

# Natural language acquisition and gestalt language processing: A critical analysis of their application to autism and speech language therapy\*

Autism & Developmental Language  
Impairments  
Volume 9: 1–20  
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DOI: 10.1177/23969415241249944  
journals.sagepub.com/home/dli



Tiffany L Hutchins 

Communication Sciences & Disorders, University of Vermont, Burlington, VT, USA

Sophie E Knox

Communication Sciences & Disorders, University of Vermont, Burlington, VT, USA

E Cheryl Fletcher

Integrated Therapy Services, Camarillo, CA, USA

## Abstract

**Background and Aim:** Recently, there has been a lot of interest surrounding the term gestalt language processor (GLP) which is associated with Natural Language Acquisition (NLA): a protocol intended to support the language development of autistic people. In NLA, delayed echolalia is presumed raw source material that GLPs use to acquire language in a stage-like progression from delayed echolalia to spontaneous speech. The aim of this article is to evaluate NLA in light of relevant literatures to allow scrutiny of NLA claims.

**Main contributions:** First, we review the notion of gestalt language and situate it in the broader literature on language styles to update understanding of its significance. We then review the links from gestalt language processing to autism and identify definitional and conceptual problems and clarify the construct ‘episodic memory’. We discuss the ‘raw material view of delayed echolalia’ and identify theoretical and empirical shortcomings. Finally, we review Blanc’s language stages and their accompanying assessment and language support recommendations and challenge their validity.

**Conclusions & Implications:** The term ‘gestalt language processor’ is definitionally and conceptually troubled, the assertion that autistic people are GLPs is misleading and unhelpful, and evidence is lacking that GLP represents a legitimate clinical entity. The theoretical basis of NLA lacks empirical support. NLA stages are implausible and their accompanying assessment and support recommendations lack justification. We recommend the use of alternate, individualized, theoretically-sound, evidence-based, neurodiversity-affirming supports that are sensitive and responsive to the heterogeneity that defines autism.

## Keywords

Autism spectrum disorders, language impairment /disorder, speech and language therapy, gestalt language

Recently, there has been a lot of energy surrounding the term *gestalt language processor* (GLP). A search of the term on Google yields over 500,000 results, and on social

media platforms such as Instagram it is not uncommon to find hundreds of GLP content providers with some of those exceeding 100,000 followers. This gains importance

\*Autism spectrum disorder and autism spectrum condition are referred to here as “autism.” In this review, we use the terms “people with autism” and “autistic people” to refer to this population, acknowledging that preferences in terminology are heterogeneous in the community (Keating et al., 2023).

## Corresponding author:

Tiffany L Hutchins, Communication Sciences & Disorders, University of Vermont, 402 Pomeroy Hall, Burlington, VT 05405, USA.

Email: [tiffany.hutchins@med.uvm.edu](mailto:tiffany.hutchins@med.uvm.edu)



in light of the recent finding that 64–91% of speech language pathologists (depending on state of residence) in the United States reported using social media for professional purposes at a frequency of at least once a week (Diehm & Hall-Mills, 2023).

In the current context, the term GLP is associated with Natural Language Acquisition (NLA, Blanc, 2012, 2024) which is offered as a protocol to advance the language development of autistic people (especially those using echolalia). The popularity of NLA suggests that it captures something meaningful for professionals and families of autistic people (Haydock et al., 2024). We presume that NLA is attractive, in large part, because it emphasizes respect for autistic people and a high degree of parental support. NLA also promotes several practices that while *not unique to NLA* are time-honored and evidence-based. These include following the child's lead and interests and maintaining a high degree of responsiveness in motivating contexts. In our experience, NLA enthusiasts are genuine in their celebration of autism and aspirational in their commitment to neurodiversity-affirming practice: examples include scrutinizing interaction to understand communication in its many forms and raising awareness that echolalia has function and should be leveraged as a part of language therapy rather than targeted for extinction.

On the other hand and in the tradition of NLA, numerous blogs, social media accounts, and continuing education trainings provide descriptions of gestalt language processing as a style of natural language development, emphasizing its prevalence in autistic people. In NLA, a GLP is described as someone who communicates primarily through *gestalts* (Blanc, 2012) meaning *delayed echolalia* such that the terms are used interchangeably. To illustrate our concern involving claims circulating on social media, consider the following appraisal from a translational research resource popular among speech language therapists and related professionals:

we've seen everything from '50% of children are gestalt language learners' to '75–85% of autistic children are gestalt processors.' Given the lack of evidence for these numbers—and the reality that there's no clear-cut way to designate a child as *gestalt vs. analytic vs. somewhere-in-between anyway!*—these estimates **shouldn't be broadcast as facts**. (italics and bolded in original, TISLP, Evans, 2022)

Our interactions with professionals in social media spaces confirm these observations and we agree that such estimates should not be broadcast as facts for several reasons. First, no one on social media appears to be able to identify the empirical source of the claim that (whatever percent of) autistic people are GLPs (e.g. AndNextComesL, 2024; Communikids, 2024; Total Spectrum Speech Therapy, 2022). Alternatively, the statistic is sometimes

vaguely linked to an early study on the prevalence of autistic echolalia (or even hyperlexia) but this amounts to nothing more than circular logic. It goes something like this: 85% of autistic people have used echolalia. Hence, they are GLPs. How do we know they are GLPs? Just look at their echolalia. Problematically, the same tautology is advanced when a GLP is described as someone whose early language is stereotypical of autism (e.g. the use of scripts, unintelligible utterances; Zachos, 2022). Furthermore, the notion of GLP is definitionally and theoretically troubled leading to the implication that it may not be a legitimate clinical entity to begin with. Finally, hasty generalization to almost all people with autism neglects the heterogeneity that defines the condition and invites misunderstanding and stereotyping of autistic people.

In this paper, we explore the conceptual links between autism and gestalt language and examine the claim that autistic people are GLPs who follow a stage-like progression in their language development from delayed echolalia to spontaneous speech. We begin with a brief review of the language styles literature to update understanding of the origin and evolution of the notion of gestalt language. We then evaluate the claim that delayed echolalia is a gestalt form and that autistic people evidence a gestalt mode of cognitive processing. Next, we clarify the construct episodic memory. NLA proponents claim that episodic memory underpins gestalt processing in autism but we will argue that this misunderstands episodic memory with potentially damaging clinical implications. Finally, we challenge the validity of NLA's language stages and supports. To be clear, NLA is often associated with the neurodiversity movement, which is cosmically important for promoting sensitivity and respect for people's individual and cultural differences. At the same time, the two are not synonymous and this paper is *not* a critique of the neurodiversity movement. Rather, our purpose is to examine the theoretical bases, empirical claims, and utility of NLA-protocol-specific supports, which in turn, have implications for a philosophy of neurodiversity-affirming care.

To clarify terminology, we use the following definitions in this paper:

*Formulaic speech*: a broad set<sup>1</sup> of conventional language forms that are somewhat predictable, “relatively fixed expressions commonly used to communicate specific meanings in a proportion overwhelmingly higher than other grammatical alternatives” (Kallens & Christiansen, 2022, p. 2).

*Delayed echolalia*: repetition of speech that is uttered at a significantly later time that involves exact repetition (pure echolalia) or minimal structural change (mitigated echolalia) (adapted from Rydell & Prizant, 1995).

## A brief history of gestalt language

In the 1970s and 80s, linguists and child development scholars began to challenge the prevailing notion of their time that

there was a universal, nativist basis for the acquisition of language. For example, Nelson (1981) pointed to individual differences in children's early productive vocabularies as evidence of a 'referential' style (i.e. dominated by nouns/object names; so-called 'noun lovers') or 'expressive' style (i.e. diverse vocabularies with more social routines/formulaic speech; so-called 'noun leavers'). In a related vein, Peters (1977; similar to Clark, 1974; Wong Fillmore, 1979) questioned the assumption that expressive language progressed from single words, to word combinations, to more complex forms and proposed an analytic-gestalt distinction to capture individual differences in language development. Purportedly, 'analytic' children acquired language using a part-to-whole strategy (from single words to larger units) whereas 'gestalt' children worked in reverse: they began with larger, unanalyzed 'chunks' of language (e.g. phrases, sentences) that got broken down to extract units at the word level. Peters' seminal work (1977) was informed by detailed longitudinal observation of a single typically developing boy 'Minh' (age seven months to two years; three months) who appeared to produce both analytic speech along with a large number of unintelligible utterances which could only be interpreted with the assistance of his mother or with additional context information. He also produced full sentences, was sensitive to rhythm and intonation, and used filler syllables as a substitute for unanalyzed segments of speech, along with intonation contours which made his utterances more target-like (a gestalt style).

