



Conditioning Tendency Among Preschool and Primary School Children: Cross-Sectional Research

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Abstract

The present study aims to understand children's behavior within classroom settings in terms of conditioning theories. It was designed based on grounded theory. Data were collected through participant observation and 98 children whose ages varied between 6 and 10 years were observed. Data were inductively analyzed. Findings indicated that kindergarteners and first graders tend toward classical conditioning and need more teacher control to adjust to classroom settings, whereas children aged from 9 to 10 years behave based on operant conditioning. It is proposed that differences in conditioning stem from teachers' classroom management strategies, and cognitive development.

Keywords Classical conditioning · Operant conditioning · Kindergarteners · Primary school children · Grounded theory

Introduction

Human beings always try to adjust to their environments. Adjustment is reached through learning; therefore, learning is an adaptive process. Even though learning is not always observed directly, it can be inferred from changes in behavior (Carlson et al. 2000). Learning is the acquisition of new behavior or modification of existing behavior and mental states as a result of teaching, training, and tutoring (Woolard 2010). Conditioning and behavior modification occur in two ways: classical conditioning and operant conditioning. Classical conditioning, sometimes called Pavlovian conditioning, is the process in which neutral stimulus is converted into conditioned stimulus. In other words, classical conditioning is a type of learning in which natural stimulus is paired with another stimulus eliciting a certain response. There are four components in classical conditioning. These are unconditioned

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stimulus, unconditioned response, conditioned stimulus, and conditioned response. The unconditioned stimulus elicits a natural response from an organism, and the unconditioned response is the response that is naturally demonstrated. The conditioned stimulus elicits a certain response through pairing with the unconditioned response. The conditioned response is the response which is elicited through presentation of the unconditioned stimulus (Carlson et al. 2000; Singh et al. 2013; Powell et al. 2013; Timberlake 2001; Woollard 2010). Classical conditioning conceptualizes learning in two approaches. The first approach, developed and promoted by Watson and Hull, views classical conditioning as a process of directly attaching a reflex to a new stimulus. Therefore, it is called the stimulus–response (s–r) theory. According to the S–R Model, the neutral stimulus is directly paired with the unconditioned response thereby eliciting the same response through the unconditioned response. Another way of learning in classical conditioning is to associate the neutral stimulus directly to the unconditioned stimulus. This association can elicit a certain response that is similar to the unconditioned response. This conceptualization is called the stimulus–stimulus model (S–S model). For instance, a child warned by his teacher to get ready associates warning with getting ready (O’Doherty et al. 2004; Mowrer 1939; Powell et al. 2013). Pavlov also developed a stimulus-substitution theory in which the conditioned stimulus functions as a substitute for the unconditioned stimulus. According to Pavlov, the conditioned response makes an individual ready for unconditioned stimulus. A child may be accustomed to sit appropriately at the desk after the teacher’s instruction, thereby understanding teacher’s instruction as signal to sit appropriately (Mowrer 1939; Powell et al. 2013). Stimulus generalization and discrimination are concepts used to explain classical conditioning. Generalization can be described as the inclination to respond to a stimulus that is similar to the conditioned stimulus, once a response has been conditioned through several presentations of conditioned stimuli. Therefore, a similar stimulus can elicit the conditioned response (Carlson et al. 2000; Ghirlanda and Enquist 2003; Pearce 1987; Powell et al. 2013; Vervliet et al. 2013; Walker 1987). Discrimination is that a certain response is only elicited by one stimulus.

Operant conditioning is another way of addressing learning as an adaptive process. Skinner (1953, 2013) developed a theory that views human behavior as a phenomenon controlled and determined jointly by genetic heritage and environmental contingencies. The most important claim of operant conditioning theory is that behavior is controlled by its immediate outcomes (Bandura 1986, Skinner 1953, 1965, 2013). The future probability of a specific response, whether it is repeated or not, is determined by its consequences. Operant conditioning views human behavior as regulated by feedback rather than its immediate impact. Baum (1973, 1981) concluded that humans combine information about how often and when their responses are rewarded and reinforced over a long period. They adjust their actions based on aggregate outcomes. They become aware of probabilistic relations between actions and their consequences. They observe the improvement that they are making, and tend to set goals for progressive development. As a result, they form beliefs from observed regularities of events. The power of expectancy and beliefs on outcome influences human behavior under similar environmental contexts (Kaufman et al. 1966). Humans regulate their behavior based on both predictive situational cues and

outcomes that they expect (Bandura 1986). In other words, human behavior operates in the environment to produce the desired outcomes (Skinner 1953).

There are three elements to operant conditioning. The first element is situational cues which cause a response. The response is the second element and the third element is the consequence of response. Consequence of response shapes and controls future responses such as whether the response will be repeated or not in similar settings. Therefore, consequence of response reinforces the response. In operant conditioning, the consequence either increases or decreases frequencies of a specific behavior to respond a stimulus. Consequences that strengthen the behavior are reinforcers and consequences that weaken behavior are punishers.

