

MIRROR, MIRROR, IN MY MIND: AN ETHOLOGICAL APPROACH TO SHAPING STUDENT BEHAVIOR

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ABSTRACT

This paper introduces an ethology for understanding student behavior and creating interventions to shape positive social, emotional, and academic performance. Rooted in the principles of applied behavior analysis and learning theories, the author suggests a proactive perspective to observing and shaping student behaviors in a post-pandemic era and provides one tool for flipping and reframing a student's mindset to promote constructive thinking and positive social behaviors.

KEYWORDS

Post-Pandemic Learning, Student Behavior, Behavioral Interventions, Mirror Neuron System, Shaping Behavior

1. INTRODUCTION

There is no argument that the students who returned to school from the COVID-19 lockdown were not the same students who went home in the spring of 2020. Worldwide, reports of the COVID Learning Loss (Donnelly & Patrinos, 2022; Dorn et al., 2020; Patrinos et al., 2022; Storey & Zhang, 2021), increased frequency and intensity of behavioral concerns (Harris, 2023; Wang et al., 2021), and deficits in self-regulation, resiliency, and academic achievement seem overwhelming to most educators. A recent report from the Economic Policy Institute stated key findings of current teacher shortages were predominantly driven by (1) the declining compensation in the teaching profession relative to other occupations that employ college graduates and (2) the increasingly stressful work environment teachers face, a long-standing reality that has been greatly exacerbated by COVID-19 (Schmitt & deCourcy, 2022, par. 2). This paper takes an ethological perspective of student behavior and explores how experiencing the COVID-19 pandemic shaped their behaviors as a natural part of social-emotional learning and developing under pandemic conditions. Finally, the author presents one tool for flipping and reframing a student's mindset to promote constructive thinking and positive social behaviors.

2. ETHOLOGY OF STUDENT BEHAVIOR

To understand human behavior and social organization from a biological perspective, it must be understood as an adaptive trait important to survival and there are correlational changes that occur in the brain. Donal Hebb (1949) was the first to describe associative learning, which became known as Hebbian Learning and was ground-breaking for understanding how cells that are stimulated simultaneously become more efficient through metabolic changes. Hebb's work is summarized as "Cells that fire together, wire together." Though John B. Watson (1903) had already reported the correlation between learning and brain changes, it was much later before

neurobiological explanations of behavior became more scientifically acceptable. Many of these changes in the brain occur as a response to trauma and selectively rewire the brain for survival. These are the same neural networks that must be repaired with trauma informed principles and applied behavior analysis. The most important aspect of the discussion of this paper is the Mirror Neuron System as the focus of intervention and behavior change.

2.1. Mirror Neuron System

The Mirror Neuron System (MNS) is described as “one of the most important discoveries in the last decade of neuroscience. These are a variety of visuospatial neurons which indicate fundamentally about human social interaction” (Acharya & Shukla, 2012, Abstract). These are the neurons that fire when we observe others. For example, a person may cry or laugh when they see others cry or laugh, or they may simply return a smile. It is suggested through research that infants may begin to develop mirror neurons in their first year of life through associative learning to understanding the actions of others. The observed actions of others can be categorized into what action is being observed and why the action is being performed, or the intention of the action. The ability to understand observed behaviors are how people learn to mimic behaviors but also how emotions and empathy are developed and how language evolved (Acharya & Shukla, 2012; Bonini et al., 2022). Deficits in the MNS may contribute to features of Autism Spectrum Disorder, pathological features of narcissism and neurosis, and interfere with positive social interactions and behavior (Dickerson et al., 2017; Goulston, 2010).

2.2. I Do, We Do, You Do

Mukamel et al. (2010), suggested “multiple systems in humans may be endowed with neural mechanisms of mirroring for both the integration and differentiation of perceptual and motor aspects of actions performed by self and others” (Abstract). In their study, they conducted three phases to include (1) an observation of an action or facial expression, (2) a behavior action based on a visually presented word that represented what participants had observed, and (3) the control group. Interestingly, they found that the same neurons were involved with the observation and the overt behavior for the participants. However, action differentiation (specificity) was introduced by having participants perform the same action of grasping food but different goals; the food was to be either placed in a container or it was to be eaten. The researchers reported that the motor neurons had mirror properties but were able to selectively discharge during the observation phase. They posited that the action-constrained mirror neurons evidenced understanding of what the participant was to do (grasp the food) and why they grasped the food (place it in a container or eat it), which demonstrated understanding of intentions. Behaviorally, this work by Mukamel et al. (2010) is neurobiological evidence for complex observational learning as described by Albert Bandura through Social Learning Theory (Rumjaun & Narod, 2020).

