

Language Interventions Informed by Natural Language Acquisition: A Critical Appraisal

Sari Risen, M.A., CCC-SLP, Reg. CASLPO, BCBA

Introduction

Over the last few years, many clinicians, educators, and parents of individuals with autism have become interested in using strategies for language intervention that are based upon a framework called Natural Language Acquisition. These strategies are purported to be effective for learners who are said to be “gestalt language processors.” What follows is a white paper discussing the evidence behind these strategies as well as the plausibility of some of the assumptions included in the approach. A brief discussion of alternative strategies is included as well.

What is Natural Language Acquisition (NLA)?

There is a theory posited by some linguists that while some children’s production of language develops gradually from use of one word at a time to use of longer utterances (analytical language learning style), others begin to learn language as multi-word chunks (called “gestalts”), and this type of language learning is called a gestalt learning style (e.g., Peters, 1977; Peters, 1980; Prizant, 1983). The term Natural Language Acquisition was coined by Marge Blanc to label the progression of individuals with autism through the 6 stages of language acquisition that she has posited as the progression that individuals who are gestalt language processors go through (Blanc, 2012). Several intervention strategies have been posited based upon the NLA theory.

Research evidence supporting NLA and NLA-based intervention protocols:

Proponents of NLA and its associated treatment strategies state that evidence for their claims come from the sources listed in the left column. The purpose of the table below is to discuss the information provided by these sources.

	What information does this provide?	Does this source provide evidence for the NLA theory?	How does this contribute to our understanding of NLA-based intervention approaches?
Peters, 1977 https://www.jstor.org/stable/413177	Dr. Peters uses examples from her data to illustrate the presence of multi-word utterances in an early language learner whom	Dr. Peters’s data and the data from other authors that Dr. Peters included here are observational	This article does not provide any information about intervention for learners whose language is not

	<p>she observed. She makes the claim that some language learners lean more towards a gestalt language processing style while others lean more towards an analytic processing style, and she uses her data along with data from other linguists to support this claim.</p>	<p>only. These data provide us with examples of young children using longer utterances than we would expect based upon other research and thus help Dr. Peters to make the point that perhaps linguists would benefit from evaluating the strategies they use when analyzing language samples that they record and should begin to look further into whether some children's language development begins with use of longer utterances than was previously thought. While this article sheds light on interesting information for further study, the data</p>	<p>developing as expected.</p>
--	---	---	--------------------------------

		<p>presented here do not provide strong evidence for this on their own.</p> <p>Dr. Peters's claim that individuals who use multiword utterances early in their language development use a different language learning "strategy" cannot be verified without experimental research.</p> <p>This paper doesn't address the 6 stages of language development that NLA posits.</p> <p>The article talks about children lying at different points along a continuum, from analytical language learning at one extreme and gestalt learning at</p>	
--	--	--	--

		<p>the other extreme. If true, this would partially support the NLA idea that some children can be classified as gestalt language learners and therefore require different teaching techniques. However, to determine that children's learning styles differ enough that they can be placed in these separate categories, quantitative comparisons would need to be made, requiring far more complicated research designs.</p>	
<p>Prizant, 1983 https://psycnet.apa.org/record/1984-23284-001</p>	<p>Dr. Prizant summarizes other theorists' views of gestalt language processing and gives examples from his own clinical practice of language used by autistic clients that he</p>	<p>This article reviews explanations about gestalt language learners provided by other authors, and it also includes 2 examples</p>	<p>The article describes gestalt language acquisition style but does not provide any evidence regarding the intervention practices that have been</p>

	<p>hypothesized to indicate a gestalt style of language acquisition. Dr. Prizant also posits that for autistic individuals, gestalt processing occurs not only for language but also for all cognitive tasks.</p>	<p>from Dr. Prizant’s clinical work. The examples provided are anecdotes only and do not constitute research evidence.</p> <p>Dr. Prizant describes 4 stages that gestalt language learners are posited to go through but does not provide evidence for these stages.</p> <p>Dr. Prizant makes a point of saying that the information he presents here is a “working argument” as opposed to conclusive information.</p> <p>Therefore, this article does not contribute evidence to the NLA theory.</p>	<p>posited as being effective for individuals who are purported to employ this learning style.</p>
<p>The Units of Language Acquisition (Peters, 1980) http://www.ling.hawaii.edu/faculty/ann/units.0.pdf</p>	<p>Dr. Peters gives various examples from her own research and</p>	<p>The data provided are from case studies. Stronger</p>	<p>No information regarding intervention is provided.</p>

