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Antecedent Analysis

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Editors' Note: We hope you enjoy the following article on Antecedent Analysis. It is another installment in the continuing series of articles we plan on the topic of Behavioral Assessment and Functional Analysis. Let us know what you think.

Introduction

This article attempts to describe in more depth than previously described (e.g., LaVigna & Willis, 1995; Willis & LaVigna, 1996a; 1996b) the contribution of a thorough “antecedent analysis” as part of a Behavior Assessment and Functional Analysis. A complete antecedent analysis identifies two sets of antecedents, i.e., those events, conditions, situations and stimuli associated with a higher probability of problem behavior and those associated with a lower probability of problem behavior.

Occasionally, people use the term “precursors” interchangeably with the term “antecedents.” In our work, we use those terms with reference to two very different things. “**Precursors**” refer to client behavior that is often (not necessarily always) displayed prior to “target behavior.” Precursor behavior signals to us that the target behavior may soon occur. Importantly, when the precursor

is observed it gives us an opportunity to respond in an attempt to prevent the occurrence of target behavior. In contrast, an “**antecedent**” is an environmental event, situation, condition, or stimulus which increases or decreases the likelihood of target behavior and/or its precursors.

Here is an example that may clarify the distinction between precursors and antecedents and how

each might be used as part of a support plan. A person may display high rate, stereotypic arm flapping as a precursor to self-injurious behavior. Knowing this, if we see such arm flapping, we may be able to do something to prevent possible escalation to self-injurious behavior (e.g., Active Listening, help solve the problem). We may further determine through our behavioral assessment and functional analysis that criticism is an antecedent that makes self-injurious behavior and its precursor, (high rate, stereotypic arm flapping) more likely and that being verbally praised is an antecedent that makes self-injurious behavior and its precursor less likely to occur. Knowing this, of course, we may want to avoid criticism and provide ample verbal praise, even as we may be using positive programming (LaVigna, Willis & Donnellan, 1989) to teach this person how to cope

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Editors' Note...

For us, this is a very exciting issue of *Positive Practices*. Harry Guetherman from Montana wrote asking us to clarify the distinction between "chain interruption" and "stimulus change." We have wanted *Positive Practices* to provide a forum for give and take among people who are interested in advancing positive practices. "Letters to the Editors" seems like a good place for some of this to occur. After two years, it is nice that Harry has taken advantage of this virtually under utilized mechanism. We hope many more of you will do so in upcoming issues. Our "Letters to the Editors" column also has a communication from Celine Wooding in Australia telling us that she was successful in using *Positive Practices* to find a pen pal. Way to go Celine!

We are very sad to tell those of you who have not heard previously that Albert Kushlick passed away this past August. We are sure many of you were aware that Albert had battled serious heart problems for many years. In spite of this, his remarkable ability to think positively about his life and the exciting things that he was doing, both personally and professionally, and to minimize his thoughts about the things he couldn't do anything about, made him a remarkable man. Albert lived fully and with verve every day of his life. We are very fortunate that we could count him as one of our friends and as one from whom we learned much, both about life and about working in our field.

One of the highest compliments we have received was his interest in and adoption of our work at IABA in his own professional practice as a Psychiatrist in Great Britain. We were proud to publish an article written by him and his colleagues in the immediately preceding issue of *Positive Practices*. Albert's wife Dee told us that he was very pleased to receive his copy of the newsletter just three days before he went into the hospital that very last time.

Albert, we will miss you terribly. Thank you for your wisdom and your inspiration.

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Suzanne Wishes to Retire: A Case Example

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Editors' Note: Terry Belcher attended our recent four day seminar in Boston. When he got back to the office he quickly mailed to us the following article. He felt it captured both the letter and the spirit of some of the things we said in Boston as to the effects of quality of life on behavior. After reading it, we couldn't agree more. We hope you enjoy it as much as we did.

An adequately supported, leisurely, and comfortable retirement at whatever age one chooses is the dream of many middle class Americans. People with learning difficulties quite often can anticipate neither a leisurely nor a comfortable retirement. Currently, retirement for a person with a learning difficulty usually involves simply a continuation of services for younger persons. Retirement activities frequently take place in settings such as segregated sheltered workshops, work activity programs, or day activity centers (Laken, Anderson, Hill, Bruininks, & Wright, 1991; Browder & Cooper, 1994). The call for a more "normal" retirement for people challenged by a developmental disability and more "normal" retirement activities is being made (Hawkins, 1993).

For two years Suzanne clearly stated her desire to do something other than work during the day. She did not like getting up early on weekdays. She loved seeing and interacting with animals; and she loved to go to Dunkin' Donuts for coffee. Suzanne is a 54 year old woman with a severe level of learning difficulty who spent 31 years in a state institution and then over five years in a segregated pre-vocational training program. She did not enjoy this day program and communicated her dissatisfaction by creating significant problems. Her discontent was expressed by screaming, work refusal, purposeful urination and

defecation, self-abuse, aggression against others, and general tantruming on a regular basis.

Suzanne also displayed her displeasure with work at her small community based home with problems getting out of bed and ready for work in the morning. The process of getting ready to go to work each day was often long and disturbed. Suzanne would yell and scream that she did not want to go to work; she wanted to stay home. She would also hit people, throw objects, destroy property, purposefully urinate and defecate, and generally create chaos to voice her displeasure at going to work.

Of Suzanne's difficult behav-

iors at home 25% occurred in the morning as she was getting ready to go to work. At her sheltered workshop Suzanne acted in the same manner. For 13 consecutive months at home and work Suzanne averaged 22.2 behavioral episodes per month.

The manager of the home where Suzanne lived decided to approach her residential agency with the idea of Suzanne retiring from the sheltered workshop. The manager reasoned that Suzanne's communication of her wishes should be listened to. The manager had listened and understood that retirement would improve Suzanne's life satisfaction. The idea of retirement was warmly received until the question of funding arose. The State Department of Mental Retardation could not allocate funds for Suzanne's retirement. Money was just too scarce. The executive director of Suzanne's residential agency studied the issue and decided that the agency alone would fund Suzanne's retirement, if that would make her life better.

On September 25, 1995 Suzanne officially retired from her pre-vocational training program. Suzanne's residential agency made arrangements for a staff person to support Suzanne's new activities as well as provided a car for her use. It took Suzanne approximately one month to fully comprehend that she did not have to go to work anymore. She was retired.

Suzanne began to smile. She could now sleep till 9 or 10 AM every day. She could do things she liked to do. She volunteered at the local animal shelter. She started talking more often and more spontaneously. She bought more CD's of her favorite classical music to listen to. And, she could go to Dunkin' Donuts for coffee whenever she wished. Her behavioral episodes decreased by 89% after six months of retirement (from 22.23 per month to 2.50 per month).

An adequately supported individualized retirement for people challenged by a developmental disability is a concept that is beginning to gather serious notice and consideration (Browder & Cooper, 1994). Funding sources need to become involved more sincerely in planning for and implementation of these services. We should not allow retirement services for people with learning difficulties to become "retirement programs" in the same fashion as supported employment became sheltered workshops. Suzanne speaks of the need for a person centered individualized retirement similar to that envisioned, planned, and often achieved by the average American citizen.

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Continued from page 1

with and tolerate the kind of criticism he may get in the real world, without engaging in self-injurious behavior and, perhaps, its precursors.

As environmental occurrences, antecedents are more than events in the external environment. Antecedents may originate in the external environment, in the internal or organic environment, and/or in the mental environment. Antecedents that originate in the person's *external environment* usually can be seen, heard, felt or smelled by others. An observer can experience these events through their own senses. For example, for a given person, criticism, being pressured to perform a nonpreferred activity, and being touched may be antecedents in the presence of which certain behaviors have a higher probability of occurring (i.e., high probability antecedents). On the other hand, being verbally praised, engaging in a highly preferred activity, and being with a particular person, may be antecedents in the presence of which the same behaviors have a lower probability of occurring (i.e., low probability antecedents).

Antecedents may also originate in the person's *internal or organic environment*. These are not so easily determined by others. They may be reported by the person; may be inferred from the way the person presents himself at the time of the incident; or may be inferred or extrapolated from available medical or other records. For example, a hay fever episode and being hungry may be internal antecedents in the presence of which certain behaviors (e.g., physical assault) have a higher probability of occurring, while feeling well rested, feeling well and feeling full, may be internal antecedents in the presence of which certain behaviors (e.g., physical assault)

have a lower probability of occurring.

Finally, antecedents may originate in the person's *cognitive or mental environment*. Thoughts of being persecuted, delusional thoughts (i.e., those associated with mental illness or even certain internalized rules (such as "physically confront and challenge anybody who has insulted your mother"), may be high probability antecedents and being confident in one's abilities, reminding yourself about the goals you are working on, or certain other rules (such as "sticks and stones may break my bones, but names will never hurt me"), may be low probability antecedents in the *mental environment*.

