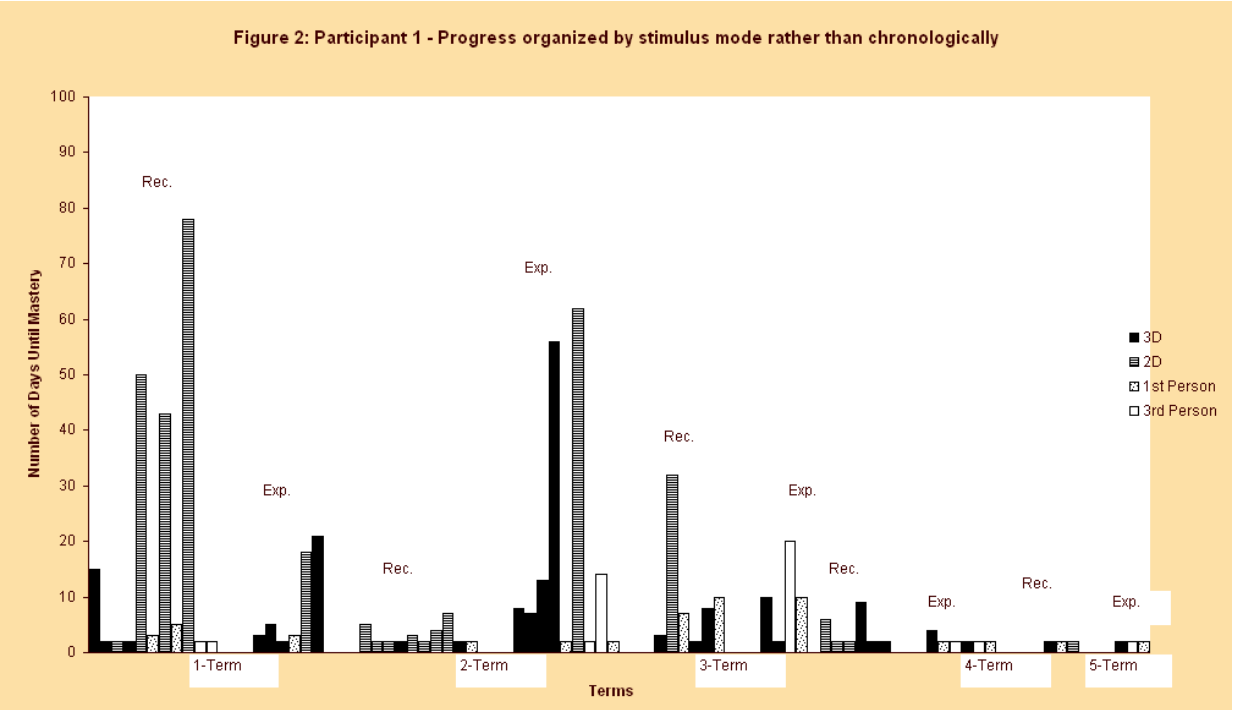
(range 2 -78 days). Forty or more consecutive training days were required for actions, prepositions, and adjectives before child 1 demonstrated generalized responding to novel or untrained stimuli. Acquisition of generalized responding for the expressive 1-term response mode occurred more rapidly than the receptive response mode. On average, 9 consecutive training days (range 3 - 21 days) were necessary before the mastery criterion was met.

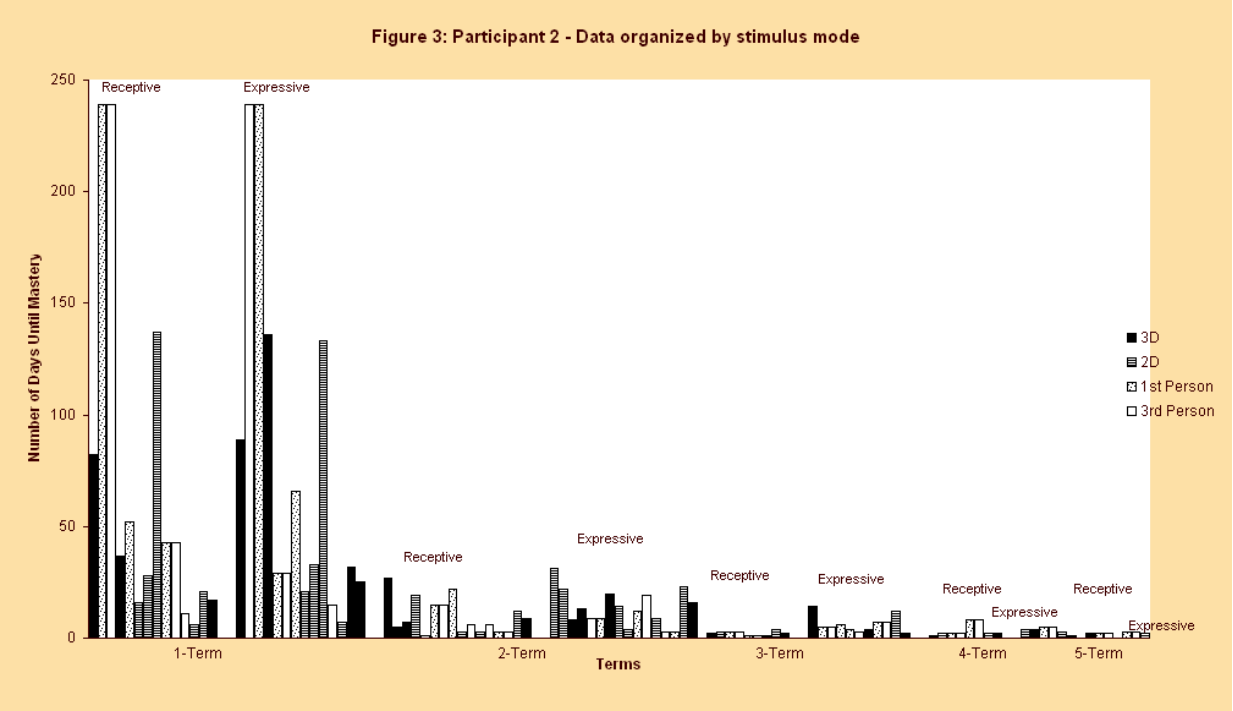


For Child 1, receptive 2-term conditional discriminations were acquired more rapidly than receptive 1-term conditional discriminations. Three training days on average (range 2-7 days) were conducted before the child demonstrated comprehension of novel 2-term conditional discriminations. However, additional training days were needed for the expressive response mode (average 18 days; range 2 - 56 days).

