

Efecto de la correspondencia entre descripciones de contingencias y contingencias sobre la conducta de elección bajo paradigma de autocontrol

Yamile Andrea Gómez Delgado*, Diana Marcela Muñoz Rosero, Edwin Gerardo Luna Tascón y Juan Carlos Benavides Martínez
Grupo de Investigación Psicología y Salud
Universidad de Nariño, Colombia

Recibido, agosto 3/2016

Concepto de evaluación, febrero 3/2017

Aceptado, mayo 16/2017

Referencia: Gómez-Delgado, Y.A., Muñoz Rosero, D.M., Luna Tascón, E.G. & Benavides Martínez, J.C.(2017). Efecto de la correspondencia entre descripciones de contingencias y contingencias, sobre la conducta de elección bajo paradigma de autocontrol. *Acta colombiana de Psicología*, 20(2), 240-252. doi: <http://www.dx.doi.org/10.14718/ACP.2017.20.2.11>

Resumen

En este trabajo se analiza el efecto de la historia de correspondencia entre las descripciones de contingencias y las contingencias sobre la conducta de elección bajo paradigma de autocontrol en 85 participantes de entre 10 y 11 años de edad, por medio de dos experimentos intrasujeto, uno realizado en contexto de laboratorio y otro en una situación natural simulada. Los resultados indican que es posible afectar la conducta de elección entre un reforzador inmediato —de menor magnitud— y otro demorado —de mayor proporción— en favor de la segunda alternativa a partir de una historia experimental de correspondencia entre las descripciones de contingencias y las contingencias. En ambos experimentos, la mayoría de participantes eligió el reforzador demorado después de experimentar los ensayos de correspondencia entre descripciones y contingencias, y el reforzador inmediato después de enfrentar los ensayos de correspondencia ausente pese a que las situaciones de entrenamiento fueron formal y funcionalmente diferentes en relación con la tarea establecida para evaluar la conducta de elección. Los resultados se analizan a la luz de la Teoría de los Marcos Relacionales, específicamente en relación con la alteración de las funciones del lenguaje.

Palabras clave: Autocontrol, conducta de elección, lenguaje, claves contextuales, descripciones de contingencias.

The effect of correspondence between descriptions of contingencies and contingencies on the conduct of election under the self-control paradigm

Abstract

In this paper, the effect of correspondence history between contingency and contingency descriptions on the behavior of choice under the self-control paradigm is analyzed in 85 participants between the ages of 10 and 11, through two intrasubject experiments, one carried out in a laboratory context and another in a simulated natural situation. The results indicate that it is possible to affect the behavior of choice between an immediate reinforcer of lesser magnitude and a delayed one of greater magnitude in favor of the second alternative, from an experimental history of correspondence between descriptions of contingencies and contingencies. In both experiments, most of participants chose the delayed reinforcer after undergoing correspondence tests between descriptions and contingencies, and the immediate reinforcer after facing the correspondence absent trials, even though the training situations were formally and functionally different in relation with the task established to evaluate the conduct of choice. The results are analyzed in light of the “Relational Frame Theory”, specifically, in relation with the alteration of the functions of the language.

Key words: Self-control, choice behavior, language, contextual keys, contingency descriptions.

* Universidad de Nariño, Departamento de Psicología, Calle 18 Carrera 50-02, Ciudad Universitaria Torobajo, (2)7315444, andreagomezdelgado21@gmail.com

Efeito da correspondência entre descrições de contingências e contingências sobre o comportamento de escolha sob o paradigma de autocontrole

Resumo

Neste trabalho, analisa-se o efeito da história de correspondência entre as descrições de contingências e contingências sobre o comportamento de escolha sob o paradigma de autocontrole com 85 participantes entre 10 e 11 anos de idade, por meio de duas experiências intrassujeito, uma realizada em contexto de laboratório, e outra, numa situação natural simulada. Os resultados indicam que é possível afetar o comportamento de escolha entre um reforçador imediato —de menor magnitude— e outro demorado —de maior proporção— em favor da segunda alternativa a partir de uma história experimental de correspondência entre as descrições de contingências e contingências. Em ambas as experiências, a maioria de participantes escolheu o reforçador demorado depois de experimentar os ensaios de correspondência entre descrições e contingências, e o reforçador imediato depois de enfrentar os ensaios de correspondência ausente, embora as situações de treinamento tenham sido formal e funcionalmente diferentes com relação à tarefa estabelecida para avaliar o comportamento de escolha. Os resultados foram analisados à luz da Teoria das Molduras Relacionais, especificamente quanto à alteração das funções da linguagem.