Importantly, language researchers recognized early on that the output they were observing may not be characteristic of individual children at all but of the same children at different times and in different contexts. For example, Peters (1977) described how Minh used two styles depending on the situation. "The gestalt style was used in social contexts when the child and another were engaged in free play ... whereas the analytic style was used in specifically referential situations such as reading books with mother. The two styles were apparently extremely well differentiated and highly context specific" (Nelson, 1981, p. 176). Similar observations were reported for the referential-expressive distinction (Della Corte et al., 1983; Elsen, 1996; Hampson & Nelson, 1993). Taken together, these findings suggested not endogenous child characteristics as much as they did functional differences. Indeed, children learn to use language in a variety of contexts, for a variety of purposes, and so must balance multiple strategies across linguistic domains, none using one to the exclusion of the other.

The nature of children's early productions is shaped not only by social and situational contexts but by the quality of the data in the language-learning environment. To test a number of claims surrounding the stylistic variation of young children, Pine et al. (1997) longitudinally examined the relation between children's early language and the structural and functional characteristics of maternal input. They found that mothers who used talk that provided

information about where new words begin and end, tended to have children with few unanalyzed phrases in their early productions. In the past, this had "tended to be explained in terms of hypothetical differences in children's processing mechanisms or abilities. However ... it may be possible to explain it in terms of the interaction between processing mechanisms that are common to all children and differences in the structure of the input to which they are exposed" (p. 818). These conclusions aligned with the work of Heath (1983) and Lieven (1994) who reported that children (from adult-centered societies) who are exposed predominately to adult-directed language models (and so may not get as easily parsed data) begin talking by producing large, memorized chunks of input.<sup>2</sup>

Crucially, since the early work on language styles, an impressive body of evidence (psychological studies, computational linguistics) has accumulated suggesting that *all* language-developing children rely on chunky parsing to process language at multiple levels of abstraction (Arnon, 2021; Bybee, 2006, 2010; 2013; Dabrowska & Lieven, 2005; Fusaroli et al., 2023; Kallens & Christiansen, 2022; McCauley et al., 2017; McCauley & Christiansen, 2019; Pine & Lieven, 1993; Wray, 2002; Wray & Perkins, 2000). This is consistent with the fact that formulaic speech is ubiquitous in both children's linguistic productions and children's language environments, with estimates that it makes up as much as 80% of adult native language (Altenberg, 1998). Such findings have led scholars to conclude that when it comes to the puzzle of the infinite generativity of language, "a large portion of language is restricted to a relatively small region of infinity" (Kallens & Christiansen, 2022, p. 10). As Bolinger (1976) presaged: "our language does not expect us to build everything starting with lumber, nails, and a blueprint, but provides us with an incredibly large number of prefabs" (p. 1).

In summary, research on individual differences in language acquisition reveals that expressive language development is not independent of situational context, parental expectations and acceptations of children's linguistic forms, or the language models available in the environment (Bates, Bretherton et al., 1988; Bates, Dale et al., 2017; Bretherton et al., 1983; Nelson, 1981; Peters, 1983; Thal et al., 1996). Moreover, *all language-learners* make use of chunky parsing and if any disposition toward analytic or gestalt processing exists, it interacts dynamically with properties of interaction including the social, linguistic, and task demands of communication and problem solving. In this light, language 'styles' do not seem very style-like and their malleability calls into question the usefulness of any dimension of linguistic variation for grouping individuals. This leads to the implication that it may not prove fruitful to characterize styles as either 'analytic' or 'gestalt' in the first place (see also Bretherton et al., 1983) and comports with the observation that segmentation/extraction of phrases from adult speech is itself an

analytic process (Pine & Lieven, 1993). If it is unhelpful to characterize any persons or groups as natural born ‘gestalt’ or ‘analytic’ processors, this has clear consequences for NLA which hangs on the assertion that (most) autistic people are GLPs: a claim we now explore.

## Autism and gestalt language processing

Peters’ research proved impactful for understanding the role of formulaic speech in language acquisition; however, the focus of her work was more circumscribed than is often presumed. First, her analyses focused on what she termed *gestalt productions*. She was expressly interested in the form of language (what is produced) as opposed to the cognitive level of functioning. Thus, although not atheoretical, her works were descriptive as opposed to explanatory. Second, Peters never mentioned autism in her work and in the broader literature reviewed above, all of the children studied (including Peters’ focal child) were ‘neurotypical’ (NT) by today’s terminology.

Below, we examine the claim that autism represents an extreme gestalt processing style which, in turn, involves the claim that delayed echolalia is a gestalt form as described by Peters (1977, 1983). At this point, it is important to underscore the definitional distinction (see above) between *delayed echolalia* and *formulaic speech*: each have a difficult history (e.g. Cohn et al., 2022; Luyster et al., 2022; Wray & Perkins, 2000) and it is broadly accepted that formulaic speech along with predictable discourse, is a beneficial and normative operation as well as preference among many autistic people (Arnold, 2019; Dobbins et al., 2003). An excerpt from Wootton (1999) provides an example of delayed echolalia:

during a game [Kevin] is playing with his mother he issues a series of injunctions ... one of which is ‘You do not touch anyone’s work Kevin’. These words do not appear to be addressed to his mother, nor are they treated by her as so doing. Their intonation, their unrelatedness to what is taking place at that time and the fact that they are formally addressed to himself, Kevin, make them recognizable as the reproduction of talk that he has heard elsewhere... (pp. 359–360)

### Proposal: autism as extreme gestalt style

Prizant (1982) underscored several similarities between autistic echolalia and Peters’ gestalt productions that, by his assessment “cannot be overlooked” (p. 17). Indeed, some similarities exist. For instance, like Peters’ gestalt, delayed echolalia can be deployed systematically to convey a variety of pragmatic and communicative functions (Prizant, 1983a, 1983b; Prizant & Rydell, 1984). Furthermore, although some have differentiated autistic

echolalia from NT children’s repetitions on the basis that the former was meaningless or acontextual, this is not accurate. Delayed echolalia may be purposeful and meaningful for the speaker and those around them who are privy to the experiential associations. It is also contextual in that the utterances are reminiscent of a previous time when the speech was first heard (Cohn et al., 2023; Sterponi & de Kirby, 2016). It has been argued that in all of these ways, delayed echolalia is best understood as varying along a continuum of conventionality (Prizant, 1983b; Prizant & Rydell, 1984).

Of course, focusing solely on similarities risks a false analogy: just because two things appear similar in some respects (e.g. consider turtles and tortoises), does not mean they are similar in all respects and autistic echolalia and Peters’ gestalt productions appear to be different in several interesting ways. For instance, delayed echolalia tends to demonstrate a wide variety of topographical descriptions (e.g. borrowing or animating of others’ voices) along with innovative pitch structures (Sterponi & Shankey, 2014; Wootton, 1999) and it lacks the filler syllables characteristic of gestalts and the connectives (e.g. ‘like’ or ‘then’) characteristic of NT children’s soliloquies (Baltaxe & Simmons, 1977; Weir, 1962; Wootton, 1999). Unlike ‘talk-in-interaction’, the content of delayed echoes may also be detached from nonverbal action and their placement may be orderly, albeit differently coordinated within interactional engagement (Sterponi & Shankey, 2014; Tarplee & Barrow, 1999; Wootton, 1999). Moreover, fine-grained interactional analyses suggest that autistic children systematically highlight segmental and suprasegmental features of delayed echoes to signal to interlocutors the distinctive, borrowed status of their source material (Sterponi & Shankey, 2014; Wootton, 1999).