The antecedents that control the higher or lower likelihood of behavior can occur singly or in combination. In most instances, all three environments interact to determine whether a behavior will occur or not. How you behave now or tomorrow is likely to depend on how you feel at the moment (i.e., internal environment), what you believe (i.e., cognitive/mental environment), and the conditions that are present at the time (i.e., external environment). In addition, the antecedents that control our behavior do not always occur "immediately before the behavior." They can vary in terms of their proximity to the target behavior and/or its precursors or to the absence of these behaviors. This leads us to a discussion of a special class of antecedents known as "setting events."

"Setting events" are antecedents that can occur considerably earlier in time, perhaps hours, days, weeks, months or even years earlier, that have an impact on a person's behavior. Bijou and Baer (1961) illustrated the role of setting events and their effect on everyday behavior in the following example. "One mother, who routinely puts her eighteen-month-

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old son in a playpen after his afternoon nap, has found that during the next hour, the baby will play with his toys, try some gymnastics on the side of the pen, and engage in vigorous vocal play - but will not fuss (and so mother has free time for an extra cup of coffee and a few telephone calls). However, one day the baby is kept awake during his entire nap time by the unusual and persistent noise of a power mower on the lawn outside his bedroom window. When his mother puts him in the playpen this time, he whimpers, cries, is generally fussy, and does not play” (Bijou & Baer, 1961, p. 21). In this instance, the failure of the child to get his nap (i.e., he is tired) is a setting event that affects his behavior later when he is placed in the crib, as mother usually does. Also recognize that having the nap earlier is a setting event that affects his behavior quite differently when he is later placed in the playpen.

Bijou and Baer (1961) go on to describe a number of other “set-

ting events” that can influence behavior, including “...changes in the usual sleep cycle or eating cycle; changes in the organism following injury, disease, surgery, or drugs; and any relatively prolonged deprivation of social contact, or, similarly, any current satiation of such stimuli. A setting event of particular significance is the use of verbal instructions, such as telling a child ‘now be a good boy’ or ‘Santa won’t bring you any toys unless you behave yourself.’ These setting events may change his behavior for some time afterwards, especially in that the proportion of ‘good’ behaviors increases and that of ‘bad’ behaviors decreases” (Bijou & Baer, 1961, p. 22).

People sometimes have difficulty distinguishing “setting events” from immediate antecedents or, as they are frequently termed, “triggers.” While “setting events” may occur some distance in time before the behavior, the “trigger” has immediate proximity to the behavior or its absence. In

other words, we can say that a “setting event” sensitizes the person to the “triggers” that occur in their environment; or predisposes them to act in a certain way in the presence of those triggers. For example, have you ever been in a bad mood? Isn’t it true that whether you give your kids money upon request is partially dependent on your “mood.” In a bad mood, you may be likely to ask them to justify the need, or you may simply say “no.” In contrast, given you are in a good or even euphoric mood, the same request may result in you saying “Sure! Here is \$10 extra and the keys to my new car.” In this scenario, the mood is a “setting event,” while the request for money is the immediate “trigger.” Table 1 further attempts to illustrate the differences between “setting events” and immediate “triggers.”

Setting events and triggers rarely act as isolated events to influence behavior. Rather, some mix of setting events and triggers typically combine to influence the

Antecedent Analysis	
Examples of Antecedents That Might Increase the Likelihood of Challenging Behavior	Examples of Antecedents That Might Decrease the Likelihood of Challenging Behavior
<p>Setting Events:</p> <ol style="list-style-type: none"> 1. Organic Environment: Having a headache and/or being tired. Neurologically based poor impulse control. 2. External Environment: Boredom and lack of interesting activities; a low density of noncontingent reinforcement. 3. Mental Environment: Belief that short people are not as important or as good as other people and seeing oneself as a short person. <p>Triggers:</p> <ol style="list-style-type: none"> 1. Organic Environment: A sudden onset of an extreme migraine headache or the pain of hitting oneself on the thumb with a hammer or of getting one’s hand caught in a door. 2. External Environment: Being criticized and/or having to wait for something. 3. Mental Environment: Concluding that you just made a bad mistake or just made a fool of yourself. 	<p>Setting Events:</p> <ol style="list-style-type: none"> 1. Organic Environment: Being well rested and full after eating dinner. 2. External Environment: Having a schedule of interesting activities in which to engage; a high density of noncontingent reinforcement. 3. Mental Environment: Believing that “sticks and stones may break my bones but names will never hurt me.” <p>Triggers:</p> <ol style="list-style-type: none"> 1. Organic Environment: Turning a fan on to cool down and/or having a cold drink when it is hot and humid. 2. External Environment: Being complimented and/or being invited to go for a ride to get an ice cream cone. 3. Mental Environment: Mentally reminding oneself to “do unto others as you would have them do unto you.”

Table 1- Examples of Setting Events and Triggers

probability of behavior. Sometimes this combined effect may be an interactive effect. For example, a high probability setting event might be feeling sick and feverish and a trigger may be criticism. Feeling sick might not be sufficient to increase the probability of problem behavior by itself, nor might not criticism. However, when they are both present, these two antecedents might *interact* and combine together to increase the probability of target behavior and its precursors. At other times, this combined effect may be an additive effect. For example, consider the following: dinner has burned, the person we usually eat with has dinner plans elsewhere, our favorite TV show has been preempted for a political speech, it's raining out and the newly planted flower bed is being washed away, and the roof is leaking. It may be that any one, two or even three of these five potential triggers will *not* increase the likelihood of target behavior. However, *any* four may *add* and combine together to increase the probability of problem behavior. The concept here is that there may be a "straw that breaks the camel's back."

Finally, an antecedent analysis recognizes that the interaction between an antecedent and target behavior isn't only in one direction. That is, antecedents (as environmental events) and behaviors can interact back and forth to influence the course of the behavior (Willis & LaVigna, 1996b). For example, a complex set of antecedents may "trigger" precursor behavior. If staff react one way to precursor behavior, this may increase the likelihood of target behavior, but if they react in yet another way, this may decrease the likelihood of target behavior. Let us illustrate this with a hypothetical example. Suppose you know that a person's aggression has the typical precursor of verbalized profanity. Suppose you

know further that if staff respond to verbal profanity with a verbal reprimand it increases the likelihood of target behavior but if they respond with active listening (Gordon, 1970), the likelihood of aggression is sharply reduced. This might suggest the utilization of active listening vs. verbal reprimands as part of this person's support plan. If verbal profanity is of sufficient concern, strategies other than verbal reprimands can be employed.

As described above, the goal of an antecedent analysis is to identify those antecedents which make target behavior and its precursors more likely and less likely **and** to identify those antecedents that are *more* likely to *escalate* precursor behavior to target behavior and those that are *less* likely to *escalate* precursor behavior to target behavior and thus resolve the situation without the occurrence of target behavior. But antecedent analysis does not stop at the occurrence. Rather, antecedent analysis continues to be important even after the target behavior occurs. Specifically, the reactions that people have to the problem behavior can make it worse, can improve it, or can have no effect at all. Thus, one purpose of the antecedent analysis is to identify those reactions and interactions of others that (1) *increase* the likelihood that the episode continues and/or escalates; and (2) *decrease* the likelihood that the episode continues and/or escalates thus increasing the likelihood that the episode stops and/or de-escalates.

For example, you may learn that if staff respond to a person's aggression by trying to physically control the person, this escalates the episode and makes injury more likely to occur. In contrast, you may also have learned that if staff simply turn and walk away, the person will not attempt to chase and hit them and the episode will

subside. Given this antecedent analysis, our reactive strategy might very well include "turning and walking away" with very clear instructions to staff not to "physically attempt to control" the person. If we are concerned about reinforcing this behavior with this counter-intuitive strategy and fear inadvertently creating a counter-therapeutic effect, we can address this concern in our proactive plan (LaVigna & Willis, 1997).

To summarize, the role of an antecedent analysis includes the identification of those environmental events that: 1) increase the likelihood that target behavior and its precursors will occur; 2) decrease the likelihood that target behavior and its precursors will occur; 3) increase the likelihood that precursor behavior will escalate to target behavior; 4) decrease the likelihood that precursor behavior will escalate to target behavior; 5) increase the likelihood that target behavior will continue and/or escalate; and 6) decrease the likelihood that target behavior will continue and/or escalate.

Methods of Antecedent Analysis

Antecedent analysis may not be simple; it can be quite involved. Indeed, without a proper understanding of what information needs to be gathered and the methods used to gather the information, an antecedent analysis could yield very little that is truly useful. In this section, we describe a number of methods that can be helpful in gathering information for the purpose of identifying both the high probability and the low probability antecedents. These methods include a variety of data collection strategies, interview techniques, records review, and observations of and interactions with the person.

Before we begin, we would like

to articulate the difference between an information gathering question and a question that yields conclusions. We find that the distinction is not always clear when carrying out an assessment. Table 2 illustrates the two types of questions.