Ten consecutive training days on average were implemented for receptive 3-term conditional discriminations before mastery criteria was met across all stimulus modes (i.e. three-dimensional, two-dimensional, first person, and third person). The number of training days for the expressive response mode decreased to an average of 6 consecutive days (range 2-6 days).

For the receptive and expressive 4-term response modes, an average of 4 and 2 consecutive training days, respectively, were required before the child demonstrated comprehension and production of generative language. Furthermore, Child 1 generalized responding to both the receptive and expressive 5-term conditional discriminations without training. This child participated in the language matrix program for 22 consecutive months.

Child 2. Data for child 2 are presented both by order of stimulus mode (Figure 3) and by date of program introduction (Figure 4). Child 2 achieved mastery criteria for 1-term discriminations on an average of 81 and 78 consecutive training days for receptive and expressive response modes, respectively (range 6 - 239 days). Two hundred thirty-nine training days were required for possessive pronouns in both response modes and three of the target stimulus modes (i.e. three-dimensional, first person, and third person).



The average number of training days decreased to 10 (range 1-27) consecutive training days for receptive 2-term conditional discriminations. In addition, the average number of consecutive training days decreased to 13 (range 3-31) for the expressive response mode. The accelerated acquisition of more complex conditional discriminations continued for 3-term conditional discriminations. It took an average of 2 and 6 consecutive days to meet mastery criteria for the receptive and expressive response modes, respectively (receptive range 1-4; expressive range 2-14).

For both receptive and expressive 4-term conditional discriminations, averages of 4 and 2 consecutive training days were conducted before the child exhibited generalized responding to untrained combinations (receptive range 1 - 8; expressive range 1 - 5). Also, minimal training was required for receptive and expressive 5-term conditional discriminations (receptive average and range 2; expressive average 2.5 days and range 2 - 3 days). The data for Child 2 illustrated accelerated generalization of responding to more complex conditional discriminations across various response and stimulus modes. This child participated in the language matrix program for approximately 12 months.

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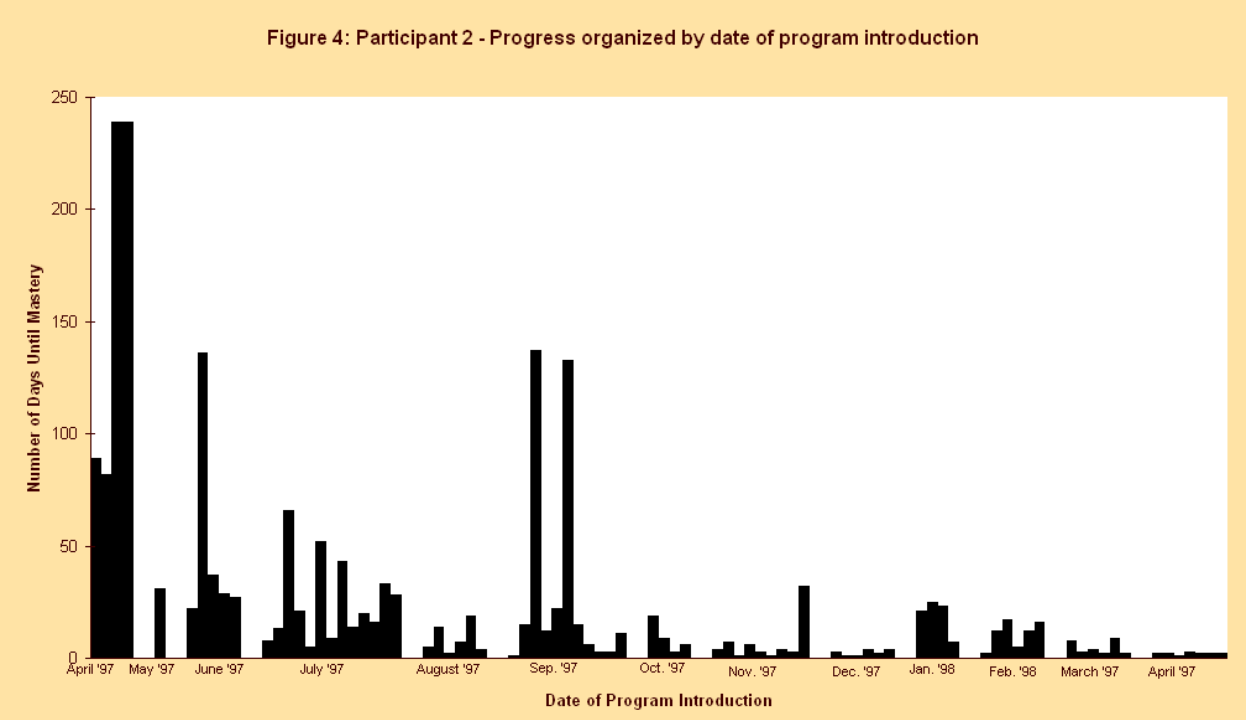

Child 3. Data for Child 3 are presented both by order of stimulus mode (Figure 5) and by date of program introduction (Figure 6). Child 3 required an average of 42 consecutive training days for both receptive and expressive 1-term discriminations. Receptive 1-term discriminations ranged from 1 - 136 training days; whereas expressive 1-term discrimination ranged from 2 - 94 training days.