The classroom is a social setting which involves considerable value-laden experience for children. Children interact with each other and their teachers. Teachers employ various classroom management strategies to make children adapt to classroom settings, demonstrate a sample set of behaviors, and send feedback about their responses (Brophy 1986, 1988). This interaction entails adaptive behavior. Children's behavioral adaptation is seminal because children's behavioral adaptation in the kindergarten period predicts achievement in the primary school period (DiPerna et al. 2007; Ladd et al. 1999; Kaufman et al. 2009). The behavioral adaptation pattern and processes among children are different, so learning as behavioral adaptation in the classroom environment may occur differently. Observing behaviors of children whose ages range from 6 to 10 years, and discovering similarities among their learning patterns will help to explain their learning inclination and their behavioral adaptation processes.

Purpose of the Study

The classroom is an environment in which students have to follow the rules and procedures in order to adapt. Moreover, the classroom functions as an environment for teacher-child interaction and peer interaction. The interactions have remarkable implications for behavioral adaptations of children. Adaptation entails learning. Behavioral conditioning is one of the significant ways in learning. In the classroom, students need to regulate their behavior to adjust and manage their interactions with each other and the teacher. In this process, they observe others' behaviors and their behavior and reach a conclusion about how to behave. Teachers use a wide range of classroom management strategies to make the children adapt to the classroom environment. Rules and procedures are explained, and a sample set of behavior is demonstrated by teachers. The adaptive processes that are used to adapt to classroom settings may be different for children of different ages and developmental stages. Teacher and student interaction might occur within the framework of either classical conditioning or operant conditioning in terms of students' adjustment to the classroom environment.

There are many researches about the interactions in classroom settings. Fawley et al. (2019) found out that positive teacher-children interaction helps to decrease behavioral problems among children. King (2016) reported that manipulation of reinforcers resulted in better support for K-8 students with emotional disturbance. Gee et al. (2019)

noted that contingency prompts improved pre-schoolers' matching skills. Daly et al. (2004) concluded that stimulus control, one of the key components of conditioning, leads to better achievement in literacy among primary school children. Camargo et al. (2016) behaviorally based intervention improved social interaction of children with autism spectrum disorders. Panahon and Martens (2013) revealed that non-contingent reinforcement, a response-independent delivery of stimuli, developed academic performance among primary schoolers. Hundziak et al. (2017) concluded that operant conditioning helps mentally retarded children to gain toilet behavior. However, aforementioned researches were conducted through experimental research design. There is research, which reveals how conditioning is influenced from context, causes, conditions, and consequences which occur in the classroom interactions in terms of age of the children yet. Therefore, the present research aims to explain how conditioning occurs in the classroom interactions.

In the present study, conditioning patterns of participant children whose ages range from 6 to 10 years were revealed, and consequently their conditioning processes are dealt with from an evolutionary perspective.

Methodology

Design of the Study

The present study was designed through grounded theory because the aim was to interpret and understand children's conditioning patterns in terms of their behavioral adaptation to classroom settings. The purpose of grounded theory is to reveal and understand context, causes, contingencies, consequences, covariances, and conditions (Glaser and Strauss 1967). Moreover, grounded theory allows a focus on interactions and social process within a definite context so it helps the researcher to reveal what context, social process, and interactions occur (Starks and Trinidad 2007). The present study seeks to explain the conditioning pattern of kindergarten and primary school children during behavioral adaptation in classroom settings and was conducted with grounded theory with the researcher developing a general explanation about certain processes, actions, interactions, and social processes among a large number of participants (Strauss and Corbin 1998). In addition, grounded theory provides a theoretical base for studies aiming to remove a gap in existing knowledge (May 1986). The present study was designed with grounded theory to produce an explanation because there is no research about the general tendency of conditioning as behavioral adaptation in classroom settings among kindergarten and primary school children in the literature. The present study has cross-sectional nature because participant children, whose ages are between 6 and 10 years, were observed simultaneously.

The Research Process

Participants

The purposive sampling strategy was used because of the fact that the present study was designed in grounded theory, one of the qualitative research traditions. Purposive sampling depends on handpicked cases, which are thought to provide the basis for data collection, because the aim is to develop a theoretical framework in order to explain behavioral responses and characteristics of primary school children and kindergarteners under classroom settings in the present study (Cohen et al. 2007). After official permission was obtained from the Ministry of National Education, schools were visited, and the purpose of the research was explained to kindergarteners and primary school children and their teachers. Participant children were recruited after mutual approval and consent from the parents and teachers of the children. Ninety-eight children were included in the research sample, with 17 from a kindergarten classroom, 19 from a 1st grade classroom, 18 from a 2nd grade classroom, 24 from a 3rd grade classroom, and 20 from a 4th grade classroom. Patterns and regularities of incidents are important rather than the number of participants in the qualitative research tradition (Miles and Huberman 1994). Pseudonyms were given as “Child 1, Child 2”, to each of the participant students in order to abide by ethical considerations.

Entry into the Research Field

The present study was launched in a school in Artvin, Turkey, after necessary consent and approval from the participant children’s parents and teachers, and the Ministry of National Education. Logic of the grounded theory depends on the notion that the researcher enters into research settings with no prior knowledge related to phenomenon being studied. Therefore, no relevant literature was read before the participant observation. Data were gathered through participant observation in which the researcher’s role was complete observer (Gold 1958). The observation took place while the teachers were instructing their students. Kindergarten classroom, 1st grade, 2nd grade, 3rd, grade and 4th grade students were observed at depth in their natural settings during one semester. The researcher took field notes during the observations. The field notes were shared with participant students’ parents and teachers in order to meet ethical standards. Observation took about 5 months in one semester. As soon as similar incidents and regularities among the incidents in the classrooms were observed to occur, observation was ended.