	<p>data from other researchers that include utterances consisting of more than one word that children seem to be using as unanalyzed chunks; discusses mechanisms through which she and other researchers believe these sequences of words are learned.</p>	<p>research designs would be required for valid conclusions about language development to be drawn from these data.</p> <p>The stages described within NLA are not mentioned here.</p>	
<p>Natural Language Acquisition on the Autism Spectrum: The Journey from Echolalia to Self-Generated Language</p>	<p>Marge Blanc provides language samples recorded for some of her learners, discussing the intervention approaches she used and the outcomes. Marge also recommends</p>	<p>The data provided seem to be classified best as case studies or, perhaps, anecdotes. Only bits and pieces of each learner's data seem to be available, and it is not clear if a systematic method was used to determine which data to examine at each point in time that is discussed..</p>	<p>The author's descriptions of her clients' progress constitute case studies, rather than controlled experimental designs, and as such do not allow for conclusions to be drawn on the effect of the interventions that she has described on outcomes.</p> <p>It should also be noted that outcome measures have not been clearly defined. Wherein improvements have been said to have occurred, it is</p>

			difficult to determine if this is correct due to the subjectivity of the measures used when evaluating language samples taken at baseline and language samples recorded once treatment has occurred.
--	--	--	--

Intervention Strategies:

As we can see from the table above, there is no evidence at this time for use of an intervention approach that is based upon the NLA theory. A few components of the NLA approach are shared by evidence-based language intervention approaches and will be described below. However, some components of NLA-based interventions, as I’ll describe below, run contrary to current evidence. In my opinion, some of these practices also run contrary to the logical conclusions that I would draw based upon my own experiences as a clinician and my understanding of learning principles. In the table below, I will list recommendations that have been made regarding components to include in an NLA-based intervention (Blanc, 2012) and provide my opinion on each component, citing evidence where applicable.

Recommendations for NLA-based Intervention practices:	Evaluative comments
Engage the learner in preferred activities, including physical play. Be animated and fun.	Agreed! Developing strong rapport with a learner and making sessions as fun as possible is very important for ensuring success. Animation is often helpful in engaging learners (but sometimes it isn’t, and that needs to be gauged when a clinician is getting to know a new client).
Assume that teachable moments are those in which the learner is “pain-free, regulated, and happy” (Blanc, 2012, p. 97)	Yes! Learning happens best when our learners are happy, relaxed, and engaged (Hanley, 2021; see https://practicalfunctionalassessment.com/2021/09/09/a-perspective-on-todays-aba-by-dr-greg-hanley/), and it is our responsibility as clinicians/parents to modify our own behaviour and to modify the environment so that we can help our learners achieve this optimal state.
“...make careful observations of your child’s fascinations, joys, and favorites (Blanc, 2012, p. 98), and use these as a starting point for interactions.	I agree completely! We need to observe our learner and conduct preference assessments to help us figure out which activities will work best to motivate our learners to interact with us.

<p>Assume that all scripts are communicative, and look for hidden meanings in these scripts.</p>	<p>Delayed echolalia can certainly be used with communicative intent. However, we should not be assuming there is a hidden meaning when a learner produces a script that is used in situations in which nothing in the context would suggest that the script is communicative.</p> <p>Making this assumption is problematic: The clinician is assuming that these hidden meanings tell us something about what the child is interested in or what he/she is worried about. The subsequent claim made by NLA proponents is that with the “hidden meaning” in mind, the adult should then talk to the learner about the issue that has been brought up by the script. As a consequence, therapy time is spent with the adult talking to the child about something that the therapist assumed the child is interested in that they may not be and may, in fact, not actually understand.</p>
<p>Conduct language sample analyses to determine which of 6 stages the learner is currently in; select language structures to model that are appropriate for the child’s stage, according to the following instructions:</p> <ul style="list-style-type: none"> -Carefully avoid modeling single words during Stage 1, as these will be learned as gestalts. -In Stages 1 and 2, model lots of gestalts, with gestalts beginning with ‘I’m’, ‘It’s’, and Let’s being a large focus. -In Stage 3, model 2-word combinations. -In Stage 4, begin to model sentences that contain target grammatical structures selected from levels 1 to 3 of the DSS (Developmental Sentence Scoring; Lee, 1974) chart, which is a table that lists various grammatical forms in a developmental sequence. -In Stages 5 and 6, gradually introduce more grammatical forms into your models based upon the DSS chart. 	<p>These recommendations are problematic. The 6 stages described are purported by NLA theorists to be stages that exist in the natural development of an individual who is a gestalt language processor; however, empirical evidence does not exist for this claim. The initial 4 stages are described in Prizant (1983); Prizant made a point of noting that these stages serve as a model and do not represent “psychological reality.” Prizant (1983) does not provide evidence that these stages exist.</p> <p>Furthermore, the recommendations for assessing the stage that a learner is currently in involve much subjectivity and, in my opinion, much room for inconsistency among clinicians. No studies to date have looked at the reliability of the measures used in the evaluation of a learner’s current stage.</p> <p>There is also no evidence for the recommendations regarding what to do at each step. Furthermore, as I describe below, the recommendation regarding modeling multiword utterances at stages 1 and 2 as a means to allow the learner to extract units that he/she can later use to create novel utterances lacks plausibility.</p>
<p>Use indirect language stimulation strategies: Provide lots of modeling in the absence of an expectation for the child to respond immediately following your model.</p>	<p>-studies on use of indirect language stimulation for children with ASD have been limited in number; a review of the literature that I have been able to find doesn’t support use of indirect language stimulation with individuals with autism spectrum disorder who use little to no expressive language with communicative intent.</p>