The training time required to meet mastery criteria for more complex conditional discriminations consistently decreased as the complexity increased for both response modes and all stimulus modes. Receptive and expressive 2-term conditional discriminations required an average of 15 and 11 training days (receptive range 1 - 59 days; expressive range 2 - 29 days), respectively. Averages of 9 and 6 training days were conducted to achieve generalized responding for receptive and expressive 3-term conditional discriminations (receptive range 2 - 14; expressive range 2 - 22).

Additionally, Child 3 continued to require minimal training for both 4 and 5-term conditional discriminations in both response modes and all stimulus modes. The average and range of consecutive training days was 8 for the receptive mode and 16 for the expressive mode. Child 3 participated in the language matrix program for 11 months.

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Figure 5: Participant 3 - Data organized by stimulus mode

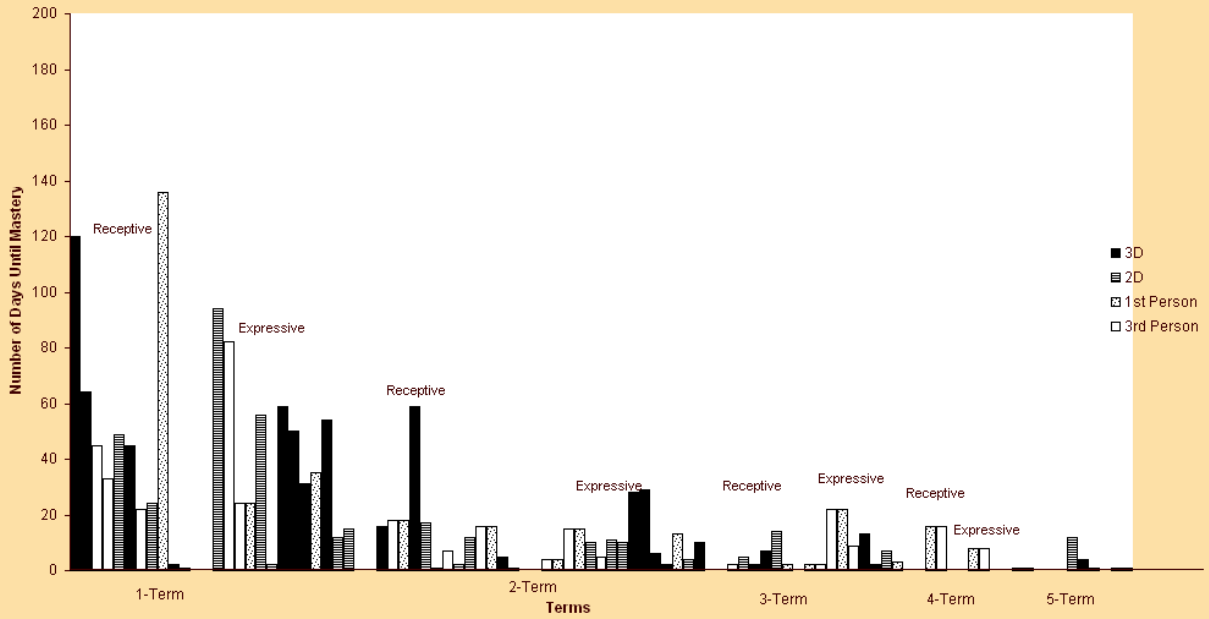
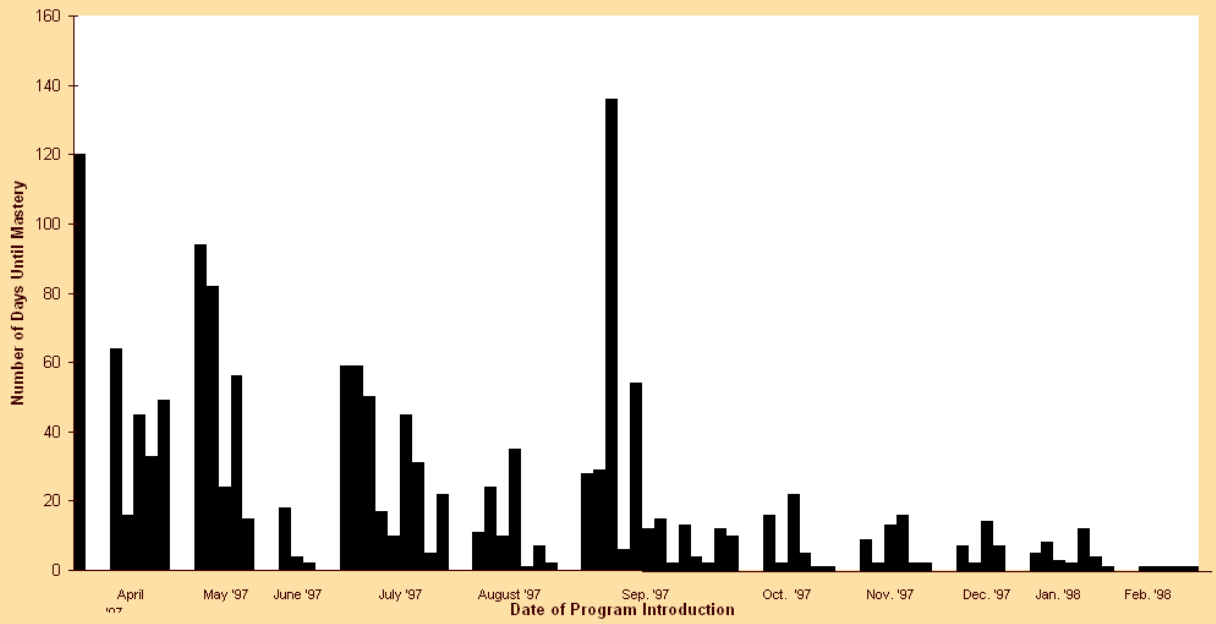


