

## VERBAL BEHAVIOR EXCERPTS FROM THE WEBSITE

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A lot of talk exists in the world of autism services about different methodologies, different approaches, and different theories of what works. Most noticeably, there have recently been many discussions about particular behavioral interventions and their differences. The acronyms relevant to this site that are most often discussed are "ABA," "AVB," "DTT," and "NET." So what is AVB? In actuality, there is no such thing, not if having its own acronym implies that it is something separate from the science of behavior analysis. The term "AVB" has apparently become a shorthand for a program of applied behavior analysis that focuses on teaching verbal behavior through a collection of highly effective teaching procedures taken from the science of behavior analysis. In that case, AVB is ABA, plain and simple. Most, if not all, good ABA programs incorporate most, if not all, of the effective teaching procedures described elsewhere on this site. While it is important to specify that there are ABA programs that do and do not incorporate the teaching of verbal behavior based on Skinner's analysis of language, it would be unfortunate if people thought of teaching VB as anything other than ABA. So if you come across the term "AVB," know that it probably refers to ABA with a focus on teaching verbal behavior, but is truly simply ABA.

That said, what is ABA and what is verbal behavior? In 1938, Skinner published *The Behavior Of Organisms*, which described operant conditioning, or the process by which learning occurs as the result of selection by consequences of behavior. Skinner also discussed how antecedent stimuli, when correlated with the function altering effects of consequences, also alter future occurrences of that behavior. This is known as a three-term contingency (A-B-C), the basic unit of analysis of behavior, and was the first description of the discrete trial. In addition to describing the instructional trial, Skinner detailed the basic experimental methodology that led to his findings, which he termed the experimental analysis of behavior (EAB). Later applications of this science to education, and to other matters of socially significant behavior, by behavior analysts led to what is now known as Applied Behavior Analysis (ABA).

In 1957, as applied behavior analysis was developing and research on ABA was being published, Skinner published *Verbal Behavior*, which detailed a functional analysis of verbal behavior. What Skinner's text did was to extend operant conditioning to verbal behavior in order to fully account for the range of human behavior. Since the publication of *Verbal Behavior*, many applied behavior analysts, including Jack Michael, Mark Sundberg, Jim Partington, and Vince Carbone, have conducted and published research on verbal behavior, much of which can be found in *The Analysis of Verbal Behavior* journal. This body of research serves as the basic and applied foundation of teaching VB as part of an ABA program, or what is now sometimes referred to as AVB, as discussed above. The science of applied behavior analysis now has a solid empirical foundation to support it, due largely in part to Skinner and Ivar Lovaas.

In *Verbal Behavior*, Skinner outlined his analysis of VB, which describes a group of

verbal operants, or functional units of language. Skinner explained that language could be analyzed into a set of functional units, with each type of operant serving a different function. He coined terms that didn't exist (to separate these operants from anything described by traditional linguistics) for these operants. AVB is ABA with a focus on Skinner's analysis of verbal behavior; it is the application of the science of behavior analysis to teaching verbal behavior. While there is some debate among behavior analysts as to the merits of the "AVB" acronym, most of the concern revolves around the potential for an artificial distinction between ABA in general and VB in particular. To me, as long as it's understood that they are the same science, it's reasonable, though unnecessary, to discuss the application of Skinner's functional analysis of VB as "AVB," much the way we discuss the application of Skinner's science of behavior analysis as ABA. Whatever it's called, this application can look quite different from that of language instruction through discrete trial teaching (DTT); some of those differences are discussed in the next section. The primary verbal operants, which are most often initially discussed in relation to teaching children with autism, are echoics, mands, tacts, and intraverbals. Here I will briefly explain the functions of these operants and how they may be taught. I also want to touch on the *establishing operation* and how it relates to teaching language.

## **IMITATION REPERTOIRE**

In order to learn any skill, a child must have an imitation repertoire. Without imitation it is nearly impossible to teach anything. This is especially true for teaching language. To learn to sign, for example, a child needs to develop a good motor imitation (mimetic) repertoire; to learn to speak, the child needs a strong vocal imitation (echoic) repertoire. The echoic is the verbal operant that relates to vocal imitation. An echoic is verbal behavior whose form is controlled by someone else's verbal behavior with point-to-point (1:1) correspondence. What this means is that the child echoes exactly the speech of the teacher. For example, the teacher says, "Cookie" and the child says, "Cookie." In order for speech to be reinforced, it must occur. The echoic provides us with a mechanism for evoking speech such that we may reinforce it. If, for example, we wish to teach the child to say, "Mommy," but there is no echoic repertoire, we would have to wait until the child said, "Mommy" on his own and then reinforce it strongly. If instead we teach the child to develop a strong echoic repertoire, we can repeatedly say, "Mommy," the child can echo, "Mommy," and we can reinforce it many times, thus increasing the probability of the behavior (the word *Mommy*) in the future. Thus, you can see how a strong echoic repertoire is critical in teaching new language, since the child's ability to imitate vocally allows the teacher to create many opportunities for the child to use and be reinforced for speech. Echoics are key in teaching the other verbal operants as well.