Palavras-chave: Autocontrole, chaves contextuais, comportamento de escolha, descrições de contingências, linguagem.

INTRODUCTION

The tendency to behave according to delayed consequences -what is commonly called self-control- is learned and consists specifically in the choice of the most long term optimal alternative, in terms of quality and magnitude of reinforcement or avoidance of the aversive stimulation (American Psychological Association, 2012; Martin & Pearl, 2006; Montgomery, 2008, Skinner, 1974 quoted by Gómez & Luciano, 1991; Theler And Shefrin, 1981).

A report published by *American Psychology Association* (2012) mentions that self-control is related to healthy lifestyles, such as practicing a regular exercise routine, eating a healthy diet, evidence of high academic performance, lower rates of substance abuse and greater financial security, among others. In addition, reference is made to a variety of socially relevant issues, that are associated with the opposite trend: behavior according to immediate consequences, even if it involves experiencing unpleasant situations in the future these include obesity (American Psychology Association, 2012; World Health Organization, 2012); cigarette smoking (World Health Organization & Ministry of Health, 2006); illicit drugs (United Nations, 2012; Tibbetts & Whittimore, 2002 cited by Cáceres, Salazar, Varela & Tovar, 2006); internet overuse related to the decrease of time allocated to academic behavior and work activities (García, 2008); and environmental pollution (Corral, 2006; World Health Organization, 2010).

The relevance of this variable has led different authors to propose strategies that favor development of self-controlled behaviors. Initially, Skinner (1974, cited by Montgomery, 2008) referred to the following procedures: 1) restriction and physical help; 2) manipulation of states of deprivation and satiety; 3) manipulation of emotional states; 4) use of aversive stimuli; 5) use of drugs or stimulants; 6) self-reinforcement or self-extinguishment; 7) self-punishment of undesirable responses and 8) incompatible responses.

Subsequently, different investigations have come to differentiate three useful procedures to increase the probability of choosing a delayed option in a situation of choice. The first one is called maximization of response by manipulation of delay interval, which has to do with the manipulation of quantity, quality or retardation of reinforcement (Dixon & Cummings, 2001; Gómez & Luciano, 1991, 2000). With the application of this procedure it has been found that the closer the end of the waiting interval, the greater the probabilities of waiting (González, Ávila, Juárez & Miranda, 2011). Similarly, it has been observed that it is possible to increase self-control by means of choice tests repetitions, increasing progressively the delay to obtain reinforcement of greater magnitude (Dixon & Cummings, 2001).

The second procedure is the use of distractors or alternative behaviors, which proposes that distractors of immediate reinforcers or attention to other stimuli facilitate waiting (Dixon, Rehfeldt & Randich, 2003; Gómez & Luciano, 1991). In other words, the probability of choosing the delayed reinforcer option increases when there is the

possibility of performing simultaneous alternating activities at the time of waiting (Dixon & Cummings, 2001; Grosch & Neuringer, 1981).

The third process relates to the formulation of self-instructions, self-reinforcement, or its joint application (O'Leary & Duvey, 1979 cited by Gómez & Luciano, 1991). Within this latter category are the programs of correspondence *say-do*, in which the participant is trained to show consistency between the description of what he will do and what he actually does after verbally saying it; in these procedures, no aid such as models or waiting instructions is required (Gómez and Luciano, 2000).

In relation to these procedures, Gómez and Luciano (1991) observed that with the gradual increase of delay, even though increasing the choice of the delayed reinforcer of greater magnitude in the trained situation, transfer of untrained behaviors is not achieved. Unlike this, the *say-do* procedure, not only generates a waiting repertoire, but also produces a repertoire of facilitation (equivalent to the distractors). In the same way, they observed that a functional generalization of the *say-do* procedure can be given through the similarity of instructions or contextual—or specific—characteristics of one task to another.

This last group of procedures to generate self-controlled behavior, reveals that language constitutes a relevant variable for the study of human self-control (Benabou & Tirole, 2004; Gómez, López & Mesa, 2007; Gómez & Luciano, 1991; 2000 Guevremont, Osnes & Stokes, 1986, Luciano, 1992, Montgomery, 2008, Wilson & Luciano, 2007).