-Ingersoll (2011) compared indirect language stimulation with direct elicitation of language and found higher rates of overall language use as well as more spontaneous language for one of 2 participants when direct elicitation was used. She did find that more comments occurred in the indirect language stimulation condition. It should be noted that both participants used spoken words to communicate, and one used simple word combinations, before the study began. The effect on commenting therefore cannot be generalized to learners who do not yet use spoken language communicatively.

- Our ability to rely on study results that point to benefits for language stimulation for early language learners with autism is limited by the following study characteristics: some of these studies have looked at approaches that include language stimulation combined with other treatment components, some have used only parent report measures, some have focused on learners who already use at least some spoken language communicatively, and some have involved only case studies.

-It is possible that autistic learners with higher level language and social communication skills may benefit from an indirect language stimulation approach; it is less likely that autistic learners with more severe language impairments (particularly those who do not yet use spoken language with communicative intent) and/or those with more severe social communication skills will benefit. Yoder et al. (1995), for example, found that milieu teaching (which includes direct elicitation of language) was more effective for their participants who began treatment with lower level language skills than responsive interaction (which involves indirect language facilitation); the opposite was found for learners with more advanced language skills.

It is my opinion that social communication skills affect an individual's ability to benefit from indirect language stimulation: Learners who frequently observe and imitate adults spontaneously, for example, are probably more likely to benefit from indirect language stimulation than learners who have not yet developed these skills. Some of the learners served by clinicians using an NLA-based approach already use spoken language communicatively (e.g., those who are already producing single words and some novel language combinations) and also may already have more advanced social communication skills; perhaps these learners may benefit from indirect language stimulation;

	<p>however, evidence and a critical appraisal of the matter lead me to believe that for learners who do not yet have these skills, direct elicitation of language is a more effective approach.</p>
<p>Stay in stage 3 (production of single words and novel word combinations) as long as possible to prepare for stage 4. Particularly for older learners, it is important to model all possible types of word combinations before leaving this stage.</p>	<p>It's difficult to interpret the meaning of this recommendation. There is certainly no evidence to state that a longer duration of work in a stage of this type leads to stronger sentence production skills.</p>
<p>What to target in Stages 1 and 2: Rather than trying to teach single words, model full sentences.</p>	<p>The theory behind this is that the child will begin to use some of the multi-word utterances that the adult has modeled and that after using these as full utterances, the child will begin to break the utterances up and begin to mix and match parts of various utterances. It is posited that this will eventually lead to stage 3, in which the learner will begin to use single words and novel two-word combinations. However, we don't have empirical evidence for this, and it is somewhat difficult to imagine a mechanism of action through which this could plausibly occur. We do have strong evidence that learners with autism can learn to use single words to communicate when these words are modeled within direct elicitation approaches (e.g., Coleman, Sutherland, Xu, & Mason, 2020; DeSouza, Akers, & Fisher, 2017) and that, for some children, these single words can then be used to develop novel utterances (e.g., Marva, Frampton, & Shillingsburt, 2021).</p> <p>When recommending this approach, clinicians are assuming that their learner is a "gestalt language processor." At this time, there are no established criteria for assigning this label to a learner. It appears that some proponents of this approach believe that all individuals with autism might use this type of learning style (e.g., Prizant, 1983). There is no evidence for that, nor has a plausible mechanism been posited for what this sort of learning style would entail.</p>
<p>How to target: Model mitigable gestalts: Model sentences that begin with 'let's', 'I'm', 'it's', 'we're', 'Look at'. Model various sentences; the child may imitate these utterances right away or, perhaps, use the utterance at a later point in time.</p>	<p>-We don't have evidence that the specific sentence starters recommended will result in positive outcomes. For example, we don't know if these sentence starters are likely to be used, if they're likely to be used in the correct contexts, and if they're likely to be combined effectively with other units of language.</p> <p>- 'I'm', 'it's', 'we're', and 'look at' are useful sentence starters only given motivation to comment or direct others' attention towards items or events of interest. With joint attention skills often being a significant area of difficulty for individuals with autism, particularly</p>