Information gathering questions are designed to elicit facts on the basis of which we can draw conclusions. In contrast, conclusionary questions ask people being interviewed to “infer” from their experiences. The information gathered with these conclusionary questions may not be useful or provide valid answers. We think it will be helpful for you to keep the distinction between information gathering questions and conclusionary questions in mind as you consider the following methods we describe for carrying out an antecedent analysis.

Data Collection Strategies.

Perhaps one of the most utilized methods of data collection to assist in a functional analysis of behavior is the well known *A-B-C method of data collection*. In this approach, staff are instructed to record the Antecedents (A), Behavior (B) and Consequence (C) for every occurrence of a target response. The idea is that the patterns of A-B-C's that emerge can help to identify the antecedents, consequences and functions of the behavior.

As typically used, however, we find this method inherently limited. For one thing, it is usually structured to identify the high probability antecedents only. This limitation occurs since staff are usually only asked to describe the antecedents for an actual occurrence of target behavior. If anything, these are more likely to be the antecedents associated with the higher rather than the lower probabilities of the behavior. This is not to say that this method could not be used as an aide in identifying the low probability an-

tecedents. It, however, would be necessary for staff to describe what is happening at periodic times throughout the day when the behavior is not occurring. We have seen such information gathering around the non-occurrence of problem behavior very, very rarely.

The A-B-C method has a second limitation, even if it is used solely to identify higher probability antecedents. The A-B-C method of data collection is usually recommended as an *Information Gathering Tool* to help answer *Conclusionary Questions*. Unfortunately, those using the A-B-C method often understand the task itself as a conclusionary one; in other words; they put the cart before the horse. When they are filling out an A-B-C sheet they write in the “A” box what they *think the trigger is*, rather than write their description of *what was happening just prior to the occurrence of the target behavior*. This is probably why we all too often see the statement “no apparent antecedent” in the “A” box. What they

mean is “no apparent *trigger*.” However, we may only be able to figure out what the triggers are after we have collected a lot of information about what happens prior to target behavior occurrence and what tends to be happening when target behavior is absent.

For example, we recently had a chance to review an A-B-C sheet filled out by staff who were supporting an adolescent boy who would frequently dash out into the road, apparently being oblivious to oncoming traffic. This “dashing” was the target behavior. They indicated on the A-B-C sheet that “there were no known antecedents.” In talking to us, they said that they (i.e., two staff) were simply walking down the street (meaning the sidewalk) with David (his fictitious name) and he dashed into the road without warning. In discussing this event with them, we agreed that they may not have been able to figure out what “triggered” the behavior. However, in our discussion we concluded that it might be helpful if we simply

Sample Information Gathering Questions	Sample Conclusionary Questions
1. What was he doing just prior to engaging in the target behavior?	1. What antecedents make this behavior more or less likely to occur?
2. Who had asked him to do that?	2. Where is this behavior most likely to occur?
3. How was the request made, e.g., what tone of voice was used; was it authoritarian and/or parental in tone or was it egalitarian in tone, as you would use with a peer of whom you were making a request?	3. During what activities is this behavior least likely to occur?
4. You said that last Saturday he did not exhibit any of these target behaviors. How had he spent that day?	4. With whom is this behavior least likely to occur.
5. Who was his support staff last Saturday?	

Table 2 - A Comparison of Information Gathering and Conclusionary Questions

described the events, conditions, situations and stimuli present just prior to the behavior. We suggested that after we gathered information such as this for a number of events, we might *then* be able to determine the trigger. The following are examples of the information that could have been placed on the A-B-C sheet in the "A" column: 1) Where they were coming from; 2) Where they were going to; 3) Had this been explained to David; 4) Was this a destination of his choosing or of his liking; 5) Who was with him; 6) Who had talked to David last; 7) What had been said; 8) What was on the other side of the street; etc.

Further, we discussed that it could be very revealing to ask these sorts of questions for those times he goes for a walk and does not dash into the street. If we gathered such information, we might then be able to identify some antecedents associated with both the higher likelihood and the lower likelihood of the target behavior.

To help the staff who are doing A-B-C data collection, remember that we are asking for *information* rather than for *conclusions*, we sometimes provide a more specific list of questions to prompt the information we are seeking. For example, the "A" box would ask for a list of the people present; the time of the occurrence; the setting in which the behavior occurred; the activity at the time of occurrence; the events immediately preceding each occurrence, including the closest verbatim record possible of the conversation leading up to the event, along with an assessment of the tone of the conversation; immediate changes in physical proximity; etc. We might also ask staff to record this kind of information on a regularly scheduled basis even when the behavior has not occurred, in order to contribute to an identification of the low probability antecedents.

In some cases, we have used rather complex A-B-C formats that involve staff using a combination of codes, words, fill-in the blanks and moment-by-moment narrative; all for the purpose of identifying the antecedents that control behavior. The data collection sheet shown in Table 3 illustrates this.

In this approach, the data sheet

is laid out in such a way that the antecedents to an episode of target behavior or the antecedents that exist at times during which target behavior has not occurred can be entered by staff using predetermined codes. For example, in Table 3, under "Place/Location Code," "a" may represent the living room and "b" the kitchen. In

GENERAL INFORMATION	MOMENT-BY-MOMENT EVENT DESCRIPTION RECORD	
Date: _____ Focus Person: _____ Staff: _____ Start Time: _____ Stop Time: _____	Staff/Others <small>What They Did/What They Said</small>	Focus Person <small>What They Did/ What They Said</small>
Place/Location Code: a) b) c) d) e) f) Other	A	B
People Present Code: a) b) c) d) e) f) Other	A Then	B Then
Activity Code: a) b) c) d) e) f) Other	Then	Then
Verbatim description of 2 minutes leading up to event:	Then	Then
General comments describing how day has been:	Then	Then
Other:		

Table 3 - Sample A-B-C Data Collection Sheet

the data sheet under "People Present Code," "a" may represent mother, "b" father, and "c" sister. We can use this approach when there are certain antecedents that we believe may influence the likelihood of the behavior or its non-occurrence.

The data sheet shown in Table 3 gives staff a place to describe "events" leading up to the incident. This is a period during which we might expect "triggers" to appear. It also gives staff a place to describe the "sequential" actions that may occur between the focus person and others. In the second column staff would begin by describing what they did and said as the episode unfolded (A). They would then describe what the focus person did and said (B). They would then describe what they (staff) did and said (C), etc. This sequential description would continue until the entire episode has been presented.

As this information is collected, it can be summarized on a monthly or quarterly basis to visually reveal the high probability and low probability antecedents. Such a summary graph would show frequency on the vertical axis and coded antecedent category on the horizontal axis. For example, it may show that the behavior happened 30 times last quarter when he was with one particular staff person but only two times when he was with another.

How frequently staff are asked to fill out such A-B-C sheets needs to be sensitive to the staff resources available. Keep in mind that it may take several minutes to complete an A-B-C entry for each event. Therefore, it would probably be unrealistic to ask people to complete an A-B-C entry for a behavior that occurs at a relatively high rate behavior. (Staff would probably spend more time recording than being with the person they are serving.) With high-rate behaviors, chances are we

would not ask staff to fill out a sheet for every occurrence. Rather, depending on the situation, we might ask staff to complete an A-B-C for the first event of the day, or the first event each hour, or the first event following a randomly selected time of day, or each hour on the hour, whether or not the behavior has occurred, etc.

Finally, it is important to remember that A-B-C recording strategies were never meant to be used as a primary *data collection* strategy for purposes of program evaluation. They simply require too many resources. Rather, A-B-C recording strategies are meant to be used for *analysis*; to help determine the antecedents that control higher and lower probabilities of the behavior during a Functional Analysis, and to help determine the *functions served by behavior*. Once an assessment has been completed, A-B-C recording strategies are meant to be used to identify changes that may have occurred in the antecedents that control behavior and possible changes in the functions of the behavior. For the purposes of ongoing data collection other strategies should be used (e.g., event, interval sampling, etc.).

Scatter graph analysis (Touchette, MacDonald & Langer, 1985) is yet another form of data collection that can be enormously helpful in antecedent analysis. Using this approach, behavioral episodes are plotted on a graph which has the hours of the day on the vertical axis and the days of the week on the horizontal axis. When data are plotted in this way, patterns can sometimes be seen that show the times of day and the days of the week associated with the higher and lower likelihoods of the target behavior. This information can be further examined by comparing the times and days during which the behaviors have a higher or lower likelihood with activity schedules, work sched-

ules, staff schedules, etc. Such comparisons may help identify activities or events and staff present during periods of higher and lower likelihood.

For example, we were providing consultation in a group home in which one of the adult men living there would loudly yell and cry for long periods of time. In carrying out a scatter graph analysis, we discovered that these behaviors were happening almost exclusively Mondays through Fridays, between the hours of 3:30 PM, when he returned home from his day service, and 6:30 PM, when dinner was typically served. This suggested the hypothesis that his "problem behavior" was simply his way of expressing his hunger. Given this hypothesis, the proposed solution included, among other things, teaching him how to prepare his own snack, independently (without requiring staff prompting, presence or participation); having snacks out and available through out the day that did not require preparation (e.g., having a fruit bowl available); and teaching him how to express his hunger and request something to eat (especially for those occasions when he was out in the community or in somebody else's home).