Data Source

Data were collected through participant observation in which the researcher’s role was complete observer. Kindergarten classroom, 1st grade, 2nd grade, 3rd grade and 4th grade students were observed for one course hour in each observation session every 2 weeks during one semester. As a result, observation took a total of 50 course

hours. During observation, the researcher wrote what happened and added his comments to the field notes.

Data Analysis

Observational data were analyzed within three steps of open coding, axial coding, and selective coding as suggested by Strauss and Corbin (1990, 1998). The analytic process was constructed using microanalysis, which entails investigating the data line-by-line and discovering repeated incidents, coding, and comparing them. This process is the basis of grounded theory. Microanalysis is useful in finding initial categories and relationships (Morrow and Smith 1995; Strauss and Corbin 1990, 1998). Data analysis began with open coding which helps the researcher fragment and reduce data into manageable size and, determine concepts, categories and their dimensions (Strauss and Corbin 1990, 1998). In open coding, incidents, actions, and interactions were compared iteratively, and classified in terms of their similarities and differences. Conceptually similar incidents, actions and interactions were clustered under the same groups and labelled to form categories.

Axial coding is the second step in the data analysis. Coding is conducted around the axis of a category so axial coding allows subcategories to be linked and related and adds to the properties of a category. In axial coding, the data, fragmented in open coding, were reassembled. Thus, subcategories and the relationships can be verified. Codes and categories were identified, compared, and contrasted until no codes and categories appeared among the raw observational data (Strauss and Corbin 1990, 1998).

Selective coding is the third step in the analytic process. All categories are integrated around a core category, which systemically relates all the categories with each other thereby validating and refining those relationships. Therefore, all categories, identified in open coding and axial coding, were clustered under a core category in order to validate and refine relationships among the categories. Six criteria were taken into consideration in determining the core category. These criteria are centrality to all categories, frequencies among all of the data, inclusiveness and easiness with all categories, implications for general theory, theoretical power in explaining details, and appropriateness in explaining variations among dimensions, consequences, conditions, properties (Strauss and Corbin 1990, 1998). Selective coding was conducted by identifying the core concept for all categories, and displaying it in a graph.

Overall the analytic process was based on deep immersion into the data, identifying similarities and patterns as categories, and variation and properties in the categories.

Results

Two categories of teacher control and pervasive behavior were revealed as a result of the data analysis (Table 1).

Table 1 Concepts and their categories emerging from open coding and axial coding

Categories	Concepts
Teacher control	Maintaining instructional order through classic conditioning
	Instruction of the teacher as conditioning stimulus
	Loose teacher control due to teacher position
	Shaping student behaviour
	Impact of the activities on conditioning
	Assigning instructional tasks as contingent stimuli
Peer interaction	Teacher demonstration as sample of operant behaviour
	Pervasive behaviour through classic conditioning
	Pervasive behaviour through operant conditioning

Open Coding

Teacher Control

The participant teachers tried control the participant children's behavior in order to manage their behavior. The preschool teacher employed classroom strategies relying on classical conditioning so as to make the kindergarteners adapted. It was found that the teachers' control is influenced from their position. Moreover, instructional activities played a role in making the 1st graders, the 2nd graders, and the 3rd grader. Finally, it was observed that demonstration strategy by the teacher produced sample off operant behavior among the 4th graders.

The results of this category consist of the codes from kindergarteners to the 4th graders. This category includes maintaining instructional order through classical conditioning, instructions of the teacher as conditioning stimulus, loose teacher control due to teacher position in the classroom, shaping student behavior, impact of activities on conditioning, assigning instructional tasks as contingent stimuli, and teacher demonstration as sample of operant behavior.

Maintaining Instructional Order Through Classical Conditioning

"Child 1 and Child 4 were talking to each other. The preschool teacher interrupted and asked them to stop talking. The preschool teacher said that she would give a gift to those who obeyed the rule by remaining quiet. Child 1 and Child 4 ended the dialog. The preschool teacher said that she had surprises and would give them to those sitting in their own chairs. The children were stimulated as those who were not sitting sat on their chairs right away. The teacher told students that Child 7 had brought gifts. The teacher demanded the children thank Child 7 for her gifts. They obeyed the directions from the teacher and thanked Child 7. Child 7 gave away the gifts." The teacher tried arousing the children's interest by employing classical conditioning and rewarding. First the teacher displayed the reward and formed the children's behavior. Thus, she matched her call with the desired behavior. Indicating the

rewards functioned as unconditioned stimulus, her call played a role as conditioned stimulus, and favorable kindergarteners' behavior were conditioned behavior.

The preschool teacher used verbal reinforcement in classical conditioning so it was coded as classical conditioning with verbal rewards. "The teacher distributed the activity book and opened the page. The teacher asked questions about the painting activity and demanded they raise their hands before speaking. Painting the umbrella aroused the children's interest. When the teacher reminded them of the 'rule of the magic finger', they obeyed the rule and spoke after permission from the preschool teacher. The teacher thanked the kindergarteners." The teacher maintained instructional order through classical conditioning. The teacher employed verbal signals such as "magic finger" like conditioned stimulus, and helped the students obey instructions. She reinforced favorable behaviors of the kindergarteners through verbal compliments.

