

REFLECTIONS OF LEARNING PERSPECTIVE ON BEHAVIOR MANAGEMENT STRATEGIES DURING DENTAL TREATMENTS OF PEDIATRIC PATIENTS

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Many children perceive a visit to pediatric dentist as a stressful event. Children respond to things that happen to them in their daily lives. If this reality is also taken to a pediatric dentist's chair, the consequences of children's behavior should be experienced through learning theories. Today, two main themes of learning in modern psychology are behaviorism (Classical & Operant Conditioning) and social-learning theory (deals with observational imitation). Through these learning theories, fear and phobias are believed to be learned behaviors, and therefore might also be forgettable. The aim of the present paper is to observe the nature of learning theories on how children learn to behave, with bullet point cases of pediatric dentistry settings. By this way, the application of learning theories to our daily practice will encourage us to better understand and serve the child patient.

Descriptors: BEHAVIOR; CHILD; CHILD, PRESCHOOL; PEDIATRIC DENTISTRY

Oral cavity is a very sensitive part of the body. It possesses sensory receptors for taste, touch, temperature, and pain perception. During early childhood, it serves as a major sense organ helping the child explore her/his environment. From this point of view, dental treatment confronts oral cavity with a multitude of variable sensations (1). Dental fear and anxiety are sensations to be highlighted. As Klingberg et al. (2) describe, "dental fear is a natural emotion based on a real threat, while anxiety is associated with fear-reactions towards a situation of an anticipated, but not realistic, threat". Therefore, child dental anxiety and fear has been a matter of concern for many years (2, 3) and its etiology is multifactorial and still complex.

Many children perceive a visit to pediatric dentist as a stressful event. This could be expected since an appointment

includes several stress-evoking components, such as dental pain, meeting unfamiliar adults, attires worn by the clinicians, having to lie down, strange sounds and tastes (e.g., drilling, dental injections and analgesia, etc.), dental extractions, discomfort, etc. (2, 4-9). Children (and adults who once were also children) respond to things that happen to them in their daily lives. If this reality is applied to a pediatric dentist's chair, then the consequences of children's behavior can be predictable. Therefore, practitioners should focus on abnormal behavior that may jeopardize successful dental treatment of a child patient. At this point, we must describe what abnormal behavior is.

Generally speaking, anxiety, fear and phobias are considered to be abnormal behaviors if they make other people concerned or wish to help (10). Abnormal behavior is addressed by main treatment strategies such as behavioral, cognitive behavioral, psychoanalytic and humanistic approaches (11, 12).

In behavioral strategies, rather than time demanding psychoanalysis of any underlying factors, pure behavior or abnormality itself is targeted and how abnormal behavior is learned, how new

(normal) behaviors can be re-learned (behavior shaping) are the principal issues of interest. For pediatric dentistry, the behavioral approach, which creates a fast solution in dental chair compared to other approaches seems to comprise the ideal methodology. Acquired behaviors as a result of learning process have a long lasting effect as it is based on experience, or adaptation to the environment (13). In the 1970s, Rachman (14) demonstrated the three-pathway theory where children may develop an anxious response directly (by conditioning) or *via* more indirect learning (by modeling or from information). Developments in modern psychology have highlighted two main themes of learning: behaviorism (classical and operant conditioning) and social-learning/social-cognitive theory (13-15). How we respond to the environment (classical conditioning), how we act in the environment (operant conditioning), and how we observe the environment (observational learning) are the basic ways we learn new behavior.

Anxiety is related to some cause that is usually not present, and could be forgotten for that cause, but as a feeling it still could exist, especially in some children. Pain as a feeling is something that is hard

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to forget. However, one should note that if fear and phobias are learned behaviors, then these might also be forgettable. As Aristotle said in the 4th century BC, "to learn is a natural pleasure" (15). Therefore, it is vital to observe the nature of learning theories on how children learn to behave. In the present text, each theory is addressed and there are bullet points where the theory is adapted to pediatric dentistry.