## **MANDS**

The mand is verbal behavior whose form is controlled by states of deprivation and aversion; it is often said to "specify its own reinforcer." What this means loosely is that the function of a mand is to request or to obtain what is wanted. So if a child says

"Cookie," and it is functioning as a mand, that means the child is requesting the cookie. Think of *mand* as short for "demand" or "command." The way to reinforce a mand is to deliver the item manded for. So if a child says "Cookie," you'd give him a cookie. This positive consequence (reinforcement) of the mand will make it more likely that the behavior will occur in the future, i.e., that the next time the child wants a cookie, he will say cookie. So you can equate a mand with a request. We mand for a great many things every day without really thinking of them as mands: Desired items ("I want pizza for dinner"); information ("What time is it?"); assistance ("Can you help me"); missing items (given a bowl filled with cereal and milk, the child says "I need a spoon"); actions ("Play with me"); attention ("Mommy, look what I did"); negative reinforcement (removing something undesired/aversive) ("Turn off that loud music!"), etc., etc., etc. Manding is typically a first step in teaching language because it's based in the child's motivation. Manding typically increases language in general because, through the positive reinforcement delivered as a consequence for the mand, the child comes to associate the sound of his/her own voice with positive consequences.

Tied inextricably to the mand is the motivative/establishing operation (MO/EO). Technically, the MO/EO (as per Jack Michael, 1982) is a set of environmental events that temporarily alter the value of other stimuli/events as reinforcers and therefore evoke all behaviors that have produced these events in the past. The MO/EO relates to conditions of deprivation and aversion. When the child is deprived of something, the MO/EO for the item is high because the "not having" makes the item more attractive. However, once the child has access to the item, he becomes satiated and the MO/EO is low. For example, if a child who loves cookies has not had any for weeks, the MO/EO (desire) for cookies is probably very high. If you take a platter of cookies and offer one to the child, you could likely teach the mand for cookie fairly easily. You would hold up a cookie and say, "Cookie." If the child has a strong echoic repertoire, he will probably echo, "Cookie," which you then reinforce by giving the child the cookie. Once this has transpired several times, the child will begin to mand "Cookie" in the presence of the cookie when the MO/EO for it is strong because saying, "Cookie" has historically led to access to cookies. However, after the child has eaten the platter of cookies, the MO/EO is gone and the mand will probably not occur. Thus, as you can see, MOs/EOs are dynamic, not static, and are temporary. When teaching mands, you want to teach in a condition of deprivation, when the MO/EO for the stimulus is high. In mand training, there is an MO/EO for the target stimulus, which is also the reinforcer that will be delivered. The MO/EO is probably the single most important motivative variable in teaching children language, although it is typically not discussed outside the circles of verbal behavior.

## **TACTS**

Once the child has an echoic repertoire and has acquired a number of consistent mands, you can begin to teach the tact. The tact is verbal behavior that is under the control of the nonverbal environment and includes nouns, actions, adjectives, pronouns, relations, and others. This one you can think of as a label of something in the environment or vocabulary. The word *tact*, another of Skinner's intentionally "nonsense"

words, comes from the notion of the child's making "conTACT" with the nonverbal environment. Tacting is functionally very different from manding. If a child sees a cookie and says "Cookie," but maybe has just had dinner or a bunch of cookies and is satiated (there is no or a weak MO/EO), his saying, "Cookie" is not functioning as a mand, but as a tact. He could just as easily say "Hey, there's a cookie." We also do this all the time, in so many ways it's hard to enumerate, but think of it essentially as labeling. The way to reinforce a tact is NOT by delivery of the item named, because a tact does NOT specify its own reinforcer, as a mand does. You reinforce tacts with generalized reinforcers, essentially anything other than the item named. Naturally, praise or confirmation are typical means of reinforcement (i.e., to the child labeling "Airplane!" the mother says "You're right, it IS an airplane" and maybe ruffles the kid's hair). You can also reinforce with a primary/tangible reinforcer: "You're right, it's an airplane. Here's a cookie." Tacting is, in a way, most of vocabulary and makes up a huge portion of everyday language. It is usually the focus of many DTT programs, although echoics and mands are arguably far more important, especially when first teaching language. When teaching tacts, you want to teach in a condition of satiation, when the MO/EO for the stimulus is low. This is the exact opposite of mand teaching. To teach a tact, you would choose a stimulus for which there is no or a weak MO/EO and give the echoic, "Cookie" (after he's had his fill). When the child echoes, "Cookie," you could say, "Right, it's a cookie!" and reinforce with chips, or something else for which there's an MO/EO. In tact training, there is no MO/EO for the target stimulus, but there still must be a strong MO/EO for the reinforcer that will be delivered. Thus, the MO/EO is still critical in tact training, although it relates to the reinforcer that is now different from the target stimulus.