The interest in the study of language from a behavioral perspective goes back to the first systematic approach of itself, made by Skinner (1981), who in addition to characterizing it as any behavior that is learned through reinforcement, raised the concept of "conditional discrimination" as an aspect of central importance for its understanding. This phenomenon refers to a situation in which the response of an individual to stimulus depends on others that alter the functions of the first (Alós, Guerrero, Falla & Amo, 2013; Hernández & Sandoval, 2003). Conditional discrimination studies generated a relevant context for the discovery and conceptualization of a procedure for experimental analysis of category formation: the equivalence of stimuli (Sidman, 1971; Zentall, Galizio & Critchfield, 2002).

The emergence of sorts of equivalent stimuli is a basic behavioral process that has spawned explained relational responses that arise without direct training, in other words, from their linking -mutual or combinatorial- with other stimulus (Hernández & Sandoval, 2003). In the 1990s, an analytic-behavioral approach to language and cognition was proposed, which was called Relational Frame Theory (RFT) that addresses the emergence of relations between

directly untrained stimuli and arbitrarily applicable relational responses through more general terminology, which is adapted not only to relations of equivalence, but also to those of non-equivalence (like opposition, distinction, comparison, temporality or causality, among other) (Barnes-Holmes, Rodríguez & Whelan, 2005; Hayes, Barnes-Holmes & Roche, 2001).

From this perspective of RFT, language is an operant response that consists of learning to relate events with arbitrarily established criteria -not based on their formal properties-, through various examples and situations that lead to abstract the contextual key that relates them and apply it to different and original events (Valdivia & Luciano, 2006). Thus, the response of a participant to stimuli never seen before is presented as a function of contextual clues that delimits relationship frames, which can be of equivalence -is equal to-, of difference -is different from- of comparison -more than -less than-, of temporality -before — after- or of causality -"if ... then"-, among others, which define the relationship between events (Hayes et al., 2001; Luciano, Gómez, Hernández & Cabello, 2001).

From this perspective, the description of a contingency affects the referred events, because of the possibility of transferring or transforming functions between stimuli -words and events referred to- that are part of a relational frame working function with relational frames to which they belong (Luciano et al., 2001). In relation to self-control behavior, the acquisition of a consolidated verbal repertoire allows human beings, among other things, to functionally contact the appetitive properties of choice that lead to the delayed reinforcer or aversives associated with the immediate reinforcer's choice, even if they are not normally present in the situation they interact with.

According to Wilson and Luciano (2007), verbal control over an action in a particular context would be a case of arbitrary relationship between verbal and non-verbal behavior. According to the authors, such descriptions develop a discriminative control when in the history of the individual, numerous and varied interactions have been generated to form pertinent relational frames. In this way, the interactions that an individual has -since his childhood- with other speakers are determinants for verbal regulation repertoire.

In the case of choice behavior under the self-control paradigm, verbal behavior allows contact consequences that will only be available long term -or that are unlikely- through verbal linkage of the current situation with events that are not present in the same spatial-temporal dimension; in addition, it facilitates the learning of behaviors without the need to be exposed to aversive consequences (Törneke, Luciano & Valdivia, 2008).

Evidence of this phenomenon is illustrated in the study by Binder, Dixon and Ghezzi (2000) conducted with children between the ages of 3 and 5 who had been diagnosed with attention disorder and hyperactivity. Specifically, the results showed that when the participants were initially proposed the option between an immediate reinforcer of lesser magnitude and a delayed reinforcer of greater magnitude, all chose the reinforcer of lesser magnitude, however when slight delays were introduced to obtain a greater magnitude reinforcer along with the verbalization of the self-rule "If I wait more, I will have the biggest", all the participants demonstrated self-control. In this same line, Ruiz and Gómez (2016), in a study carried out with people between the ages of 12 and 15, observed that as they learn to respond to different verbalizations, the frequency of behaviors increases in function of delayed consequences, which turn out to be indispensable in situations where they should focus on monotonous tasks that do not represent an immediate reward, but which will be useful in the future.

Based on the above, this work was carried out under the hypothesis that correspondence -or absence of it- between descriptions of contingencies and contingencies mediated by other individuals during infancy, affects adjustment before descriptions of contingencies that involve behavior on function of delayed consequences of greater magnitude, in other words, on self-controlled behavior. It is understood by correspondence between descriptions of contingencies and contingencies, when the verbalization of elements of the contingency to be experienced, coincides or is directly related to what the person actually experiences. On the other hand, it is understood that absence of correspondence is the inconsistency between the verbalization of the elements of the contingency and the experience itself.