Figure 6: Participant 3 - Data organized by date of program introduction



Summary of clinical data. Overall, the average length of time for the three children to complete the basic language matrix program was 14 months with a range from 10.5 months to 22 months. All three children were able to comprehend novel complex instructions and produce generative language that contained at least 5-terms. Furthermore, the time required to meet the generative mastery criteria in each response and stimulus mode generally decreased for each

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child as the conditional discriminations became more complex. The alternation of stimulus modes in treatments offers an alternating treatments design for analysis.

While these are typical results, it should be noted that, for whom the clinical focus is noncompliance, rather than language skill per se, the pattern of results may be quite different. In such a case, the child might begin engaging in stereotyped noncompliance only when certain modes at a certain level of complexity were reached. The difficulty with those modes may, for example, begin to surface in the three-term discriminations. The length of time to mastery in such cases may be due to the time required to problem-solve an effective clinical solution, by engaging in a sequential functional analysis of alternative interventions (Riedesel & Larsson, 1999). Other reasons for a different progression of acquisition rates would include a case in which there is a functional barrier to the child's attending skills, that is only addressed at a certain level of complexity. Other clinical focuses are also found.

Advanced programming issues. In many children, the use of reading and writing is an effective format for developing language responding (Lovaas & Lovaas, 1999); and the sequence of written statements can be developed according to the principles discussed here. It is often noted that a reading response results in more rapid vocal language acquisition than does a picture-based system. This may be because both vocal and written language responses are arbitrary representations of visual discriminations, while a picture-based language response involves much more direct representations of the visual discriminations. This distinction concerning arbitrary language modes suggests an important refinement to the concept of symbolic language. Nonarbitrary picture and gestural systems are much more primitive than are arbitrary written and vocal systems.

Much of a child's everyday language involves surprisingly large conditional discriminations. In the second phase of matrix training, five-term conditional discriminations are established. But many language interactions involve up to 12-term conditional discriminations or larger. Not every conditional discrimination is a highly structured sentence that follows grammatical rules. Much everyday language is a string of phrases, which must nevertheless be comprehended or initiated ("It's a bear, it's big and brown, and it's chasing your Daddy away from the fish he caught!") Therefore the conditional discriminations will be generalized into a variety of grammatical (and "nongrammatical") statements comprising many terms. Another common multiple-term variation involves conjunctions (and, or, before, instead of, rather than, then, if-then). Many of the terms are used in combinations of two or three in the same conditional discrimination (adjectives – big and hairy; prepositional phrases – in the bucket under the bed; subjects – Bert and Ernie; or verbs – dancing and singing). Also, alternate term orders are also significant generalization steps ("the frog is under the table" vs. "under the table is where you'll find the frog").

After establishment of basic language skill in the requesting and labeling areas, more complex variations or forms of concrete language may be developed as expressive and receptive labels (Risley & Baer, 1973). Such further objectives to be addressed include syntax (Goldstein, Angelo, & Mousetis, 1987), word forms (Baer & Guess, 1973), and tenses (Kuczaj, 1977). Many skills that often pose challenges to therapy may more readily be developed when taught through this framework. For example, pronouns, possessives, tenses, and syntax (or grammatical rules) may be more readily developed when introduced upon a base of generative language responding. In fact, these advanced language skills may be taught through the same conditional discrimination process as were the basic skills. Conversely, the simple generative programming of sufficient sentence forms may result in natural generalization to these specialized forms, without the need for direct programming. Alternatively, these forms may never need direct

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programming, when, for example, the original function of the delayed language development was a clinical behavior challenge such as noncompliance or social avoidance. In these cases, thorough matrix programming is not necessary because the clinical focus processes of generalized compliance training and generalized imitation training meet the functional needs for normal development.

The focus on controlling language development, according to the planned development of terms and modes, may substantially shape the curriculum. For example, in an alternative early intervention system, many early labeling and requesting skills may be taught as full sentences ("I want _;" "I have a _;" "Show me _.") However, each of these language responses incorporate three terms. Further, they incorporate pronouns. Finally, each of these sentences use an abstract term (want, have, show). In the language matrix formulation, programming would begin with single term labels and only move to such phrases once concrete three-term sentences are recombinative conditional discriminations. Then the pronouns would be taught as single term discriminations, being faded into proper noun discriminations, and keeping the receptive and expressive forms distinct until generative mastery of each mode is mastered. As the earlier examples suggested, these multiple-term sentences may then be taught as analogue concrete conditional discriminations (using terms that are visual). Once the concrete conditional discriminations are established, generalization to the abstract terms are more readily acquired as recombinative terms.

The focus on generative labeling also suggests other significant deviations from traditional curriculums. For example, in alternative systems, sequencing two-dimensional stimuli is often introduced as an early skill. However, the commonly employed sequencing cards usually vary by three or more terms as the sequence progresses. In order to avoid merely teaching rote associations, which may easily be irrelevant to the sequencing concept, it is preferable to first teach the child to label each stimulus card (after acquiring the multiple-term conditional discrimination) and then sequence the cards. Therefore, in the matrix system, this skill will typically be introduced after a year of therapy, rather than early in programming.