Delayed echolalia and gestalt productions evidence further differences. Consider that a decision toward chunkier parsing of the speech stream is driven by the size of the unit a child can manage at a given point in time (implicating cognitive load). That is, under certain conditions, NT children opt for lengthier, less analyzed forms to deal with complex language while still taking part in social exchanges (Bates et al., 1988; Clark, 1974; Elsen, 1996). Interestingly, there is evidence that echolalia may function similarly in that it is more likely to be observed under conditions of communicative pressure. However, the picture is complicated because it appears to be *immediate* echoes that fulfill turns in conversation whereas delayed echoing is more commonly observed when communicative demands are greatly *reduced* (Rydell & Mirenda, 1994; Wootton, 1999).

Finally, the subjective experience as revealed in several first-hand accounts of autistic people suggests that delayed echolalia is phenomenologically distinct. For example, Donna Williams (1996, 1998) described disruptions in the self-system and difficulty with meaning that manifest in an inability to receive language (although production was

not a problem). Schaber (2014) sharply distinguished delayed echolalia (what she termed *echolalial scripting*) from formulaic speech (what she termed *social scripting*). For her, delayed echoes function as expressions of social engagement, a way to connect with a past emotion, a form of self-talk to support on-line processing, and stimming for self-soothing and enjoyment. By contrast, Schaber described social scripting as the use of ingrained social formulas that are associated with specific verbal routines (e.g. meeting someone on the street and saying ‘Hi how are you?’: an example of a *familiar expression* which is a kind of formulaic speech).<sup>3</sup> For Schaber (2014), social scripting is something that both NT and autistic people do although the operation is automatic for NT people whereas it can be conscious and effortful for autistic people. Likewise, another autistic adult, ‘Zackary’, characterized delayed echolalia as “passive” and social scripting as “active”.

For Zackary, ‘scripting feels like a tool that we use to interact and usually echolalia is ... kind of thoughtless like an automatic response, but less involved than scripting ... scripting is something that I work on in order to engage, and when I have echolalia, it’s likely because I’m exhausted or stressed or something, and it’s just kind of blurted out against my will.’ (Arnold, 2019, p. 125)

This brings to light another feature of delayed echolalia: it is sometimes puzzling to, and undesired by, the autistic person (e.g. Wootton, 1999). This is ostensibly untrue for Peters’ (1977, 1983) gestalts and is consistent with Wootton’s (1999) contention that switching from spontaneous speech to delayed echoing signals movement to “other kinds of involvement” (p. 372) and that the two are “non-equivalent” (p. 359). Taken together, these first-hand accounts underscore the heterogeneity that exists in the autistic experience: an important theoretical and clinical consideration.

The differences described above are presumed *qualitative* differences and although one might argue that these dissimilarities are evidence of an extreme form of gestalt processing, this would be problematic as continua are necessarily quantitative. Unless such differences can be reframed as quantitative, they are difficult to dismiss and call for reconciliation if one is to accept the claim that delayed echolalia is a form of gestalt language as Peters described it. Until then, it is prudent to avoid equating delayed echolalia with ‘gestalt language processing’ without further interrogation.

### **Proposal: autism as a gestalt mode of cognitive processing**

Prizant’s proposals for gestalt processing in autism (e.g. 1982, 1983a, 1983b; Schuler & Prizant, 1985) were never fully developed but rather couched in a spirit of exploration. He

regarded them as “speculations” (p. 70) in need of supporting research (1983a) and “working arguments” that were “by no means complete or irrefutable” (1983b, p. 297). We find Prizant’s (now Blanc’s) proposals of gestalt cognitive processing in autism untenable, but it should not be surprising that key terms and conceptual links lack clarity, because the proposals were and remain underspecified.

In what we take as the most developed work on the topic, Prizant (1983b) defined a *gestalt mode* of processing as one “in which events are remembered or retained with relatively little analysis ... [which] must be viewed in contrast to an analytic mode in which experiences or events are analyzed and segmented into meaningful components based upon prior experience” (p. 300).<sup>4</sup> Problematically, some examples provided by Prizant (1983b) seem contrary to the notion of a gestalt mode involving “relatively little analysis”. For instance:

a mother reported that her ... son with autism insisted nightly that she provide him with specific instructions for setting the dinner table by saying, ‘Mother, now tell me to put the plate down ... tell me to get the cups,’ and so on. ... What [this seems] to indicate is a need to realize interactional gestalts, one aspect of the need for sameness that might be caused by an extreme form of gestalt processing. (pp. 302–303)

This example speaks to a *need for sameness* but not a lack of internal analysis of the situation. In fact, a good deal of analysis including segmentation and sequencing of the original scene must have occurred to permit this adolescent to issue such directives to his mother. Further, Prizant (1983b) argued that “delayed echolalia is exemplary of gestalt processing because it seems to be *an effort to bring forth whole forms* that were heard previously in similar situations” (italics added, p. 48). The problem with this characterization is that if a gestalt mode of processing is an *effort to bring forth a whole*, then the gestalt (usually meaning ‘whole’) must not have been whole to begin with and implies the opposite; that is, competent analysis of parts and elements (and Prizant, 1983b, regularly referred to “partial fulfilment” of gestalts and reproduction of “portions” and “pieces” of events, p. 302). For these reasons, it is not obvious to us how insistence on sameness is indicative of a gestalt mode. In fact, insistence on sameness is typically taken as a result of its converse: detail-oriented processing. To illustrate, Happé and Frith (2006) described how many people with autism:

can name the pitch of the ‘pop’ as a cork comes out of a bottle, or identify dozens of brands of vacuum cleaner from their sound alone. Others can spot a misaligned book in a bookcase in seconds, or mimic foreign speech distinctions not usually noticeable to non-native speakers ... Kanner’s original description of autism highlighted this *attention to detail and inability to experience wholes*

*without full attention to the constituent parts* as one factor in the characteristic insistence on sameness (Kanner, 1943) (italics added, p. 5)

If our interpretation is correct, Prizant's use of 'gestalt' may not be inconsistent with but nevertheless *inverts* the original (Kanner) and more contemporary conceptualizations of the links from 'insistence on sameness' to the processing of parts and wholes. Our conclusion is that the term *gestalt* should be disfavored; employed, forced-fit style, because of its association with Peters' work (i.e. a *descriptive term* for the surface structure of NT children's polyword productions) but unsuitable for capturing autistic cognition.

Before leaving this topic, it is important to point out that Blanc's use of the term 'gestalt' seems to further confuse the issue. NLA advocates often invoke Peters (1983) to describe 'gestalt' (Blanc et al., 2023) but do so in a way that *misapprehends* Peters' use<sup>5</sup> by grounding the term in Gestalt psychology (a movement in the psychological sciences that sought to explain holistic perception). In that tradition, a gestalt can be defined as *an organized whole that is perceived as more than the sum of its parts*.<sup>6</sup> For example, in the well known Kanizsa triangle illusion, there is a floating triangle, which does not exist, but is seen: perception of the triangle is taken as evidence for holistic processing that prioritizes access to the 'big picture' over attention to the local features from which it is derived. Adopting the parlance of Gestalt psychology is another way to assert a gestalt mode of processing in autism but it neglects decades of research demonstrating strength in detail-oriented processing (e.g. Happé & Frith, 2006; Koldewyn et al., 2013; Lawson, 2011; Mottron et al., 2006). To our knowledge, NLA proponents have neither acknowledged nor attempted to reconcile this disconnect.

In conclusion, we have argued that in the present context, the term *gestalt* is a misnomer that likely obscures the detail processing *strengths* observed in autism. At best, the relations and entailments of part-whole processing within a proposed gestalt mode are ontologically ambiguous and pursuit of domain-general mechanisms seems more profitable for understanding and responding to differences in autistic cognition: a topic we now consider in light of NLA claims regarding the role of memory in autistic echolalia.