## **INTRAVERBAL**

Requests and vocabulary are obviously very important in language acquisition. Equally important is another operant, the intraverbal. The intraverbal is verbal behavior that is under the control of other verbal behavior and is strengthened by social reinforcement. Intraverbals are typically thought of in terms of conversational language because they are responses to the language of another person, usually answers to "wh-" questions. There are two classes of intraverbals, fill-ins and wh- questions. So if you say to the child "I'm baking..." and the child finishes the sentence with "Cookies," that's an intraverbal fill-in. Also, if you say, "What's something you bake?" (with no cookie present) and the child says, "Cookies," that's an intraverbal (wh- question). Intraverbals allow children to discuss stimuli that aren't present, which describes most conversation. With an intraverbal, what the child says in response to the adult's/peer's language does not match what the adult or peer originally said. Intraverbals can be reinforced in a number of ways, with praise, generalized reinforcers, or, naturally, with a continuation of the conversational exchange, i.e., "Wow, cookies! They smell great!" (to which the intraverbal response could be "Thanks" or "You can have some when they're done."). To teach an intraverbal, you would ask a question and prompt the response with an echoic, reinforcing based on the MO/EO when the child echoed the correct response. Obviously, it's unnecessary to explain why teaching conversation is important.

Hopefully, it is clear how all of these verbal operants, along with the MO/EO, come together in language teaching. Once the child has a strong echoic repertoire (or mimetic/motor imitation repertoire for sign) you can teach across all the functions of language by prompting echoically and reinforcing differently. We target these operants and teaches them through errorless learning (prompting and immediately fading prompts/transfer trials), mixing and varying targets, interspersing easy and hard tasks, and teaching to fluency. This combination of curriculum and teaching procedures has led to great success for many children with autism. It is important to point out that teaching VB can be effective for any student whose language is delayed or disordered, whether they will speak, sign, or use PECS (or other forms of augmentative communication), and whether they are early, intermediate, or advanced learners. The examples above are mostly for early learners, but all learners who need language instruction can benefit from ABA with a focus on teaching VB.

## EFFECTIVE TEACHING PROCEDURES

There are so many variables to control for when teaching children with autism. Rather than blaming the child when s/he isn't learning, we must always analyze the teaching. There are many data to indicate that certain teaching procedures are most effective in teaching language and other skills to children with autism. I'd like to discuss these procedures in some detail here and to explain why they are more effective than other popular procedures. You can find further discussion of some of these procedures on this site under [How to Improve Your Existing Program](#). Please keep in mind that none of these teaching procedures are specific to teaching VB, although they marry very well with doing so.

**Errorless Learning:** There is an entire section of this website devoted to the use of [errorless learning](#), especially as it relates to no-no-prompting. In addition to that explanation, I would like to say that errorless learning is one of the foundational teaching procedures of ABA/VB. Please see the discussion on this site for more detail.

**Mixing/Varying Targets and Tasks:** Mass trialing (presenting 10, 20, or some other number of consecutive trials on the same target) is not often used in ABA/VB. The preferred procedure is to mix and vary different targets and tasks. This means that we will switch among mands, tacts, intraverbals, receptive ID, RFFC (receptive by feature, function, class), TFFC (tact by FFC), motor imitation, echoics, etc. This makes "autipilot" (my affectionate term for the tendency of kids with autism to respond rote once they've "figured out" what you want them to do) impossible, since the child cannot simply respond identically 10, 20, or however many times in a row without actually attending, discriminating, and learning.