METHOD

Two experiments were carried out to analyze the differential effect of a correspondence story or absence of

correspondence between descriptions of contingencies and contingencies, on the choice of immediate or delayed reinforcers. The first was performed in a laboratory situation and the second in a simulated natural situation.

EXPERIMENT I

Participants

In the first experiment twelve fifth graders from a state educational institution between the ages of 10 and 11 were randomly selected. A report provided by the attendant and the teacher of the school was taken into account to choose the students which allowed to discard psychological or medical variables that could affect the performance of the participants during the investigation. It is important to point out that all of them lacked experience in the experimental task.

Technical equipment and experimental situation

The experimental sessions were held in a class within an educational establishment, equipped with a Hewlett Packard Intel Core I5 desktop computer, a video camera, a booster dispenser (coins of 50 COP which means 0.01730 USD), a chair located in front of the monitor for the participant, and a chair placed for the experimenter at a distance of approximately two meters (to the child's right side).

Design

In this study, an intrasubject design was used and participants were randomly assigned to two experimental conditions, as shown in table 1.

After each block of tests, the self-control variable was measured by means of a task of choice. It is worth mentioning that the design used does not incorporate a baseline, since performing a previous measurement of choice behaviour could affect the subsequent evaluations given the learning effects (Kerlinger & Lee, 2002).

Table 1
Experimental conditions

Experimental conditions	First block of tests	Second block of tests
1 (six participants)	Absent correspondence between contingency and contingency descriptions.	Correspondence between descriptions of contingencies and contingencies.
2 (six participants)	Correspondence between descriptions of contingencies and contingencies.	Absent correspondence between contingency and contingency descriptions.

Procedure

Each participant entered the classroom individually and took a seat in front of the monitor. In this way, the investigator proceeded to give the general instruction of the activity:

Next you will play a game. Instructions will appear on the computer screen, I will be here in case you have any questions. You must keep in mind that I will not give you a rating for what you are going to do now, there is rapport, if you have any doubts, you can ask me, okay? Now you can start reading.

The researcher remained inside the classroom to verify that the participant read the complete instruction, clarify possible doubts and count the execution time in the task raised to evaluate self-control.

All participants were exposed to the following phases: a) correspondence trials, b) task of choice, c) absent correspondence trials, and d) choice task. The difference between the two experimental conditions was the order in which the test blocks were presented, as shown in the design section. For the two experimental conditions a conditional discrimination procedure was used consisting of 14 correspondence trials between descriptions and contingencies, and 14 absence correspondence trials, presented all of them with the Microsoft Office Power Point 2007 program.

Each trial consisted of the presentation of a description of contingencies located at the top of the screen and different stimulus according to the description: numbers, geometric figures, animals and objects extracted from Wechsler Intelligence Scale for Children-Revised - WISC-R (Wechsler, 1981), to guarantee the knowledge of such stimulus by the participants.

In the correspondence block, the description of the contingency corresponded to the contingency experimented in all the trials. In this way, every time the participant chose the correct option, a message appeared that indicated his success, and when the dispenser was activated, a coin of 50 pesos (COP) was issued. On the contrary, if he chose the incorrect option, a blank screen appeared, and after 5 seconds, the same test was automatically presented.

In the absence of correspondence block, the description did not correspond to the contingency in any of the tests, that is, although the description informed the participant that he would receive a coin of 50 pesos (COP) for an execution, when the dispenser was operated, the booster was not supplied.

The initial instruction for each block of trials was presented through three slides for simple understanding of the participant. Each one of them included a graphic example of the stimuli, the required execution and the consequences:

Pay close attention: some figures will appear on the screen. You must click on the figure that indicates the instruction [Slide 1]. If you do this correctly, an image of a 50-pesos coin will appear as shown below the screen [Slide 2]. When the image of the coin comes out, go to the dispenser and pick up only the chip that the computer tells you and the dispenser will give you a 50 pesos coin [Slide 3].

When the participant finished reading the instruction, a slide with an example was presented and the researcher indicated the location of the dispenser and its use. To ensure that the child understood the instruction, a slide appeared in which two options were posed: read the instruction again or start the game. When clicking on the start icon, the block of correspondence trials or absence of correspondence was presented depending on the experimental condition. The difference between the two conditions was the relevance of the description of the contingency (i.e. if it describes what actually happened or not), since the correspondence condition the participant obtained the coin of 50 (COP) when the dispenser was actuated, while in the condition of absent correspondence was not fulfilled.