2.3. Happiness Advantage

Harvard University researcher, Shawn Achor, studied positive psychology and promoted his work through his writings about The Happiness Advantage (Achor, 2011, 2018) and posited that “positive brains have a biological advantage over brains that are neutral or negative” (Achor, 2018, par.1). From a behavioral perspective, rather than the psychological perspective, what is thought or felt is not a mere construct of the mind, these are in the realm of verbal behavior and though they cannot be overtly observed, they do follow the principles of applied behavior analysis and follow the same rules for interventions. In his work, Achor describes the inability to have a positive and a negative thought at the same time. What he is describing is Differential Reinforcement of Other Behavior (DRO) or the possible use of Differential Reinforcement of Alternative Behavior (DRA) and fall under the principles of conditioning for new, positive, and

socially acceptable behaviors. Achor also described using functional magnetic resonance imaging (fMRI) in his work and the participants recalling a memory activated the same portions of the brain and with the same intensity as when performing the overt behavior. The neurological correlation between experience and memory can be a powerful tool to flip and reframe individual's verbal behavior. Key to this concept is that "instructions and relational operant [behavioral] learning allow people to verbally frame life events and this framing may be influenced in a therapeutic setting to alter the client's probability of behavior" (Pierce & Cheney, 2017, pp. 438-439).

2.4. Flipping and Reframing

Seymour Epstein (1991) described cognitive-experiential self-theory (CEST) as a way to explain personality. His psychodynamic theory stitched cognitive science with learning theories and illustrated a two-system information processing model. Epstein referred to them as "a predominantly conscious, verbal, rational system and a predominantly preconscious, automatic, experiential, learning system. The two systems operate in parallel by different rules and are interactive" (Epstein, 1991, Abstract). Epstein also described destructive thinking and constructive thinking, which are verbal behaviors that may or may not promote socially acceptable and observable behavior, respectively. Verbal behavior changes can be obtained by changing the "reinforcement or the density of reinforcement of daily activities [to produce] a change in feeling and thinking" (Pierce & Cheney, 2017, p. 437). Positive psychology and cognitive behavior therapies refer to flipping the script of negative self-talk or destructive verbal behavior and reframing it into constructive verbal behavior (Reframing Negative Thinking Patterns, 2021).

2.5. Paradigm Fulcrum ©

It is one thing to tell someone to do something different, or to think or feel differently, and quite something else to know how to do things differently. An individual may even know what they want to do and can visualize what it may be like to experience the difference but getting them to perform that difference can be quite the conundrum. In my research, I have described what I call the Paradigm Fulcrum© (Davis, 2019a, 2019b) as what moves people from thoughts to action. It is in this space between verbal behavior and overt behavior that individuals become motivated to perform a behavior and build behavioral momentum to sustain that performance. In that space the performer is transitioning from a discriminative function of a stimulus or knowing a reinforcer is available, to a motivational function of stimuli, which changes the effectiveness or value of that reinforcer. In the section four, an exemplar tool of how to move a student through that space is described.

3. INTENTION IN INTERVENTION

When asked to observe students while in schools, it is common to find the student assigned an adult to accompany them throughout the school day or routinely placed in the principal's office or In-School Suspension (ISS), if not Out-of-School Suspension (OSS) for their disruptive behaviors. Here is where the question arises about the intention of the consequences delivered to the student and whether that consequence is reinforcing the likelihood the behavior will occur or reducing the likelihood of occurrence. When a student's behavior is disruptive and interfering with their learning or the learning of others, it is important to determine the function of the behavior and the contact with the consequences that reinforce that behavior to be able to apply interventions appropriately. It is just as important to consider the behavior conditioning that must happen, who will deliver that training, and how efficacy will be determined.

3.1. Assigned Adult Student Supervision and Office Referrals

For students who have a shadow assigned to them, a behavior intervention plan should already be in place with specific instructions for the adult shadow to implement with that student throughout the day. If a student has been referred to the principal's office, or another space for them to regroup before returning to the classroom, what is happening with that student while they are away from their class and learning? There should be a behavioral intervention that has been put in place that is being applied during that time. In the next section, I will describe one such tool as an example to consider when designing interventions for the students in your office.

3.2. Student In-School Suspension and Out-of-School Suspension

For students who have been removed from the classroom for longer periods of time than an office referral would be, as with ISS or OSS, there should be an intervention plan in place to work on the problem behavior, but also a transition plan to transfer the intervention training back to the classroom. Many times, when students are out of school for a period of time there is no plan to re-integrate them making successful returns exceedingly difficult.