Natural language programming. The simple development of language skills in a one-to-one therapeutic setting is not the intended outcome of this approach. As indicated above, the true goals of therapy reflect the natural use of natural language in natural activities. Therefore the use of these skills must be directly related to the use of these skills in the natural environment. Highly structured programming, as described above, may be necessary to develop generative language responding. Then natural programming techniques may be employed to generalize the language skills throughout the day. A common procedure is to gradually fade the structure of the language programs into that of a natural play situation as each skill is developed. A significant fading step is to increase the number of modes used within the same activity until the natural variety of modes is arrived at. Maintenance programming is then assessed in the natural play activities rather than in the structured activities. Again, the strongest modes of language development may be used to develop the desired natural uses in the environment. Incidental trials may be inserted in natural activities in order to create behavioral momentum for natural language usage and then planned reinforcement may be used to establish the necessary rate of the desired skill. After establishing the desired skill in the natural environment, the contingencies may be faded to the natural rates found in the environment. Conversely, while therapy is progressing, natural language activities that demand a higher order (number of terms, unmastered mode) of language skill than that which has been mastered in direct therapy, should be avoided. Premature exposure to unsuccessful tasks may inhibit natural language development, by counter-establishing stereotyped language behavior in those activities.

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It is usually essential to target natural statements in the home, school, and community; as well as to generalize statements to other persons in the environment, such as relatives and peers. Again, this programming usually proceeds with a minimum of stereotyped errors if the language skills used in these natural environments follow the sequence of generative programming, rather than not being coordinated with that sequence.

Of course, the child's therapy will progress most effectively if initial learning is programmed through the most highly successful structure for that individual child. After establishing the skill, the skill is generalized to all naturally occurring activities. One of the most significant areas for generalizing the skill is to operant responding. Free operant language responding takes many functions, but regardless of the function, the complexity of the language should be programmed in concert with matrix progress. The spontaneous operant may be directly programmed by establishing labels that are not dependent upon a specific vocal S^D. Rather, the conditional discriminations are presented as the materials themselves, and the prompts are faded until the child naturally labels a visual array. Then similar arrays can be arranged in natural settings, such as the living room, bathroom, or playground. The child is then given repetitive errand trials to go to the setting and label a series of arrays. After momentum is established, the artificial array is removed, and the child is given a new errand trial to go to the same setting. The likely result is that the child will now label a natural array in the setting. This "spontaneous" label can then be operantly reinforced.

Auditory comprehension programming. A focus on concrete requesting and labeling skills enables the use of straightforward direct teaching procedures to establish a relatively high degree of language skill, before moving into less concrete language skills, which are typified by auditory comprehension skills. Initially, the comprehension skills can be established as direct concrete analogues of the labeling skills. These comprehension skills are first developed as comprehension questions about visual stimuli, and then comprehension questions about analogous auditory stimuli. Then these comprehension skills can be developed into abstract and inferential comprehension skills. A significant aspect of the comprehension skill for the treatment of autism is social comprehension. Upon this base, the development of attention span, communication of complex information, and conversational skill will also be developed. Simultaneously all of these skills are generalized to all of the natural activities in the child's day, ensuring that their skill is fully established as a bona fide resident of the ecology of the child's behavior.

The progression of advanced communication skills follows this general course:

- Requesting
- Expressive labeling
- Receptive labeling
- Concrete reciprocals
- Generative concept formation
- Concrete visual comprehension
- Concrete auditory comprehension
- Abstract auditory comprehension
- Inferential auditory comprehension
- Social comprehension
- Naturally occurring language interactions
- Complex language production
- Abstract conversations
- Comprehension of conversations

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In the auditory comprehension phase, the prerequisites (all generative) are seven-term conditional discriminations and relevant concept categorization. Concept development is a particularly important realm of language responding, as it forms a straightforward base for abstract comprehension skill. Indeed most, if not all, knowledge can be conceptualized as a hierarchy of categories.

After development of the multiple-term labeling and requesting skills, comes concrete development of language concepts through matching, sorting, categorizing, and labeling related to these skills. For example, a relatively high level of discriminative ability can be developed through nested and related concept matching (i.e., horse to horse; farm animal to farm animal; mammal to mammal; transportation to transportation; pet to pet; "cowboy stuff" to "cowboy stuff;" big animal to big animal (two-term matching)). Not only are these concepts generatively matched, but relevant labels are generative (given a class, name a member; given a member, name a class; given an attribute, name a class; given a class, name an attribute). When all of these skills become generative, the stage is set for the auditory skills. Both generalized vocabulary skills and higher-order concepts (typically taught through categorization) can be developed according to these principles. In particular, with concept development, the language tasks (labeling members of a category, characteristics of a category, etc) can conform to the child's current skill level in the matrix of conditional discriminations.

The preliminary phase of comprehension programming is visual, in which the child is presented with a visual display, and then given an S^D in the form of a question. Before each of the subsequent auditory comprehension tasks are delivered, the analogue visual task should be mastered. A particular component of the visual comprehension task that should always be checked, but may not need programming, is the "Wh" term discrimination. An individual child may need single term programming to discriminate Who-What-Where as a term, especially if these words have been used "indiscriminately" in earlier programming – resulting in potential latent inhibition. Normally, the "Wh" discrimination is begun as a two-term discrimination in the appropriate matrix of distracters ("who is jumping"). The relevant discriminations in this two-term matrix should be previously mastered as part of the seven-term conditional discriminations. One subset of the term discriminations should be the receptive labeling discriminations (touch, give, find, push, etc.). As an example of the two-term Wh visual comprehension task, if the activity area has the following items present:
Red Ernie
Blue Bert
Red Car
Blue Truck

The visual comprehension S^D can be one of four:
"Who is red?"
"Who is blue?"
"What is red?"
"What is blue?"