Upon completing the 14 trials of each block, a slide presented a situation of choice to evaluate the self-control variable. The task of the participant in this phase was to click on the option that he preferred: to finish the activity, avoiding the effort required to perform a monotonous and long task (immediate low magnitude reinforcer) or to transcribe 500 letters that appeared on the screen to obtain 600 pesos (.2053 USD), which was established as the delayed reinforcer. The options were presented as follows:

(a) "I want to end the activity now" or (b) "I want to copy the 500 letters that are at the bottom of the screen on the sheet that is on the table to earn 600 pesos". If you choose this option, when you finish copying all the letters take number 15 and the booster dispenser will give you 600 pesos.

When the participant chose the first option, a slide appeared which indicated that the activity had finished and then the participant left the classroom; but if the participant chose the second option, a slide repeated the instruction about the transcription of the letters.

The moment the participant began to transcribe the letters on the sheet arranged on the table, a timer was activated to count the execution time. Every four minutes, the experimenter asked the participant if he wanted to continue or suspend the task, remembering that he could take whatever option he preferred. This aims to recreate a situation similar to what happens in everyday life, when a person can choose the immediate reinforcer at any time (depending on availability). The instruction to instigate the participant

was: "Do you want to continue copying the letters or do you prefer to stop? You can choose the option you prefer".

The experimenter accompanied the participant until the end of the activity, and afterwards the participant went to an adjoining room, where he/she stayed with another experimenter for 10 minutes. After 10 minutes of rest the participant returned to the classroom and the procedure was repeated with the second block of trials.

At the conclusion of the study, the researcher explained to each participant the purpose of the experiment and was instructed on the importance of following instructions from reliable sources such as parents and teachers.

RESULTS

The results of the experiment indicate that the choice of participants between a delayed reinforcer of greater magnitude and an immediate reinforcer of lesser magnitude is affected after experiencing correspondence or lack of correspondence between the descriptions of contingencies provided and the contingencies they describe.

Among the six participants who initially experienced the absence correspondence and correspondence blocks, three chose the smallest immediate reinforcer in the first situation (P2, P3 and P6) and the other three chose to transcribe the 500 letters to obtain the reinforcer delay of greater magnitude (P1, P4 and P5). However, two of the participants who chose this last option (P1 and P4) left the activity within four minutes of the presentation of the first instigator, and only one participant completed the transcription of the letters (P5) after 28 minutes.

When passing to the blocks of correspondence between descriptions of contingencies and contingencies, one of the participants chose the immediate reinforcer of lesser magnitude (P2) and five participants chose the delayed reinforcer of greater magnitude (P1, P3, P4, P5 and P6). Of the latter participants, three (P4, P5, and P6) completed the task in an average of 30.4 minutes, despite the presentation of the instigators, one wrote more than half of the content, leaving the task at 16 minutes of execution (P1), and another participant left the activity after 4 minutes (P3). Figure 1 shows the number of letters transcribed by the participants in each block.

On the other hand, the six participants who first experienced the correspondence blocks and subsequently the absence of correspondence blocks, chose the delayed reinforcer in the first block; five completed letter transcriptions in approximately 30 minutes (P7, P9, P10, P11 and P12) and one performed more than half of the transcription (P8), leaving the task 15 minutes after the start of the execution (before the presentation of the fourth instigator).

Afterwards, in the absent correspondence blocks, four participants chose the immediate reinforcer (P8, P9, P11 and P12) and two opted for the delayed reinforcer of greater magnitude (P7 and P10); One of them managed to finish the task after 24 minutes (P10) and the other gave up 4 minutes after the first instigator. Figure 2 shows the number of letters transcribed by the participants in each block of this experimental condition.