**Memory and gestalt processing.** Understanding memory is important because memory powerfully influences the kinds of knowledge and skills that are acquired (Boucher, 2012; Boucher & Anns, 2018). According to Blanc et al. (2023; who credit Prizant), an extreme gestalt style is part of the "episodic memory abilities associated with gestalt thinking" (p. 3):

this kind of episodic memory, which Prizant called 'situational gestalts,' refers to the ability of an autistic individual to recall every aspect of a particular situation including sights, sounds, smells, sensations, feelings, and so forth (Prizant, 1983). The specific elements of the situation are part of the whole gestalt, in the sense that they cannot be separated from one another in the memory of the autistic person. (p. 3)

It is difficult to imagine what it could mean to "recall every aspect of a particular situation" but it seems safe to say that no memory operates this way. And if the claim is that episodic memory is memory for aspects of experience, and that situations have many aspects, and that the recalled aspects comprise the 'situational gestalt', that is not saying much: the content of episodic memory is merely a consequence of the definition of gestalt. Moreover, as we elaborate below, contemporary conceptualizations of episodic memory emphasize its inherent flexible nature and if memories "cannot be separated from one another" they may not be, ipso facto, episodic. Finally, if the claim simply means that recalled aspects of experience are not reconstructed but rather reproduced at the item-level, this appears to conflate 'episodic detail' with 'episodic memory' and 'episodic memory' with other kinds of memory (for exposition, see Gaigg et al., 2008)

Episodic memory is a complex system and the term *episodic memory* has a difficult history which has likely contributed to a good deal of conceptual confusion (Gardiner, 2008). Episodic memory has been assessed in various ways but most studies show that compared to NT samples, autism is associated with moderate reductions in scores on tests of episodic memory (but comparable or increased scores on tests of semantic memory; Boucher et al., 2012; Desauvay et al., 2020; Griffin et al., 2022): a conclusion that stands in stark contrast to claims trending on social media that "gestalt language processors have great episodic memories" (Zachos, 2023).

In NLA, episodic memory is invoked to explain delayed echolalia (e.g. Blanc et al., 2023; Blanc & Zachos, 2022) which may be linked to a specific experience that was emotional, salient, or otherwise personally meaningful. Episodic memory certainly involves such episodic detail but there is more to it and episodic memory has come to be used interchangeably with the term *relational memory* to capture its dynamic, flexible nature. Episodic memory can be thought of as the ability to flexibly bind (and unbind and rebind) memory for elements of experience (i.e. episodic detail) within a richly interconnected network of associations. Episodic memory integrates disparate subjective elements of a specific event (e.g. what I heard and saw on a shoe shopping trip with Sophie last Sunday) in a *flexible* way that allows recollection of one element by itself (e.g. what I heard) as well as its linkage to aspects of other experienced events (e.g. other things I've heard, a different shoe shopping trip, another

Sunday). From this vantage, delayed echolalia could not be product of superior episodic memory (as asserted by many NLA advocates) and is better understood as reflecting strength in *perceptual memory*; a non-declarative form of memory that registers and retains relatively unprocessed ‘snapshot’ records of single items to *compensate* for episodic memory challenges (Boucher et al., 2012; Boucher & Anns, 2018).

Much more study is needed to understand how memory systems contribute to cognition and language in autism and this represents a promising and exciting direction for research. For the time being, it is important to distinguish between terms and the concepts they refer to and we encourage professionals to challenge the characterizations surrounding episodic memory and autism when they are rooted in NLA claims. This is important for improving the accuracy of communication in the profession and raising awareness of (rather than obscuring) the fact that episodic memory represents an area of *support need* for many autistic people (Chen et al., 2024; Hutchins & Prelock, 2018; Norris & Maras, 2022).

## A critical examination of natural language acquisition (NLA)

NLA is based on the idea that delayed echolalia is raw source material that GLPs use to acquire language. NLA asserts developmental stages and provides recommendations for language assessment and support. NLA’s theory, stages, and clinical recommendations are evaluated in the following sections.

### What about theory?

Professionals in the health sciences have recognized the need for a theory-driven approach in the development and evaluation of clinical practice because a lack of knowledge about *how* or *why* an intervention works makes it difficult to select the most appropriate criteria upon which to judge *whether* it works (Greenhalgh et al., 2005). In NLA, GLPs learn language in a series of steps in which delayed echoes (unanalyzed rote memorized language chunks) are broken down into parts (e.g. constituent phrases or single words) which, once isolated, can be recombined in creative ways (e.g. novel utterances) (hereafter referred to as the ‘raw material view of delayed echolalia’). According to Blanc (2013), researchers “found that gestalt language processors use echolalic language as the source material for developing their self-generated grammar (Prizant & Rydell, 1984)” (p. 1) but this statement is incorrect and it is more accurate to say that Blanc (2012, 2013, 2024; Blanc et al., 2023) embraced and over-credited Prizant’s *speculations* on this matter. According to Prizant (1983b):

it is no coincidence that as spontaneous utterances increase, echolalia decreases. In fact, a causal relationship is being suggested in that the breaking down of echolalic utterances may be part of the process of acquiring more spontaneous forms. (p. 304)

Prizant’s argument was conjecture, and he underscored the need for longitudinal research. Decades hence, the *developmental* functions or origins of delayed echolalia are still not understood (Eigsti, Bennetto et al., 2007; Eigsti, de Marchena et al., 2011) and despite strong assertion (Blanc, 2012, 2013, 2024; Blanc et al., 2023), empirical support for delayed echolalia as source material for autistic language learning is woefully lacking.<sup>7</sup> When it comes to the expressive morphosyntactic development of people with autism, it seems widely accepted that verbal production proceeds from echolalia (a positive prognostic indicator of language development; e.g. Kanner et al., 1972; Roberts, 2014), to mitigated echolalia, to more creative, flexible language. This characterization is supported by evidence showing an inverse relationship between the frequency of immediate and delayed echolalia and more spontaneous speech in both autistic and NT children (Howlin, 1982; Nakanishi & Owada, 1973; Roberts, 2014). Despite arguments for the transitional properties of mitigated echolalia (and mitigated *delayed* echolalia in particular), very little work has addressed the claim empirically and it remains an open question in need of longitudinal research (Luyster et al., 2022).

However, evidence of a developmental progression would constitute necessary *but not sufficient* evidence for the raw material view. If pure and mitigated delayed echolalia are inversely related, it may not be because the former materially begets the latter: it may be because they are each sensitive to a *common underlying mechanism*: “the problem then becomes the identification of this mechanism and the developmental process for language” (Roberts, 2014, p. 67). Here it is important to note that the frequency of delayed echolalia is not independent of developmental level leading to the implication that decreasing delayed echolalia may simply be artifactual to increasing cognitive-linguistic skills (Loveland & Tunali-Kotoski, 2005). That is, delayed echolalia may be an advantageous communicative strategy for autistic people with developing language but its usefulness (especially for purposes of maintaining interaction) and relative frequency may decrease as the child develops more advanced and effective communication skills (for similar arguments vis-a-vis immediate echolalia; see McEvoy et al., 1988; Pruccoli et al., 2021; Tager-Flusberg & Calkins, 1990).

As noted above, acceptance of the raw material view requires explication of underlying mechanisms and Blanc has been unclear on this topic (2012, 2024; Blanc et al., 2023). Nevertheless, one candidate involves the ability to

segment running speech to identify language units. As Prizant (1982) speculated:

the acquisition of a more sophisticated and flexible linguistic system depends on an autistic individual's ability to segment and break down linguistic chunks and thus induce the rules of the system. This task is a formidable one because word boundaries are typically not marked in running speech, and deficits in the perception of prosodic cues may be characteristic of autism. (p. 22)

A strong version of a domain-specific auditory processing hypothesis of language impairment cannot be correct because flexible language could simply be acquired via the visual/signed modality. And although various acoustic cues inform the parsing heuristics of spoken units of all sizes (and many autistic people experience peripheral hearing anomalies and listening differences; Bendo et al., 2024; Davies, 2019; Demopoulos & Lewine, 2016; Key & Slaboch, 2021 for review), the ability to discriminate acoustic dimensions of complex auditory stimuli is often considered an autistic *strength* (Davies, 2022; Jones et al., 2009; Lepistö et al., 2005; Mottron et al., 2001; Remington & Fairnie, 2017). Furthermore, researchers have documented that delayed echolalia can be mobilized for a variety of interactional purposes through the segmental and suprasegmental modulation of echoes (Sterponi & Shankey, 2014; Tarplee & Barrow, 1999; Wootton, 1999) which would seem to require compositional analysis of the acoustic signal at multiple levels. It is also worth considering that the identification of linguistic units is a complex operation involving not only auditory perception but the mapping of *meaning* to the social and situational context to meet a communicative purpose. As Donna Williams (1996) observed, “anyone who can echo back in your own accent what you have said but seems unable to comprehend the meaning of the words is *not* having a problem with the clarity of sound but with the processing of those adequately clear sounds for meaning” (italics in original, p. 61).

