Introduction

Unimanual handedness has been proposed by Michel (1983) to be an emergent behavior which can be described as the preference to use one hand over another to manipulate an object. According to Michel's (1983) modified progressive lateralization theory, earlier appearing patterns of hand-use preference, along with other behaviors and experiences, will integrate into a unimanual hand-use preference.

Previous research on unimanual handedness from this lab has revealed that from 7 to 11 months, infants were who found to have no preference or a right preference for apprehending objects, subsequently show an increase in right hand unimanual manipulations. Those infants who indicated a left hand preference for apprehension show an increase in left hand unimanual manipulations (Hinojosa et al., 2003).

Based on this data and Michel's modified progressive lateralization theory, a hypothesis was formulated which states that hand-use preference for apprehending objects will be related to hand-use preference for unimanual manipulations at each month of development at 7, 11, and 13 months.

Methods

- 18 infants (9 females)
- 3 visits at 7, 11, and 13 months
- Infants were divided into 3 groups based upon handedness patterns for apprehending objects:
  - 6 Right preference
  - 6 Left preference
  - 6 No preference

Unimanual Manipulation Procedure:

Infants' actions were videotaped during the presentation of two identical toys. These pairs of toys were placed, simultaneously, in each hand of the infant. 17 pairs of toys were presented in this manner to the infant. The number of manipulations performed by each hand on each toy was coded using Noldus Observer software.

The following is a description of the unimanual actions which were coded:

- Clack = Lateral movement of object in the air and contact with other hand or object in opposite hand.
- Drop = Release of item (throwing and placing on table included; contact between hand and toy has been severed).
- In Mouth = Infant places object in mouth
- Pick-Up = Toy is lifted off of the table.
- Refuse = Presenter attempts to put the toy in the infant's hand and the infant does not grasp the toy.
- Repeat Hit = Several abrupt contacts of toy with table.
- Rotate = Wrist rotation; turning toy in a circular motion.
- Scrape = More than one sliding movement of object across the table.
- Shake = Swinging item in hand; moving in a vertical orientation without table contact.
- Take = Hand A transfers a toy to Hand B. For consistency, hand coded is the hand "taking", not the hand "giving".

Results

Figure 1 shows the frequency of right and left hand unimanual actions for right-handed infants. From 7 to 11 months, the frequency of both right and left actions increases slightly. From 11 to 13 months, there is a decline in the number of unimanual actions for both the right and left hand.

Figure 2 demonstrates the number of right and left hand unimanual actions for infants with no handedness preference. These infants are performing many more left hand unimanual actions at 7 months, as compared to the number of right hand actions at this age. By 13 months, the number of unimanual actions performed by the right and left hand have declined to a nearly equal frequency.

Figure 3 shows that the frequency of actions for left handed infants declines steadily from 7 to 13 months at a similar rate for both the right and the left hand.

Discussion

Figures 1 through 3 show that the number of unimanual manipulations are decreasing across time for all hand preference groups. These decreasing trajectories may indicate that the infant is beginning to perform actions which utilize both hands as was found by Kimmerle et al. (2009). These authors indicated that role differentiated bimanual manipulations begin to increase across the 9 to 13 month time period.