There is only one correct response for each question, and the mode can be either vocal or motor, depending upon the child's strength. In this example, category sorting would also be a helpful prerequisite, in that the child should already sort "who'" from "what" (persons from inanimate objects), WITHOUT saying, "sort Who," or "sort What." Because of this prerequisite, the child should have no additional discrimination to learn regarding "Who" vs. "What," other than the

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"Wh." Another prerequisite step, which is not often necessary, just like the one-term "wh," is, after the sorting, tell the child, "touch who," or "touch what."

Then the first phase of auditory comprehension is detail comprehension for each of the single terms. Programming in this phase typically involves a discriminative stimulus which is composed of two two-term statements and one two-term question (Ed is running and Fred is sitting. Who is sitting?). This is developed in a series of single trials, with each trial commencing with new statements, because the content of the terms themselves is no longer being programmed. Each trial is a partial conditional discrimination for the sake of attention span, but through the course of repeated trials, every possible combination is pursued. Typical questions involve who, what, where, which, and yes-no. The skill can be directly taught, based upon the foundation of labeling, by using the direct visual labeling analogue of the comprehension skill. The visual analogue can be used as either a prompt or for behavioral momentum. After generative responding at this level, the program progresses to three-term statements and four-term questions (counting the "wh" word as a term). Finally, attention span is built by gradually increasing the number of sentences in a story and then asking a single question.

A sample two-term "wh" discrimination is as follows:
Arrange a layout with two sets of three unambiguous items and do actions with the two subjects (Ernie is in a racecar and Bert is next to the trash):

S^D: "Who is in?"	R: "Ernie"
S^D: "Where is Bert?"	R: "Next to"
S^D: "What did Ernie do?"	R: "Drive"
S^D: "Who sneezed?"	R: "Bert"

A sample detail comprehension task embedded in a story would be as follows:
"Piglet and Pooh went to Eeyore's birthday party. Pooh brought honey and Piglet brought a balloon. The balloon broke and Eeyore said it was alright. Who brought the balloon?"

The second phase is concrete reasoning comprehension. The common question words are when, how, why, if-what, and yes-no. This reasoning comprehension skill is termed "concrete" because of the existence of natural cue words (because, since, so, before, after, etc.) in the discriminative stimulus (in this phase, these cue words are not prompts). Here the direct response is to give the answer based upon giving the content that is related to the cue word. This skill progresses through the same term structure as detail comprehension, until a full story is given and the correct response is to give the answer based upon the cue word. The use of two cue words forces an active discrimination that usually ensures accurate attending and responding.

A sample concrete reasoning task would be as follows:
"Mary and Margaret went to the store for dessert. When they got there, the man told them that there were no more cookies. So they went home. When did the man tell them there were no more cookies?"

Note that a "When" question is a more relative comprehension question than is "who," "what," or "where." In the concrete reasoning, there are many common time-concept cue words, such as "before," "after," "while," "first," "second," and "then." The child's discrimination of these time concepts can be programmed generatively.

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In the cue-word progression, several steps are involved. The time-concept cue words are first used in the receptive and expressive modes as a term: "push the ball then throw the ball." Therefore, the child masters these relative time concepts in the labeling mode before being challenged in the comprehension mode. Then, in the comprehension mode, the labeling can be used as a prompt for the comprehension. Here, it should be noted that the time concept is then an additional term in the sentence: "hug and tickle the doll" requires only a three-term conditional discrimination, whereas "hug then tickle the doll" requires a four term.

Whether as a visual comprehension task (showing 3D items and asking a question about them), or as an auditory comprehension task, the progression of distractors and randomization is as follows. First, the cue word is introduced in a single two-clause sentence, with the cue word randomized into either the first or second clause ("Because cats are furry, I like cats"). Randomizing the position requires the child to attend to which clause is associated with the cure word. Second, two two-clause sentences are given with only one cue word ("Mary was going to a party, so she wore a dress. At the party, everyone ate cake"). This forces a further discrimination between clauses. In the third step, two two-clause sentences are given with two cue words ("Because Billy had a red marker, he colored the car red. His teacher gave him a candy, so he ate it"). For the first time, at this step, the child is required to discriminate reasons, and is showing true reasoning comprehension. For this reason, it is important to move quickly through the three steps, upon generative mastery, before the child develops rote strategies for correct answers.

Throughout these three steps, as throughout the language programming in general, it is essential to randomize modes in order to ensure that the child is attending to the "wh" word. For example, the S^D "The children ran across the playground after they found all of the eggs" may be given with the question, "where did they run?" If such an S^D is randomized with "When" questions, the child can not rely on simply memorizing the clause with "after" in it. In practice it is usually helpful to identify the distractor modes for a particular session as a prompt for the staff or parent to effectively randomize the S^Ds. The staff can do this if they are supplied with a master list of mastered modes, and simply check off which modes they successfully randomized in that session.

Once the concrete reasoning is mastered, abstract reasoning analogues can be built using the same forms of statements and questions, but with no cue words. The same progression is followed as before. A sample abstract reasoning task would be as follows:
"Jenny couldn't get into the house when she got home. She looked and looked but couldn't find a key. She went to Mary's house and called her mother. Her mother came home and unlocked the door. How did Mary get into her house?"

Then inferential comprehension is developed. The distinction between abstract and inferential comprehension is that no correct answer is given in the S^D. The correct answer is a creative, but relevant, answer to the question. Inferential comprehension questions include: "why do you think," "how do you think," "what do you think will happen next," "if-what," and "yes-no." The same progression is followed as before.

To distinguish again between a matrix-based curriculum and a traditional early intervention curriculum, common factual comprehension skills may not be programmed until mastery of these reasoning skills is achieved in order to avoid the development of stereotyped "memorization" of the answers to the factual questions without true comprehension. Instead, as the examples have shown, each of these tasks are plainly generative, in that the child is learning

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to answer questions about novel content, and mastery is assessed when the generalization to novel material occurs.