**Transfer Trials:** One of the most common complaints about errorless learning (EL) is that it "makes children prompt dependent." This can be true if the teacher doesn't properly fade the prompts. Transfer trials, in which prompts are immediately faded to allow for independent responses, are critical to success with EL. Rather than following a set prompt level to criterion, it is preferable to use most-to-least prompting and adjust

your prompting moment-to-moment according to the child's responses. A good rule of thumb to follow is that for every prompted trial you run, immediately run an unprompted, or transfer, trial. This procedure looks like this:

Teacher: "What is it? Cookie. (echoic prompt)"

Child: "Cookie."

Teacher: "Right. What is it? (no echoic prompt)"

Child: "Cookie." (Teacher immediately reinforces.)

You can see that the initial prompted trial was not reinforced, while the unprompted/transfer trial was. This differentially reinforces independent responding, which increases the probability that the child will respond before or without the prompt. This also prevents prompt dependency by making the prompt (which delays reinforcement) slightly aversive.

**Fluency Teaching:** Children need to be able to respond not only accurately, but quickly as well. Very few behaviors are truly functional when they occur with a long delay after the antecedent. Imagine asking someone you're meeting for the first time for their name and having them reply 10 seconds later. To be truly "mastered" and functional, behaviors need to have both accuracy and speed. This is teaching to fluency and is crucial for skills to be successfully acquired, retained, and generalized. To achieve fluency in teaching, the teacher needs to control for two variables: Latency and intertrial intervals. Latency is the time between the end of the antecedent and the beginning of the child's response. There should rarely, if ever, be a latency of longer than 2 or 3 seconds. The way to control for latency is with errorless learning. If the child does not begin to respond within those 2-3 seconds, the teacher should prompt, reinforce, and run the transfer trial. By prompting when necessary, you can keep latencies short and reinforce faster, independent responses. In addition to short latencies, you also want short intertrial intervals (ITIs). ITIs are the time between the end of the consequence for one trial and the beginning of the next antecedent. This can also be referred to as rate of teaching, since this variable is purely related to the teacher. Again, ITIs of no more than 2-3 seconds are preferable. Short ITIs allow for more teaching to be done in less time and keeps motivation to work high and motivation to escape or stim low.

**Interspersal of Easy and Difficult Targets:** Since the child always has three options for contacting reinforcement (escape, stim, or working with you) it is important to keep the value of working higher than the other two options. Another way to do this (besides EL and teaching to fluency) is to run about 80% easy targets and 20% difficult. This ratio may change slightly depending on the child, but the general idea is the same. By presenting many easy tasks and fewer hard ones (which are, in turn, made easier through EL) the child is reinforced more often, which results in both increased learning and elimination of the need to escape or stim.

There is much more to all of these teaching procedures, but this brief explanation will hopefully hint at some of the most effective ways to teach children with autism.

## **ERRORLESS LEARNING**

There is much discussion of what prompting strategies are most effective for children with autism. The two most-discussed prompting procedures are errorless learning and no-no-prompting. This is my take on errorless learning (EL), which will make the most sense if it's discussed in the context of no-no-prompting (NNP).

Prompting procedures differ across programs; while some DTT programs use NNP, others use EL; many use EL for acquisition skills and NNP for mastered skills; others use some combination of the two. I don't know of any ABA/VB programs that use NNP, though they may be out there; rarely is anything but EL used in such programs, if ever. However, DTT and NNP are not synonymous, which many folks falsely believe. I'll add that some folks adapt the NNP or errorless procedures slightly, so this may not be what some versions look like, but this is the gist of both. Determination as to the efficacy of any prompting procedure must be done on a case-by-case basis. And, again, this is my opinion, for folks to take or leave, although I've included some citations that support these statements (and from which much of this discussion stems). If anyone using NNP would like to email me with a contrasting opinion (preferably laid out similarly to this one) I'd be happy to discuss posting it here as another viewpoint.

NNP is intended, and used by those who do it correctly, to work on skills that are considered mastered, or (as some have said) for skills that have been in acquisition for a while, i.e., in random rotation. Unfortunately, this is not always done correctly; some begin teaching acquisition skills with NNP, which is not supported by anyone as an effective way to teach. This also begs the question of what is considered mastery, which is discussed elsewhere on this site. I'm not convinced that NNP is effective at any stage in teaching, for the reasons described below, but some others feel differently.

That said, with NNP, the teacher delivers an antecedent (i.e., "Point to the dog") and waits for the child to respond. Assuming the child in this example responds incorrectly, the teacher's consequence is to say "No," often also turning her head to the side. The antecedent is then delivered again and, assuming the child again responds incorrectly, the teacher again consequences with "No." The antecedent is then delivered again and the child is prompted to give the correct response, which is then praised. It's important to point out that most folks doing NNP use what's termed an "informational no," or "no equivalents" (such as "nope," "try again," etc.) meaning that it's not harsh, just neutral.