Consequently, results under "maintaining instructional order through classical conditioning" can be interpreted as showing that participant kindergarteners are inclined to be conditioned through classical conditioning because of the fact that the preschool teacher tried to match unconditioned stimulus to a conditioned response.

Instruction of the Teacher as Conditioning Stimulus

"The preschool teacher had her students sit down in a circle and then she put toys in the middle of the circle. The preschool teacher said that there were 4 cars but there were 7 children so they had to play in order. The teacher determined the order as Child 2, Child 9, Child 11, and Child 3. The children obeyed their turns. They played with cars under the teacher's control for about 10 min. The preschool teacher said that all of them were free. The kindergarteners left the group and began to play with toys individually. However, there appeared to be a conflict among the children about sharing the toys. The teacher intervened, and reminded them of the classroom rules." When the teacher's direction was absent, the children's activities lasted for a short time, and they were purposeless. Instruction by the preschool teacher made the kindergarteners more purposeful.

"The 1st grade teacher said that they would clap as an entire class, and asked whether they were ready. All of the 1st graders focused on the teacher. The teacher told them to hold their hands up and clap. After they clapped, the teacher told them to touch their own tables. The 1st graders first clapped and then touched their own tables. Some students did not manage to follow the clap and hit commands from the teacher. The teacher identified those students and explained in depth what they needed to do. The teacher asked the students if they were ready. That question prepared the 1st graders. The teacher told them to perform the actions of clap and touching in order. All students followed the instruction from the teacher and completed the necessary performance according to the instructions from the teacher."

"The teacher told them to play the night time and day time game. The teacher explained the rules of the game and asked the 1st graders to attend to his instruction. After the game finished, the teacher asked them to go to their desks. The students who left the game sat at their desks and the teacher demanded they complete their work sheets. Those who left the game obeyed the instructions from their teacher.

Child 18 and Child 22 left the game sat at their desks and began to complete their work sheets.” 1st grade students, who are 7 years of age, need external stimulus to achieve and complete a given task. They are inclined to behave based on external, unconditioned stimulus. They also seemed to pair their teacher’s instructions with focusing on a given task. Therefore, classical conditioning is very convenient for 7-year old children in the classroom. Long-term teacher control and influence helped 1st graders to become conditioned. Therefore, teacher control and influence functioned as an element in the stability of conditioning.

Loose Teacher Control due to Teacher Position

“The teacher got the 1st graders to read each line. The teacher read the text aloud together with them. The teacher turned his back to the classroom and began the sentences on the smart board. While the teacher was writing the sentences, Child 19 and Child 22 started to speak to each other. The teacher asked the students to write the sentences into their notebooks. Child 25 went to the waste bin to sharpen his pencil and then Child 19 and Child 22 followed Child 25. They came together around the waste bin and began to talk to each other.” The teacher’s position with his back to the 1st graders disabled contact between the teacher and the 1st graders so they lost the goal of the instruction and focus of conditioning. Teacher contact with the 1st graders seemed to provide the basis for the conditioning stimulus.

Shaping Student Behavior

“From the beginning of the lesson, Child 30, a 2nd grader, was attempting to show what she did, and speaking about irrelevant things. The teacher ignored her behavior. Child 30 gave up her behavior”.

Child 30 realized her behavior did not work and yield the desired outcome so she stopped this behavior and changed to adapt to the social environment. Child 30 was conditioned through operant conditioning.

“Child 32 and Child 38, 2nd graders, asked to respond to the question but the teacher rejected their request because the teacher said that it was not their turn to speak. Child 32 and Child 38 stopped insisting.”

“Child 31, 2nd grader, wanted to add something and interrupted Child 35’s speech, but the teacher warned Child 31 about speech rules in the classroom. Child 35 continued to talk about his ideal profession, Child 31 again wanted to add something, but the teacher again warned her and reminded her of speech rules in the classroom.” The 2nd grade teacher tried to make the 2nd graders aware of the results of their behavior by reminding them about classroom order. Therefore, the teacher employed operant conditioning to maintain classroom order.

Impact of Activities on Conditioning

“After the teacher had instructed and shown the 1st graders how to draw a curve and lines, he gave out a picture work sheet about curves and lines. The 1st graders were trying to complete the drawing exercises which the teacher gave. Child 19

laughed and was talking with Child 25, his desk mate. Child 25 also seemed to be so uninterested that he was not working on the drawing activities. The teacher realized that Child 19 was not motivated for the activities and said “Come on Child 25! Let’s start to draw”, then Child 25 began to draw a line on the activity sheet. However, his motivation for the drawing activities did not last for long and he again started to talk to Child 19. Child 21 joined the conversation between Child 25 and Child 19.” Child 25 did not complete the work sheet within the lesson due to lack of motivation about drawing linear and curved lines. Instruction was conducted mainly based on demonstration. The 1st grade teacher’s instruction strategy depended on demonstration alone so they got bored easily with the instruction. The teacher failed to produce reinforcement even if he had strict control over the 1st graders.