3.3. Student Behavior Intervention as an Academic Intervention

Most schools have designated intervention time built into their school days to help students with academic skills they did not master during Tier 1, whole class instruction. Many schools are using a form of Response to Intervention or Multi-Tier System of Supports to identify and support academic growth and achievement. If a Kindergarten student is unable to write their name, the teacher would determine if the student were able to recognize letters and sounds and is able to hold their writing utensil – ensure they have the requisite skills and no medical need that would prevent them from successfully performing the behavior of writing their name. The teacher may even go so far as to use a hand over hand technique to help the student learn to trace the letters of their name, prompting the desired behavior, and eventually fading those prompts until the behavior was able to be performed independently. However, schools do not build and remediate behavioral skills the same as academic skills.

Children are taught from birth to cry and have tantrums to access reinforcement. They cry to be fed, or changed, or held. Children are allowed to gesture for items they want or to have needs met. They are conditioned to behave a certain way and that is socially acceptable as infants in all cultures. What is often lost in the child's development is the shaping of new behaviors as they acquire language skills through functional communication. This scenario has been exacerbated by isolation during COVID-19 Pandemic.

3.4. My, How Things Have Changed

Students in early elementary, or primary grades, now, have entered the school system in a way that has not been experienced before the COVID-19 Pandemic. During isolation, many parents worked from home and children could not attend childcare or pre-schools. For parents who continued to work from their job site, many children were left without adult supervision. Several factors must be considered from this scenario that evidence trauma for these students and their families and is manifesting now as inappropriate behaviors in schools and difficulties in learning or closing the learning gaps since the pandemic closures.

As briefly discussed earlier, children develop their Mirror Neuron Systems (MNS) before they are a year of age, which is critical to developing their social and emotional learning networks and affects their academic achievement. During isolation, people wore face masks making it very difficult for others to identify the social cues from facial recognition and mimicry. Most families did not gather for holidays or events as they practiced social distancing, yet another obstacle to typical development. Fear was heightened due to concerns of contracting the virus and the unknowns around infection. Many families lost loved ones during the pandemic and may or may not have been able to find closure in isolation. Parents working from home were more likely to provide their children with electronic devices to entertain themselves to prevent or minimize interruptions of their business meetings and work. The social fabric of families came to a halt – a multitude of traumas for everyone. Additionally, children missed the transitional time between grade levels. Schooling from home for such an extended period brought them back to school two grade levels later with no practice at being in that new grade level or ample preparation for the changes causing much anxiety for students and difficulties for educators trying to help students acclimate to the new expectations of the school structure. All these factors are traumas and they all occurred for every person, everywhere, before actual life events or other physical traumas are considered for each individual person. What is important to keep in mind is that trauma is an injury to the brain and that injury can be healed. Daniel Amen’s research using fMRIs is an exceptional review of how trauma of all types affects the behavior of individuals across their lifetime and how it manifests (TEDx Talks, 2013).

4. EXEMPLAR INTERVENTION TOOL AND CASE STUDY

A sample of the tool described in this section can be found in Appendix A. After integrating a behavioral intervention program with a campus academic intervention, I was able to demonstrate how an ethological perspective may positively impact student behavior. For this example, I will share a scenario of one of the students supported in this program.

This session day was on Monday and her birthday had been the day prior. The family was unable to celebrate her birthday at the beach as planned, due to inclement weather. Instead, the family visited a local ice cream parlor. When this third-grade student entered the intervention room, she threw her backpack across the room, pulled her chair out from the desk hard enough she was unable to keep her grip and sent the chair toppling to the floor. She grabbed a handful of her own hair with both hands and pulled her hair as she screamed very loudly. In the few words she spoke to me, it was in short sentences and styled as a toddler might speak. For example, she would point at her chair on the floor, lower lip pouted, and face turned down while saying, “chair.” I did not respond to this type of communication. I set a graphic organizer (Appendix A) on the table with a pencil and invited her to join me. I said no other words, made no other gestures, and made no eye contact with the student. After three minutes, the student came to the table, set her chair upright and sat in the chair with her arms crossed and slouching. She was breathing hard but not saying anything or performing any other behaviors. After approximately 15 seconds, I thanked her for sitting at the table with me and asked why she was angry. She began to cry and shared her weekend birthday experience. I did not ask questions, but I did ask her to draw a picture of the rainy beach on the left side of the graphic organizer, which she did without delay. I asked her to lay her pencil on the table when she was finished so I would know it was complete. As soon as the pencil was on the table, I picked it up while asking what she drew. I let her give me a brief description of the image without asking for details or clarification. While she was describing the image, I set a box of crayons on the table where I had picked up the pencil. I asked what she did instead of being at the beach while it rained. The student responded, “We had to go eat ice cream because it rained on the beach.”