	<p>early on, it is unlikely that a child in the very early stages of language development will be motivated to engage in interactions that involve sharing interests with others using language. While we certainly want to help learners move towards effective use of all functions of communication (i.e., all verbal operants), requesting objects and preferred actions tends to be the most effective type of communication to teach early on (e.g., Sautter & LeBlanc, 2006).</p> <p>-As noted above, the idea of modeling language with no expectation that the learner will immediately use this language is a strategy from the indirect language stimulation approach; for learners who are at an early stage of expressive language development, the effectiveness of this approach in comparison with direct elicitation approaches is questionable (e.g., Ingersoll, 2011; Yoder et al., 1995).</p>
--	---

Evidence-based Approaches for Improving Expressive Language in Individuals with Autism

...So, what should we do to promote language development for individuals with autism??

The answer to that is that we need to use evidence-based, comprehensive assessments along with interviews with our learners and their families to determine areas of strength, areas of need, and areas that are of high priority for intervention. We then need to select evidence-based interventions that address these areas effectively. I realize this is quite a tall order! Dr. Mary Barbera's book - *The Verbal Behavior Approach* – is a great place to start!

https://marybarbera.com/the-verbal-behavior-approach-book/?gc_id=17850584803&gclid=CjwKCAiAqaWdBhAvEiwAGAqltkq-JcL_83dORINrOiuGjSDgpv9NxoFsqCZRKyXKyJ9PIFBk338TCBoCA14QAvD_BwE

The following tools can help you to perform a comprehensive assessment of your learner's language skills and also guide your assessment of your learner's skills in non-linguistic areas. Remember that it's crucial to address your child's language development within the context of helping him/her to develop skills and interests in a wide range of developmental tasks (e.g., self-care skills and leisure skills). For example, if you find that a child isn't able to answer many questions, one factor that needs to be considered is his/her experience with the items/events you are asking about. You may need to offer your learner the opportunity to participate in these experiences in order to help them get ready to learn the associated language skills. Please see the following assessment tools:

VB-MAPP (*Verbal Behavior Milestones Assessment and Placement Program*)
<https://marksundberg.com/vb-mapp/>

ABLRS-R (*The Assessment of Basic Language and Learning Skills*)

<https://partingtonbehavioranalysts.com/products/ablls-r-the-assessment-of-basic-language-and-learning-skills-revised>

AFLS (*The Assessment of Functional Living Skills*)

<https://partingtonbehavioranalysts.com/pages/afls>

Essential for Living

<https://essentialforliving.com/>

Here are some tips for use with some of the learner profiles for whom practitioners might be considering use of an NLA-Based approach.

- Learners who might be classified as functionally nonverbal and do not yet imitate language that is modelled for them
 - o Help the learner begin to imitate sounds and words:
 - Rapid motor imitation antecedent training (Tsiouri & Greer, 2003; <https://doi.org/10.1023/A:1025508311022>); see the following book for details: <https://products.brookespublishing.com/Rapid-Motor-Imitation-Antecedent-RMIA-Training-Manual-Research-Edition-P1318.aspx>)
 - <https://storage.outreach.psu.edu/autism/9Presentation.pdf>
 - While in the process of learning to imitate sounds and words, the learner may benefit from access to augmentative and alternative communication (AAC). Use of AAC needs to be taught systemically, usually with requests being taught first.
- Learners who are classified as functionally nonverbal and do imitate language that is modelled for them (and may also produce some memorized strings of words).
 - o Mand training: Teach requests as a means to introduce early spontaneous language and as a means to increase your learner's quality of life by giving them the ability to access items and activities that are most meaningful to them. See Chapter 5 of Dr. Barbera's book. Also see <https://www.pattan.net/Videos/Mand-Training-Teaching-a-Vocal-Mand>.
 - o Next, begin to help the learner develop skills in the various other verbal operants (i.e., the various other communicative functions). Systematic teaching, with one of the assessment tools described above, is important. Along with teaching specific language skills, we also want to be engaging learners in activities at this point that create opportunities for the various linguistic targets we have for them. For example, we may be introducing art skills with the purpose of teaching the learner to complete projects that he/she can then show an adult or comment on.