Classical conditioning

Classical conditioning is a form of learning in which a neutral stimulus becomes associated with a meaningful stimulus and acquires the ability to elicit a similar response. Pavlov was the first to perform systematic dog studies of classical conditioning phenomena and established many principles that are still accepted today. The relationship between the 'image of a lemon/hypersalivation' is a good example of classical conditioning.

Hakan, a 6-year-old boy, sits in dental chair for the first time. We say 'open your mouth' and the lighting of a reflector at the same time causes Hakan to open his mouth just by lighting of a reflector later on (10, 15, 16).

Operant learning

Operant conditioning is a form of learning in which the consequences of behavior produce changes in the probability of the behavior's recurrence. Skinner, name-father of operant conditioning, believed that the mechanism of learning was the same for all species. His belief and animal studies made him develop the Skinner box in the 1930s, where he experimentally showed that rats learned that the consequences of pressing a lever in a box and a food pellet would be dispensed. Although Skinner has emerged as the primary figure in operant conditioning, Thorndike's experiments signed the law of effect where it was stated that behavior followed by positive outcomes is strengthened, whereas behavior followed by negative outcomes is weakened (16).

Children who visit dentist for the first time are thought to be experiencing in an operant learning phase and during this encounter both the child and the dentist play an active role in communication. Children respond to some commands and if their cooperative behaviors are appreciated, compliant behaviors become strength-

ened, and if uncooperative behaviors are disregarded, they become weakened (16). After the examination period, during treatment sessions the child is inactive, whereas the dentist is active and classical conditioning phase starts for the patient.

Ekin, a 4-year-old girl, makes her first visit to a dentist. We welcome her in the waiting room and ask some basic questions like her name, favorite pet name and number of her fingers. After each correct answer appreciating her with good words, makes her more willing to answer our questions. Then we mention a surprise we give every child after counting their teeth. Ekin is now more ready and willing for examination.

Reinforcement

Reinforcement is a consequence that increases the probability that a behavior will occur in every learning theme (15). In reinforcement, the frequency of response increases because it is followed by a stimulus. In positive reinforcement, the frequency of a behavior increases because it is followed by a stimulus.

On her first visit to a pediatric dentist, Melisa (a 5-year-old girl) is welcomed in the waiting room with a puzzle, which she is appreciated as she tries to gather up the pieces of the puzzle. Later in the operating room, we have a discussion in order to get to know one another. She will feel that we are interested in her. She is crowned as a princess and asked about her teacher and best friends! She is also asked if she has a pet or would like to adopt one.

Defne (a 5-year-old girl) is a frequent patient for the last 2 years. She was crying during her first visit for examination. She was told that "children who do not cry and let their teeth counted win a surprise". Then she stopped crying gradually and let us count 20 teeth and received the surprise. Later, she had her molars restored with glass ionomer fillings and after every successful procedure she received a surprise, which she wondered a lot. Now, her parents are astonished and wonder how a child can eagerly want to visit the dentist and how our small surprise gifts are so effective.

This kind of frequent reinforcements render the child more receptive to dental environment and increase the probability of achieving ideal treatment. Conversely, in negative reinforcement, the frequency of response increases because the response either removes the stimulus or involves avoiding the stimulus.

Zeynep, a 4.5-year-old girl, whistles in dental chair and does not wish to open her mouth. We should not abandon our intention to examine her mouth by letting her leave with such a negative behavior. If she does not open her mouth and we give her a second appointment and say "Ok, Zeynep, let it be as you want, but next time you will open your mouth", we will give her the chance to reinforce her negative behavior and negative reinforcement will occur.

Positive reinforcement can be provided by a communicating gift (reading a book in the dental chair, telling an imaginary story of a cat visiting dental office everyday) or by some easy questions that every child can answer and successively reinforced by verbal appreciations. Zeynep can also be told that "children who open their mouth as big as a lion win a surprise". After she opens her mouth once, we should ask her open her mouth once again and say "Oooh, this is the biggest mouth I have ever seen. Thank you, and this is enough for today".

In a cat experiment, Mestan receives cat food whenever he meows, where Sarman receives the same food only in one of every five meows. After experiencing this operant learning, cat food is no longer given. Mestan quickly stops meowing, whereas Sarman insists on meowing for some period (10).