Meanwhile, some scholars have expressed skepticism of the raw material view of autistic echolalia on other grounds. Longitudinal evidence (Tager-Flusberg & Calkins, 1990) showing that children's imitation is not associated with morphosyntactic development in autism along with the observation that the complexity of spontaneous speech can routinely outstrip that of echoed utterances has led some researchers to conclude that these “echoed utterances do not appear to ‘move’ a child's syntactic skills into a more advanced range. In fact, the opposite may be true” (Eigsti et al., 2011, p. 683; see also Loveland & Tunali-Kotoski, 2005). Indeed, the opposite is plausible considering well-known grammaticalization processes demonstrating that “over time and many usage events, a new construction

can become more and more autonomous [leading it to] lose its analyzability” (Bybee, 2013, p. 63): this is believed to be true both diachronically and ontogenetically (Bannard & Lieven, 2012; Bybee, 2006; 2013). Thus, although delayed echolalia serves a variety of communicative functions that can facilitate and sustain interaction (e.g. maintaining social engagement through a turn-taking function; see also McEvoy et al., 1988; Schuler & Prizant, 1985), it does not appear to be linguistic raw material that directly advances grammatical development.

Although the topic of autistic learning is not characterized by consensus, many contemporary scholars have concluded that morphosyntax or the “nuts and bolts of language” (Abbot-Smith, 2020, np.) is a relative strength in autism whereas semantics and pragmatics are hard won achievements (Boucher, 2012; Boucher & Anns, 2018; Loveland et al., 1988; Naigles & Tek, 2017). Strength in language form combined with good (or superior) statistical learning, implicit learning, detail-oriented processing, and enhanced auditory processing (Boucher & Anns, 2018; Davies, 2022; Obeid et al., 2016), suggest that the chief obstacle to flexible language acquisition for most autistic people does not involve difficulty isolating linguistic units of analysis. This raises another challenge for the ‘raw material view’ of delayed echolalia and NLA in particular: it is uncontroversial that delayed echolalia routinely takes the form of phrases *as well as single words*. If delayed echolalia reflects an extreme form of gestalt processing and problems extracting units at the word level, why do so many minimally-speaking autistic children do so with frequency?

### What about stages?

Table 1 offers a summary of NLA stages, a description and example, and a sampling of prescribed supports for each stage. The excerpts are taken from various sources (Blanc, 2012, 2024, 2023a, 2023b; Blanc et al., 2023) as there is no section in the primary sources (Blanc, 2012, 2024) that presents all this information.

Before examining Blanc's (2012, 2024) NLA stages, it is worthwhile to consider the conventional assumptions of stage theories. In psychology, the notion of stages is usually associated with a discontinuity view of development (e.g. Piaget, Erikson). From this perspective, development proceeds in a sequence of steps that are qualitatively distinct. The discontinuity (stage) view is often contrasted with the continuity view (e.g. Vygotsky, Bronfenbrenner) in which development is a slow, gradual process characterized by incremental quantitative change (see Figure 1).

Generally speaking, research suggests that the morphosyntactic development of autistic and NT children “is more similar than dissimilar” (Kim et al., 2014, p. 345), commensurate with developmental age across the spectrum (Boucher, 2012; Boucher & Anns, 2018, Tager-Flusberg,

