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# The Relationship Between Vocal Development and Motor Development During Language Learning: A Review

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## Abstract

This study attempted to search the nature of language development and the relationship between vocal development and motor development in infancy, and it relied on the descriptive and qualitative approach and the method of content analysis to review and compare three researches related to the relationship of language development and physical development during language learning in the infancy. The results of the three studies, despite some difference between them, indicates the relationship between sound, movement, and body signals before, during and after language learning in infancy.

**Keywords:** Vocal Development, Motor Development, Language Learning

## 1. Introduction

Aspects of language or sound—vocalization—development in infant children and the links between language and gestures. All of the sources discuss some aspects of the relationship between infant gesturing or hand movements and development factors of language. The The three articles we are considering for this paper all look at various research is being conducted for several reasons. This type of research can help investigators learn more about cognitive development as well as the earliest stages of language development. Some of the research might also give investigators insights into diagnosing early autism spectrum disorder and further identify if there are exact developmental stages of language that are common or universal to all children.

## 2. The relationship between language development and physical development according to the view of dynamic system theory

In the work “The Interplay Between Language, Gesture, and Affect During Communicative Transition: A Dynamic Systems Approach (Parlade´&Iverson,2011), the authors are looking at different groups of infants they define as “spurters” and “non spurters” in an effort to learn more about transition periods during the language development process. These investigators believe there is an important difference between infants who spurt or elicit increased vocalizations or word utterances and word learning rates. It appears from the research that children who are “spurterers” develop vocabularies differently than children who are not spurters. Moreover, there is

evidence that communicative expressions such as frowns or smiles occur both in isolation or when the infant is alone and also when they are with others such as parents or caregivers. This implies that cognitive developments are also taking place irrespective of this type of behavior employed for communication with others. The research also looks at relationships between such things as an infant's hand and arm movements and vocalizations.

These researchers, in their work, point to other scientific studies by (Yale, Messinger, Cobo-Lewis, & Delgado, 2003; Yale, Messinger, Cobo-Lewis, Oller, & Eilers, 1999). These studies have been used as evidence for the existence of multidimensional development in relational attitudes in the infant stage (breastfeeding period). For example, as young as three months old, children can use simple facial expressions (such as smiling or refusing) as well as some sound expressions. These studies have been used as evidence for the existence of multidimensional development in relational attitudes in the infant stage (breastfeeding period). For example, as young as three months old, children can use simple facial expressions (such as smiling or refusing) as well as some sound expressions. And some research speaks of the existence of links between the gestures of the arms and the pronunciation of the sounds, this at the age of six months. In this regard CF (Iverson & Fagan, 2004). Other works have been mentioned such as those (Adamson & Bakeman, 1985; Kasari, Sigman, Mundy, & Yirmiya, 1990; Messinger & Fogel, 1998; Mundy, Kasari, & Sigman, 1992). They proved that around the age of 12 months, facial expressions would be accompanied by meaningful gestures, such as finger-pointing and object demonstration in children. For these researchers, the aim of these studies was to analyze these changes in the adaptation of facial expression with arm gestures, sound pronunciation and words.

The connections between language and gesture at different stages such as before, during and after language learning are highlighted by the findings of this study. The research seems to suggest that children show a discernible transition in word learning and gesturing depending on how much they are learning. In other words, infants who are experiencing more utterances and more vocabulary development have more significant changes in their other communicative behaviors like hand movements and facial expressions. These discoveries may give researchers more insight into stages of both language and developmental transitions and any connections between the two phenomena. These researchers theorize that by identifying early small differences in beginning stages of development they can more fully understand development stages at later periods in childhood and even adult development.

It can be seen that the background of this study is based on the theory of dynamical systems. The researchers point out that the basis of these studies is very useful for researching the system of human relations in the transformation phase, for two main reasons:

- Dynamic system theory relies on the connections between all the organs of the human body as a source of change.
- Because this theory refers to this new form of attitude that appears in the transitional phase, and is in itself an opening that allows us to understand the process of change (According to the researchers).

This research is based on the assumption that the transformation phase in development brings instability in which we can see changes, especially in dynamical system theory.

### **3. Collaboration between movement and sound styles during Canonical Babbling**

Canonical Babbling, CB is a kind of repetition of sounds that appears at the age of six to seven months. These expressions are, in a way, the attachment of the letters and their repetition, like when a child says: mamamaa or daddy daddy, these expressions appear suddenly. Children who are just a few months old test the use of sounds and expressions, which is how children develop their language learning. When the child is testing sound expressions he is trying to express himself but he cannot. There are three kinds of Canonical Babbling:

- Marginal babbling: which appears between four and six months, the child mixes vowels and consonants, for example when he says: ma aaaaa, paaa paaaaa, uuuuumn.
- Reduplicated Babbling: This is the stage where the child repeats the same expression or the same sound, for example: ma ma ma, ba ba ba ba ba, dad a da dad.

- Nonreduplicated Babbling: This comes between the ages of nine and 12 months the child is making sounds but cannot yet construct correct words.