Interview Techniques. Interviewing represents another very important information gathering tool when it comes to Antecedent Analysis. In addition to the focus person, we attempt to interview people who live and work with the person day in and day out, including parents, siblings, friends, group home operators and staff, community support staff, etc. As the person who is carrying out the assessment, we may know the person only through the assessment process. Except in unusual situations, it is unlikely that we will have information needed to complete an assessment. If the critical information is to be had, it will be provided by those who know the

focus person most intimately.

Our *Behavior Assessment Guide* (Willis, LaVigna & Donnellan, 1993) is a tool that provides what we call door opening questions (Willis & LaVigna, 1996a) for gathering the needed information. However, sometimes the door doesn't seem to open

"Ma'am, just one more thing." (Columbo at work.) "If we could offer a million dollars if you got through the afternoon without any occurrences of target behavior, what would you do to maximize your chances of earning the million?"

At this point, staff usually say something like "there is nothing I can do to guarantee the behavior won't occur." "But" we say, "you have nothing to lose. You may not be able to guarantee it, even so, what could you do to at least give yourself the best chance possible. For a million dollars, certainly you would try your hardest. Anything goes. What would you do?" Invariably, staff will then take a stab at it and say what

they think they could do to minimize the occurrence of target behavior. For example, they would say "...well, I guess I would put him in the hot tub with Mary Jane, give him pizza to eat and play country and western music on the stereo."

In one fell swoop we have identified certain antecedents associated with the lower probability of target behavior, i.e., being in water, being with Mary Jane, eating pizza, and listening to certain kinds of music. Of course we could follow-up with the obvious by asking staff: "To earn a second million, what would you do to make the target behavior occur?" This might have them saying something like "...I would have James work with him, I would tell him he wasn't going to see his mother that weekend, I would delay dinner, and I would tell him he had to rake the yard." In this way we could identify certain antecedents associated with the higher probability of target behavior.

These are just door opening questions of course. We would follow up with quite a number of

other questions. For example, we would want to know a lot more about Mary Jane's and James' physical characteristics and interpersonal styles, their attitudes and expectations when working with the focus person, etc. We would want to probe specifically to see how readily staff could identify occasions when behavior occurred in contradiction with the suggested antecedent control. For example, we might ask the last time target behavior occurred in the presence of Mary Jane or when country and western music was playing. If such occasions can't be recalled, it suggests very strong antecedent control. If such occasions can be recalled, their relative rarity may still indicate a significant degree of antecedent control, although a significant number of occasions may suggest that the antecedent control isn't so obvious, which would require us to ask a number of other questions to find out why the staff would place their bet on Mary Jane and country and western music.

In addition to this *Columbian* method of interviewing, we have discovered another approach that is surprisingly revealing in an antecedent analysis. In contrast to asking the reporter to characterize situations in general, we ask them to describe specific incidents in concrete terms. What we ask for is a second-by-second, frame-by-frame description. As an example, we recently were performing an assessment for Andrew, a young man in his early twenties, who had been described as being aggressive. The following is the gist of that part of the staff interview we carried out in which we asked staff to describe a concrete event.

Question: When did Andrew's aggression last occur?

Answer: Last night when I asked him to set the table.

Question: Can you describe the

...we are trying to evoke the image of Columbo and remind people that they have to be detectives in carrying out an antecedent analysis.

much at all. For example, if we ask with whom is the behavior most likely to occur, the answer is "everybody;" if we ask "Where?", the answer is "everywhere;" and if we ask "When?" the response is usually "anytime, all the time," etc. These "door opening" questions then need to be followed up with more specific, probing questioning.

In our lectures, we sometimes joke that the two items necessary to do a good antecedent analysis is an old, torn and tattered trench coat and a half smoked cigar. Of course, in doing this we are trying to evoke the image of Columbo and remind people that they have to be detectives in carrying out an antecedent analysis. In fact, as Columbo often finds that the direct question doesn't always produce the most useful information, we also find that the indirect method often works. One favorite and surprisingly productive question we ask is what we call the "million dollar question." After staff have told us that the behavior essentially occurs everywhere, with everyone, all the time, we ask:

events leading up to this behavior?

Answer: I asked him to set the table and he just hit me.

This pattern of questions and answers is very typical but not very revealing as to the possible antecedents. At best, we would end up with “task avoidance” as our understanding of the meaning of the behavior. Look, however, at the different understanding that unfolds as we continue to guide staff from a very general characterization of the incident to a frame-by-frame, concrete description.

Question: Think hard, to the best of your recollection, how long was it, that is, how many seconds went by between your asking Andrew to set the table and when he tried to hit you?

Answer: (Pause) About two minutes.

Question: So as you have thought about it, it was about 2-minutes, that is 120 seconds between your request and Andrew’s attempt to hit you. That’s actually quite a long time. It might be really helpful if we could have a very concrete description of what exactly happened during that time. To start with, where were you when you made the request?

Answer: By the dining room table.

Question: Where was Andrew and how far away was he?

Answer: He was sitting in the living room, about 12 feet away.

Question: What was he doing?

Answer: He was looking at a magazine.

Question: What exactly did you say to him?

Answer: I told him it was time to set the table.

Question: Try not to characterize what you said. Tell me verbatim what you said. In fact, let’s do a little role play. Pretend I’m Andrew. Say to me exactly what you said to him,

using the same volume and tone of voice that you used then. OK, shoot.

Answer: Andrew, come here, it’s time to set the table for dinner! (Said fairly loudly, in a stern, parental tone of voice.)

Question: Then what happened?

Answer: Nothing. He ignored me and kept reading his magazine?

Question: Then what happened? What did you say?

Answer: I said-Andrew put the magazine down and come here.

Question: Then what happened?

Answer: He ignored me again.

Question: Then what did you say?

Answer: I said-Andrew, this morning when we were choosing chores, you said you would set the table. It’s time now. Come on!

Question: Then what happened?

Answer: I said-Andrew, if you don’t set the table, we won’t be able to eat. Come on, we’re all counting on you.

Question: Then what happened?

Answer: Since he was still ignoring me, I went up next to him and asked him again.

Question: Try not to characterize what happened. Describe what happened in concrete terms. Tell me verbatim what you said.

Answer: I said put the magazine down and come with me.

Question: Then what happened?

Answer: He put the magazine down, stood up and started walking away from me.

Question: And then...

Answer: I went after him.

Question: And then...

Answer: I caught up with him and took his arm to prompt him to go into the dining room.

Question: And then...

Answer: He turned and hit me.

From this interview we get a much different picture of possible controlling antecedents to Andrew’s aggression. Our hypotheses might include that authori-

tarian control, “nagging,” activity interruption, and *physical* guidance, as well as pressure to perform a nonpreferred task, set the occasion for the higher probability of aggression, while autonomy, self scheduling, and respectful and well timed verbal reminders may set the occasion for the lower probability of aggression. These hypotheses can be tested against additional frame by frame analyses of other specific events of aggression as well as specific occasions when aggression did not occur when Andrew was asked to set the table and in fact did the task as requested.

In addition to the insight that such frame by frame descriptions of specific incidents can reveal, interviewing also allows us to go deeper into an event in an effort to identify the relevant antecedents. For example, we may learn that when the focus person is engaged in a particular activity, the target behavior is more likely to occur and when they are engaged in yet another activity, the behavior is less likely to occur. If true, we have identified antecedents that can help us. For example, scheduling the second activity and not scheduling the first should produce an immediate decrease in target behavior.

However, we may find it even more helpful to go deeper with our antecedent analysis. Specifically, in this case it might be helpful to know the nature of the activities. For example, does one require large motor activity and the other small motor activity; does one take place inside and the other outside; do staff usually select one and the focus person the other; does one tend to take place right after dinner and the other just before (or at other typical times during the day); is one a group activity and the other an individual activity; is one regularly scheduled and the other only sporadically scheduled; etc.? Know-

ing the differences in the characteristics of these activities, how they are selected, etc., may provide a *deeper* understanding of the controlling antecedents. If we gather this kind of information,

by frame dissection that we illustrated above. Similarly, if they were to say that the target behavior rarely occurs when the focus person is with a particular staff person, we might ask if they could recall any exceptions to this or how long had it been since the behavior occurred in the presence of that staff person.

Such illustrative examples will not only act to confirm the developing antecedent analysis but will also support the conclusions

that are reached and make the findings of the analysis more credible to the people providing the information. In fact, this is one of the reasons that interviewing is so valuable to the assessment and analysis process. Not only are we able to gather information that we have not been able to gather by other means and/or to confirm the information gathered from these other sources, we are also laying the ground work for the credibility of our findings and the buy-in we will need from staff and parents if our recommendations are to be adopted.