“The 3rd grade teacher said that they would interpret visuals about the text. The 3rd graders, who are 9 years old, held up their hands up to interpret the visuals. The teacher got different students to interpret different visuals; however, they found this activity so routine and boring that they got bored about 5 min later. They began to talk about irrelevant things to each other so noise broke out. The teacher realized that they were bored so he asked several questions about the reading text’s main theme. The students wanted to respond. However, the teacher said that they would respond to the questions on the 37th page of their work books. The activities on the 37th page included activities such as drawing a picture about the text, and questions to answer. They were interested in the activity so they immediately began to draw.” The teacher used different strategies to condition his students. During the lesson, the teacher’s classroom strategy depended on demanding several instructional tasks and producing students’ operant behavior. Therefore, the 3rd graders need instructing through different instructional stimuli to produce operant behavior. When the instructional tasks were routine, the 3rd graders got bored and did not manage to produce operant behavior.

“The 2nd grade teacher asked about math homework which he had given them yesterday. The teacher got the 2nd graders to do some math. The teacher wanted several students to come to the smart board and answer the questions. This instruction continued for 15 min so the students were bored because similar instructional activities caused the students find the instructions routine. The students began to speak to each other, and were playing with their erasers, pencils, and pencil boxes. As soon as the school bell rang, they left the classroom.” The 2nd graders were bored with same instructional activities, so they violated the classroom rules. When their teacher did not intervene through reinforcement, they couldn’t be motivated to complete the instruction.

“The teacher asked the 3rd graders to guess what they would learn in that lesson and said that he would teach subtraction. Then the teacher wrote several subtraction exercises on the board. The teacher told the 3rd graders to write these subtraction exercises into their notebooks and solve them, and individually find their results. They wrote the exercises and began to solve them. They appeared to be focusing on the exercises. While the students were solving the exercises, the teacher added that he would get one of them to solve the exercises on the board. The students seemed to have finished answering so the majority of the students held their hands up. The teacher selected Child 48. The students liked solving the exercises. Child 48 solved

an exercise on the board. After Child 48, the teacher wanted more students to solve another exercise (900–643) on the board. The majority of the students wanted to solve on the board and the teacher told Child 65 to solve the exercise. Child 65 came to the board and solved the exercise accurately. While Child 65 was working on the exercise, other students were solving the exercises in their note books. The teacher wrote another subtraction exercise (990–860), and then he told Child 53 to solve the exercise. While Child 53 was working on the exercise, other students were writing the exercise into their notebooks and working on it. Other students were following Child 53 carefully and comparing results and his method of solution. This instructional method was conducted for Child 58, Child 61, Child 50, and Child 49.” 3rd graders easily focused on their given task and motivated themselves. This motivation in turn helped them behave based on the outcome of their behaviors. The fact that the teacher gave different subtraction exercises, asked the 3rd graders to work individually, and compare their results with each other provided different instructional stimuli. Furthermore, independent working did not cause distraction by stimuli among them and they focused on the instructional tasks. Different instructional stimuli helped the 3rd graders respond accurately to instructional tasks. This finding can be interpreted as showing that 3rd graders are inclined to be conditioned through operant conditioning because the teacher tried to shape the 3rd graders’ behaviors by presenting different instructional stimuli.

Routine instructional activities conducted by the teachers were deficient for conditioning among 2nd and 3rd graders. However, changing instructional stimuli helped to stabilize conditioning among the 3rd graders.

Assigning Instructional Tasks as Contingent Stimuli

“The teacher told 2nd graders to tear out Appendix-6 from their course books. The teacher clearly asked the 2nd graders to read Appendix-6 and complete the activities. The teacher left his students free. They helped and discussed with each other while they were completing the activities. When the teacher said that let’s hear your response to the activities, the 2nd graders directed their focus from Appendix-6 to him. They responded to the activities, and the teacher praised them” When the teacher determined a goal for the 2nd graders to achieve, they could focus on the goal and try to produce a favorable outcome. This finding can be interpreted as indicating that 2nd graders can be operatively conditioned when the teacher sets a goal.

“The teacher told the 3rd graders that they would read the text about space rockets in order. The teacher asked Child 52 to read the text entitled “The Space Rockets” aloud. After Child 52 read one paragraph, the teacher wanted Child 66 to continue to read. After Child 66 read one paragraph; the teacher wanted Child 53 to continue to read. This reading continued for 10 min. While any student was reading, the other students were following and waiting for their turn.” The reading instruction to different 3rd graders did not cause them to be bored because each of the 3rd graders had to follow the reading. Vagueness about their reading turn helped them to be conditioned, and respond appropriately to the conditioning stimulus. The vagueness functioned as contingency. This vagueness was set as conditioning stimulus and the 3rd graders developed awareness about how to respond to this vagueness. This

mechanism formed a chain between a response and its results. Hence the formation of a response and its result can be interpreted as showing that 3rd graders tend to be conditioned through operant conditioning.

“The teacher made his decision, and asked the 4th graders who wanted to read the reading text called ‘Our World’. The students held their hands up to get permission to read. The teacher warned the 4th graders who had violated the rule about how to get permission to read. The teacher said that each paragraph would be read by different students. The teacher selected Child 78 and told her to read the text loudly. While Child 78 was reading the first paragraph of the text, other students were tracking wondering whose turn would be next. After Child 78 read the first paragraph, the teacher told Child 70, Child 75, and Child 86 to read in order. Child 83 and Child 85 wore their coats and put their books into their bags. Other students ignored them and continued to track the reading text. After the reading instruction was ended, the teacher asked several questions about the text, and the majority of the students held their hands up to respond the questions. The teacher thanked the 4th graders for their accurate answers.” Although the teacher’s control over the 4th graders was not strong, the students did not behave as Child 85 and Child 85 behaved, they continued reading the text. They tended to behave so as to get the desired results. The teacher asked questions about the text and the majority of her students wanted to respond so they held their hands up. Based on this behavior pattern, it can be interpreted that 4th graders are achievement-oriented so they follow the tasks given by their teacher. Setting a goal to be achieved functioned as conditioning stimulus.