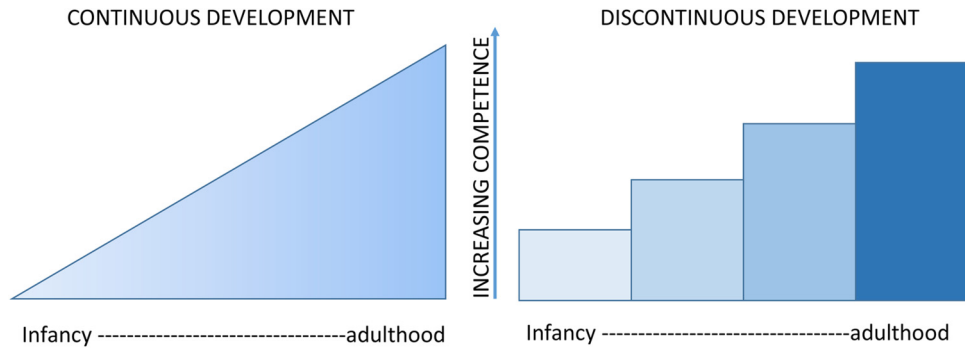


**Table 1.** Stages of natural language acquisition and intervention recommendations.

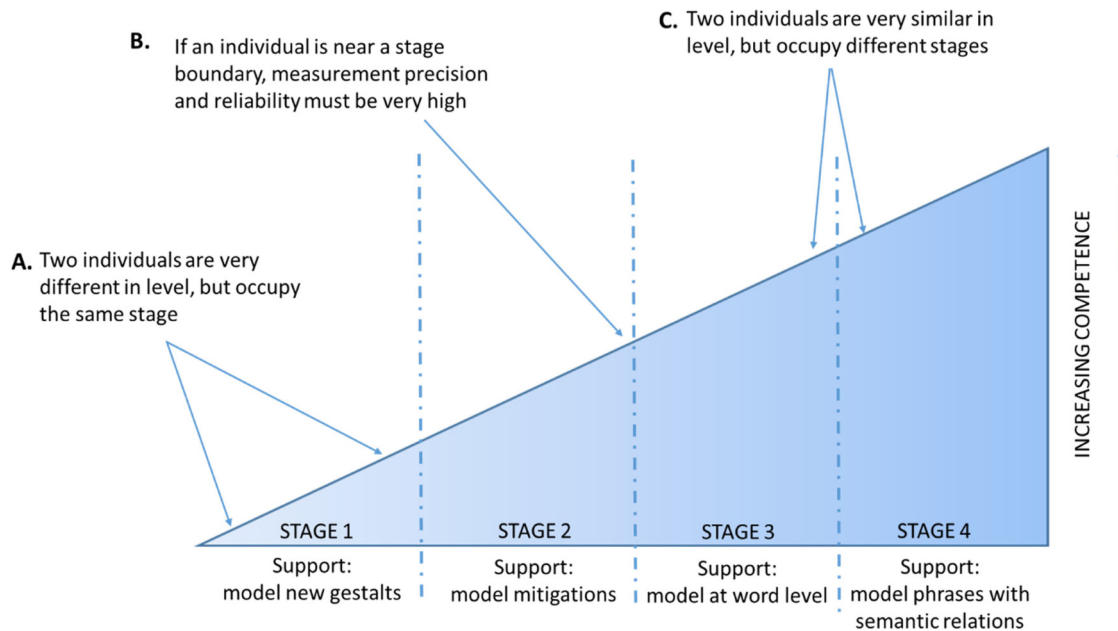
NLA stage	Sample NLA language supports (example rationale/claims)
<p>Stage 1: Use of Gestalt Language Wholes</p> <p>Use of complete gestalts ... as single units of sound taken directly from the environment and used moments, hours, or days later.</p>	<p>Provide 'gestalt' language models: "'I'm + x,' 'Let's + x,' 'Where's + x,' 'Look at + x'" (Blanc, 2024, p. 32)</p> <p>"Eliminate any focus on single words. ... Single words will be processed as 'unmitigable' gestalts — and will be in your child's head forever. They do not lead to language development because they don't break down. They are not building blocks. They are what is known as 'stuck gestalts.'" (Blanc, 2023a)</p> <p>"When our kids are yearning for stage 1 gestalts [the word] 'more' is just one more [gestalt]. It doesn't become part of a new sentence any more than 'To infinity and beyond' does. Gestalts are supposed to be broken down, not added to." (Blanc, 2012, p. 20)</p> <p>"Stage 1 is when kids use multi-word language gestalts lifted from elsewhere in their entirety. It's all or nothing at Stage 1, and kids can't use these gestalts any other way. The language wholes can be phrases, sentences, paragraphs, songs, or entire movie scenes..." (Blanc, 2012, p. 14)</p> <p>"There is no grey; there are no shades of meaning at stage 1." (Blanc, 2012, p. 16)</p> <p>"They can't start with single words like analytic processors. That's not how their brains work, and if we try to teach them language that way, they will learn those single words as single gestalts, impossible to mitigate and impossible to build with. It doesn't speed up their process; it slows it down and lengthens it." (Blanc, 2012, p. 12)</p>
<p>Stage 2: Mitigation of Phrases and Recombinations</p> <p>Common parts of gestalts are mitigated from the whole, and a child can mix and match these phrases.</p>	<p>"Provide lots of 'redundancy' in your language modeling ... 'I'm + trying to find you!', 'I'm + getting tired!', 'I'm + catching up with you!', 'I'm + gonna get you!'" (Blanc, 2023b)</p> <p>"Listen and model options for mitigations that can be used in other contexts (e.g. 'Let's play ball!' or 'Let's go + school?')." (Blanc et al., 2023, p. 4)</p> <p>"Once a child has amassed enough similar language in his mind, he starts to hear the embedded pieces that are shared from one gestalt to another. Kids who once could hear only the larger gestalt start to hear smaller chunks within the larger wholes. This is the process of mitigation." (Blanc, 2012, p. 17)</p>
<p>Stage 3: Isolation of Single Words and Recombinations</p> <p>Mitigated phrases are further broken down to isolate single words. A "mix and match" of single words creates original two-word phrases.</p>	<p>Focus on combining "nouns, locations, words, and attributes"</p> <p>Examples: "Table + chair", "Milk + table" ... "Outside + clouds" (Blanc, 2024, p. 24)</p> <p>"Acknowledge single words the child isolates, and model a variety of two-word combinations, without regard for grammar or word order (e.g. noun + attribute; noun + location, noun + noun)." (Blanc et al., 2023, p. 4)</p> <p>"Avoid verbs" (Blanc, 2024, p. 25)</p> <p>"When we do it right and support our kids in the natural way their brains were intended, Stage 3 single words are true building blocks for self-generated simple phrases built from scratch." (Blanc, 2012, p. 21)</p>
<p>Stage 4: Use of Grammar</p> <p>The beginning stages of grammar, both correct and incorrect.</p>	<p>"Begin your Stage 4 modeling with brand new formulations, ones you suspect your child has never said. This way, you can avoid the old mitigations that might trigger a return to Stage 2." (Blanc, 2023b, para 20)</p> <p>"Support and model short phrases that express semantic relationships (e.g. noun + verb + location; verb + adjective)..." (Blanc et al., 2023, p. 4)</p> <p>"At stage 4 we need to inventory all contractions, and practice freeing up each word as an independent agent. Later on in stage 4, GLPs will use contractions again (because everyone does). But, at the beginning of stage 4, we need to make sure that every-single-word is a free agent." (Blanc, 2024, p. 27)</p>

1981a, 1981b), and gradual and continuous as opposed to abrupt and step-like. For example, using growth curve analysis, Tek et al. (2014) followed 17 autistic children (mean age 33 months) across six time points over an approximate three year period. Their data evidenced continuity in gross measures of expressive morphosyntax although the rates

of gain differed among children with autism such that those who began the study with higher language scores, made more gains subsequently (similar to a NT control group) whereas the growth curves for autistic children with very limited expressive language were much flatter (but nevertheless stable, continuous). Similar



**Figure 1.** Continuous development theories are analogous to the growth of a plant. It starts with a few leaves and gradually grows in size and maturity. Discontinuous theories are analogous to the development of a butterfly: progressing through invariant, qualitatively distinct stages (caterpillar, cocoon, and butterfly).



**Figure 2.** A model of continuous development with superimposed false stages and their implications for practice. The supports noted here are example from the NLA protocol (Blanc, 2012, 2024; Blanc et al., 2023).

portraits emerge from other longitudinal studies and relative continuity has been documented for a range of outcomes in autism including joint attention, representational play, nonverbal communicative behaviors, morphosyntactic and lexical development, and receptive and expressive language development (e.g. Hart & Curtin, 2023; Naigles et al., 2011; Sigman, 1998; Tager-Flusberg et al., 1990). These data are consistent with gradual, continual advances in development often characterized by different individual profiles (Boucher, 2012; Broome et al., 2023) again, highlighting the heterogeneity that defines autism.

If a continuous model of morphosyntactic development is correct,<sup>8</sup> then the superimposition of false stages

introduces unnecessary complications for clinical decision making (see Figure 2). Because the dividing lines and resulting categories are arbitrary, they lack descriptive power for characterizing the state of language development for any given individual (noted by **A** and **C**). Accurate assessments to identify stage must also be extremely precise (noted by **B**) in the region of a stage boundary. These stage boundaries are terrifically consequential in light of another feature of stage theories: they aim to capture common barriers to change faced by those in the same stage and different barriers to change from those in other stages (Weinstein et al., 1998). In short, different stages necessitate different supports (Figure 2) so it is important to identify stage with precision and accuracy.

Blanc et al. (2023) claimed that NLA stages were “detailed and quantified” by Blanc (2012) who “analyzed 15 years of clinical data collected from the language samples of dozens of autistic and neurotypical individuals who used gestalt style of language development” (p. 3); however, it should be noted that this work was written and published without peer review and comprises only a handful of informal case descriptions. Blanc (2012, 2024; Blanc et al., 2023) credits her NLA stages to Prizant (1983b) who offered an informal four-stage description for understanding the nature of communicative and language development autistic individuals<sup>9</sup> (particularly those who were minimally-speaking). Prizant offered these for illustrative purposes cautioning that “the notion of stages of language acquisition is presented for convenience of presentation; no claims are made as to their psychological reality” (p. 303). He also made explicit that “the process is best understood as *continuous, without clear points of delineation*” (italics added, 1983b, p. 303). If indeed Blanc’s (2012, 2024) stages lack discontinuity (and psychological reality), we would not expect them to be useful for identifying consequential gains that inform an understanding of language development and change. Nor would we expect assessment data to conform neatly to the proposed stages and there would be many boundary disputes when attempting to assign person to stage. As described below, this is precisely what is observed in NLA assessment guidelines and scoring examples provided by Blanc (2012).

Blanc’s (2012) criteria for determining NLA stage are based on the percentage of utterances in a language sample occupying each stage. Specifically, if 80% of utterances are at one stage, the child is said to be operating at that stage, and if 50% or more are at one stage, the child is operating at that stage “most (or much) of the time” (p. 276). However, if no single stage occurs more than 50% of the time, then “processes at more than one stage are being used” (p. 276). Although placing an individual into two contiguous stages simultaneously (presumably because a person is on the cusp of change) does not constitute a crisis for a legitimate stage theory, routine assignment of individuals to multiple stages simultaneously is problematic.

Consider the following: Blanc (2012) appendicizes two (and only two) analyzed language samples (Appendix E, Dylan and Bevin) to illustrate scoring and interpretation based on NLA guidelines. For Dylan it is determined that 33%, 41%, 21%, and 5% of his utterances are at stages 1, 2, 3, 4, respectively. For Bevin the values are roughly similar: 26%, 39%, 30%, and 5%, respectively. According to Blanc’s (2012) guidelines, both Dylan and Bevin simultaneously occupy Stages 1, 2, and 3. Of course, this is inconsistent with discontinuity and the notion of stages but equally important, it is unclear how Dylan and Bevin might be different from each other, how they might be different from others who occupy Stage 1, Stage 2, or Stage 3, and which language

supports are most appropriate for either one of them. For these reasons, Blanc’s stages might be better classified as *pseudostages* where it is understood that continuous phenomena are being carved into arbitrary categories (Weinstein et al., 1998). Yet, even this is problematic for the present purposes because if the underlying continuum model is correct, there is no reason to expect that people in the same ‘stage’ are held back by the same barriers or that the nature of the barriers actually change from one stage to the next (Weinstein et al., 1998).