In summary, it is possible to observe that when the participants underwent correspondence trials between descriptions of contingencies and contingencies, prior to the situation of choice under a self-control paradigm showed a

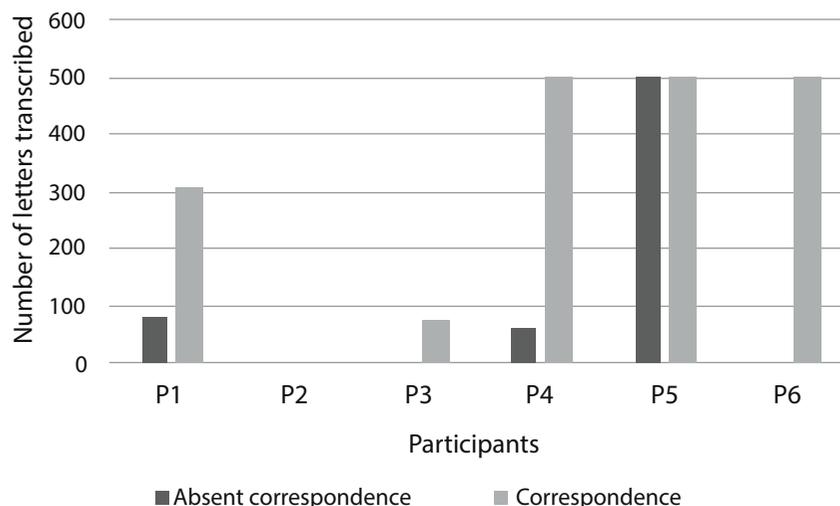


Figure 1. Choice behavior in the experimental condition of absent correspondence and correspondence.

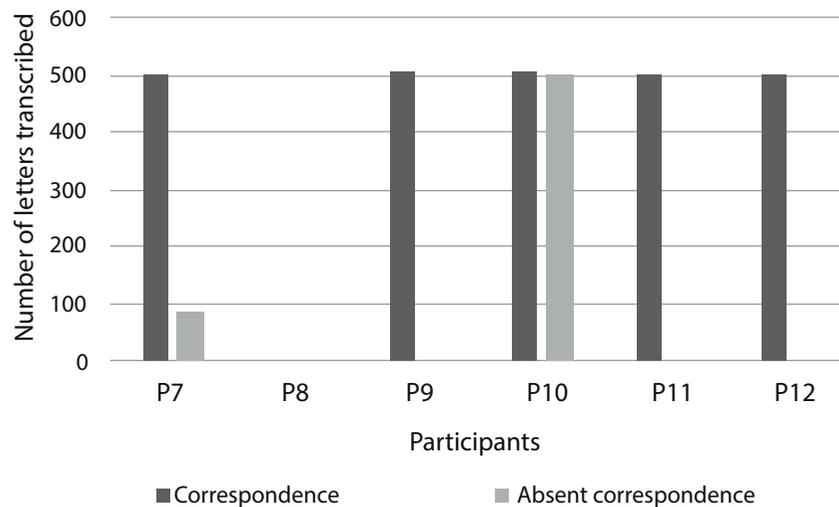


Figure 2. Choice behavior in the experimental condition of correspondence and absent correspondence.

greater tendency to choose the delayed reinforcer of greater magnitude, that is, to show self-controlled behavior. In contrast, in the absence of correspondence trials, the participants showed a greater tendency to choose the immediate reinforcer of smaller magnitude. This effect was observed in the measurement of the two experimental conditions.

EXPERIMENT II

Participants

In the second experiment, 63 students from a state educational institution between the ages of 10 and 11 participated in the study. The participants were chosen taking into account a report provided by the institution's advisor and teacher which allowed to discard psychological or medical variables that could affect the participant's performance during the investigation. All of them lacked experience in the experimental task and were part of two courses chosen randomly among 13 courses of fifth grade of the elementary school.

Technical equipment and experimental situation

The experiment was performed in two sessions of 45 minutes each. These were carried out in a classroom of the educational institution, equipped with a table, chairs and a video camera. During the application of the experiment other people were not present besides the participants and the researcher.

Design

In this experiment, an intrasubject design applied in a simulated natural situation was used. Table 2 presents the experimental conditions.

Subsequently to each block of tests, the self-control variable was evaluated by means of a task of choice.

Procedure

One week before the experiment was carried out, the research team asked the institution and the legal guardians of the participants to authorize the study. With the informed consent, the participants completed a checklist that allowed to obtain information about psychological or medical aspects that could prevent their participation. In addition, parents were asked to refrain from giving recommendations to their children about how to behave in the experiment.

Two simulated natural situations were developed as activities within the participants' first two hours of class at school (between 7:00 a.m. and 9:00 a.m.). The tasks had the following characteristics: they were presented by a human source (experimenter), each task was solved by one of the participants and its consequences were experienced by all the children. The activities were designed in such a way that doing them would not involve arduous work for the participant and guaranteeing a correct answer in all the cases. Five tasks were structured in total, which were maintained for the two experimental conditions; sweets and rest time were established as reinforcers.