Teacher Demonstration as Sample of Operant Behavior

“The teacher showed her protractor and drew a square on the board. The teacher asked them to observe what she would draw. The 4th graders carefully watched what she did. The teacher told her students to open their math notebooks and write a title Exercises. The students did what she told, and wrote what she said. Child 94 said that she could easily draw a square with her ruler. The teacher asked her students to draw a square whose side length was 1 cm. Child 89 and Child 86 told the teacher that if side length was 1 cm that they would not use their rulers. The teacher agreed and told them to draw a square without their rulers. Child 97 went to the teacher, and asked where she start to draw on the ruler. The Teacher responded that Child 97 needed to start drawing from “0”. The 4th graders seemed to have been conditioned to produce the desired operant behavior, because everyone in the classroom was trying to repeat what the teacher had already drawn.” The teacher influenced the 4th graders and conditioned them. The teacher displayed examples of the desired behaviors and the 4th graders were motivated to draw. Although there was no tangible reinforcement, they tried to repeat the teacher’s actions. This finding can be interpreted as indicating that belief functioned as tangible reinforcement among the 4th graders and they were conditioned through operant conditioning.

The teacher gave away worksheets to the 1st graders. The worksheets included the activities about letter “r”. After that, the teacher tried to set up the smart board in order to demonstrate how to write the letter “r”. The teacher demonstrated how to write the letter “r”, while the 1st graders were doing exercises on the worksheet.

While they were doing the activities, the teacher was observing them. He realized that they had difficulty in writing the letter “r” so he demonstrated again how to write it. While he was demonstrating, most of the students were watching him.” Teacher demonstration helped students get ready to perform a specific action. They tried repeating what their teacher was doing and teacher demonstration presented a specific operant behavior. The teacher of the 1st graders presented the set of behaviors again. This instructional strategy depends on operant conditioning.

From the codes under teacher control, it can be construed that the kindergarteners and the 1st graders need stricter teacher control to be conditioned, so strict teacher control led to classical conditioning. Therefore, the preschool teacher and the 1st grade teacher tried to elicit the desired behaviors among the kindergarteners and the 1st graders. As for the 2nd graders, their teacher tried to shape their behaviors through classroom rules and ignorance to make them aware of the results of their behavior. In addition to that the 2nd graders and the 3rd graders were influenced negatively by routine and long instructional activities given by their teachers; therefore, they needed different instructional stimulus. Finally, the 4th graders needed the least teacher control and more easily focused on instructional goals with operant behaviors.

There is difference between the 1st graders and the 4th graders. In the demonstration strategy, the 1st graders needed stricter teacher control, while the 4th graders were conditioned through loose teacher control.

Peer Interaction

Pervasive Behavior Through Classical Conditioning The participant children’s behaviors functioned as behavior models for each other. As a result, the behavior models initiated peer interaction. Therefore, codes related to the behavioral interaction were integrated under “Peer Interaction” category. Peer interaction emerged through either classical conditioning or operant conditioning.

“The teacher released the 2nd graders. Child 30, Child 34, Child 31, and Child 37 were playing with play-dough from the beginning of the lesson. First Child 35 came to the teacher and then Child 30, Child 31, and Child 37 followed Child 35. They began to play chess together on the teacher’s table. Five minutes later Child 30 and 31 stopped playing chess and came to Child 36. Child 38 was trying to shape some paper into binoculars. Child 31 and Child 37 found it very interesting and they participated with Child 36.” When the teacher control and directions were absent in the classroom environment, the 2nd graders observed each other and participated in each other’s activities. Therefore, activities and behaviors play a role as stimulus for them to elicit the same behavior among the 2nd graders. They were conditioned by such similar stimulus that similar stimulus elicited similar behaviors. Hence, similar patterns of behaviors were pervasive among them. This behavior mechanism is a sample of classical conditioning among the participant 2nd graders.

Pervasive Behavior Through Operant Conditioning “It was in the last lesson that the teacher left the 4th graders free. Child 80 requested permission from the teacher to help Child 85 and the teacher allowed him. When the teacher permit-

ted, Child 80 instantly went to Child 85. Child 90 saw that Child 80 had gone to Child 85, Child 90 went to Child 81, and told Child 81 that her drawing was very nice. Child 80 came to Child 85 and began to help Child 85. Child 88 stood up and observed the teacher who was working on planning. Child 88 began to wander around the classroom, examined what other students were doing, and sat down again. Thereupon, Child 75 stood up from his desk and walked around the classroom, and investigated what other students were doing. " As soon as the teacher left the 4th graders free, they did not behave as they wanted. First Child 80 asked permission from the teacher to walk and help Child 85. Other 4th graders observed Child 85's behavior and the teacher's reactions. They vicariously experienced a response and the teacher's reactions. Child 80's permission initiated similar patterns of behavior among the 4th graders. Other students observed that walking and talking was not prevented by the teacher, so they repeated similar behaviors. Each of students' behaviors became a stimulus for other students. Relation response and its outcome forms the basis for operant conditioning. Similar behavior patterns pervaded among the 4th graders through operant conditioning based on vicarious experience.