With EL, in contrast, the teacher delivers an antecedent and either prompts immediately (zero-second time delay) or waits a beat to see what the child will do. If the child begins to move to an incorrect response, or doesn't respond, the teacher immediately prompts the correct response and praises. The same antecedent is then presented again, this time as a transfer trial (meaning it's an attempt to have the child respond correctly without the prompt or with less of a prompt). If the child is correct independently, the teacher reinforces more strongly (differentially reinforcing the independent response)

and moves on. If the child again begins to respond incorrectly, the teacher prompts again, then usually moves on for a few trials to other targets. However, she soon returns to the missed target to try for an independent response, again prompting and trying for a transfer trial as necessary.

NNP is a system that uses least to most prompting, which (as the name implies) involves starting with less prompting and gradually increasing that prompt in response to errors. EL is a system of most to least prompting, which initially involves prompting with a 0 second time delay (meaning immediately) and gradually fading the prompts to foster independence. There are many errorless learning strategies, i.e., progressive time delay, intrastimulus prompting, etc., but the goal (to minimize or eliminate errors) is the same regardless of technique. While NNP may seem like it fosters independence, and may in some cases do so, in my opinion it can also teach a chain of errors, thin the reinforcement schedule such that learning can become aversive, slow the rate of teaching, make kids prompt dependent, and misuse the child's learning time. EL done correctly can and likely will prevent these teaching problems. Let me discuss why:

**NNP May Teach a Chain of Errors:** You get what you reinforce. That means that if you allow two (or any number of) errors and then prompt and reinforce a correct response, you may have chained those 3 behaviors together (wrong, wrong, right). For example, I had a student whose teacher had been using NNP with him. He'd been taught to answer the question, "What's your name?" this way. The teacher explained to me that he typically would answer with "Buh," which she'd consequence with "No"; this would happen a second time, after which she'd prompt, "Billy." This explained to me why when I'd asked him his name, he'd replied, "Buh-Buh-Billy." I thought he had a slight stutter, but it was just the way he'd been taught. EL aims to keep the rate of errors to a zero- or near-zero level, prompting (hopefully) before they happen so that the child doesn't spend his time practicing errors. Why is it useful to have a child be wrong twice before he's taught to be right? Were any of us taught that way in school? If we were, did we learn anything from it? The purpose of teaching is to show kids how to be correct so that they learn, not to prove that they don't know something by letting them be wrong. That may not be the aim of NNP, but it's sometimes the result of it. The logic of NNP really escapes me and I'm still waiting for someone to provide a great explanation of why it's done.

**NNP May Thin the Reinforcement Schedule, Making Learning Aversive:** We all want kids to find learning itself reinforcing. I achieve this through an ABA/VB/NET errorless learning approach by pairing myself with reinforcement, keeping demands low and reinforcement high, and having a roughly 80% easy to 20% difficult ratio of targets (and I make the difficult tasks easy through EL). Kids (like all of us) are reinforcement-seeking missiles; they will go wherever there is the highest level and best quality of reinforcement. At any given moment, as Vince Carbone describes so well, there are three ways that a child can get reinforcement: 1) Escape (socially-mediated negative reinforcement), which involves almost any behavior that results in not working, such as aggressive behavior, disruptive behavior, literal escape, etc.; 2) Stimming (automatic

reinforcement), which involves getting reinforcement from their own body; or 3) Learning (socially-mediated positive reinforcement), which is, obviously, working with you. Given this, what the teacher has to know is that she must constantly be at least as reinforcing as, and preferably more reinforcing than, escape or stim for the child. (This is called the matching law.)

Okay, so given all of that, let's compare quality and rate of reinforcement in NNP vs. EL. Let's say the child is presented with 300 trials during a session. If the teacher is doing NNP, each antecedent might be presented 3 times before the child is reinforced. If the child is making a lot of errors, this might result in the child's being reinforced for only 30% of the session. This could mean that the child is only reinforced 100 times in those 300 trials. Look at it the other way: That child spends 70% of the session being wrong. That low rate of reinforcement usually results in the child's seeking reinforcement from escape and/or stimming, where there's a higher rate of reinforcement.

With EL, the child is always right, whether as the result of prompted or independent responses, so the child is reinforced potentially 100% of the session, or 300 times in 300 trials. With that high rate of reinforcement, there's no need for the child to go to escape or stimming for reinforcement; it's right there in the learning.

