Comprehension and Production of Gestures within Preschool Children with Specific Language Impairment (SLI) and Children with Cerebral Palsy (CP), Pre and Post Motor and Semantic Intervention Plans

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Abstract

Gestures are meaningful body movements that are used by individuals in their daily social communications. They may accompany speech or appear without it, and they function as an 'additive' to the general meaning of the message by clarifying it. In addition to their use in interpersonal communication, gestures assist the comprehension process and the transition to spoken language.

The aim of the current study is to examine the abilities to produce and understand gestures by children experiencing Specific Language Impairment (SLI) and children experiencing Cerebral Palsy (CP) compared to children with normally developed motor and language skills (TD). An additional and equally important goal is to examine the effect of semantic and motor intervention plans on gestures comprehension and production within both populations.

Until now, only a handful of studies directly examined the ability to understand and produce gestures within 'special' populations, where the focus has been mainly characterizing spontaneous use of gestures when interacting with others. Other studies have examined the ability to imitate gestures, but most have focused on meaningful gestures. The understanding of gestures has been studied even less, and the small amount of studies that have, did not use the same evaluation methods that were used in the current study when evaluating the child's ability to understand the semantic meaning of the gestures presented to him.

The innovation of the current study is that to the best of our knowledge, CP children's gesture comprehension and production abilities have not been examined. An additional major innovation comes in the form of the method we used in order to evaluate comprehension of symbolic gestures, which was designed specifically for this study and from the unique intervention plans that were formulated in order to improve examined children's ability to comprehend symbolic gestures and produce accurate imitations of meaningless gestures

In the current study we included 96 children between the ages of 5-6, separated into 3 groups: The first included Children with Specific Language Impairment (SLI), the second included children with Cerebral Palsy (CP) that have been diagnosed with Dyplegia and the third included children with typical language and motor development (TD).

Two groups of gestures were created used for two different purposes: The first included 36 symbolic gestures that were used for the task of gesture comprehension and the second, which included 36 meaningless gestures that were used for the task of gesture imitation. Following a pilot study intended for evaluating the level of difficulty, the gestures were assigned to the four stages of the study, making sure that the level of difficulty was identical within each stage.

In order to apply the intervention every population was divided into three sub groups in accordance with the intervention plans: (1) the semantic intervention group for improving the comprehension of symbolic gestures; (2) the motor intervention group for improving the ability to produce imitations of meaningless gestures; (3) the control group that was exposed to any activity that is related to the study.

At every stage of the study, the subject were given two tasks: a production task – accurate imitation of a hand posture or movements and a comprehension task – semantic comprehension of a symbolic gesture. In our initial assessment of the children in the three groups we assumed that the special populations (SLI, CP) will have significant difficulties comprehending symbolic gestures and accurate imitation of meaningless gestures compared with groups of normally developing children of the same age. This assumption was confirmed. As expected, in the production task, the CP population showed the weakest abilities. In the comprehension task, both of the special populations shows the same level of weakness compared to the typically developed population.

An additional assumption, was the effectivity of the intervention plans, both in the ability of the intervention (semantic and motor) to directly improve the subjects abilities in its own domain (The effect of the semantic intervention on comprehension and the effect of

motor intervention on production abilities) and indirectly improve their achievements in the other domain (The effect of the semantic intervention on production abilities and the effect of motor intervention on comprehension). This assumption was also confirmed for both the direct and indirect effects of the intervention. In addition, in accordance with our assumption, we found that the improvement that was achieved due to the intervention was still significant after three months.

Additionally, we assumed that the level of familiarity with the item (symbolic gestures/ meaningless gestures) will have an effect on the subjects' achievements favoring the familiar items. This assumption was partially confirmed, as the familiarity with the item mainly effected the production task and an improvement was not shown in the comprehension task among the study population (that was exposed to the intervention).

The results of the current study reflect the functional correlation between motor and language skills, based on comorbid impairments within every population (Difficulty to comprehend symbolic gestures among children with CP, and difficulty to imitate meaningless gestures among children with SLI). The intensity of this correlation between language and motor abilities, arises from the results regarding the effect of the semantic intervention plan on motor abilities, and vice versa – the effect of the motor intervention plan on language abilities.