### What about assessment?

With regard to assessment, Weinstein et al. (1998) argued that “the advantage of a stage-based intervention depends on one’s ability to identify stages accurately and efficiently” (p. 298). Problematically, the existing NLA stage classification system is wholly reliant on subjective judgment of an extremely opaque construct. That construct is the degree of segmentation and/or morphosyntactic analysis in the mind of the speaker. It is to be inferred on the basis of verbal productive output and often requires encyclopedic knowledge of the individual’s expressive language history. These judgments (which are notoriously difficult to conduct reliably and validly, e.g. Baltaxe & Simmons, 1977; Roberts, 2014; see Peters, 1983, for fulsome discussion of the complexities) are to be made by examiner-clinicians using an underspecified coding system (see Blanc, 2012, pp. 275–279) that is without operational definitions. All this gains importance considering that NLA codes have not, to our knowledge, been evaluated for inter- or intra-rater reliability which is necessary (but not sufficient) for validity.

### What about supports?

As noted previously, NLA advocates have raised awareness of the communicative value of echolalia while advancing the use of many time-honored, evidence-based speech-language practices (e.g. honoring preferred modes of communication, following the child’s lead, maintaining a high degree of responsiveness, engaging in motivating contexts). These practices are neither novel nor developed exclusively for autistic children (and certainly not unique to NLA; e.g. Hanen) but encouraging caregivers and speech-language professionals to adopt such well-established practices is, in our view, creditable and justified (although constructive disagreement as to what constitutes things like ‘responsive’ and ‘child-led’ is still needed, Schuck et al., 2024).

Here we restrict comment to NLA stage-specific supports; those that differ from one stage to the next and stem from the idea that (most) autistic people are natural born GLPs (see Table 1). Justification for the use of NLA stage supports relies on the acceptance of several assertions: namely, gestalt and analytic processing are legitimate language styles that contrast with each other in validly

*antithetical* ways and gestalt processing is prevalent in autism. Moreover, use of NLA stage supports demands acceptance not only of the raw material view of delayed echolalia but an extreme version of that hypothesis: one where delayed echoes are the “foundation of gestalt language development” (Blanc, 2024, p. 3), linguistic analysis of gestalts is “all or nothing” (2012, p. 14), and GLPs “need to go through the steps” (2012, p. 9) to advance their language.

Up to this point, we have argued that these assertions are theoretically and empirically unfounded but they are also incommensurate with the state of the science in that they are unmoored from its conventional wisdom: an observation that may (paradoxically) explain some of its appeal. Of course, it is possible for innovative and correct claims to emerge from markedly different and non-prevailing paradigms. But on those rare occasions, proponents usually present some kind of scientifically compelling evidence for the promise or superiority of their paradigm beyond the existing models (Finn et al., 2005). This is not the case for NLA and an immediate priority for proponents would be to provide positive evidence in support of NLA stage supports (e.g. some compelling demonstration that scaffolding input from grammatically complex to simpler forms facilitates language development in autism). But no less pressing, there is a need to reconcile existing data, which are inconsistent with NLA recommendations. In brief, recommendations to *avoid single words* (stage 1), use lots of *contractions* that obscure the boundary between subject and predicate (stage 2), and model *isolated words without regard to grammar* while also *avoiding verbs* (stage 3), do not square with existing research examining the properties of linguistic input that predict and support language development in NT and autistic children (e.g. Butler et al., 2023; Clark-Whitney et al., 2022; Hadley et al., 2018; Naigles et al., 2011). In fact, it is not obvious how NLA stage-specific recommendations would follow from even the raw material view of delayed echolalia on which NLA is founded.

Existing empirical data, comprehensive and thoughtful expositions on the topic of clinical practices for enhancing language and communication in autism (e.g. Prizant et al., 1997), and contemporary theories that reject dual routes to language learning (and instead emphasize the inseparability of lexical and syntactic processes; described below), lead us to conclude that NLA stage-specific supports are an unjustified and unhelpful preoccupation. In this light, it is worth remembering that while trying unproven therapies sometimes seems warranted, they do carry a potential for harm in that they divert resources from approaches known to be effective and result in loss of service time and learning (Travers et al., 2016).

### What about outcomes?

Although many autistic preschool-aged children are non-speaking, most will go on to acquire single words, and at

least half will use phrase speech by the time they enter primary school (Anderson et al., 2007; Brignell et al., 2019; Tager-Flusberg & Kasari, 2013). In fact, by kindergarten, it is estimated that a minority (approximately 25%) of autistic children remain minimally-speaking (Anderson et al., 2007; Tager-Flusberg & Kasari, 2013) but they too can make meaningful gains in spontaneous language through evidence-supported interaction strategies (e.g. the use of joint engagement, low-demand ‘follow-ins’, Bottema-Beutel et al., 2014; Haebig et al., 2013; adult language modeling and expansions, McDuffy & Yoder, 2010; Naigles, 2013; Scherer & Olswang, 1989; Naturalistic Language Paradigms, e.g. Laski et al., 1988; or interventions blending AAC, joint engagement, and play; Kasari et al., 2014).

The fact that most echolalic autistic children go on to acquire good, communicative speech in the absence of training (Howlin, 1981, 1982) points to the need for controlled experimental research to identify *intervention-specific active ingredients*. This is important because evidence in support of NLA is, to our knowledge, entirely anecdotal. Anecdotes are powerful and useful in many ways but they can also be dangerous when attempting to draw sound conclusions (Finn et al., 2005). Anecdotes are not only vulnerable to confirmation bias and survivor bias (those for whom the intervention did not produce results tend to not be solicited) but because they are based on individual experience, they provide *no probabilistic information on the likelihood that something will occur* (in this case a therapeutic effect) which requires systematic observations with larger numbers of people. Finally, when extravagant claims are paired with poorly specified outcomes, they are especially in need of rigorous peer-review; an area in which NLA is terribly deficient.

## Discussion

The language styles literature reviewed previously raises interesting questions about the role of the lexicon (words) and grammar (rules) in language development. In fact, research over the last several decades strongly suggests that dual acquisition strategies should be viewed not as two mechanisms or extremes of one bipolar continuum but rather two sides of a single, non-dissociable process. (e.g. Abbot-Smith & Tomasello, 2006; Bates & Goodman, 1999; Bybee, 2006, 2013; Kallens & Christiansen, 2022; Lieven et al., 1997; Pine & Lieven, 1993; Wray, 2002) in which words and grammar are ‘emergent’ products of domain-general mechanisms that transcend the boundaries of the language proper. From this perspective, all language-learners are exposed to, extract, and produce language of variable chunk size (e.g. words, phrases) which they gradually abstract, categorize, and generalize. This proposition is most compatible with ‘construction grammar’ and ‘usage-based’ theories of language

acquisition (e.g. Bybee, 2010; Goldberg, 1995; Tomasello, 2003) which posit that people learn multiword expressions as patterns that are accessible in the language input and that knowledge of these patterns underlies fluent language processing (e.g. Ellis & Ogden, 2017).

In a related vein, many researchers have concluded that NT and autistic people appear to acquire language via the *same mechanisms* although language learning among delayed and minimally-speaking autistic people appears to be less efficient and not necessarily governed by the same cognitive constraints (Abbott-Smith, 2020; Arunachalam & Luyster, 2016; Boucher, 2012; Dawson et al., 2008; Goodwin et al., 2012; Hartley et al., 2020; Naigles, 2021; Swensen et al., 2007; Tager-Flusberg, 1981a, 1981b; Tager-Flusberg & Calkins, 1990). When it comes to cognitive constraints, the evidence strongly implicates autistic differences in social cognition and strengths in perceptual processing accompanied by reduced top-down influence (Boucher & Anns, 2018; Mottron et al., 2006).