Also, even difficult tasks are made easy through EL. No task in itself is inherently difficult, if you think about it; tasks seem easy or hard based on our skill set. For example, my husband is very good at math. He had good teachers who helped him and reinforced him such that he learned how to do math easily and well. He doesn't view math as a difficult thing. I, on the other hand, am not good at math (so forgive any errors in this post!) because I had terrible math teachers who told me to "figure things out myself," so I didn't get any reinforcement for math and never learned how to do math well. I, consequently, view math as a difficult thing. It's all in your perspective. What seems difficult can be made easy through good teaching, which involves effective prompting. Kids who are taught with errorless learning don't know the difference between easy and difficult tasks because the easy ones are those that they can do independently, for which they receive reinforcement, and the difficult ones are those for which they require prompting, for which they also receive reinforcement. In that scenario, what's difficult?

With NNP, by contrast, the difference is usually very clear. When the child is wrong, they hear, "No" (or something like it), get no reinforcement, and have to try again at the risk of being wrong again. This is very clear and delineates easy and difficult tasks sharply. Easy tasks are those that result in reinforcement and difficult tasks are those that result in "No" and no reinforcement. Given the percentages I mentioned above, that can mean 70% difficult and 30% easy, which is far from the 80% easy and 20% difficult of EL.

**NNP May Slow the Rate of Teaching:** There are reams of data that show that a high rate of teaching results in better learning for the student, so we aim to keep that rate

high. Rate of teaching is mostly determined by two things: 1) Latency, which is the amount of time between the end of the antecedent and the start of the child's response. So if I say, "Point to the dog," and 2 seconds later the child raises his hand to point, that's a latency of 2 seconds; and 2) Intertrial intervals (ITI), which is the amount of time between the end of one consequence and the beginning of the next antecedent. So if the child correctly IDs the dog, I say, "Great!" and then 2 seconds later I say, "What's this?", that's an ITI of 2 seconds. Both latency and ITIs need to be short to get the most teaching done in the least amount of time.

With NNP, the rate of teaching can be pretty low, due to the no, no, prompt structure. Since the teacher may have to wait for the child to respond (as we've seen, often incorrectly) twice before prompting, this can slow things down. Much of this depends on how long a latency is permitted before the teacher consequences.

With EL, usually there's no more than 2 seconds latency permitted before a prompt is given, and teachers aim to have no longer than 2 second ITIs, so in an hour-long session, that means that hundreds of targets would be presented. This is another consideration when choosing a prompting procedure.

**NNP May Make Kids Prompt Dependent:** The argument typically made against errorless learning is that it makes kids prompt dependent. If EL is done correctly, this is not at all true. After every prompted trial, the teacher should go back and try for the transfer trial, in which there's no prompt, in order to get an independent response. These independent responses are reinforced much more strongly than the prompted ones, which typically results in learning, since the child wants the better quality reinforcement that comes with independent responding. EL will only make kids prompt dependent if these transfer trials aren't part of the teaching.

NNP, however, can and sometimes does make kids prompt dependent. The reason for this is that unless the child is correct the first time, he will often be wrong until he's prompted. Kids quickly learn that they can be wrong twice and then be prompted, so there's no need for them to respond independently. This can be combatted with differential reinforcement, but it often isn't. Think about it: If you were essentially told "No" almost every time you responded to something, you'd stop responding pretty quickly. I know that most NNP proponents say that the child learns from his errors, but all he may learn is that he was wrong, not how to be right. This also prevents the student from practicing being correct and from being reinforced for being correct, which is what leads to learning (behavior contacting reinforcement). Punishing incorrect behavior does not necessarily evoke correct responding that can then be reinforced.

**NNP May Misuse the Child's Learning Time:** I think the above illustrates this point pretty well, but it's worth saying outright. Good teaching can eliminate almost all errors so that the child spends the maximum amount of time learning. NNP may do the opposite, which seems to me to demonstrate that it's not necessarily effective teaching.

When a child is wrong, it's rarely helpful, no matter what people say. Being right, and more importantly, being reinforced for being right, is how you learn. Instead of practicing errors, as kids may do with NNP, they are practicing successes with EL. There's no downside to that.

My last point is that there are few, if any, data to support the use of no-no-prompting; it's sort of an anomaly. If you want to read up on errorless learning in the journals, so that you're not restricted to my information, here are a few great studies explaining these issues:

Heckaman, K., Alber, S., Hooper, S., and Heward, W. (1998) A comparison of least to most and progressive time delay on the disruptive behavior of students with autism. *Journal of Behavioral Education*, 8, 171-202.