Initially, one of the two test blocks (correspondence or absence of correspondence between contingency and

Table 2
Experimental conditions

Experimental conditions	First block of tests	Second block of tests
1 (37 participants)	Correspondence between descriptions of contingencies and contingencies.	Absence correspondence between descriptions of contingencies and contingencies.
2 (36 participants)	Absence correspondence between descriptions of contingencies and contingencies	Correspondence between descriptions of contingencies and contingencies

contingency descriptions) was administered and the remaining block was applied after measuring the effect on choice behavior under the self-control paradigm. Of the 73 participants, 37 underwent trials in the order of correspondence - absence of correspondence, and 36 in the order of absence of correspondence - correspondence.

In the blocks of correspondence between descriptions and contingencies, the participants faced 5 tasks presented by a source. In each task the source provided a description of contingency that mentioned a stimulus situation, a response and consequences. This description was followed by one of the participants and the consequence (reinforcers) for correctly performing the behavior was experienced by the whole group.

For example, for task 1, the experimenter randomly chose a participant from the group, called him to go ahead and gave the following description: "Look at this dice, just a moment ago I threw it and I got two, if you throw it and you get more than two, I'll give everyone a chocolate."

When the participant was able to perform the activity word by word, the experimenter provided the consequences described to the whole group. If the participant failed, the experimenter gave him another chance, until he was able to reach the criterion of the task. The following four tasks were performed similarly within the 45 minutes stipulated for the session.

In the absence of correspondence blocks, the source and the tasks of session one were preserved; however, even if the participant chosen by the experimenter fulfilled the criterion of success mentioned in the description of the contingency, the described consequence was not administered. For example, for task 2, the experimenter randomly chose a participant from the group, called him to go ahead and mentioned the following description of contingency: "Look at these cards, on the other side they are of different colors, what you must do is to indicate one of them, if that card on the back is yellow, I will let you out to play for 5 minutes."

When the participant was able to perform the activity word by word, the experimenter did not provide the

consequences described, because they were in the absence of correspondence block, and said: "Well, you took the yellow card, but I will not let them out to play". If the participant failed, he was given another chance until he succeeded in fulfilling the criterion of the task. The following four tasks were performed similarly within the 45 minutes stipulated for the session.

After each block, self-controlled behavior was evaluated through a choice situation. This was the following situation: if the participants wanted (individually), they could perform an additional activity that was to fill a blank piece of paper with letters on the front and back, thus obtaining a positive consequence. The experimenter provided the following description:

Let's do one more activity. Here I have some sheets of paper that (indicating the blank sheet of paper), have a grid from side to side with letters at the beginning. What each of you must do is fill the two sides completely with the letters that appear at the beginning. Whoever does it, gets to play out for 15 minutes before entering the other class. Then, whoever wants to fill out the form, should raise his hand, come to pick up the sheet and fill it completely.

RESULTS

The results of this experiment indicated that the behavior of choice in the self-control evaluation of 23 of the 37 participants who experienced the trials in the following order: correspondence - absent correspondence, was modified as a function of each block. When correspondence was presented between contingency and contingency descriptions, the participants chose to perform a monotonous task in order to obtain a deferred reinforcer of greater magnitude. On the contrary, when they experienced absence of correspondence in the previous experimental situation, they behaved according to immediate consequences.

In the same sequence of presentation of the blocks, 13 participants maintained their behavior in the two measurements of self-control; 12 of them behaved according to delayed consequences after each block of trials, and one according to immediate consequences in both measurements.

In the same situation, a participant showed a behavior under a paradigm of self-control contrary to expectations, i.e., after experiencing correspondence between descriptions and contingencies, in the task of self-control the participant chose the immediate option. On the other hand, when the participants experienced no correspondence, he/she behaved according to delayed consequences in the self-control evaluation

Figure 3 shows the trend of choice during the self-assessment of the 37 participants previously described.

On the other hand, the results indicated that the behavior of choice during the self-control evaluation of 27 of the 36 participants who experienced the sequence of absent correspondence and correspondence was modified as a function of themselves.