Records Review. In addition to data collection and interview techniques, an antecedent analysis requires a thorough records review. It can be quite revealing to read progress reports, nursing notes, previous assessment reports and evaluations, data summaries, special incident reports, etc. We have learned that we can't anticipate where we will find useful information, so we look at it all.

For example, we once carried out an assessment for a person who had been referred to us for aggression. The staff insisted that the behavior "came out of the blue." However, they had carefully recorded each incident in a "special incident report." In reading those reports, two different situations

seemed to emerge as possible antecedents. One was that aggression would sometimes occur when the person was waiting for something to happen; the other was when one of his *rituals* was interrupted. These events were *not* noted for each of the incidents but for enough of them to warrant further interview exploration with staff. With further interviewing, we were able to confirm that delay in gratification and ritual interruption were the major antecedents for aggression. The reason these had been so hard for staff to see was that the aggression didn't always follow these events, nor did aggression, when it did occur, always occur immediately.

In another example, in one of our longitudinal training courses, one of our trainees was assigned a focus person whose referral problem was described as "operant vomiting." In going through the records, she discovered that the focus person had been referred three times in the past year for suspected gastrointestinal problems. Each time, the results were negative, indicating that no gastrointestinal problems existed. However, in the mode of *information gathering*, our trainee read each of the medical reports and got the impression that the exams that had been carried out were cursory in nature. During the interview part of the assessment, she further discovered that the so-called "operant" vomiting occurred only during meal time, regardless of the frustrations, delays or other provocation's she experienced during other times of the day. In addition, "operant vomiting" did not occur with pureed foods or fluids.

Suspecting that there might indeed be a physical explanation for the behavior, she pushed real hard for a full and thorough gastrointestinal exam. Sure enough, the findings were that there was a problem with the esophagus at the

In addition to data collection and interview techniques, an antecedent analysis requires a thorough records review.

we may be able to identify which characteristics of activities, not just which concrete activities, set the occasion for the higher and lower likelihood's of target behavior.

Yet another interview technique is to explore with staff and parents their impressions concerning the higher and lower likelihood's of target behavior under those conditions that would make it more or less likely for most people to *act up*. For example, we could ask whether we would be more likely to see target behavior in the face of naturally occurring aversive events such as delay in gratification (i.e., having to wait for something), denial (i.e., not getting something), criticism, failure, frustration, boredom, physical discomfort and the need to perform nonpreferred activities. We could also ask whether we would be less likely to see target behavior during a favorite meal, while engaged in a favorite activity, while with a favorite person, etc.

When asking questions such as these, we would not leave staff or parent responses at the door opening level. For example, if staff said that the target behavior is more likely to occur in response to criticism, we might ask if they could remember when that last happened. Such recollection might also be subject to the kind of frame

point of entry into the stomach. Specifically, the opening into the stomach was too small to allow moderate or large chunks of food to move down into the stomach. A sad note was that she had been subjected to some fairly severe punishment strategies to “treat” her “operant vomiting.” Based on the new information it was decided that “behavioral” treatment had been and would be folly, although there may be a role here for positive programming to teach the person better ways of communicating to others when she isn’t feeling well. The answer was not “behavioral.” Rather, the physician dilated the opening on three separate occasions and the problem subsequently disappeared.

In another case, interviewing had disclosed that the presence of a pretty female was an antecedent for the higher probability for the focus person to grab toward the intimate body parts of her’s and others. In going through the records, it was discovered that this behavior first appeared during the onset of puberty. Further, it was discovered that the behavior was essentially absent for a six month period a few years previously, when the focus person was receiving sexuality training and was actively being given opportunities during the day to masturbate.

A records review can confirm hypotheses, raise questions about developing hypotheses, or even suggest new hypotheses that hadn’t previously been considered. Records represent the written history of the person and as such may be particularly useful in identifying historical setting events for the behavior. Early childhood experiences, physical health, mental health, cognitive characteristics, family history and background and other areas of information gathering may be topics that we discuss separately in our assessment reports. However, they should be considered as part of

our antecedent analysis, in so far as they may reveal setting events and even point us in the right direction to uncover and, very importantly, to understand the immediate antecedents that increase and decrease the likelihood of target behavior.

Direct Observation and Interaction. Finally, but certainly not the least of our information gathering strategies, is the direct observation of and interaction with the focus person. This is not to say that it is necessary to actually see the target behavior occurring. There is a good chance that we will not see “low rate” behaviors during the assessment period. And of course we would *not attempt to set off serious behaviors* just for the purpose of seeing them. Yes, we would like to have the opportunity to see an actual occurrence of the target behavior; but not at the expense of a person’s safety or dignity.

On the one hand, the benefit of actually seeing the target behavior is that it allows us to see first hand the events leading up to it. For that event at least, we would not have to rely on staff or parent reports.

On the other hand, we must keep in mind that observation at times during which the behavior is not occurring also gives us information about the ecology, which may provide a setting event for the occurrence or non-occurrence of the behavior or even about antecedents. One technique for observations when target behavior is not occurring is to be aware of precursor behavior and to look for triggers for this category of responding. As we mentioned, while we would never “set the person up” for target behavior, through our interactions with the person, we may attempt to trigger a precursor response, if it is a relatively

innocuous one and if we have a hypothesis to test. But we need to remember that such probes should be avoided if there is an increased likelihood of injury or injury to the person’s dignity.

If the behavior does not occur during our observations, we may also be looking at direct evidence of antecedents associated with the lower rate of the behavior. One question to raise might be whether the very act of observation by a relative stranger can account for the non-occurrence of target behavior, attributing this, for example, to the influence of novelty or “wanting to make a positive impression.” Perhaps, but maybe novelty and/or the opportunity to make a good impression, should be explored as predictable antecedents for the lower probability of problem behavior for the focus person.

One could say that all of the information gathered during observations of and interactions with the focus person is grist for the antecedent analysis mill, whether or not the target behavior occurs.

A records review can confirm hypotheses, raise questions about developing hypotheses, or even suggest new hypotheses that hadn’t previously been considered.

For example, one of our staff was carrying out a parent interview concerning the aggression of her twenty three year old son. In the midst of the interview, in fact, an occurrence of target behavior occurred. On the surface, the behavior seemed to come out of the blue. On deeper reflection, however, a number of things were

antecedents to a higher likelihood of aggression, with this specific episode as an illustrative and supporting example. We might also hypothesize that having his personal space respected and the use of a nonthreatening style when working with him may be antecedents for the lower likelihood of this behavior. Our subsequent observations, interviews and records review would try to uncover evidence that would both support this hypothesis and also appear to contradict this hypothesis. In an antecedent analysis, concrete examples should be sought to support the conclusions reached. However, it is only through a thorough examination of the contradictory evidence that may exist that we can have confidence in the validity of those conclusions.

While passive observation can be helpful, as illustrated above, through our interaction with the focus person, we may also gather information to assist us in our antecedent analysis. (We would like to emphasize again that we would not purposely provoke an occurrence of target behavior, nor would we recommend this practice to others.) For example, during one assessment in which the focus person was a nine year old boy who engaged in high rate self-injurious behavior, we discovered that when we engaged him in a tightly structured discrete trial instructional session, self injury did not occur. This interaction supported one of the conclusions in our antecedent analysis that predictability and clarity in a task with clearly defined expectations and easily discriminated reinforcement for a correct response were antecedents for the lower probability of self-injurious behavior.

In another example, which we have cited elsewhere (LaVigna et al., 1989), we were performing an assessment for a young man who had been referred for "noncompliant aggression." As part of the

assessment process, we had taken him for an excursion in the community. We gradually, carefully asked him if he would do increasingly unreasonable things. While we didn't want to see aggression, we were interested in seeing what it would take to provoke the more innocuous precursor behaviors that had been described to us. No matter how unreasonable the request, the focus person did his best to respond, quickly and with the biggest smile on his face. We never were able to provoke precursor behavior. However, we wondered what he would do if he was *unable* to perform the requested activity. To test this, we asked him to do something using strictly nonsense words. Lo and behold, what we saw was his quite remarkable *total lack of response* to this nonsensical request. Putting this interaction with other information we had learned, we were able to conclude that a *request to perform* was not the antecedent that increased the likelihood of aggression. It was somewhat more complex than that. The high likelihood antecedent was to be asked to do something in a confusing way that he did not understand and to be verbally pressured and physically *prompted* to perform that task. The low likelihood antecedent was to be asked to do something in a clear, concise, unambiguous way. When asked in this way, he was more than willing to do anything, with a smile.

Finally, our observations should take in more than observations of the focus person and their interactions with staff. We can also be making note of the ecology, that is, of the physical, interpersonal and programmatic environment. We are often struck by how we so easily take environments for granted and as givens and how we may overlook them as providing information about set-

ting events and triggers for the higher and lower likelihood of target behavior. Sheer routine and sameness may produce boredom and a high likelihood setting event for one person, while novelty may be a setting event for a lower likelihood of target behavior. In contrast, another person may find predictability and sameness a low probability setting event and novelty and newness a high probability setting event for target behavior. Among other things, the environment can be observed for such setting events as noise; crowding; lighting; decor; variety and age-appropriateness of and the physical and cognitive demands placed by the activities observed; the degree of choice and control provided to the focus person; the characteristics of the other people who interact with the focus person; the expectations and attitudes others have for the person; etc.