Touchette, P.E. & Howard, J. (1984) Errorless learning: Reinforcement contingencies and stimulus control transfer in delayed prompting. *JABA*, 17, 175-181.

Also see: Terrace, 1963; Sidman and Stoddard, 1966; Sailor, Guess, Rutherford, and Baer (1968); Reese, Howard, and Rosenberger, 1977; Etzel and LeBlanc, 1979; Altman, Hobbs, Roberts and Haavik, 1980; Carr, Newsom and Binkoff, 1980; Weeks and Gaylord-Ross, 1981; Touchette and Howard, 1984; Carr and Durand, 1985; Lancioni and Smeets, 1986; Woolery, Bailey and Sugai, 1988; Durand, 1990; Horner and Day, 1991; Woolery, Ault and Doyle, 1992; Cameron, Luiselli, McGrath and Carlton, 1992; Cameron, Ainsleigh and Bird, 1992; Sprague and Horner, 1992; Smith and Iwata, 1997; Woolery, Ault and Doyle, 1992.

## WHAT IS NET?

Many people think of ABA as a child and teacher at a table, with instructional materials, a program book, and reinforcers spread out in front of them. In truth, this is more the case with structured teaching (usually DTT). However, ABA is more than DTT, more than structured teaching. Students must learn to learn in all environments, not first in one and then taught to generalize to others. Environmental contingencies (the way in which the environment is arranged, so to speak) has a lot to do with stimulus control. In order to generalize well and easily, generalization must be built into teaching from the beginning, and one way to do this is with Natural Environment Teaching (NET).

NET is not complicated, although those coming from a purely structured teaching model may have difficulty adjusting at first. Luckily, students rarely do. In a nutshell, NET is teaching the student away from the table (the structured teaching setting). Good ABA programs generally involve both NET and structured teaching, since there are certain skills that are difficult to teach first in the natural environment, such as academics. In NET, the teacher has a curriculum in mind (what to teach) and makes it portable. Following the student's MOs/EOs initially, the teacher generates ways to teach the curriculum using those MOs/EOs and the materials in the natural environment. Here, the cliché that "The world is a classroom" really applies; learning is not dependent on a table or particular set of materials.

One important variable in NET is instructional control. It is often easier to maintain instructional control at a table, but that is often accomplished through socially mediated negative reinforcement, or working to escape work. This is the student-teacher dynamic in which the student works for "breaks," or time away from the table. Generally, teachers can only get through 3 or 4 trials before needing to reinforce with a break; any more than that and they may start to "lose" the student. The reason for this is typically that the reinforcement value of learning is fairly low, and that the reinforcement value of escape from learning is much higher. These two factors are in constant flux; a balance of difficult tasks with easier tasks combined with the teaching procedures mentioned elsewhere on this site will keep the reinforcement value of learning high. Failure to use those teaching procedures will raise the reinforcement value of escape higher than that of learning and will result in the student's attempting to escape work through tantrums, aggression, or other undesired behavior. In this situation, students will tolerate a brief period of instruction that is over just before the value of escape becomes higher than that of learning. This is no way to teach, as it breaks up the rate of instruction and prevents fluency.

A better way to establish instructional control is for teachers to first pair themselves with positive reinforcement (pairing). Pairing begins with noncontingent reinforcement, meaning that the student is first reinforced without having demands placed on him or her. Technically, the reinforcement is still contingent, as there must be an absence of undesired behavior (tantrums, aggression, SIB, etc.) for reinforcement to be delivered. Initially the only requirement for accessing reinforcement (besides the lack of undesirable behavior) is that the student take the reinforcers from the teacher. After this is happening consistently, the teacher must gradually fade in demands, slowly

increasing the response requirement before reinforcement is delivered. Eventually the teacher will be able to present more trials of varied difficulty without lowering the reinforcement value of learning and increasing the value of escape. Pairing is slightly more involved than that, but essentially involves 3 elements which must be in close association with each other: 1) The student; 2) the teacher; and 3) the student's MOs/EOs and reinforcers. The teacher must capture and contrive MOs/EOs and identify strong reinforcers, with which she can pair herself, in order to become a reinforcer herself. Once this happens, everything associated with the teacher, especially learning itself, will become reinforcing. One tip: If the student's situation doesn't change for the worse (read: if the level of reinforcement doesn't decrease) when the teacher leaves the room, the teacher isn't pairing correctly. The teacher must be the conduit directly through which the student gains access to reinforcement. It is not enough to be in the room with the reinforcement while the student is contacting it; the teacher must be an integral part of it.