As Arunachalam and Luyster (2016) argued, rather than conceptualizing ‘disorder’ as manifesting different patterns of development than what we observe in ‘typical’ development, we should instead construe developmental outcomes as variants produced by different combinations of biological and environmental influences. It is clear from the literature that outcomes in autism are complex, interactive, and multiply determined and that single cause explanations rarely if ever apply (Boucher, 2012; Tager-Flusberg & Kasari, 2013). This recognition is crucial for responding to the heterogeneity of autism and should underscore the importance of individualized, tailored supports. In fact, research has made real gains for understanding which children are likely to benefit from which kinds of input (and why). These approaches recognize that although autistic and NT people have access to the same language learning mechanisms, it does not always follow that they are equally responsive to the same kinds of input. Such approaches seek to provide the most accessible form of input ‘in the moment’ in natural language contexts to promote optimal long-term outcomes (Bottema-Beutel et al., 2014, 2022; Haebig et al., 2013; Kasari et al., 2021; Smith et al., 2023; Yu & Sterponi, 2023) and they require no presumptions of GLP. We encourage speech language professionals to pursue assessments and supports such as these which are well-reasoned, evidence-aligned, and sensitive to how different children prefer, and are able, to take from the language-learning environment. After all, it should be uncontroversial that clinicians embrace theoretically-sound and empirically-supported individualized therapies, which is a pillar of precision health and neurodiversity-affirming care.

In summary, we have sought to update the literatures relevant to ‘gestalt language processing’ to apprehend their relevance vis-a-vis NLA. Along the way, we raised numerous questions and challenges to NLA which are

paramount for practical and ethical reasons. To begin, there is not compelling evidence to conclude that any persons or groups can be appropriately identified as natural born GLPs (or analytic language processors for that matter) or that GLP constitutes a legitimate clinical entity. Relatedly, delayed echolalia may be an interactional accomplishment while also being different from Peters’ (1977, 1983) *gestalts* and it is premature to equate the two. Moreover, there are definitional and conceptual problems surrounding the terms *gestalt language* and *gestalt processing* and misperceptions of episodic memory that may frustrate the understanding of developmental language and cognitive differences in autism. Crucially, reducing diverse aspects of autism to the classification (misnomer) ‘gestalt language processor’ obscures and may mischaracterize autistic strengths and diminishes the diversity and complexity that define the condition. As noted in this paper’s introduction, many clinicians and families are enthusiastic about NLA, perhaps in large part because of its association with the neurodiversity movement. Still, neurodiversity-affirming care is a philosophy not reducible to, or synonymous with, any protocol or trend in clinical practice (Gaddy & Crow, 2023). There is no contradiction in saying that NLA might promote the use of some sensitive and responsive *general* language strategies while still being unfaithful to core neurodiversity-affirming ideals. Relatedly, the popularity of NLA seems partly attributable to its frequent positioning as a champion of hope and celebration for autism. Yet, hope and celebration are free agents, and their potential is amplified when unaffixed to any particular code or conviction.

Even *if* one accepts GLP as a legitimate clinical entity, a series of questions follow: Can GLP be reliably and validly assessed and is there a criterion for GLP status?; Is delayed echolalia truly the ‘raw material’ for autistic language development (or any form of linguistic practice) or is its decline incidental and artifactual to increasing spontaneous speech?; If it is raw material, how strong is its effect and what is the developmental mechanism and appropriate therapeutic response? Are NLA stages truly discontinuous? If so, do the NLA treatment recommendations for each stage follow? In closing, we reiterate that what is most helpful for advancing understanding of autistic language behavior, is apprehension of heterogeneity and elucidation of the cognitive mechanisms at play. We believe that individual differences in domain general processes (e.g. memory and sensory informational systems) are good candidates and that theories developed on a foundational recognition of autistic strengths, are promising for advancing that goal. Ultimately, whether NLA is a red herring will depend on whether NLA advocates are able to clarify definitions and theoretical claims, demonstrate the psychological reality of clinically meaningful GLP stages, and provide controlled-experimental peer-reviewed support for the unique active ingredients proposed in the NLA protocol.

In the meantime, we recommend theoretically driven, evidence-based practices that are individualized to meet the priorities of autistic people.

### Acknowledgments

We are grateful to Alison Wray and Dermot Bowler as well as ADLI reviewers for their generosity with their expertise and the thoughtful feedback they provided on earlier versions of this manuscript. We are grateful to Emma Rose McCadden for her advocacy and thoughtful contribution in support of our shared commitment to neurodiversity-affirming scholarship.


### Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Dr. Hutchins' time on this research was supported by the University of Vermont. Publication fees were also funded by the University of Vermont. No other support or funding for this work was received.

### ORCID iD

Tiffany L Hutchins  <https://orcid.org/0000-0003-0502-3968>

### Notes

1. Formulaic speech includes, but is not limited to slots and frames, idioms, conventional expressions (e.g. 'My grandma is sick' as opposed to 'The mother of my father is stricken by disease'), lexical bundles (e.g. 'in the middle of the...'), complex propositions and verbs (e.g. 'in support of'), turns of phrase (e.g. 'for whatever reason'), collocations and binomials (e.g. 'black coffee'; 'bride and groom', respectively), full phrases (e.g. 'how can I ever repay you?'), and longer sequences such as songs or poems (all examples credited to Kallens & Christiansen, 2022).
2. It is also evident in Peters' (1977) original work. Although Minh's mother engaged him as a conversational partner, she did: "relatively little simple naming except when reading a book with Minh. Most of her speech to him is rather conversational in nature and is characterized by use of longish sentences with marked intonation contours. She often repeats whole sentences directed to Minh. Perhaps the rapidity of her speech and her repetition of whole phrases were factors causing Minh to concentrate more on the holistic patterns of her speech, rather than on analysis of individual segments" (p. 570).
3. Also see Boucher (2007) and Grandin (2005) who describe the cognizant accessing of verbatim-remembered conversations.

4. However, Prizant described a gestalt mode in slightly different ways across works. For example as a "mode of processing that may stem from an inability to segment experiences into smaller, constituent components" (1982, p. 18); a mode in which "language, environmental experiences, and social interactions may be processed as whole units that can be understood only when perceived in the same way as first experienced" (1983a, p. 70); a mode in which "language and environmental experiences may be processed as whole units rather than analyzed and segmented into meaningful components allowing for rule induction" (1987, p. 77).
5. Peters (1977) employed the term 'gestalt' not to mean holistic emergence from parts but to propose the possibility of children's movement from a part-to-whole versus whole-to-part language acquisition strategy. This is very different from the cognitive linguistics rooted in Gestalt psychology often associated with scholars such as Talmy, Lakoff, or Langacker.
6. Although it is more accurate to say that a 'gestalt' is an attribute of perception of a thing that has a quality that is *different* (not more) than the sum of its parts. "It is the quality of the entity as a whole, resulting from its configuration i.e. the relationship, interaction, and interdependence between its parts rather than the sum ... of its parts" (Sabar, 2013, p. 9). Incidentally, using this definition of *gestalt*, delayed echolalia (if understood as an unanalyzed unit with no internal structure; see Blanc, 2012) could not qualify as an instance: a gestalt emerges from its parts and if echolalia has no parts, it cannot yield a gestalt.
7. Prizant (1983b) cited Baltaxe and Simmons (1977) who documented particular ungrammaticalities in the utterances of a primarily echolalic 8-year-old autistic girl. Their exemplars appeared to be conjoined chunk-style and were taken as a demonstration that "rote learned echolalic patterns were only gradually broken down into individual chunks of varying sizes" (p. 392). However, this conclusion can be no more than tentative given that Baltaxe and Simmons (1977) were unable to achieve reliable coding for echoed vs. spontaneous utterances and their study was cross-sectional (longitudinal data are needed to assess this claim).
8. Blanc describes gestalt language development as sometimes gradual and sometimes occurring "virtually overnight" (2024, p. 20).
9. Prizant's four stages are actually quite *unlike* Blanc's (2012). Prizant emphasized the importance of the number of communicative functions in early stages but this was jettisoned by Blanc who focused exclusively on morphosyntax and added two additional stages to capture increasingly sophisticated forms.

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