This explains to us that the relationship between Canonical babbling and gestural actions in children begins even before they know the difficulty of words. This relationship will influence the development of the child's language. BC is not only the product of development, for the experience of hearing is also important, which is visible in the development of all languages in the world in general (Field, 2011; Oller, 2000; Goldstein & Schwade, 2008).

The study by Keiko Ejiri and Nobuo Masataka entitled, "Co-occurrence of preverbal vocal behavior and motor action in early infancy (Ejiri & Masataka, 2001)", the scholars look at the relationship between vocal behaviors and motor actions and pre linguistic development. The study is interested in understanding processes at work in this pre linguistic period that may affect later development processes such as acquiring the abilities to articulate auditory movements such as rapid glottal movements and other articulatory soundings

The findings of the study suggest that there is a relationship between an infant's rhythm actions and vocalizations. In this study they call these early vocalizations canonical babbling or CB. The research suggests that CB co-occur with motor action in a manner that can be recorded and studied. From this data they believe there is definitely a connection between the two that enables infants to gain the early abilities to begin to form sounds which will eventually become words and vocabularies. In other words, even before infants begin to form the rough outlines of words there is a connection between CB and motor actions that plays a major part in later language development.

#### **4. The primitive relationship between speech and bodily movements before the onset of expressive behavior and verbal activity**

The final study reviewed for this paper is entitled, "Multimodality in infancy: vocal-motor and speech-gesture coordinations in typical and atypical development." Author Jana M. Iverson (Iverson, 2010). The study looks at the earliest links between gestures and speech even before speech or vocal motor activity has begun. Iverson's research strongly suggests that there is a pre babbling or cooing or spurt stage where hand and pre vocal development is occurring. This has implications for later developments which clearly show strong connections between speech and gestures.

The researcher presented the primitive relationship between speaking and signals before the start of the speaking activity or the movement of the mouths, and confirms that the activation of the movement of the hands and the movement of the mouths has a role in the issue of raising the voice and this indicates the relationship between speech and the signal, and the researcher reveals here two things:

- Before the child can benefit from using the hand or the mouth for the required relationship, (sense and movement) are two main factors in memory connections.. Variations in coordinating methods exist since the beginning of life and with continued growth as well, and these coordinations grow and strengthen more when the child reaches the required stage.
- The research focuses mainly on coordination between vocal-motor, speech and movement, which gives an introduction in the field of growth of the next, and it is of great importance in the case of studying the various characteristics.

This research also refers to the development of signs before speaking, and most importantly, the understanding of these relationships, which is a source of assistance in diagnosing the onset of the stage (utism) in the child, meaning that this research is an indicator of the changes that occur in the pre- and expected movements when children grow, especially when they show Sources of motor and speech development when vocal-motor coordination, and vocal-motor growth can be useful for early diagnosis of utism, because utism appears when the growth process worsens, especially at the third year of life. One of the most important symptoms of (utism) is the delay in movement and speech with the continuation of incomprehensible echoes and imitating it with those around it of movement and speech without understanding their meanings and the problem in the expression of names.

The findings suggest that later word gesture coordination are processes preceded by infant hand mouth movements. Exactly what these findings mean will require even further research but the implications are considerable for scholars interested in the development of multi modal communication systems. The research described in this paper indicates that changes in gesture occur even before speech. Perhaps, the most important finding is that understanding these connections can help diagnosis the earliest stages of childhood autism.

## 5. Conclusion

These three studies deal with the link between gesture and sound in language learning, with an emphasis on language and sound development and expressive behaviors in newborns. The question of factors of language development in newborns at different stages before, during and after language learning is also raised.

- Before language learning, at the age of a newborn child, it is the stage of the explosion of sounds and gestures without precise meaning.
- The stage of language learning, at six months of age, is a stage in which there are connections between the movements of the hands and feet and the child's first facial signs.
- The post-learning stage occurs at over 12 months, a stage in which children move their heads with their hands and feet to express anything or idea. At this stage there is also a balance between facial expressions and hand and foot movements.

These articles are generally similar in their scope of investigation and contribute to the boarder data about gesture/movement and language/vocal motor development. They only differ significantly in their focus of the different theoretical stages of infant language development. The stages of these various processes are still regularly debated and researched by investigators. To date, there is no universal agreement about the development stages and processes which is accepted by all researchers. Moreover, there are still no universally agreed upon definitions for various speech and development terminology. At some point in the future it would be beneficial if agreement could be reached on some of these things so they could be organized within a broader framework for more investigation and study.

However, these studies are very important to the developing research on this topic. It seems very clear there are connections between infant gestures and the language development process. As a result, the research is exciting for many reasons. As scholars and investigators learn more about these connections they will be in a better position to understand and explain language development. If this can be achieved the ramifications for the future would be substantial. In the future investigators or even doctors could identify such things as learning deficits or worse things such as Autism. They could also learn how to make childhood learning more efficient and it could even have implications for curricula development in early childhood development stages. Finally, although largely unknown, understanding early language developmental and cognitive processes could affect the way adult cognition and development are understood.

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