To describe this in more scientific detail, when you pair yourself with positive reinforcement, what you're technically doing is conditioning yourself as a reinforcer. Some stimuli start out as reinforcers, meaning that they strengthen behavior, even though a person has never had any contact or experience with them before. These stimuli, such as sleep, food, drink, sex, etc., are called unconditioned reinforcers. There are also unconditioned punishers, such as pain, that weaken behavior even without prior contact or experience. When stimuli are unconditioned, we don't have to be taught to "like" or "dislike" them; they're tied to some biological need and are therefore classified right out of the box. While these unconditioned stimuli are very important, most of the reinforcers and punishers we traffic in aren't unconditioned; they are conditioned. This means that the stimuli, through being paired with other reinforcers or punishers, take on some of their reinforcing or punishing properties. We gather conditioned reinforcers and punishers through our experience and history with the environment. Since we all experience the world differently, the complete list of our reinforcers and punishers is sort of our experiential thumbprint, different from everyone else's. In other words, we learn through experience to "like" or "dislike" things, which means that they will either increase or decrease certain behaviors when presented as consequences for those behaviors.

Given all that, when you're attempting to pair yourself with positive reinforcement, or condition yourself as a reinforcer, you're likely going to start by associating yourself with a range of unconditioned and conditioned reinforcers. So you'll identify foods, drinks, toys, games, videos, computer games, physical/social reinforcers, etc., to associate yourself with. The more directly you are involved in providing your child with access to reinforcement, the more you will be paired up with that reinforcement. The child should always have to go through you to get what he wants; otherwise, he's just accessing reinforcement while you're in the room, which isn't enough. You have to be a key part of the reinforcement: Handing the food, drink, or toy to the child, playing the game with him, helping him bounce, pushing him on the swing, turning on the TV or computer, etc. If he doesn't have less fun when you leave the room than he does when you're there, you're not pairing, because the access to reinforcement must not really involve or be dependent on you. You have to make the reinforcement happen, not just be there while

it's happening. It's the difference between chipping in on a lottery ticket with a friend and picking half the winning numbers versus going with your friend when she picks the numbers and buys herself a winning ticket. For more info, see Yoon, So-Young, and Bennett, Gina M., Effects of a Stimulus-Stimulus Pairing Procedure on Conditioning Vocal Sounds as Reinforcers, Analysis of Verbal Behavior, Vol. 17

Pairing must take place for instructional control to be gained in both natural and structured environments. However, it is especially important in NET because the student is moving from environment to environment with the teacher. If the teacher doesn't have instructional control, it will be very difficult to teach in the natural environment. Once pairing has been done, however, the teaching should start. It's very difficult to give blanket descriptions of NET, since it's so dependent on creativity and motivation, so here are some examples of how to teach in the natural environment:

° **Manding**: The student wants to go on a swing outside. The teacher gets a mand for "Swing" (at whatever level the student can mand) and then begins chaining in mands. The teacher tells the student to get his "socks" and "shoes," each of which he must mand for, as well as perhaps manding for "help" to get them on. Then the teacher can block the door to the backyard, prompting the student to mand, "Move" or "Excuse me." Once she moves, the student can mand to "Open" the door, then again for the "swing," to "get up," get a "push," go "faster," "higher," etc. This will squeeze several mands out of just one. However, be careful not to chain in too many mands too soon, or the student's MO/EO may be lost.

° **Receptive ID and Tacting Colors**: The student enjoys playing with playdoh. The teacher begins to make favorite shapes and then allows the student to mand for what to make. The teacher can ask the student to give her the "yellow" playdoh to make Big Bird, the "blue" playdoh to make Blue from Blue's Clues, the orange playdoh to make Chuckie's hair (from Rugrats), etc. The colors become motivating themselves because they're used to make the characters that the student loves look more accurate and realistic. You can also build in tacts of the colors and characters, echoics of the characters' catchphrases, etc.

° **Intraverbal Fill-ins**: The student loves music, so the teacher sing some songs while playing and leaves out key words from the songs, i.e., "The wheels on the..." or "Head, shoulders, knees, and..." Gross motor imitation of the movements that go with the songs, receptive ID and tacting of body parts in the songs, and echoics can also be worked in.

**The important elements of NET are to keep in mind are what you want to teach, to identify MOs/EOs that will create strong reinforcers, to be creative in figuring out how to teach the target skills using those MOs/EOs, and to have fun. When the curricular targets are functional and made to be motivating through good teaching, much can be accomplished in the natural environment.**