Similarly, parents of uncooperative children may be asked to leave the room. Following the establishment of communication with the child, the parent is invited in again. Thus, contrary to the children's prior learned behavior that the parent approaches when the child cries (reinforcing "crying"), the parent's presence is used to the dentist's advantage by becoming a reward and positive reinforcement to the child's improved cooperation (17).

Today, there are many reinforcers in pediatric dentistry. Reinforcers establish the main roots of non-aversive behavior management techniques (BMTs) used in pediatric dentistry. Tell-show-do, voice control, non verbal communication, positive reinforcement, parental presence and absence, distraction, and perceived control are some of the commonly used child friendly non-aversive BMTs. The use of BMTs is influenced by various factors and is subject to change over time. Social attitudes, parental expectations, developing children's rights and technology in conjunction with the leading research per-

formed on BMTs urge re-shaping of the strategies for the cooperative child (18).

Extinction

We should also address extinction where there is a decrease in the tendency to behave in a way resulting in neither positive nor negative consequence.

Mars, a 7-year-old boy, had an injection without the aid of a topical anesthetic solution prior to the procedure. He has felt some pain and the practitioner insists performing another local anesthesia. At this point, Mars will be anxious and fear would arise. If the practitioner does not stop insisting, negative reinforcement will occur. This way, Mars will see the needle as a factor of pain and fear in future. However, from the outset, if the practitioner had used the pain free injection technique with the aid of topical anesthetic solution, and had shown the needle and pretended to perform local anesthesia, but not doing it for some time, the child would become used to the process (19). With this method, extinction will occur. Distraction may also support extinction. While distracting, the practitioner would ask Mars which animals (pets, farm, sea, etc.) he should mention while his mouth was open. Then he would name 10 animals living on the farm while performing local anesthesia. Another way of distraction may occur by the child patient watching cartoons while in dental chair.

It should also be noted that there might be times when reinforcement is not necessary.

During play, children are divided into two groups, where group A is rewarded after the game and group B is not. This reinforcement continues for a couple of weeks and it is observed that the children in group A do not find the game interesting any more and do not want to play the game if there is no reward. However, group B are happy with the game and continue to play. It should be noted that the game itself is a reinforcer (10).

Ayşe behaves well in dental chair, so we should give a small reward such as a sticker. As the treatment goes on, Ayşe learns how it feels to live with clean teeth. Sticker rewards are stopped after some time and another verbal reward is given: "I see that you have grown up into a young lady, that you brush your teeth and I am proud of you".

There may be some rewards supporting Tell/show/do. At the end of first ap-

pointment, we should introduce the child patient with new instruments that will be used in future sessions. It should be noted that the use of symbols and the ability to classify them are the highlight cognitive advances of early childhood and Tell/show/do is a good vehicle to explore these new-found senses.

Deniz, a 5-year-old boy, is introduced to dental brush (by his grandfather), micro brushes (mother and father) and prophylaxis brush (himself). These multi colored brushes were given as a reward and taken home to clean his toy cars' tires.

Generalization

Generalization in operant conditioning means giving the same response to other similar stimuli (16). If the child has visited a dentist before and had experienced anxiety and pain, (s)he will try to generalize the situation (s)he felt before with us. The same will apply to attire, voice, and aura of the environment (like colors, smells, etc.), which will stimulate generalization and the child will respond in a negative temper (9). In the same way, if the practitioner behaves in a child-friendly manner and does not give any pain, extinction will occur and her/his negative feelings will be eroded.

At this point, we should consider if human behavior can be classified in the same way as animal behavior. In an experiment by Verplanck, students were reinforced when they mentioned their own opinions and used the terms "according to me", "feels like", with positive responses such as "I feel the same", "you are right". Contrary, the use of such words as "hmm???" or "really???" resulted in a decrease or so called "extinction" in students' behavior expressing their own opinions (10).

Clearly, not all learning is due to a mechanistic theory of behaviorism. Besides the importance of classical conditioning or operant learning, unseen mental processes occur during learning, rather than concentrating solely on external stimuli, responses, and reinforcements. Learning is rather a bulk of experiences which could be scaled from classical conditioning to cognitive-social approaches such as latent and observational learning (10).