In addition to examining the features of the environment, notes should also be taken as to what is missing from the environment and day-to-day experiences of the person. For example, the lack of affection, physical intimacy, family members, a pet, good friends, enjoyable and productive work, weekend trips, etc. may very well be setting events for the higher probability of problem behavior

In an antecedent analysis, concrete examples should be sought to support the conclusions reached.

for us (e.g., moping around, overreacting to certain provocation's, lack of cooperation, etc.). Why wouldn't they be for the people we are working with. In contrast, the presence of such things in a

person’s life might well immunize them from exhibiting behavior that others consider to be problematic. In fact, a good pair of glasses for examining the environment would be to consider how we would feel if we were living the focus person’s life. People are people!

An ecological analysis is so critical in completing the functional analysis that we have a whole section on this in our assessment guide (Willis et al., 1993). Further, we plan to address ecological analysis as a topic in its own right in an article that will appear in a future issue of *Positive Practices*.

Writing an Antecedent Analysis

After gathering our information, we are ready to ask the conclusionary questions and write the antecedent analysis section of our behavior assessment and functional analysis report. As indicated above, the information we

draw on in reaching our conclusions goes beyond that gathered in the antecedent analysis section of the *Behavior Assessment Guide* (Willis et al., 1993). It also very much relies on all of the background information we collected regarding the focus person and their characteristics, their family history and background, their living arrangement and day program or school placement, their health and medical status, the ecological analysis, the motivational analysis, etc. You might find it useful to develop a worksheet in preparing to write. Such a worksheet can help us make sure to include all of the relevant information in our report.

Table 4 shows just such a worksheet. It would allow us to list in abbreviated form both the antecedents that increase the likelihood of target behavior and those that decrease this likelihood. Further, we can with more refinement indicate what “triggers” make the precursor(s) more likely, make es-

calation to target behavior more likely, and/or make it more likely that an episode will continue and escalate. We can also indicate what “triggers” make the appearance of precursor behavior less likely, make escalation to target behavior less likely, if precursor behavior should occur, and/or make it less likely that an episode will continue and escalate, should target behavior occur. Referring back to what we wrote earlier, we need to remember that the *setting events* and specific *triggers* can emanate from the person’s internal environment (e.g., pain), cognitive/mental environment (e.g., a belief), and/or the external environment (e.g., home, with George, at 2:30 PM, when criticized).

In addition to listing the triggers, the Preparation Worksheet also prompts us to list the setting events we have identified as a result of our behavior assessment and functional analysis information gathering process. It is at this point that we stand back from our

	ANTECEDENTS					
	High Likelihood			Low Likelihood		
	Precursor Behavior	Target Behavior	Episode Escalation	Precursor Behavior	Target Behavior	Episode Escalation
Setting Events						
1.						
2.						
3.						
Trigger Events						
1.						
2.						
3.						
4.						
5.						
6.						
7.						
Specific Incident Example						

Table 4 - Preparation Worksheet: Antecedent Analysis Summary

information, analyze, synthesize and summarize it, and *draw conclusions*. Finally, the form provides space for us to indicate which specific incidents or events reported or observed can be cited as examples to support the conclusions that have been reached. Having prepared a worksheet such as this, we are then ready to write this section of our report with confidence that we have as complete a picture as possible as to the antecedents to the target behavior.

Using the Results of an Antecedent Analysis

There are a number of ways that an antecedents analysis can be useful. In addition to giving us direct information as to the conditions, situations and events that both increase and decrease the likelihood of target behavior and its precursors, an antecedent analysis can also provide useful information for other parts of the functional analysis (Willis & LaVigna, 1996a; 1996b). For one thing, the results of our antecedent analysis might help us in completing the consequence analysis. For example, we might have learned in the antecedent analysis that the target behavior is more likely to occur when the focus person is not with a particular staff person and is less likely when they are together. This suggests at least two possibilities that might be explored in the consequence analysis. Possibility number one would be that time spent with this staff person is a reinforcing event for the focus person and the withdrawal of the staff person under certain conditions may represent an aversive event. Possibility number two would be that the staff person has used aversive control in the past and therefore represents a discriminative cue for the focus person to suppress target behavior in order to avoid punishment.

A second example of how to use the results of the antecedent analysis is that it can help us to interpret the meaning of the behavior. Ultimately, the goal of the behavioral assessment and functional analysis is to understand the behavior from the focus person's point of view. The results of an antecedent analysis can make a significant contribution toward this goal. For example, we may have discovered that the behavior is more likely to happen when there is a lack of interesting and varied activities and is less likely to happen when the person is involved in a rich schedule of varied and interesting activities that have been largely self selected. If consistent with all of the other information gathered, this might help us conclude that the target behavior is the focus person's way of saying "...I'm bored!"

Finally, the antecedent analysis can be very productive in generating ideas for developing the support plan for the person. Very few examples of these follow:

Ecological Strategies: Typically, in performing an antecedent analysis, we learn that certain environment features increase the likelihood of target behavior and others decrease the likelihood. Accordingly, we may recommend changes to the environment to more smoothly fit the environment to the person's needs and characteristics. For example, we might learn that a noisy environment is a setting event for the higher likelihood of target behavior. Our plan may therefore include the somewhat obvious strategy of keeping things quite, at least until the person has learned to tolerate naturally occurring loudness. As another example, we might learn the use an "active listening" style may be a setting event for the lower probability of target behavior. Our plan may therefore recommend that staff adopt this style. Finally, we might

learn that the behavior rarely if ever occurs in the community. We may accordingly plan to schedule as much time in the community as possible.

Positive Programming: An antecedent analysis might also help us see what skills might be important to teach. This would apply to all four categories of positive programming skills, i.e., general, functionally equivalent, functionally related and coping and tolerance skills (LaVigna et al., 1989; LaVigna & Willis, 1995). For example, we might have learned that the focus person's dependency is a setting event for target behavior. As part of our solution, we might therefore provide instruction to give the focus person independence, i.e., the ability to perform the activity without staff presence or participation, in going down to the corner convenience store to buy a candy bar, in preparing a favorite snack, or in turning on the CD player. We may have learned that frustration is antecedent to the higher probability of target behavior, leading us to teach the focus person how to ask for a break. We may have learned that being teased is a trigger for target behavior, inspiring us to teach the person the "sticks and stones" rule. As a final example, we may have learned that having to wait is an antecedent for the higher probability of target behavior. In learning this we may decide to develop an instructional program to give the person better skills for dealing with delay in gratification.

Focused Support: This may be the more obvious place for using the information derived from an antecedent analysis. To put it simply and obviously, we should arrange things such that the focus person has minimum contact with those antecedents associated with the higher likelihood of target behavior and has maximum contact with the low probability antecedents. To the extent that

this antecedent control is prosthetic, artificial and contrived, it should be temporary and removed once more permanent solutions are found. For example, if criticism is a trigger for target behavior, we may artificially avoid using *any* criticism until our positive program has been successful in teaching the person how to cope with and tolerate at least the level of criticism that most people experience from time to time. To the extent that the antecedent control represents a move to a more normalized life style, it might be considered as a more permanent change. For example, if a low density of noncontingent reinforcement has been identified as a high probability setting event, a high density of noncontingent reinforcement may be arranged. If this "high" density of reinforcement is in fact no higher than that experienced by the typical person who is not challenged with a disability, arrangements may be made to maintain it indefinitely.

Reactive Strategies. The results of an antecedent analysis can also be helpful in developing reactive strategies, to the extent that these may be needed as part of a multielement support plan. For example, we may have learned that close physical proximity of staff is a trigger for target behavior and that distances of at least 12 feet is a "trigger" for the lower probability of target behavior. Accordingly, our recommendation may be that if target behavior should occur, staff should move away to a 15 foot distance between them and the focus person.

These are only a few examples of the many ways that the results of our antecedent analysis can help us generate ideas for inclusion in our multielement support plans. In its infancy, the field of positive practices had access to very little information in this area (e.g., Donnellan, LaVigna, Negri-Shoultz, & Fassbender, 1989;

LaVigna & Donnellan, 1986; Touchette, 1983). Fortunately, more recently, this has been an expanding area of interest (e.g., Luiselli & Cameron, in press)

Conclusion

The process of behavioral assessment and functional analysis is one that is complex, dynamic and interactive. Even as a complete antecedent analysis requires all of the background information, ecological analysis, motivational analysis, etc., it can also benefit from information gathered from other sections of the functional analysis (Willis & LaVigna, 1996a; 1996b). The antecedent analysis itself also contributes to an understanding of these other areas and to the ultimate understanding of the meaning of the target behavior for the person. We would like to suggest that the complex, dynamic and interactive nature of the process argues against a kind of undefined, global, indiscriminate approach to assessment as opposed to a clearly defined approach which identifies the different categories of information that needs to be considered, how that information can be gathered and how it can be integrated, analyzed, synthesized and summarized in such a way as to provide a helpful insight into the person and what their behavior may mean for them.

In this article, we attempted to describe the contribution of antecedent analysis to the process of behavioral assessment and functional analysis. As such, it should be considered to be an addition to the series of past and future articles on this topic in *Positive Practices*.

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Procedural Protocol - Biting

Millie Fernandez, *Behave R' Us*, Winter Park, FL

Editors' Note: The following protocol is based on an assessment conducted by Millie Fernandez, a participant of the 1997 IABA Summer Institute conducted in Los Angeles. The procedural protocol presented below was developed for a 4-year-old boy who carried a diagnoses of Asperger's Syndrome. The protocol describes a multi-tiered DRO for a behavior labeled as "biting" developed with his young age in mind. While biting was estimated to occur about once a week, it was felt that he would not connect reinforcement for the absence of the behavior every three days with what he does daily. Thus, verbal reinforcement for the absence "biting" along with the giving of a "star" token were given each hour for the absence of biting. The hope here was the frequent hourly reminders would increase the likelihood that Karl would learn the rule regarding "biting." The "stars" accumulate to achieve reinforcement at the end of the day. "Tier Three" represents the level of reinforcement that most closely adheres to the DRO "Goldilocks Rule." To achieve reinforcement, Karl must not engage in biting for three consecutive days. The "Race Car" monitoring device is designed to help Karl predict his closeness to the reward (i.e., Finish Line).

Please notice that this protocol incorporates the definition of the target behavior. For this reason, this issue of Positive Practices will not, in contrast to previous issues, have a separate column defining a target behavior.

Protocol

Name: Karl Rudin

Date Developed: July 23, 1997

Protocol Name: Differential Reinforcement of Omission For Biting

A. Target Behavior and Operational Definition: Biting

- *Topography.* Biting is said to occur any time Karl's teeth come into contact with the flesh or clothing of another person.
- *Cycle.* For purposes of recording, biting begins as soon as Karl's teeth make contact a person's skin or clothing. Biting ceases when Karl's teeth are no longer in contact with a person.
- *Course.* Biting is usually preceded by a person "violating" Karl's space. In other words, people get close to him. When this happens,

Karl will give warning signs such as angry look, pushing the person or clenching his teeth. If people do not move away, he is likely to initiate biting.

- *Strength.* Biting is reported to occur about once a week. It has not resulted in serious damage, but he has drawn blood requiring minor first aide and tetanus shots. Staff describe his bites as painful.

B. Observation and Data Collection Methods

1. *ABC Incident Analysis.* Incidents of BITING should culminate in the completion of an ABC Analysis. Since the behaviors occur at a fairly low rate, the ABC method is reasonable given the current staffing ratio. The ABC

Analysis should be used for ongoing analysis of the variables controlling the occurrence of Karl's behaviors. Each event should be recorded on a prepared form indicating the following:

- The time of occurrence,
- The activity in which the behavior occurs,
- The setting in which the behavior occurs,
- The immediate antecedents of the behavior,
- The consequences applied to the behavior (reactions)
- The specific actions involved in the episode (e.g., contact with teeth, tear clothing),
- The severity of the behavior (e.g., no damage, left teeth marks, ripped clothing, broke skin, first aid, etc.).

C. General Program Issues

1. *Where Will Plan Be Implemented?* The DRO will be carried out in the school setting.
2. *When Will Plan Be Implemented?* The DRO will be carried out during the time that Karl is in school.
3. *Who Will Be Responsible For Implementation?* The school staff will be responsible for implementing the DRO in the school. The parents will provide backup reinforcement in the home setting.
4. *What Materials Or Equipment Will Be Needed?*
 - Stick-On Stars
 - 3 X 5 Inch Index Cards
 - Star Menu
 - Race Car Chart
 - Special Prizes
5. *Pass Criterion.* Data will be reviewed on a weekly basis to determine Karl's progress. The size of the DRO interval will be recalculated when Karl has achieved an average of 80 percent of the avail-

able reinforcers over two consecutive weeks.

6. *Fail Criterion.* Data will be reviewed on a weekly basis to determine Karl's progress. If the percentage of reinforcement has not increased beyond 50 percent and/or if no behavior change has been observed over a period of 4 consecutive weeks, the treatment team will be reconvened to revise or change the support plan.

D. Differential Reinforcement Of Omission For Biting. A DRO should be used to reduce the likelihood of Karl's biting behavior. This can be done using a multi-tiered plan. The following represents an idea statement as to how this might be accomplished:

1. *Tier One*

- Karl should be reinforced EVERY HOUR for the absence of biting. At the end of each hour, Karl should be told "You are playing very nicely and you have NOT BITTEN. Thank you." This is an extremely important step for a 4-year-old. He requires frequent reminding about the RULE. The rule is "NO BITING."
- At the same time Karl should be given a "STAR." The star may be written or it may be a stick-on star. The STAR should be placed on a 3 X 5 index card that has been sectioned into FIVE SEGMENTS. At the time that the STAR is delivered, he should be asked "Karl, why did I give you the STAR?"
- At the end of the school-day, Karl should exchange his "STARS" for a prize. The prize should be something worth a day's work. If we assume

that Karl has the potential of earning 5 stars each day, then he should be able to get some prize for 4 stars and something much more meaningful for 5 stars. For example, for 4 stars Karl might be able to have a special story read to him; but for 5 stars he might be able to have a special story and go with his parents for an ice cream.

2. *Tier Two*

- In addition, each day that Karl does not engage in biting, he will MOVE HIS RACE CAR (See Figure 1). The race car will begin in the START BOX. (This is easy to prepare with a picture of a laminated race car and velcro.) There are three other BLANK BOXES on the chart, one for EACH CONSECUTIVE DAY without biting.
- On the first day he does not bite, he will move his race car to the first open box on the racetrack.
- On the SECOND CONSECUTIVE DAY without biting, he will move his race car to the second open box on the racetrack.
- On the THIRD CONSECUTIVE DAY without biting, he will move his race car to the third open box on the racetrack. At that point he will have WON THE RACE and will have the opportunity to select something from the SPECIAL PRIZE LIST.
- At the beginning of each day, Karl should be asked what he needs to do TO MOVE HIS RACE CAR.
- If Karl engages in biting, his car will RETURN TO THE STARTING LINE. When this happens, Karl

should be encouraged to try harder to GET HIS CAR TO THE FINISH LINE.

E. Reactive Strategies

1. Biting is usually preceded by a person "violating" Karl's space. In other words, people get close to him. Frequently, environmental events can be identified that are "cues" for escalation. When this happens, Karl will give warning signs such as angry look, pushing the person or clenching his teeth. If people do not move away, he is likely to initiate biting.

In the case that Karl is manifesting the precursors to biting, every attempt should be made to reduce environmental factors that might lead to the behavior. For example, overall congestion may be reduced by redirecting Karl to a quiet area. In his classroom, this is his "cozy corner." You might say, "Karl, you seem to be getting upset. Let's go to your cozy corner to calm down."

2. *Stimulus Change.* There are several things that you can do that may interrupt Karl's escalation or his actual biting. In the first place, the introduction of a novel stimulus may divert Karl for an instant or for even longer periods. People who know him have reported that Karl

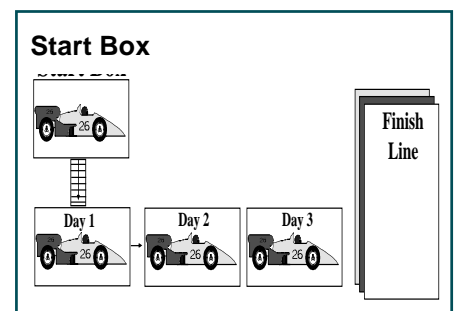


Figure 1 - Karl's Race Car Chart

may stop “anything” and “everything” he is doing if he hears a loud noise, if someone begins singing or he hears music. Therefore, when Karl is escalating or is frankly engaged in the behavior, and if redirection to the cozy corner has not been effective DO SOMETHING UNEXPECTED. Begin singing Karl’s favorite song, start coughing loudly, clap your hands, jump up and down.

3. *Strategic Questions and Instructions.* Asking a question may evoke a response that competes with or intrudes on Karl’s escalation or biting. When he is escalating, you might ask him “Where is your toy car?”. Another way to react as Karl is escalating, or even when he is biting is to give him an instruction that is likely to evoke a COMPETING ACTION. Some of the known intruding instructions for Karl include directing him to jump, to turn around, and to clap his hands.

4. *Release.* At the moment of biting and if Karl does not release using the above procedures, you (the person being bitten) should gently press the body part being bitten toward Karl’s mouth until he releases (Note: All staff working with Karl should have received California approved emergency management training and should have received special training around biting.

5. *Effect on DRO.* After Karl engages in a biting incident and he has regained control, he should be reminded that he has not earned his STAR and that you know he will work harder the next time. He should be asked what he needs to do to get stars and to move his race car.