Social comprehension. At the heart of the focus on language comprehension, for most children with autism, is social comprehension. Such tasks can be the most abstract, as the concepts are typically based upon an analysis of a series of interactions between two or more persons. Some of the initial social comprehension tasks can be concrete ("who pushed the girl?"), but most become very abstract ("why didn't they want to play with him?"). As such, the social comprehension tasks usually follow development of inferential comprehension. Then, when the social comprehension tasks are initiated, they are based upon a story that allows for such social comprehension questions. A sample task would be as follows:

Read a story about Arthur's dog ruining the decorations for his surprise party for Francine. His friends come over early and help him make new decorations just in time for the party. At appropriate moments in the book, stop and ask the following questions.

- What does Arthur want? Why?
- How does he feel? Why?
- How do his friends feel? Why?
- What can they do for Arthur? Why?
- What do you think will happen next? Why?
- What would you do if you were Arthur's friend? Why?

In social comprehension, to establish thorough social competence, each common social concept is programmed across multiple exemplars. For example, various commercial stories, which contain the same concept, can be presented in randomized fashion until correct generative responding is made spontaneously to a novel story regarding the same concept. The modes of the stories can be customized to allow for the child's strengths (video, picture book, written passage, computerized book) and ultimately generalized to answering questions regarding a role-played situation or conversation, as well as acting out the roles in a play. This is often presented as dramatic play based upon a familiar book or video, but not following a memorized script) and mastery is assessed both upon making the appropriate responses in the dramatic play, and in answering comprehension questions about the dramatic play. Sample social concepts, across which multiple exemplars are programmed, include:

- Other children want to choose what to do
- Children don't want to do the same thing all the time
- Children want people to like them
- Children want friends
- Boys and girls like different things
- Children don't like to have their things ruined
- Friends help each other
- Children want to win
- Sometimes children don't want to be together
- Children get mad for a reason
- Children can laugh when they are teased
- Children like to be good at something
- Families love each other
- Children want attention from others
- Children help someone who is hurt
- Children should be good winners
- Children should keep a secret
- Children try to be like the others
- Children don't like bullies

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Complex language production. A particularly important aspect of language development is creative speech. While much of the programming discussed throughout this chapter is creative in its outcome (novel recombinative generalization), a significant creative language skill is expression of original ideas. In the matrix program, this progression may be taught through a story-telling framework. Once the required multiple-term complexity is developed, the child's basic story telling skill is developed through expressive labeling of sequencing tasks. After the concrete sequencing tasks are mastered (expressive labeling and sequencing of a series of related two-dimensional stimuli), more ambiguous two-dimensional stimuli are given. These ambiguous stimuli still are related and tell a sequential story, but there is sufficient complexity and variety faded into successive sequences that the child's expressive labeling of each picture is necessarily more creative. Once this responding is established, the child is taught to tell a story using puppets or toys, through a simple chaining process. However, a rote script is not employed. Instead the child is labeling a variety of available stimuli in a related fashion. Variations in the array of materials provided can force creative story telling. For example, uncommon combinations of materials can be presented so that the child is highly likely to produce novel expressive labels of the materials available. Instructing creativity and differential reinforcement of creative terms and sentences are also significant techniques. Once the story telling is established with visual materials, the next step is to establish nonvisual story telling. This can be done using similar materials for either momentum or prompts. A related process is to use pictures of actual events, to develop the skill of telling about daily events.

Conversational skills. An important aspect of natural language development is conversational skill. Conversational responding is a different function from the labeling, requesting, and question-answering skills which have here-to-fore been discussed. In conversational responding, the child reciprocates statements to those made by another. The skill involves creative speech, but also a necessary degree of responsiveness to the trend of the conversation. In the present framework, the appropriate reciprocals are developed only after mastery of the conditional discriminations is accomplished, so that the conversational skills are generative rather than rote. To begin programming conversations, the reciprocal interactions can be programmed as visual reciprocals (manipulating a toy while labeling the action). To establish common conversational responding, the reciprocal response is to respond to at least one term of the conditional stimulus, and add to that, in the common way that a natural conversation often involves a series of tangential statements. They are each related to the prior, but move in a connected series of tangents, as opposed to directly mimicking the form of the stimulus. For example, the S^D may be, "the car crashed the truck," and the reciprocal response is, "the truck's on fire." This tangential relationship is more conversational than mimicking the syntax as in, "the car crashed the truck," reciprocated by, "the man pushed the button." In this manner, the various modes of the labeling skills may be used as concrete prompts for the reciprocal statements. Before transitioning to purely auditory conversations, the creative speech programming is also very helpful as a prerequisite. Then, creative reciprocals may be developed by repeatedly prompting "random" responses – never giving the same statement twice in the prompting, until the child learns to spontaneously give a new response. In addition, effective differential reinforcement is critical; and the use of sophisticated clinical judgment is called for, in determining whether the child's response was related enough to the original S^D to qualify as a relevant reciprocal response, versus an autistically unrelated response. Observational learning procedures have proven extremely valuable in rapidly developing conversational skill. Additional programming for responsiveness to the partner involves complex contingencies such as cooperation and competition; and responsive peer tutoring. Auditory comprehension skills are critical for the development of conversational skill, and comprehension of conversations will be specifically targeted.