Suzan, a 4-year-old girl, engaged in a "funny brushing" session with us at first appointment. She says she does the same in kindergarten. (Children of low socio-

economic background who do not have access to a kindergarten may react differently to this kind of communication).

Observational learning

Classical conditioning can explain how neutral stimuli become associated with unlearned, involuntary behaviors; but it might not be effective in understanding voluntary behaviors, such as children's learning to play playstation or skiing. Regarding this phenomenon, observational learning is thought to be involved. Observational learning, also called imitation or modeling, is learning that occurs when a person observes and imitates someone's behavior. Observational learning has changed drastically in the late 20th century because of television. "Sesame Street" all over the world demonstrated that television can contribute positively to children's learning. Studies have shown that regular "Sesame Street" viewers from low-income families, when they entered first grade, are rated by their teachers as better prepared for school than their counterparts who do not watch "Sesame Street" regularly (15).

Ömer, a 4-year-old boy, waits in the waiting lounge for his first visit to pediatric dentist where Ali of the same age leaves the operating room with a glance and making jokes with the practitioner. Ali is simply Ömer's mentor.

Latent learning

In latent learning, a new behavior is learned but is not demonstrated until reinforcement is provided for displaying it (20). We wish the children to visit us as early as possible; this way they will be used to us and to the clinical environment. This type of learning is a good example of latent learning. There are many adults today who dislike visiting a dentist. Advances in the scientific and technical details of dentistry in recent decades, together with unfamiliar direct messaging, should have an impact on the latent learning of these adults.

Lara, an 11-year-old girl, was first introduced to us when she was 6 months old and kept under frequent recalls. Now she makes fun and happily says "I was born here!"

Derya, a 7-year-old girl, is familiar with dental materials although she has never been to a dentist. Her mother says that last year she received a dental play set, which she likes to play with.

Another important factor affecting learning is the temperament of the child patient. Classically, the New York Longitudinal Study (21) has identified infants with some aspects of their temperament. From these, approach *versus* withdrawal to new situations (such as pediatric dentist, her/his office, new people, materials), adaptability (child's ability to modify her/his response to new situations), quality of mood and attention span-persistence are the main tasks we should be concerned with.

Kaan, a 5-year-old boy, is very shy and very frustrated. It was reported by his family that he had a very hard extraction in his first dental experience. Now, we should start again with basic communication, easy question easy answers, let the child express his feelings by asking and encouraging.

This is not surprising because some shy children who cannot express their anxiety and fear are accidentally considered silent but cooperative by dentists. And complicated treatments are executed on these silent children in the very first session without considering their actual state of soul. Fortunately, learning theories (extinction technique) can offer solution for re-cooperating these wounded children and arrange a fearless future.

In conclusion, a pediatric dentist should know learning theories which are vital in daily BMT's (1, 22). In daily routines, the administration of learning perspectives to our practice will encourage

us to understand and serve the child patient better.