4.1. Functional Behavior Assessment and Intervention

Though ideal, it is not always practical or possible to perform a full Functional Behavior Assessment (FBA) before implementing an intervention. One of the advantages of applied behavior analysis is the ability to quickly assess the function of the behavior and reassess the function and efficacy of interventions in real time through single case research design. The initial assessment of the function in this moment of maladaptive behavior was the need for functional communication to express her thoughts about the birthday plans changes.

There are several concepts being pulled together in this intervention. A student is performing overt, disruptive behavior and reporting verbal behavior (self-talk) that she does not have the functional communication skills to flip and reframe without intervention. My intervention is to provide functional communication training with a graphic organizer, implement a *Differential Reinforcement of Alternative Behavior (DRA)* by asking her to draw the ice cream experience, and considering *The Happiness Advantage*, positive reinforcement (adult attention) for constructive verbal behavior was implemented on a fixed ratio schedule for each time she added a detail to her drawing and for each time she changed the color of the crayon she was using to draw the ice cream parlor details. The concept is reinforcement of the happy feelings from the ice cream experience and using color and asking for details to elicit as much brain activity from the memory as may have been in the actual experience. I used reflective questioning techniques to elicit as much detail as possible from her memory.

4.2. Initial Data

This intervention process needs to be repeated and confirmed by other researchers, but with this student and thirteen others, the intervention has been successful across settings and students, which is very promising that this could be a tool to help improve student behavior. Total intervention time for this session was seventeen minutes. At the four-minute mark, the student was speaking in age-appropriate sentences. At seven minutes, she spontaneously asked permission to retrieve her backpack from across the room. When granted permission, she walked to the bag, picked it up by the shoulder strap and hung it on the hook assigned to her while in the room before returning to the table to complete our session. Additional attention reinforcement was given for making good choices to pick up the bag and do so in an appropriate manner, asking permission to step away from our activity, and for participating in the activity. The last five minutes of the session were used to rescript her verbal behavior. At the bottom of the graphic organizer are lines to re-write her socially acceptable verbal behavior. Her constructed sentence was, "It rained on my birthday, so we got to go eat ice cream at the parlor."

Translational research investigations are defined as "an analysis of everyday human behavior in a social context and the implications for improving the human condition" (Pierce & Cheney, 2017, p. 436). In this scenario, translational investigation is the best description for the application of behavior analysis. To be more intentional with the data driven practices, a plan was constructed for the classroom teacher based on the ice cream parlor drawing. The hypothesis being that if memories can elicit the same neural activity as the action and overt behavior was quickly (17 minutes) improved, could a reminder about the ice cream parlor continue her improved behavior throughout the day?

To evaluate this hypothesis, I wrote three questions for the teacher with the following instructions. If the student's behavior becomes disruptive or the teacher observes a change in behavior to ask one of the three questions numbered in the sequence they should be asked. Modelling of the questions were provided to the teacher with examples and non-examples of how to ask the questions as well as how the student should respond. The teacher was then asked to

practice the questions with me before she returned to her classroom. The sequence of questions required more details in the responses with each numbered question. The theory is that the higher-level questions would trigger more neural activity and have a more impact as an intervention.

At the end of the day, I received a phone call from the teacher to report the rest of the student's day. Forty-five minutes after the session, the student was engaged in an argument with another student over the use of a classroom resource. The teacher asked the first question with a smile, "I heard you got to go eat ice cream at the parlor, yesterday, what flavor of ice cream did you have"? The teacher reported the student immediately responded with eye contact and returned the smile while saying, "chocolate, I had chocolate ice cream, and it was really good!" The teacher thanked her for sharing that information and that chocolate was her favorite, too, providing the attention reinforcement for her response. The student turned back to the other child and told her she could keep the classroom resource, she would be happy to share. There were no other instances that day.

4.3. Next Steps

As stated, this intervention process needs to be repeated and confirmed by other researchers. I would also be interested in collaborating to refine the process. I have used this process with a total of fourteen students, all with similar effects. Some factors to consider may include researcher bias as the person who designed the intervention. The students knew me before I implemented the intervention and there has been no evaluation as the effect of the relationship or my campus role on the intervention success. There has not been any investigation as to the effect of latency as a contributing factor to the improved behavior. These factors are the starting point for further investigation into this intervention.

5. CONCLUSION

This paper introduced an ethology for understanding student behavior and creating interventions to shape positive social, emotional, and academic performance. The post-pandemic era calls for effective tools to flip and reframe verbal and overt behaviors into positive social outcomes. Rooted in the principles of applied behavior analysis and learning theories, the author provided a proactive perspective to observing and shaping student behaviors in this post-pandemic era and provided one possible tool to intervene a student's mindset to promote constructive thinking and positive social behaviors.

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