

## **Critical Review: Will teaching your preverbal hearing child symbolic gestures have advantages for his/her language development?**

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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.

### ***Introduction***

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.

With the previously discussed developmental milestones and basic research background in mind, many scholars went on to devote decades of research into the area of baby signing. With such a convincing logic, and desirable outcomes, many felt a "break through" in infant communication looked rather promising. However, despite the decades of research that has been dedicated to this area of research, evidence to support the several acclaimed outcomes of Baby Signing remains controversial; particularly its effects on language development.

## ***Objectives***

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.

## ***Methods***

### 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.

## ***Results***

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.

This study has many strengths, including a sufficient sample number (n=103), experimental, control and intentional control groups, and appropriate expressive and receptive language measures. However, several

limitations must be acknowledged, including non-randomization of participants without providing an explanation as to why. This has the potential to bias results, in that parents who choose to sign with their children may be more proactive by nature, or more driven to the educational aspect of parenting, and therefore, these children may already be more “privileged” than children of parents that did not choose baby signing. Another limitation of this study includes unblinded researchers, which may have introduced unavoidable biases in interpretations and scoring procedures. This study also neglected to report some potentially valuable information, such as their method of recruitment, method of group assignment, and data for base-line measures. As a result, findings of this study must be interpreted with caution. This study has a suggested level of evidence of II.

In July of 2000, Acredolo and Goodwyn presented a paper at the meetings of the International Society for Infant Studies in Brighton, UK. Using the same population as in their previous study (i.e., Goodwyn et al., 2000), they examined the long-term impact of purposefully teaching symbolic gestures to children during infancy on IQ at age 8. The only accessible information regarding this paper was a summary document. However, since it is an extension of the previously discussed paper, and is featured on the “Baby Signs” website as a key scientific research article, it was included in the current paper for critical analysis.

Detail regarding methodology for this study is not provided, however authors reported that analysis of data revealed advantages for the ST group compared to the NI group. These results were derived based on group averages on the Wechsler Intelligence Scale for Children III (WISC-III).

Although a convincing body of research, several aspects of this study warrant attention. First, since participants from this study were derived from their previous study, inherent biases and methodological problems exist as mentioned previously. These inherent biases include (but are not limited to) a non-randomized sample, and un-blinded examiners. In addition, the current paper has unexplained attrition rates and unexplained exclusion of the VT group. Further, the current study only provides access to a “summary” which evidently does not provide the reader with the detail required in order to make a sufficiently credible decision regarding the evidence at hand.

This report would be much more credible if the original paper were available, and if additional information and details were included. The suggested level of evidence is II.

Johnson, Durieux-Smith and Bloom (2005) conducted a systematic review of literature regarding the effectiveness of teaching preverbal children to use symbolic gestures. This review included all programs and studies between 1980 and 2003. Seventeen out of 1208 reports met their criteria; eight of these reports consisted of original data, seven consisted of secondary data, and two were unclear. Of the eight original studies, and two that were unclear, five were case studies, four were longitudinal prospective cohort studies and one was a single-measure cross-sectional study.

This literature review revealed that the majority of the reports included for systematic review had insufficient use of controls, and methodological flaws. Thus, they concluded that current literature on preverbal signing is inadequate in providing strong support for the notion that it will advance language development.

This systematic review is deemed to be valuable. Both the search strategies and a selection criteria used were considered to be to be appropriate. In addition, their use of reliability measure was also thought to be adequate. One aspect of this review that is believed to be less than ideal was their data analysis section, which was not discussed in great detail; thus making it difficult to properly evaluate its methodology. In addition, this review was not submitted for peer-review, which would have increased the level of evidence. The suggested level of evidence for this study is II.

Pizer, Walters and Meier, (2007) investigated the behaviors of three families that voluntarily chose to teach their children to use symbolic gestures. In addition, the degree to which this behavior is consistent with goals of fostering earlier and clearer communication was also examined. Analysis of data revealed that all parents felt positive about their decision to sign, and believed that this practice had improved early communication in their family.

While this study is based on non-evidentiary claims, it still has value in that it presents a detailed view of three families' real life practices and experiences with baby signing. Therefore this case study should not be exempted, but rather should be considered useful for what it has to offer to this body of research. This study has a suggested evidence level of IV, due to its non-experimental, qualitative nature.

Gongora and Chamarrita (2009) examined the effects of purposefully teaching infants to use symbolic gestures on mother-infant interactions. This study was an experimental, longitudinal, descriptive and comparative study. Children between five and nine months were

randomly assigned into either the Baby Signs group (BS): parents were instructed to encourage the use of symbolic gestures; or the Control group (C): parents were not given specific baby signing instructed. Baseline data was taken on their first visit via a 15-minute observation of the mother-infant dyad. A similar process of data collection was repeated when infants were between 12-14 and 18-20 months.

A non-parametric Mann-Whitney test revealed significantly more visual and tactile mother-infant synchronic interactions for children randomly assigned to the BS, compared to children in the C group.

Several limitations for this study exist. Including a small sample size (n=14), which included only middle to upper-middle class parents in one geographic location. This lowers the power of their results, and also limits its ability to be generalized toward other populations. In addition, the method of recruitment was voluntary, which may have attracted a particular sub-type of parents (e.g., parents who are able to put the time into participating in this study; pro-active parents that highly value parental education). Further, use of parental reports as one outcome measure may have introduced a bias (i.e., an over reporting of baby signing or what parents felt to be the desirable behavior).

Despite several limitations of this study, it also has notable strengths. These include randomization of participants and providing the control group with language stimulation in order to control for the effects of language stimulation. Further, this study was reportedly the first to examine the role of Baby Signing in parent-infant dyad, which is a very important aspect of a child's future language development. Therefore, when interpreted with caution, it is felt that this study provides a valuable contribution to baby signing literature. The suggested level of evidence for this study is II.

### ***Conclusion***

According to the current critical analysis, literature available on purposefully teaching preverbal hearing infants to sign does not provide sufficient evidence to support or negate the notion that it has advantages for language development.

### ***Recommendations***

#### **Future Research:**

Existing empirical evidence on the relationship between baby signing and language development is currently less than ideal due to a combination of the following limitations: nonrandomized participants, insufficient or unreported recruitment methods, un-blinded examiners,

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.

In addition, by encouraging parents to teach baby signing, we are providing that parent with the independence to be the "expert" of their child's language growth; thus allowing them to feel a sense of empowerment that they may not otherwise had. As the child learns new signs, this will reinforce the parents teaching skills, and consequently increase parenting confidence levels.

Furthermore, providing a child with the skills necessary to use symbolic gestures could help bridge the

communication gap between what they can understand and what they can verbally express. This could potentially decrease parent and child frustration, and allow for a more positive language-learning environment.

For these reasons, it is recommended that one should not discount baby signing merely based on the lack of empirical evidence to support advantages in language development. Rather, one must view baby signing as more of a holistic approach to indirectly strengthening the parent-infant bonding experience, and thus, paving the road for future positive language-learning experiences.

This recommendation does not come without cautions. In particular, when discussing pros and cons of baby signing, speech and language experts must be cognizant of the potential for parents to feel pressured into conforming to this approach, despite the presence of strong empirical evidence to support many of its claims. With this in mind, ethical implications must be considered due to the potentially costly nature of baby signing (i.e., costly resources, products, workshops, and seminars).

Therefore, rather than persuading parents to teach their child symbolic gestures, it is recommended that speech and language experts merely provide the evidence, as well as the lack of it relating to this area, and allow the parents to make an educated decision independently. The same principles apply for Speech-Language Pathologist's implementing baby signing parental courses as part of their clinical practices.

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