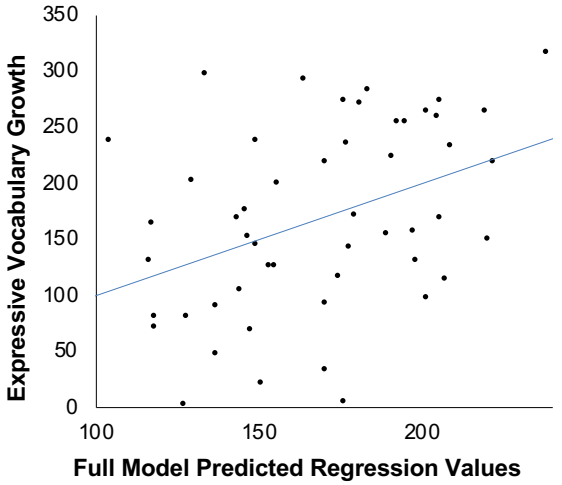

Figure 1. Scatter Plot of the Full Multiple Regression Model Predicting Expressive Vocabulary Growth

- FM score at 12 months was a significant predictor of CDI productive vocabulary growth from 12 to 24 months, above and beyond MSEL GM scores and the control variables of maternal education level, sex, MSEL VR, RL, EL scores, and CDI gesture scores $t(94) = 1.92$, $R^2 = .18$, $\beta = 0.27$, $p = .047$.

Discussion

- Infants with better fine motor skills at the beginning of their second year may experience novel interactions with objects and with caregivers more frequently and sooner at a time period when expressive language increases exponentially.
- Interactions with objects and caregivers may allow for more language learning opportunities, where fine motor skills and language result in a bidirectional interaction.
- Prior research has focused on the presence or absence of a gross motor skill. Use of a continuous gross motor measure in the current study may explain why gross motor was not predictive of language.
- Importantly, results emphasize the need for language interventions that take into account motor skills as a protective versus risk factor for language outcomes.

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For more information about our studies visit **hands.fiu.edu** & **bbdl.fiu.edu**
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