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REFERENCES

1. Abramovitch K, Dixter C. Dentistry and behaviour modification. Part 1. Principles of behaviour modification. J Dent Que. 1980;17:23-6.
2. Klingberg G, Raadal M, Arnrup K. Dental fear and behaviour management problems. In: Koch G, Poulsen S, editors. Pediatric Dentistry: A Clinical Approach. 2nd ed. UK: Wiley-Blackwell; 2009:32-43.
3. Steen WM. Our relation to children. Dent Rev. 1891;5:534-7.
4. Kusu OO. Examination of children's pain and anxiety by psychometric, physiologic and observational methods during dental treatment and local anaesthesia by two different dental injectors. Thesis. İstanbul: Marmara University, 2006.
5. Holst A. Behaviour management problems in child dentistry. Frequency, therapy and prediction. Thesis. Malmö: University of Lund, 1988. Swed Dent J. 1988; suppl 54 b:35.
6. Kusu OO, Akyüz S. Children's preferences concerning the physical appearance of dental injectors. J Dent Child (Chic). 2006;73:116-21.
7. Kusu OO, Akyuz S. Is it the injection device or the anxiety experienced that causes pain during dental local anaesthesia? Int J Paediatr Dent. 2008; 18:139-45.
8. Raadal M, Strand GV, Amarante EC, Kvale G. Relationship between caries prevalence at 5 years of age and dental anxiety at 10. Eur J Paediatr Dent. 2002;3:22-6.
9. Kusu OO, Caglar E, Kayabasoglu N, Sandalli N. Preferences of dentist's attire in a group of Istanbul school children related with dental anxiety. Eur Arch Paediatr Dent. 2009;10:38-41.
10. Cüceloğlu D. İnsan ve Davranışı. 12. ed. Remzi Yayınevi. İstanbul, 2001.
11. Peebles JE. Pain anxiety and coping self efficacy in the context of dental care. Thesis. Regina: University of Regina, 2002.
12. Townend E, Dimigen G, Fung D. A clinical study of child dental anxiety. Behav Res Therapy. 2000;38:31-46.
13. Papalia DE, Wendkos Olds S, Duskin Feldman R. About a child's world: History, Theory, and Research Methods. In: Papalia DE. Child's world. Infancy through adolescence. 8th ed. New York: McGraw Hill; 1998:26.
14. Rachman S. The conditioning theory of fear acquisition: a critical examination. Behav Res Therapy. 1977;15:375-87.
15. Halonen JS, Santrock JW. Learning. In: Kosslyn SM, Rosenberg RS. Psychology context and applications. 3rd ed. New York: McGraw-Hill; 1999: 152-89.
16. Feldman RS. Learning. In: Feldman R, Dinardo A. Essentials of understanding psychology. 4th ed. New York: McGraw-Hill; 2000:167-200.
17. Kotsanos N, Arhakis A, Coolidge T. Parental presence versus absence in the dental operator: a technique to manage the uncooperative child dental patient. Eur J Paediatr Dent. 2005;6:144-8.
18. Kusu OO, Caglar E, Sandalli N. Parents' assessments on the effectiveness of non-aversive behaviour management techniques: a pilot study. J Dental Sci. 2012;7:25-30.
19. Kusu OO, Caglar E, Sandalli N. Local analgesia - a contemporary approach: What are the techniques that provide pain-free local analgesia for children? In: Splieth CH, ed. Revolutions in Pediatric Dentistry. 6th ed. London: Quint Pub; 2011:135.
20. Tolman EC, Honzik CH. Introduction and removal of reward and maze performance on rats. University of California Publications in Psychology 1930;4:257-75.
21. Thomas A, Chess S, Birch HG. Behavioral individuality in early childhood. New York University Press, 1963.
22. Baghdadi ZD. Principles and application of learning theory in child patient management. Quintessence Int. 2001;32:135-41.

S a ž e t a k

ODRAZ PERSPEKTIVE UČENJA U STRATEGIJAMA UPRAVLJANJA PONAŠANJEM TIJEKOM STOMATOLOŠKIH ZAHVATA KOD DJECE

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Mnoga djeca smatraju posjet dječjem stomatologu stresnim događajem. Djeca reagiraju na ono što im se događa u svakodnevnom životu. Ako se ta stvarnost prenosi u dječji zubarski stolac, posljedice u djetetovu ponašanju treba iskusiti kroz teorije učenja. Dvije glavne teme učenja u suvremenoj psihologiji su bihevizizam (klasično i operantno uvjetovanje) i teorija socijalnog učenja (bavi se opservacijskim oponašanjem). Prema ovim teorijama učenja, smatra se da su anksioznost i bol naučena ponašanja, pa ih je stoga moguće i zaboraviti. Cilj ovoga rada je promotriti narav teorija učenja u tome kako se djeca uče ponašati, uza znakovite prikaze slučajeva u sredini dječje stomatološke ordinacije. Na taj način, primjenom teorija učenja u svakodnevnoj praksi poboljšat će se naše razumijevanje i obrada naših malih bolesnika.

Deskriptori: PONAŠANJE; DJECA; DJEČJA STOMATOLOGIJA

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