

Development of the bimanual self-regulation and the role of speech in early childhood

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The first aim of this study was to find the developmental evidence of bimanual differentiation and coordination. The second aim was to suggest the developmental process from interpersonal to intrapersonal regulation focusing on the interaction between behavior and speech, and to review the Luria's model.

84 children (between the age of 2¹/₂ years and 6¹/₂ years) participated in 3 tasks for bimanual self-regulation. Task1 was holding and squeezing a rubber bulb with each hand for a given length of time (sustained regulation). Task2 was alternately grasping a rubber bulb between their two hands (alternating bimanual regulation). Task3 was squeezing a rubber bulb with each hand in response to the "Go" stimulus and not squeeze in response to the "No-go" stimulus.

Results suggested that there were three developmental stages during the process of inner speech which Luria's model presented. These developmental stages were given explanations by "theory of hierarchies and stages on the reversible operations in human development" proposed by Masato Tanaka who was Japanese developmental psychologist. Stage1: Verbal or behavioral instruction from an adult initiate a child's movement in a rhythmic motor coordination (early interpersonal regulation stage). Stage2: Verbal or behavioral instruction from an adult control a child's movement in semantic way (late interpersonal regulation stage). At a same time, a child learns to perform in implicit and intuitive way through internalizing framework given by an adult (early intrapersonal regulation stage). Stage3: A child learns to perform in explicit and automatic way through internalizing framework made by him or herself (late intrapersonal regulation stage). Each of the three stages was age-related, Stage1: 2¹/₂ - 3¹/₂ years (The stage of the formative "Two dimensional operation"), Stage2: 3¹/₂ - 4¹/₂ years (The early stage of the reversible "Two dimensional operation"), Stage3: 4¹/₂ - 5¹/₂ years (The late stage of the reversible "Two dimensional operation").

The stage2 is an important stage during the process of inner speech, because this stage may be transitional period from interpersonal to intrapersonal regulation system.