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This critical review examined the language advantages of encouraging preverbal baby signing. The study included all studies published between 2000-2010 that encompassed a population sample of normally developing, hearing, preverbal, infants and toddlers who have hearing parents. Overall, current literature on preverbal baby signing does not provide sufficient evidence to support or negate the notion its acclaimed advantages for language development.

Baby signing is an augmentative communication approach that teaches preverbal children to communicate via symbolic hand gestures. Following decades of research, promoters of Baby Signing are confident that this approach provides immense benefits, including the advancement of language development, strengthening of the parent-infant bond and stimulation of intellectual growth (e.g., Gongora, 2009; Holmes, 1980). With such acclaimed benefits, it is no surprise that such Baby Signing programs have gained tremendous attention on the Internet and on television shows such as on the Oprah Winfrey Show and Dateline NBC. As a result, parents all over the world have invested and continue to invest ample amounts of time and money into resources, products, workshops and seminars, with hopes to raise a brighter, more articulate child.

The underpinnings of Baby Signing are grounded in several well-established milestones of a child's development. For instance, at as young as 10-months, before the development of fine motor skills necessary to produce speech, a child can communicate about his or her immediate environment through the use of deictic gestures. For example, a child at this stage will point to a juice box to request "more juice", or hold his or her hands in the air for "up". These gestures develop spontaneously as a result of implicit parent modeling, and will continue to be used until he or she is able to replace the gesture with a comparable verbal label (Acredolo & Goodwyn, 1988).

By approximately age three, children begin to use representational gestures to symbolize objects that are not in his or her immediate environment (e.g., holding his or her fist to their ear to represent a telephone conversation). These gestures will also develop spontaneously as a result of implicit parent modeling (Messinger & Fogel, 1998)

With these milestones in mind, Acredolo and Goodwyn (1988) explored the relationship between the number of object gestures a child develops without explicit teaching, and his or her verbal language development. They found that there was a greater tendency for children with many object signs to reach the 10-word verbal vocabulary level earlier. In addition, Rowe, and Goldin-Meadow (2009), similarly reported that the number of gestures babies used at 14-months (without explicit teaching) positively correlated with vocabulary size at kindergarten. These studies are merely correlational in nature; however, they represent some of the most foundational findings that gave rise to the hypothesis that purposefully teaching your preverbal hearing child symbolic gestures will advance language development.

Prior to developing an elaborate study on the relationship between teaching preverbal children symbolic gestures and language development, Acredolo and Goodwyn (1988) sought to explore whether children at the preverbal developmental stage are receptive to learning explicitly taught symbolic gestures. Findings of their study confirmed that infants are receptive to learning gestures in infancy. Furthermore, findings indicated that when children are explicitly taught to use symbolic gestures they are capable of learning many more gestures than if they had not been explicitly taught to do so.

The primary objective of this paper is to examine previous literature in order to make an empirically based decision as to whether teaching preverbal hearing infants symbolic gestures has advantages for his or her language development.

Search Strategy

Computerized databases, Proquest, Pubmed and Google Scholar were searched using the following criteria: (Symbolic Gestures) AND (Language Development). In addition, commercially available Baby Signing websites on the World Wide Web were explored using the following criteria (Baby Signing).

Selection Criteria

The papers that were selected for inclusion in this critical review comprised of all papers published between 2000-2010, that encompassed a population sample of normally developing, hearing, preverbal, infants and toddlers whom have hearing parents.

The following papers are presented in chronological order.

Goodwyn, Acredolo and Brown, (2000) evaluated the effect of purposefully encouraging hearing infants to use symbolic gestures on language development.

One hundred and three 11-month old children were divided into three groups: the Sign-Training group (ST): parents were instructed to purposefully teach signs to their child; the Non-Intervention Control group (NI): parents were not given any explicit instructions; and the Verbal Training group (VT): parents were instructed to make special efforts to model verbal labels. The latter group was included to control for training effects (i.e., effects attributable to families being engaged in a language intervention program).

A series a MANOVA and ANOVA analyses revealed no significant differences between the NI group and the VT group, thus ruling out the variable of training effects. The ST group had significantly higher expressive language outcomes at 15 and 24 months, relative to the NI group. The ST group also had higher (but not statistically significant) receptive language scores at 15, 30 and 36 months relative to the NI group.

and small sample sizes. Additional research is needed in this area in order to get a clear understanding of the potential language advantages associated with teaching your preverbal hearing child to use symbolic gestures.

The following are recommended in future studies in order increase the empirical evidence of this particular body of research, and eliminate avoidable limitations:

- a) Adequate sample size and random distribution of participants into experimental groups in order to increase the strength of evidence and the ability to generalize results on additional populations
- b) Blinded experimenters to reduce the potential for experimental biases
- c) Adequate base-line measurements to ensure equal groups prior to implementing treatment
- d) Longitudinal data in order to assess the long-term effects that teaching children symbolic gestures has on language development
- e) Inclusion of both qualitative and quantitative measures regarding language development, in order to assess both language scores and parental responses to teaching their child symbolic gestures

Clinical Implications:

Despite less than ideal methodologies, it is strongly recommended that this area of research not be disregarded. This recommendation stems from several reasons; including the fact that in no studies did researchers find that baby signing had a negative impact on language development. Therefore, at the very minimum, we can assume that by encouraging parents to teach their children to sign, we are indirectly encouraging dyadic communication between the parents and their child. This type of communication is a fundamental aspect of a child's language development, especially when a child is discovering and experimenting with language for the first time.

- (2000). Impact of symbolic gesturing on early language development. *Journal of Nonverbal Behavior*, 24, 81–103.
- Holmes, K. & Holmes, W. (1980). Signed and spoken language development in a hearing child of hearing parents. *Sign Language Studies*, 28, 239–254.
- Johnston, J., Durieux-Smith, A. & Bloom, K. (2005). Teaching gestural signs to infants to advance child development: A review of the evidence. *First language*, 25, 235-251.
- Messinger, D. S., & Fogel, A. (1998). Give and take: The development of conventional infant gestures. *Merrill-Palmer Quarterly*, 44, 566-590.
- Pizer, G., Walters, K., & Meier, R. (2007). Bringing Up Baby with Baby Signs: Language Ideologies and Socialization in Hearing Families. *Sign Language Studies*, 7(4), 387-430.
- Rowe, M. & Goldin-Meadow, S. (2009). Early gesture selectively predicts later language learning. *Developmental Science* 12(1) 1-10