Along with the teaching strategies above, how should we approach the memorized strings of words that a learner uses, when he/she seems to be using these without communicative intent?

- Check for communicative intent by looking at the contexts in which it occurs, but know that there may not be. The learner might be enjoying saying/hearing these words, or these words might be soothing to the learner.

- Check if the learner might be associating the script with something and if this can give you clues as to what your learner needs. He/she may not be intending to communicate with others necessarily using the script, but we still may be able to learn something about his/her needs.
- Is your learner engaging in a high rate of this scripting behaviour during particular activities? Sometimes, clinicians or parents feel that these scripts interfere with learning or engagement. I would argue that the scripts themselves are not a problem and are NOT THE CAUSE of lack of engagement in other learning tasks. However, a high frequency of these scripts occurring when we are trying to engage a learner may signal to us that something about our activity needs to be changed. Perhaps what we are asking the learner to do is too hard, or the activity is boring. We need to look at the following:
 - a. The demands we are placing on the learner (is the activity too hard?)
 - b. The learner's enjoyment of the activity (We need to make sure that either the activity itself, or the rewards that the learner is able to access contingent upon engagement in the activity, or - better yet – both, are of high enough value to the learner).

References

- Barbera, M.L. (2007). *The Verbal Behavior Approach: How to teach children with autism and related disabilities*. Jessica Kingsley Publishers.
- Blanc, M. (2012). *Natural language acquisition on the autism spectrum: The Journey from echolalia to self-generated language*. Communication Development Center.
- DeSouza, A. A., Akers, J. S., & Fisher, W. W. (2017). Empirical application of Skinner's verbal behavior to interventions for children with autism: A review. *Analysis of Verbal Behavior*, 33(2), 229–259.
- Lee, Laura L. (1974). *Developmental sentence analysis: A grammatical assessment procedure for speech and language clinicians*. Northwestern University Press.
- Marya V, Frampton S, & Shillingsburg A. (2021). Matrix training to teach tacts using speech generating devices: Replication and extension. *Journal of Applied Behavior Analysis*, 54(3), 1235-1250. doi: 10.1002/jaba.819.
- McGreevy, P., Fry, T., & Cornwall, C. (2014). *Essential for Living: A communication, behavior and functional skills assessment, curriculum and teaching manual for children and adults with moderate-to-severe disabilities*. Winter Park, FL, Orlando: Patrick McGreevy, Ph. D., P.A.
- Partington, J. W. (2010). The ABLLS-R—The Assessment of Basic Language and Learning Skills—Revised. Behavior Analysts, Inc.
- Partington, J. W., & Mueller, M. M. (2013). The assessment of functional living skills. Behavior Analysts, Inc. and Stimulus Publications.
- Peters, A.M. (1977). Language learning strategies: Does the whole equal the sum of the parts? *Language*, 53, 560-573.
- Peters, A. M. (1980). The units of language acquisition. *University of Hawaii Working Papers in Linguistics*, 12(1), 1-72.
- Prizant, B. M. (1983). Language acquisition and communicative behavior in autism: Toward an understanding of the "whole" of it. *Journal of Speech & Hearing Disorders*, 48(3), 296–307.
- Sautter R.A., Leblanc L.A. (2006). Empirical applications of Skinner's analysis of verbal behavior with humans. *Analysis of Verbal Behavior*, 22(1), 35-48. doi: 10.1007/BF03393025
- Sundberg, M. L. (2008). *Verbal behavior milestones assessment and placement program: The VB-MAPP*. AVB Press.

Tsiouri, I., & Greer, R. D. (2003). Inducing Vocal Verbal Behavior in Children with Severe Language Delays Through Rapid Motor Imitation Responding. *Journal of Behavioral Education, 12*(3), 185–206.

Yoder, P. J., Kaiser, A. P., Goldstein, H., Alpert, C., Mousetis, L., Kaczmarek, L., & Fischer, R. (1995). An exploratory comparison of milieu teaching and responsive interaction in classroom applications. *Journal of Early Intervention, 19*, 218–242.

Sari Risen is a speech-language pathologist as well as a Board Certified Behaviour Analyst. She focuses her practice on providing comprehensive interventions for individuals with autism and other neurodevelopmental disorders. Much of her work involves supporting speech and language development, with her overarching goal being to help learners develop the communication skills they need to thrive in environments that are meaningful to them.