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As described above, this language acquisition process is designed to culminate in the generalization of natural language forms functionally into the child's typical daily activities. However, the development of complex social interactions which involve language may need to be programmed directly. For example, differential reinforcement of target social skills in the natural environments is commonly required (Buell, Stoddard, Harris, & Baer, 1968; Hart, Reynolds, Baer, Brawley, & Harris, 1968). Children have been effectively learned to recruit social praise for appropriate behavior in the classroom (Connell, Carta, & Baer, 1993; Stokes, Fowler, & Baer, 1978). Target social skills may be prompted using a two-dimensional stimulus in the natural setting (Curl, Rowbury, & Baer, 1985). Creative play may be differentially reinforced (Goetz & Baer, 1973). And prompt fading and differential reinforcement may be used to establish spontaneous initiations of sharing (Rogers-Warren, & Baer, 1976; Pinkston, Reese, LeBlanc, & Baer, 1973). In addition, peer programming and observational learning techniques have been used to develop appropriate social behavior in the natural settings (Odom & Strain, 1986; Tryon & Keane, 1986).

The consideration of the clinical focus will also dramatically affect the level of social communication that generalizes from therapy to natural interactions. For example, if the child's extreme acting-out behavior is currently being reinforced by the reactive accommodations of caregivers, then this pattern may prevent the generalization of more natural social language into those activities. The remediation of the challenging behavior may be necessary before natural social language occurs in those natural settings. For example, it has been found necessary to establish compliance as a competing response for attention-getting behavior, and then use differential reinforcement to alter the rates of the two forms of interaction (Baer, Rowbury, & Baer, 1973; Pinkston, Reese, LeBlanc, & Baer, 1973). In another example, children's lack of generalization from one-to-one to group language activities was accomplished by programming the presence of individual peers into the one-to-one activities (Larsson & Larsson, 1983).

Nonverbal communication. An important feature of social communication is the skill of comprehending nonverbal communication or body language. Throughout this paper, we have referred to modes of language behavior that are produced by the mouth as vocal behavior, rather than verbal behavior; and have referred to verbal behavior as any mode of language behavior that involves a representational (or symbolic) form of language (such as written words, pictures, signs, gestures, or vocal words). However, the use of the term, "nonverbal" here is to refer explicitly to language responses that are conditional upon the body language or inflection used in language. For example, a receptive statement might be: "pick it up." If only one item is on the table, the statement is unambiguous, and merely a two-term conditional discrimination. However, if two items (a book and a candle) are on the table, the correct conditional response depends upon the glance of the speaker. If the speaker is looking at the book, then the correct three-term response is to pick up the book instead of the candle. In this simple case, the additional term is the body language (direction of gaze) of the speaker. By constructing such tasks, the child can learn to attend to the body language of others as communication.

Nonverbal language is also commonly composed of vocal inflections. For example, the statement: "My car is under the table," has a different meaning depending upon which of the six words is emphasized. To comprehend the statement when "my" is emphasized would be to respond that the speaker is discriminating his car from someone else's. The correct receptive labeling response to that statement would be to pick up the speaker's car instead of another person's. To comprehend the same statement when "car" is emphasized would be to respond that the speaker is discriminating his car from some other possession. The correct receptive labeling response to this statement would be to pick up the speaker's car instead of another of

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the speaker's possessions. A more complex receptive labeling response would be to have the speaker's car and truck under the table and the car and truck of another person under the table. However, as should be obvious, in a situation such as this, the words alone will discriminate the correct response, whether or not an inflection is used. So programming at the level of labeling can only be usefully done as a vocal comprehension task, in which the child uses the correct inflection in answering a question regarding the possessive, object, etc. In this case, interestingly, the two-term task described above would confound the correct discrimination, and instead the S^D would be comprised of: the child's car is under the table, and the parent's car is on the table, and the question is "whose car is under the table?" This could be done as a visual or as an auditory comprehension question. Of course the receptive tasks could be used to model the correct expressive inflections.

Prevention of stereotyped language. If the language-based programs for typical social activities are controlled by the progress of the language curriculum, common stereotyped language behavior may be avoided. As introduced above, the following stereotyped language behaviors such as word omissions, filling nonsense sounds or words into a phrase, incorrect or over-generalized articles, word salads, substitutions, conjunction errors, noncontextual statements, and word association errors are avoided through direct teaching of generative and recombinative language responding. Other specific language errors such as pronoun errors, plural agreement errors, tense errors, and word order errors are addressed through direct programming of the appropriate target skills within a generative framework.

Many of the functions of delayed language development may also be addressed through this generative process. For example, functions of stereotyped language are addressed through this process as follows. Lack of generalization from one stimulus to a physically similar stimulus, as if the response had been learned by rote, is addressed through generative response class development. The substitution of predictable errors in a perseverative pattern in an unmastered, or difficult task, is addressed through development of generative responding with the difficult task. Over-generalized sentence structure is addressed through recombinative generalization of the sentence forms. Using an incorrect (but often learned) sentence form in a predictable context, is addressed by generative request development. A word association controlling subsequent local language behavior is addressed through recombinative generalization of the word. Predictable "error patterns" are prevented through generative programming in the language tasks in which the patterns would occur. Lack of responding to the entire context or message, is taught through gradual shaping of the length of the language task to which the child must respond. A response being controlled by a single word in a sentence, rather than the entire statement, is prevented through recombinative generalization. Overgeneralization of a response when learning a skill is prevented by focusing on the successful development of prerequisite skills to the generative level.

The intent of this system for language acquisition is to develop the complete range of typical language behavior while preventing or minimizing the impact of common stereotyped language responses of autism. With the programming principles described above, this intent can be accomplished through multiple phases of direct teaching and simultaneous generalization throughout the child's natural daily life. The organization of the language curriculum can be used to control the pacing of related social skill development in a systematic manner. This will prevent stereotyped responding and develop functional skills for communicating complex social information. When the language interventions extend through all of the social language functions of the typical child, including conversational behavior, the child's language and social behavior may attain the typical range of functioning of the first-grade child.

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