Title: Early Motor and Communication Development in Infants with Down Syndrome

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Introduction: In typically developing (TD) infants, critical motor milestones, such as walking, serve as a foundation for many aspects of development, including language acquisition. Earlier milestones, such as grasping or sitting, are also hypothesized to have a cascading effect on later language skills (Libertus & Violi, 2016). This relationship has particular relevance to infants with Down Syndrome (DS), considering the motor and expressive communication delays observed throughout development in this population (Fidler, 2005). As a first step toward testing the applicability of this hypothesis to this population, we examine the concurrent relationship between motor skills and early communication in infants with DS.

Method: Participants were 25 infants with DS, ages 6 to 17 months, M age = 10.81 months, SD = 3.66. Infants participated in the Bayley Scales of Infant and Toddler Development (Bayley-III) to assess cognitive level using the Cognitive domain raw scores. Motor assessments included measures of both sitting and grasping ability. Sitting ability was determined using the Bayley-III Gross Motor domain and individual item scores for sitting upright for 30 seconds were dichotomized based on achievement of this gross motor milestone. Early grasping was also quantified via a laboratory Object Exploration task wherein a novel ball was presented to each infant for 30 seconds. The grasping task was coded for the number of efficient grasps the infant made during the time interval. Caregivers of infants completed the Communication and Symbolic Behavior Scales Developmental Profile-Infant Toddler Checklist (CSBS-ITC; Wetherby & Prizant, 2002) and raw scores on the three composites, Social, Speech, and Symbolic, were used to assess communication skills in the group of infants with DS.

Result: A multivariate multiple regression was conducted using SPSS. The set of independent variables, sitting ability, grasping, and cognitive level were found to be related to the set of dependent variables, Social, Speech and Symbolic composite raw scores of the CSBS-ITC, F (9, 46.4) = 3.47, p = .002, and the three independent variables accounted for 71.4% of the variance in the set of communication variables. Efficient grasping was related to the set of communication variables, controlling for cognitive level and sitting ability, F (3, 19) = 3.24, p = .045, R² = .34. Sitting ability was also related to communication, controlling for cognitive level and efficient grasping, F (3, 19) = 4.98, p = .01, R² = .44. Cognitive level was not a significant predictor for the set of communication variables. Univariate results demonstrated that grasping was specifically related to the Symbolic composite, F (1, 24) = 9.35, p = .006, but was not significantly related to Social or Speech composites. Sitting was related to all three domains of communication composites: Social, F (1, 24) = 11.36, p = .003, Speech, F (1, 24) = 7.71, p = .01, and Symbolic F (1, 24) = 5.84, p = .025. All other univariate relationships were not significant.

Discussion: The relationship between motor competencies and how each are related to communication in infants with DS has yet to be described. Findings from this study suggest that both grasping and sitting have strong associations with communication abilities, and that sitting, in particular, is related to three separate areas of communication including Social, Speech and Symbolic domains. The current study is limited to cross-sectional data, however, future studies should use longitudinal data in order to examine if the developmental cascade described in TD infants can be observed in infants with DS.

References/Citations: