Social and Environmental Influences on Aggressive Behavior in Individuals with Angelman syndrome

Learning Objectives

- To identify different risk factors for the development of aggressive behavior
- To identify the different functions of behavior
- To understand how different events can trigger aggressive behavior
- To understand the role of positive and negative reinforcement in maintaining aggressive behavior

Definition of Aggression

Aggression is a form of behavior that can result in harm to onself, others or objects in the environment. It can be physical or verbal in nature.

Aggression in Typically Developing Children

Physical aggression is very common in young, typically developing children. Toddlers are particularly prone to behave aggressively. Their desire for greater independence and control over their world often outpaces their communication skills. Frustration and anger often give way to aggression. As they develop better verbal and social skills, their aggression decreases noticeably. Parents play an active role in teaching children to use their words instead of hitting out. They show children what behavior is acceptable in a given situation. By remaining calm, they teach children to control their own emotions more effectively. They also teach children about the social consequences of aggressive behavior - that lashing out hurts people and that it is not okay to hurt your family or friends.

How Aggressive Behavior May Develop in Individuals with AS

Children with Angelman syndrome also have the desire to communicate their wants and needs and to have more control over their world. However, they lack the verbal and motor skills needed to do so effectively. They may also have an unusually high need for social attention. Aggression may occur in an accidental manner at first. Over time, children learn their behavior produces specific reactions (cause-and-effect). In the absence of other skills taking its place, the aggression serves an increasingly useful function or purpose. It becomes a way for a child to "tell" his parent to pay attention or to stay close by. It becomes a way for a student to "tell" her teacher she doesn't like to put the pegs in the pegboard. It becomes a way for an adolescent to "tell" his support worker he wants to be pushed in his

wheelchair instead of walking. It becomes a way for an adult to "tell" the world she is upset because school has ended and she misses her friends. Sometimes, the behavior even occurs when no one is around to "tell" - for example, a child may rip up the pages of a book for the sheer fun of it.

Children may not receive a clear and consistent response when they behave aggressively. For instance, aggression may be "excused" because of the belief the child doesn't know any better. Some forms of aggression such as grabbing or hair pulling may be attributed to playfulness at first because the child is smiling while it happens. It is only when the behavior is upsetting or hurtful to others that it is seen as a problem and is no longer tolerated. Inconsistent messages are confusing to the individual with AS and lead to missed opportunities to teach them more acceptable forms of alternative behavior.

Forms of Aggressive Behavior in Individuals with AS

Aggressive behavior in individuals with Angelman syndrome can be separated into two categories: physical aggression toward people and aggression toward the environment.

Examples of physical aggression that is directed toward people:

- Hitting
- Kicking
- Scratching
- Pinching
- Biting
- Hair pulling
- Grabbing

Sometimes, an acceptable behavior can turn into an aggressive behavior. For instance, hugging someone can turn into hair pulling or grabbing.

Examples of aggression that is directed toward the environment:

- Throwing or breaking objects
- Ripping, shredding or pulling apart objects

Prevalence of Aggressive Behavior in Individuals with AS

Challenging behavior such as aggression has been reported in less than 10% to as many as 100% of individuals with AS. A major reason for this variability is that different methods that have been used to study aggressive behavior. Reviews of case studies in the published literature have yielded low estimates, since many of these studies focus on the genetic rather than behavioral aspects of AS. Studies that are designed to look at behavioral issues tend to provide higher estimates, perhaps because many of the parents and caregivers who choose to participate in these studies are motivated to do so because they are already concerned about challenging behavior. More information is needed about the "true" prevalence of aggressive behavior in individuals with AS. Information is also needed about different

aspects of aggressive behavior (what types of aggression occur, whether it improves or gets worse over time) as well as the impact of different interventions (behavioral approaches, medication) on aggressive behavior.

Genetics of AS and Risk Factors for Aggressive Behavior

Certain factors are known to place individuals with intellectual disabilities (including those with AS) at risk for developing challenging behavior, including aggressive behavior. These factors include being nonverbal, having mobility problems, having severe cognitive impairment, and having seizure disorder. Many of these risk factors are in fact primary characteristics of AS. There is no evidence of a direct link between the genetic defect that causes AS (UBE3A deficiency) and aggressive behavior. There is also no evidence that aggressive behavior is related to an individual's specific genotype (deletion positive, gene mutation, uniparental paternal disomy or imprinting center defect). However, UBE3A deficiency does result in conditions, impairments and specific behavioral features that may increase the risk for individuals with AS to develop aggressive behavior. Furthermore, since behavior occurs within a broader context, social and environmental factors can modify (increase or decrease) the expression of aggression and the impact that it has on the individual's life. Rather than being caused by one or the other, it is likely that both biological *and* environmental factors interact to influence how aggressive behavior develops and continues in individuals with AS.

At the present time, we can't change the genetic defect that causes AS. However, we can try to decrease the risk that aggressive behavior will develop and continue over time by the following. First, we can try to *reduce* the impact of underlying conditions and impairments that can lead to behavior problems by optimizing the individual's physical and emotional health and potential for learning. Second, we can try to *replace* aggressive behavior with new skills that will increase the individual's personal and social competence, so that aggression is no longer "necessary." Third, we can try to *remove* the inadvertent rewards or "pay off" for aggressive behavior to stop it from occurring and *provide* rewards for appropriate behavior instead. More complete information about these issues is provided in other modules.

Making Sense of Aggressive Behavior in Individuals with AS

As stated earlier, over time children learn to associate their behavior with the specific responses they receive. For instance, hitting the parent may result in a disapproving look and being told to stop. Attempting to bite the teacher may result in being taken to the calming area in the classroom. Pinching the therapist may result in not having to get out of the wheelchair. Grabbing or slapping the support worker may result in being fed right away.

Imagine instead that the individual with AS could talk. In the first scenario, the child may be saying to the parent "Don't talk on the telephone, I want you to pay attention to me." In the second scenario, the child may be saying to the teacher "I don't want to sort the colored sticks into different boxes." In the third scenario, the adolescent may be saying to the therapist "I am too tired to walk and want to stay in my wheelchair." In the fourth scenario, the adult may be saying to the support worker "I am really hungry and want to eat right now." In each example, the aggressive behavior functions as a way for the

individual to obtain or avoid something.

There is a well-researched, effective technology for assessing and addressing problem behavior in individuals with intellectual disabilities in general, and an emerging literature applying this technology to individuals with AS. Key elements of this process are as follows:

- Selecting and defining the problem behavior
- Surveying the context for problem behavior
- Conducting direct observations of the problem behavior
- Identifying the function of the problem behavior
- Linking the problem behavior to the antecedents that cause it to happen and the consequences that maintain it

Detailed information about these steps follows in the next sections.

Selecting and Defining the Problem Behavior

The starting point for doing an assessment is to select the problem behavior you want to target for change and to define it in clear, observable terms. This is important in order for everyone to be able to recognize the behavior when it occurs. "Aggression" is a very broad term and may mean different things to different people. Pulling hair, scratching or biting are more specific forms of aggression and can be defined more precisely. For example, scratching can be defined as "using fingernails to scrape or dig into someone's skin."

Surveying the Context for Problem Behavior

Once the behavior is defined, it is helpful to survey the social and environmental context in which it possibly occurs. For instance, is the behavior more likely to occur (or less likely to occur) at particular times of the day? Is it more or less likely to occur with particular people and in relation to what they are doing at the time? Is the behavior more or less likely to occur during particular events, activities or routines? Could it be related to how the individual is "feeling" (emotional state, physical health)? Are there observable "warning signs" that precede the behavior occurring? What happens after the behavior occurs? What do you think the individual is trying to "say" through his or her behavior?

Use this checklist for identifying possible contextual factors that are related to problem behavior.

Information from the checklist can be summarized to look for patterns. Use this table to summarize possible contextual information.

Behavioral Tracking

Once the target behavior has been defined and the possible context for the behavior has been surveyed, the next step is to track the individual's behavior and record these observations on a tracking form. Several days or one week may be long enough to track the individual's behavior. In order to gather valid information, it is necessary to observe the individual in different environments, at various times and with a variety of people.

Information that is useful to track includes how often the aggressive behavior occurs ("frequency"), how long it lasts ("duration") and how severe it is ("intensity"). Some aggressive behavior such as biting may not occur very often or last very long, but can be severe when it does occur and cause injury to others. Other aggressive behavior such as grabbing at people may occur frequently and last longer in duration but be milder in intensity. It is not uncommon for people to make general statements about aggressive behavior - for example "He seems to hit me every time I ask him to do something" or "It seems like she can't go longer than a day without pinching someone." Behavioral tracking provides objective, quantifiable information rather than relying on people's judgment or impressions which may not be accurate. It can be reassuring to learn that aggressive behavior may occur much less frequently than first thought. Returning to the previous examples, "I asked him to do 10 things today and he actually hit me once" or "She pinched her worker only once in the past 2 weeks."

Use this tracking form for recording frequency data.

Paying close attention to different dimensions of behavior (frequency, duration and intensity) is an important step and will help sharpen your observational skills. It can also help prepare you to directly record more extensive information about episodes that involve the problem behavior. An Antecedent-Behavior-Consequence (A-B-C) format can be used to collect this information.

Functional Assessment of Aggressive Behavior

Functional assessment is a process that leads to a better understanding of: (1) the background factors that make the behavior more or less likely to occur ("setting events"); (2) the circumstances that directly set off the behavior ("antecedents"); (3) the events that maintain the behavior ("consequences"); and (4) the reason ("function") for the aggressive behavior. A functional assessment can help to explain *why* the behavior is occurring. After this is complete, a behavior support plan is needed to outline what to *do* about the behavior. A behavior support plan specifies in detail what needs to be done to decrease the individual's aggressive behavior and increase more socially acceptable behavior to take its place.

Information about how to design and implement a behavior support plan is provided in the module entitled "Bringing it all together."

A - Antecedents. Aggressive behavior does not occur "out of the blue" but is a response to some external or internal event. An *antecedent* is something that occurs immediately before the aggressive behavior and "triggers" or sets it off. It may be a statement by an adult that directs the individual to "do" something (e.g., wait your turn, do your craft activity, get ready for bed). It may be a statement that directs the individual to "stop" something (e.g., stop swimming, stop watching

the movie, stop eating) or informs the individual that something he or she wants is not available (e.g., ice cream is all gone, no more television). It may be a situation in which adult attention (eye contact, physical contact) is not readily available (e.g., a parent is talking on the telephone, a teacher is helping another student, a support worker is busy preparing dinner) or a social encounter is about to end (e.g., after interacting with the child, the teacher tries to move away to help another student).

Setting events. Some circumstances do not trigger the behavior directly but instead "set the stage" or increase the chance for it to happen. For instance, a child does not have interesting activities available (boredom); a student has a new teacher at school (confusion); an adult's day program is undergoing renovation (noise and disruption). These setting events can also be *physiological* in nature - for instance, a child's anticonvulsant medication has been increased (irritability); a student has an ear infection (pain); an adult has not slept well for several nights (fatigue).

B- Behavior. Behavior of concern, which is described in clear, objective terms.

C- Consequences. Consequences are responses or reactions that occur directly after the aggressive behavior and increase or decrease the likelihood the behavior will occur again in the future. Behaviors that are followed by pleasant consequences are more likely to occur again in similar circumstances. *Positive reinforcement* occurs when an individual gains access to something that is wanted (such as a favourite food or activity or attention from adults). *Negative reinforcement* occurs when something that is unpleasant or unwanted is terminated or removed (such as when a parent stops asking a child to do a disliked activity). Behaviors that are followed by unpleasant consequences (or are not followed by pleasant consequences) are less likely to occur again in similar circumstances.

Functions of behavior.

Once the antecedents and consequences for a behavior have been identified (by observing and describing the individual's behaviour over several days), the *function* or "reason" for the behavior becomes clearer. Aggressive behavior can function as a way for an individual to: (a) terminate or avoid unpleasant or disliked events ("escape or avoidance"); (b) obtain attention from parents, caregivers, peers ("attention"); (c) get access to something he or she likes, such as food treats or enjoyable activities ("tangibles"); and (d) obtain sensory rewards, such as by ripping up objects ("sensory"). It is important to note that aggressive behavior can have more than one function. For instance, sometimes a child may hit to avoid having to do something he/she does not like while at other times, hitting is associated with getting people's attention.

Consider the following example. A support worker asks the adult with AS to clean up the table (antecedent), he pinches her (behavior), and the support worker reacts by leaving him alone (consequence).

If the function of the adult's pinching was to avoid a disliked activity (cleaning up the table), then the behavior was "successful" in achieving the desired outcome. In this example, the behavior was strengthened via negative reinforcement (avoidance of something unpleasant or undesired).

Consider another example. A parent tells the child with AS they have to leave the park to go home (antecedent), the child scratches her mother (behavior), and the mother reacts by letting her stay longer at the park (consequence).

If the function of the child's scratching was to maintain access to something she likes (staying at the park), then the behavior was "successful" in achieving the desired outcome. In this situation, the behavior was strengthened via positive reinforcement (maintaining access to something pleasant or desired).

These types of scenarios may get played out hundreds of times, in different situations with different people. The individual with AS learns the link between his or her behavior and the reactions it produces. The aggressive behaviour becomes used as a means to obtain desirable outcomes and terminate or avoid undesirable outcomes.

The final step when conducting a functional assessment is to summarize the information that has been gathered into a statement that links the behavior to the context in which it occurs. This summary describes the background factors (**setting events**) that make the behavior more or less likely to occur, the circumstances that directly set off the behavior (**antecedents**), the problem behavior itself, and the primary function for the behavior (**consequences that maintain the behavior**).

Case Study: Jack

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"Jack" is a 27-year-old individual with Angelman syndrome (deletion positive). Six months ago, he moved from a group home where he had lived for 8 years to a new group home and day program. Staff at the new agency did not receive much information from his previous placement to help with his transition. They were told he is taking risperdal because of challenging behavior.

Jack has a seizure disorder and is taking 3 different anti-epileptic medications. He has not suffered from any grand mal seizures since moving to the new agency but does have drop seizures several times daily. Jack's foods are pureed and his liquids need to be thickened due to a history of aspiration. He is able to use a spoon to feed himself but this can take a long time. Jack is able to walk independently but uses a wheelchair when required to walk for longer distances. He wears ankle-foot orthotics and requires assistance on stairs.

Jack does not have a formal communication system and communicates by pointing and leading people to what he wants. He uses idiosyncratic signs, such as leaning toward another person and placing the side of his head or cheek against them to indicate acceptance ("I like you"). He has a single word approximation - "om" for home. He is able to understand routine instructions in context.

Jack has a number of interests, such as watching videos and looking at photos (they need to be laminated to prevent him from ripping them). One of his favorite activities is to sit by a window and watch people walk past outside.

Jack's support workers used to be able to divert his attention to get him to cooperate but now he is starting to pinch and hit them and pull their hair. This happens during activities of daily living, such as when they try to change him. He may also become aggressive when they try to stop him from getting his coat when he thinks it is time to go home. At these times, he will say "om" and gesture toward the door. He often spends all morning at the day program resting or sleeping, and will cover his head with a blanket and become aggressive toward support workers if they try to get him up for activities. He

appears to target a particular female support worker who has a very animated personality

Jack's support workers want to know how they can decrease his aggressive behavior and improve his communication and leisure skills.

Step-by-Step Instructions

Step 1 - Select and define the behavior of concern. The starting point for a functional assessment is to select and define the behavior(s) of concern. In the case example above, Jack's pinching is concerning because he has left bruises on the arms and legs of several of his support workers. He has also pulled their hair very hard, to the point where their scalp is very sore. As a result, they are reluctant to ask him to do many things because of the fear he will hurt them. He is missing opportunities to participate in activities and learn new skills. If the situation does not change, Jack may become isolated from his peers and support staff. Pinching is defined as whenever Jack squeezes someone's skin between 2 or more fingers. Hair pulling is defined as pulling someone's hair with one or both hands.

Step 2 - Gather contextual information. Information about possible factors and events that are associated with the occurrence of aggressive behavior can be useful for predicting when aggression is *likely* to occur. Jack's support workers have completed a checklist of contextual factors that appears in the table to the right, along with a completed summary of contextual information. Based on their responses, Jack's aggression is more likely to occur:

- when he is ill, hungry, tired or in an angry/bad mood;
- when he is with two particular support staff as well as unfamiliar support staff;
- when he is at the day program, particularly in the morning;
- when he is being changed, has to wait for meals or walk long distances;
- when support workers are paying attention to someone else, tell him to do something he dislikes or tell him that something he likes is not available or is finished;
- he is often given what he wants after behaving aggressively or something he doesn't like is stopped or changed;
- in addition, he seems to be "saying" he wants something, he doesn't want to stop what he is doing or he doesn't want/like something when the aggression occurs.

Sample completed Context Forms and Context Summary Forms can be accessed here.

S*tep 3 - Track the problem behavior.* Jack's support workers have tracked his aggressive behavior (pinching others and pulling hair) over a one-week period. Since they are all busy attending to the individuals in the day and residential programs, they shared the responsibility for tracking Jack's behavior by setting up a schedule that assigned specific staff to cover specific periods of time (for instance, Support Worker A tracked Jack's behavior from 9 - 11 am, Support Worker B from 11 am - 1 pm, and so on).

The behavioral tracking sheet showed the behavior did not occur on the weekend, but varied in frequency during the week. (For a blank Frequency Sheet, please click here)

Step 4 - Collect A-B-C data. Jack's support workers have been given an A-B-C chart to help them keep a detailed record of his pinching and hair pulling. Since their "roster" system worked so well for tracking when Jack's behavior occurred, they decided to use this approach when recording behavioral episodes. The table to the right shows how this information is recorded on an A-B-C chart. Jack's support workers record what happens immediately before he pinches them or pulls their hair ("antecedents") as well as what they do in response to the aggression ("consequences").

The immediate antecedent ("trigger") for pinching was when the support worker said "Come, let's go put the toy back" and tried to guide Jack out of the chair. The support worker responded to being pinched by yelling and backing away from Jack; she also left him alone on the chair ("consequence").

The worker had been sitting at the table with Jack, assisting him to do a puzzle. He walked away from the table and went to sit in his favorite chair. The worker tried to "entice" Jack to get up from his chair and come back to the table by showing him a toy. She asked him numerous times to get up ("Let's go put this on the table"). He tried to scratch her and reached out to pinch her or push her arm out of the way a number of times but she was able to pull away. He also turned away from her.

After the worker finished recording what had happened, she was asked how Jack's morning had gone. She said he seemed tired when he arrived at the day program and had gone to sit in his favorite chair. He covered his face with a blanket and went to sleep for an hour. She was able to get him to come to the table to do a puzzle for a couple of minutes rather than let him sleep all morning in the chair.

Step 5 - Start to link the aggressive behavior to the antecedents that cause it to happen and the consequences that maintain it. It is not possible to identify the function of a behavior based on information from only one incident. Information needs to be collected over a longer period of time (perhaps several days) in order to get a more thorough picture of the individual's aggressive behavior and the circumstances that surround it. Once A-B-C information has been gathered, it can be reviewed to identify patterns and generate ideas ("hypotheses") about the function of the aggressive behavior. People may have a variety of opinions about why the aggressive behavior occurs, but it is always better to collect systematic information to see if their opinions are supported by facts.

Information from the A-B-C form can be used to summarize a behavioral episode as outlined on the chart to the right.

When the worker was asked her opinion about what was Jack trying to "say" at the time he pinched her, she thought he was saying "Leave me alone, I want to stay in the chair." In this situation, the "function" of Jack's behavior may have been to continue with a preferred activity (sitting in the chair).

Step 6 - Develop a summary statement to tie the findings together. Once Jack's support workers finished with the functional assessment, they tried to summarize the information they had gathered. They observed 10 episodes (or instances) of pinching and hair pulling during a one-week observation period. On 6 occasions (60% of the time), the behavior was preceded by a support worker stopping something that Jack enjoyed. On 2 other occasions (20% of the time), the behavior was preceded by a support worker telling Jack he couldn't have something he wanted. All together, there was an 80% chance that Jack would pinch support workers or pull their hair if his access to a preferred item or activity was restricted or prevented. On 7 occasions (70% of the time), the behavior resulted in Jack being given something he liked or being permitted to continue what he was doing. Based on the outcome of the functional assessment, the function of Jack's aggression (pinching and hair pulling) was hypothesized to gain or maintain access to something he wanted.

With this information in hand, Jack's support staff were to develop the summary statement shown in the table to the right.

In the last module (Developing an Action Plan), information from the functional assessment will be used in conjunction with information that was gathered from the other modules (neurological and medical issues; communication issues; cognitive issues, sensory impairments and autism; mental health issues) to develop a plan to deal with the aggression.

Frequently Asked Questions (FAQ)

Q: Why is it important to track behavior?

A. It is important to track behavior in order to obtain accurate information about what is happening, rather than relying on people's subjective impressions. By tracking behavior over time, it is possible to determine whether your support plan is successful.

Q: Why is it important to do a functional assessment?

A. Research has shown that behavior support plans are more likely to be successful if they are based on the results of a functional assessment.

Q: How long should I track behavior? How much information do I need to gather?

A. There is no set answer to this question. It is necessary to obtain enough information over a sufficiently long period of time to be able to identify patterns in the individual's behavior. If the behavior happens frequently, in many situations with many different people, it may be possible to get a good sample relatively quickly. If the behavior occurs less often or is very unpredictable, it may take longer to get a good sample.

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