Letters to the Editors...

Dear Gary and Tom,

Thank you for publishing my letter in your magazine. I would like to visit America one day but I am thinking that I might travel to England first. It all depends on saving money for future dreams. My work at Stitches and Prints is keeping me busy, and so is the housekeeping in my flat.

A short time ago I worked at the Police Station for a day, doing photocopying and other things that helped the police do their work. They are my best friends in the whole world.

I have been writing to Nettie, the pen pal who replied to my letter in your magazine. She has sent me photos of herself and her friends at New Hope Village, and I have sent her some photos of my trip to Fiji.

It has been very exciting to receive letters from Nettie, so thank you once again for helping us get together. Nettie and I will be keeping in touch because she is now one of my best friends. I would enjoy writing to other friends like Nettie. Would you please help me find some other pen pals by printing this letter in your magazine.

Yours sincerely,

Celine Wooding
2/43 Bega St
Bega
NSW 2550
Australia



Dear Gary and Tom,

It’s been awhile since our winter institute in Helena, Montana. Hope all’s well with you. We’re betting you stay quite busy keeping up with IABA business.

We need some guidance! Our Developmental Disabilities Client Programming Technician (DDCPT) curriculum committee asks your assistance in clarifying the difference between two behavior management techniques.

There is confusion with our definition of “chain interruption,” as it compares to “stimulus change.” In our DDCPT final exam, some staff students go so far as to use virtually the same example to describe each. We know the definition of stimulus change, as stated in “Alternatives to Punishment.” Our DDCPT curriculum defines chain interruption as “a technique whereby the rate of someone’s behavior may be reduced by manipulating antecedent behaviors.”

E.g., When an antecedent behavior occurs, provide a change which will break the chain and prevent the target behavior from occurring. Example: Brenda would rub her eyes and then strike the person nearest her. When she rubs her eyes, staff direct her hands to an activity such as a puzzle, thereby breaking the chain.

Questions:

1. How is the above example of chain interruption different from stimulus change? We know that verbal or gestural redirection is not as dramatic as clapping one’s hands, turning a light on and off or running to the window and pretending to see a thief. But did we not create stimulus change when we redirected Brenda?
2. Is it simply the “novel stimulus” or “dramatic alteration” that qualifies it as a stimulus change? Is stimulus change a more

intense option that could be considered when chain interruption is unsuccessful?

3. In *Progress Without Punishment* the introduction of the new stimulus (stimulus change) condition is not contingent upon or related to the occurrence of the target behavior. However, the definition of crisis intervention (on page 130) does not preclude the use of stimulus change to disrupt an ongoing behavior. In fact, the procedures labeled “stimulus change” on pages 48 (case #20) and 49 (case #21) of the *IABA Forms and Procedures Manual, Volume 2* appear to be used contingent upon the occurrence of aggressive (target) behavior. So is stimulus change an incorrect term to describe what we do to break the chain of the ABC paradigm (whether or not the antecedent to a target behavior has occurred)?

We’ve reviewed the “white whale” and IABA textbooks. Frankly, the more we read about stimulus change the more we wonder: Is stimulus change merely a dramatic form of chain interruption or a different technique altogether?

So, we’re seeking guidance for how we may more precisely distinguish between the two. It would help if we could get an example of each that clearly shows the difference.

Thank you for your help.

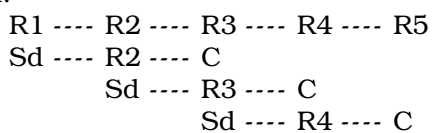
Harry Guetherman
 Montana Department of Public Health and Human Services
 Developmental Disabilities Program
 1824 10th Ave. S #10-B
 Great Falls, MT 59405



Dear Harry,

Thank you for your letter. It is always nice to hear from our friends in Montana. You have asked us to try to clarify the distinction between “chain interruption” and “stimulus change.” We’ll give it a try.

Chain interruption is based on the notion that problem behavior occurs as part of a predictable pattern of behavior in which different events can be viewed as the stimulus, the behavior or the consequence, depending on our perspective. Consider the following diagram which illustrates a hypothetical “chain” of behavior which might be exhibited by a person:



In this example, we might consider responses R1 and R2 as precursor behavior, R3 and R4 to be target behavior, and R5 to be post-cursor behavior. For the

moment, not considering the stimulus events, i.e., the *antecedents*, that might be provided by the environment, we can see that R1 might be looked as a discriminative cue for R2 which is followed by R3, which might then be considered as the consequence for R2. (See the distinction we make between *antecedents and precursors in the Antecedent Analysis article elsewhere in this newsletter.*) In such a chain of behavior, each response becomes a discriminative cue for the response that follows it and a consequence for the response that precedes it.

Chain interruption is an attempt to prevent the precursor behavior from escalating to target behavior or, once target behavior has occurred, to prevent it from continuing or escalating in severity. As such, it is probably more helpful to think of chain interruption as a desired outcome rather than as a procedure.

Stimulus change is one of a number of procedures which can result in chain interruption. It involves the *...noncontingent and sudden introduction of a novel stimulus or dramatic alteration of the incidental stimulus conditions.* “Incidental” refers to the *non-functional role the stimulus plays in the contingency rules governing the target behavior* (LaVigna & Donnellan, 1986). So, for example, suddenly singing a song, doing a somersault or laying on the ground are probable examples of stimulus change, since those events are not to be playing a functional role with the target behavior. Their noncontingency is measured by a number of features: 1) these events may vary with each application of stimulus change; 2) stimulus change may represent only one of a number of reactive strategies that are employed with the target behavior and may in fact be used very sporadically; and 3) the events that are used in stimulus change may in fact occur at times other than in reaction to target behavior, either serendipitously or as a part of an totally independent schedule. For example, singing may take place when with the church choir or you may start singing as you are doing the dishes together.

When such an introduction of a novel stimulus or alteration of incidental stimulus conditions results in an interruption in the target behavior, we have achieved chain interruption. Examples of other procedures that can result in chain interruption might include reminding somebody of the reinforcement they are working for in a DRO or DRL schedule of reinforcement or even “warning” somebody that they might end up in the time-out room or that they might lose privileges if their behavior continues. The latter, of course, would represent aversive procedures and would not, therefore, be something that we recommend.

At a more subtle level, we would like to address redirection as another chain interruption strategy.

The question is, is redirection simply a low level form of stimulus change? Keeping in mind that the definition of stimulus change involves an alteration of the incidental stimulus conditions, we might consider that redirection to a competitive reinforcing activity does involve the contingency rules governing the target behavior insofar as the introduction of an effectively competitive reinforcer would, other things being equal, distract the person from engaging in the target behavior. That is, by introducing the opportunity for another reinforcer, we have reduced the ability of the reinforcer available for the target behavior to maintain that response. To put it back in terms of the behavioral chain, one way to interrupt a behavioral chain is to offer another one that leads to a different and perhaps even more powerful reinforcer.

For reasons such as these, we would not consider redirection or similar procedures to be examples of stimulus change, although they may lead to chain interruption. The definitional need for the stimulus change procedure to employ stimuli that are not functionally related to the target behavior suggests

that it is likely to involve nonsensical and dramatic events that are suddenly introduced. It is the differentness that is introduced that produces the chain interruption in stimulus change. This is why stimulus change effects are short lived, typically requiring a transition to other reactive strategies, e.g., active listening and problem solving or redirection to a competing activity. In contrast, redirection or other strategies may be sufficiently distracting with their competitive reinforcement to prevent a return to the target behavior chain.

Needless to say, which reactive strategies are included in an individual support plan should be a function of a thorough assessment and functional analysis and reflect the needs and characteristics of the focus person. Even so, we hope that this has helped clarify both the distinction and the relationship between stimulus change and chain interruption.

Thank you very much for writing. We look forward to hearing from you again in the future.

Warm regards,
Gary and Tom

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G.W. LaVigna & A.M. Donnellan

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The Behavior Assessment Guide

T.J. Willis, G.W. LaVigna & A.M. Donnellan

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Progress Without Punishment: Effective Approaches for Learners with Behavior Problems

A.M. Donnellan, G.W. LaVigna, N. Negri-Schultz, & L. Fassbender

As individuals with special educational and developmental needs are increasingly being integrated into the community, responding to their challenging behavior in a dignified and appropriate manner becomes

essential. In this volume, the authors argue against the use of punishment, and instead advocate the use of alternative strategies. The positive programming model described in this volume is a gradual educational process for behavior change, based on a functional analysis of problems, that involves systematic instruction in more effective ways of behaving. The work provides an overview of nonaversive behavioral technology and demonstrates how specific techniques change behavior through positive means. The extensive examples and illustrative material make the book a particularly useful resource for the field. -paper, \$17.95/ISBN 8077-2911-6.

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G.W. LaVigna, T.J. Willis, & A.M. Donnellan

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G.W. LaVigna, T.J. Willis, J.F. Shaull, M. Abedi, & M. Sweitzer

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