Pervasive behavior among the 2nd and the 4th graders occurred when the teacher's control relaxed. However, the underlying mechanism is different for the 2nd and the 4th graders. Interaction among the 2nd graders initiates classical conditioning, whereas interaction among the 4th graders triggers operant conditioning through social learning because the 4th graders repeat similar behavior patterns based on vicarious experience.

Axial Coding

The kindergarten teacher shaped the kindergarteners' behaviors by displaying rewards and matching her call, unconditioned stimulus, and desired behavior. Therefore, the kindergarten teacher maintained classroom order through classical conditioning. Routine and long-lasting instructional activities failed to condition the 1st graders, the 2nd graders, and the 3rd graders. The 2nd and the 3rd graders also perceived different instructional tasks as contingent stimuli. Therefore, different instructional activities helped the teachers to condition their children. As for teacher control, the kindergarteners and the 1st graders needed strict teacher control, while the 4th graders produced the desired behavioral responses as learning outcomes without strict teacher control. As a result, strict teacher control required the kindergartener teacher and the 1st grade teacher to use classical conditioning. On the contrary, the 4th graders were more inclined to be conditioned through operant conditioning. Therefore, they needed less teacher control.

Peer interaction is another important dimension in the data analysis. Similar behavioral patterns and their consequences were pervasive among the participant primary school children. When the 2nd grade teacher was absent, the 2nd graders produced behavioral patterns which the 2nd grade teacher may not find appropriate. This behavioral pattern became pervasive. In peer interaction, the

4th graders observed each other's behaviors and their teacher reactions. If the 4th grade teacher's reaction was positive or neutral, they repeated similar behavioral patterns.

Selective Coding

Identifying the core category involves selective coding. As a result of open coding and axial coding, categories that the concepts were clustered in were revealed as "Teacher control" and "Peer interaction". All of the observed actions, behaviors, and interactions among the participant children were conceptualized and related to the categories. They helped the participant children adapt to the classroom settings. Both of the categories and their concepts were constructed through observed actions, behaviors, and interactions. Therefore "Adaptation" was identified as the core category within the broader term of the categories, and consequently selective coding reached the conceptual level of data analysis, refined by the data. Selective coding is displayed in Fig. 1.

Discussion

Although the concept of conditioning has been criticized by cognitivism and constructivism, it still offers a robust theoretical explanation about learning and instruction. Woollard (2010) views conditioning as the Cinderella of learning theories and states that post-millennium views of behaviorism are still in existence and used to articulate phenomenon related to human behaviors. Not only have behavioristic clinical applications, such as single case research and therapies, produced positive results but research findings conducted on larger groups such as in classroom settings have reported that behavioral interventions related to conditioning yielded improvements in cognitive and affective domains of learning (Becraft et al. 2017;

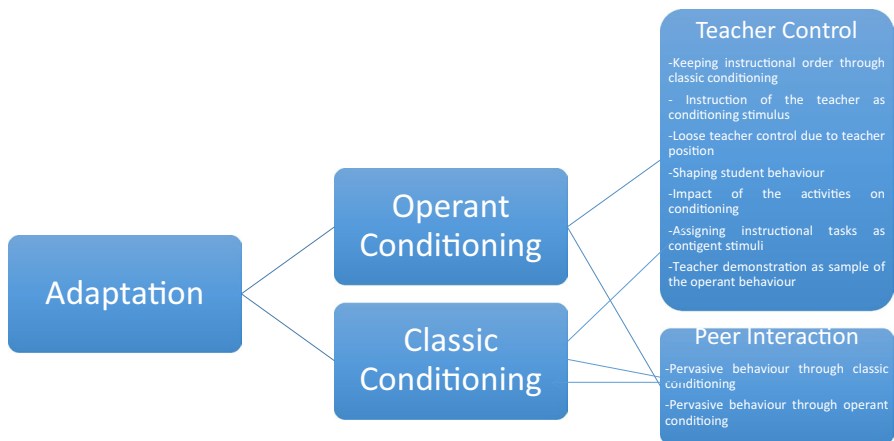


Fig. 1 Selective coding process

Cheatham et al. 2017; Conklin et al. 2017; Daly et al. 2004; Ledford et al. 2017; Ling et al. 2011; Maggin et al. 2012; McDaniel et al. 2017; Payne et al. 2017; Radley et al. 2016; Rich et al. 2017; Rodriguez and Anderson 2014; Volpe et al. 2011; Watson et al. 2016). In the present study, there were interactions between the participant students' conditioning tendency, instructional activities and classroom management styles. Therefore, the present study is different from previously conducted research in terms of explaining conditioning among children whose ages range from 6 to 10 years. The inclination toward conditioning among the participant children was explained through grounded theory in which regularities and patterns of conditioning were observed cross-sectionally and observational data were analyzed inductively within three steps of open coding, axial coding, and selective coding. A theoretical model was developed as a result of the data analysis. This model explains the conditioning tendency among the children whose ages are between 6 and 10 from an evolutionary and interactionist perspective.

Kindergarteners and 1st Graders tend to be conditioned through classical conditioning with instant reinforcement in which the preschool teacher maintained instructional order by pairing a stimulus to a response, and eliciting desired behaviors among the kindergarteners. The kindergarten teacher also presented unconditioned stimulus to conduct instructional activities before eliciting the behaviors. "The preschool teacher said that she would give a gift those who obeyed the rule by remaining quiet. Child 1 and Child 4 ended the dialog. The teacher said that she had surprises and would give them to those sitting on their own chairs. The children were stimulated as those who were not sitting sat on their chairs right away." The preschool teacher got her kindergarteners ready via preparatory response theory in which the conditioned response prepares the kindergarteners for presentation of a gift as the unconditioned response (Mowrer 1939; Powell et al. 2013; Wagner 1969). Classic conditioning has an associative and reflexive nature, so it does not require cognitive skill (Carlson et al. 2000; Powell et al. 2013; Woollard 2010). The kindergarteners and the 1st graders are the least cognitively developed students and thus they are inclined toward classical conditioning to yield desirable behavior and adapt to their classroom settings.

As a result of the data analysis, the kindergarteners and the 1st graders were observed to need strict teacher control. The teacher control functioned as conditioning stimulus for them because of the fact that they tended toward classical conditioning in order to adapt to the classroom setting. Moreover, they did not manage to maintain concentration without teacher control during the instructional activities given. This result can be explained through mechanical agency. Mechanical agency claims that environmental and external factors launch an inner process to produce conceivable and favorable behaviors so environmental and external factors influence how humans behave (Bandura 1986). The kindergarteners and the 1st graders are dependent on teacher control to yield desirable results through their behaviors. Therefore, as an external and environmental factor, teacher control impacts how the kindergarteners and the 1st graders behave. Besides loose teacher control prevented the triggering of mechanical agency.

Another seminal finding is that the participant students tended to be conditioned through operant conditioning from the age of 8. The 2nd grade teacher tried to

condition his 8-year old students through operant conditioning by presenting outcomes of their behaviors. Child 32, Child 32, and Child 38, 2nd graders, changed their behaviors based on outcomes of their behaviors, and developed an awareness of the results of their behavior. The most important claim of the operant conditioning theory is that human behavior is controlled by its immediate outcomes (Skinner 1953). Humans combine information about how often and when their responses are rewarded, whether a specific response to a stimulus works over a long period of time, and they adjust their actions according to aggregate outcomes. They form beliefs from the effects of observed repetitions of events on results (Baum 1973, 1981). This process entails cognitive determinants so radical behaviorists place cognitive determinants into stimulus operations, and thought adjusts the impact of consequences to monitor behavior. The power of expectancy and beliefs on outcomes has an influence on human behavior under similar environmental contexts (Kaufman et al. 1966; Dulany 1968).

Another finding is that assigning instructional tasks to the 2nd, 3rd, and 4th graders functioned as contingent stimuli and caused them to be conditioned through operant conditioning. Operant conditioning theory maintains that contingent stimuli are the main driver of human behavior (Skinner 2013). Instructional tasks played a role as contingent stimuli, so the 2nd, the 3rd, and 4th graders expected what was going to happen as a result of their response to the instructional tasks. Therefore, instructional tasks acting as contingent stimuli helped them to focus. Expectation and belief about the consequence of a response and adjusting expectation and belief have cognitive aspects, and they are also major components of operant behavior. The 2nd, 3rd and 4th graders are inclined to operant conditioning in their classroom settings because of the fact that they are more cognitively developed than the kindergarteners and the 1st graders. The first graders were conditioned by operant conditioning through demonstration strategy, which depends on strict teacher control. The 1st graders needed more teacher control when they were asked to display operant behavior.

Differences in cognitive development among the participant children influenced their peer interactions. The 2nd graders, less cognitively developed than the 4th graders, tend to be conditioned through operant conditioning in their peer interactions. The 2nd graders can be conditioned through operant conditioning with teacher control. However, the 4th graders can produce operant behavior without teacher control. This difference may stem from cognitive development. Producing operant behavior requires better cognitive characteristics so the 4th graders can yield operant behavior without teacher control during their peer interactions. However, the 2nd graders were impressed with such similar stimulus that similar stimulus elicited similar responses in their peer relationships, when teacher control was relaxed or absent.

Conclusion

In the theoretical model, conditioning inclination among the participant children whose ages vary between 6 and 10 years evolves from classical conditioning, which has reflexive and associative aspects, to operant conditioning. The inclination for

operant conditioning starts through teacher control at the age of 8. The more cognitively-developed the participant children are, the more they tend to operant conditioning in order to adjust to classroom settings. As a result of the conditioning, they can adapt to social settings in the classroom.

Practical implications: the following implications can be made as result of the present study:

- Teachers can use classical conditioning in order to make kindergarteners and 1st graders adapt to classroom settings and rules.
- Primary school children, who are aged 8, need teacher control and feedback about their responses, so teachers must sustain their control and feedback to use operant conditioning.
- 4th graders, at the age of 10, seem to observe and reach conclusions from their observations. Therefore, they need less teacher control.

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Data Availability Data will not be deposited in any publicly available repositories, but will be shared if asked directly to the author.

Compliance with Ethical Standards

Competing interests There is no competing interest.

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