In other words, in the absence of correspondence between the description of contingencies and consequences, they chose the immediate option, however during session two, when correspondence was presented between the description given by the experimenter and the contingencies, these participants chose the delayed option during the configured task to evaluate self-control. Of the remaining participants, seven chose the delayed option in the two self-monitoring assessments and one maintained their choice behavior in the immediate option.

Finally, one participant behaved in a way that was contrary to expectations, that is, when he experienced absence

of correspondence between descriptions and contingencies, he chose the delayed option, and changed his choice to the immediate option in session two in which he experienced correspondence between descriptions and contingencies. The results described above are shown in Figure 4.

DISCUSSION

In the two experiments carried out, the participants were exposed to correspondence and non-correspondence trials between contingency and contingency descriptions, and subsequently underwent a choice task under a self-control paradigm that had no formal or functional similarity to the above-mentioned trials; in other words, the choice of delayed or immediate reinforcer was not directly trained.

It was observed that after experiencing correspondence trials between contingency and contingency descriptions, the participants of the study mostly chose the largest delayed enhancer, which in light of the TRF might imply that they responded to an event (situation of choice) in terms of another (correspondence tests), by abstracting the function of a contextual key of causality present in the two situations (Msetfi, Wade & Murphy, 2013, Törneke et al., 2008, Valdivia & Luciano, 2006). In other words, it could be assumed that the description of the contingency that configured the situation of choice to measure self-control included contextual keys (if ... then) that allowed the participant to frame their behavior and environmental events, in causal relationships, which made it possible for their behavior to be controlled by consequences that would probably only be experienced in the long term.

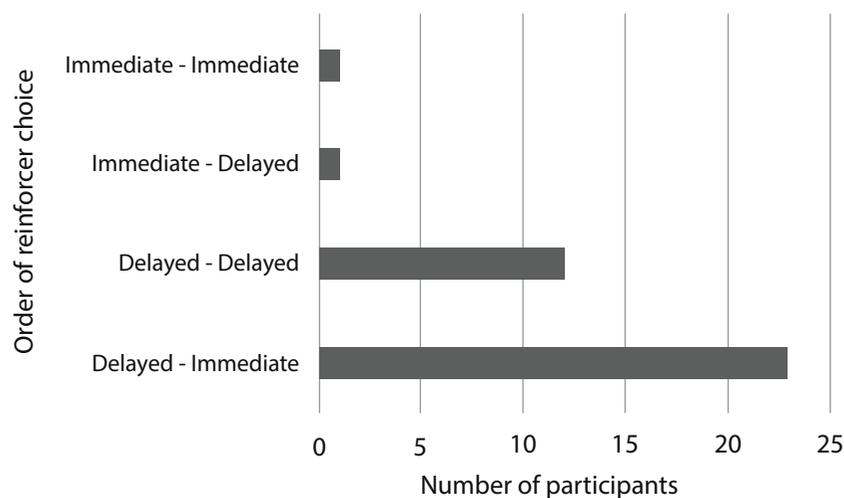


Figure 3. Choice behavior in the experimental condition of correspondence and absent correspondence.

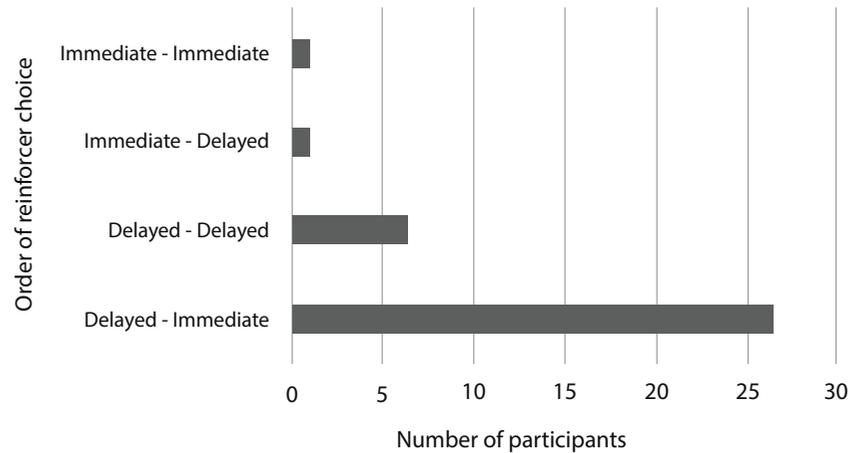


Figure 4. Choice behavior in the experimental condition absent correspondence and correspondence.

In this way, the learning history established during the exposure to correspondence tests altered the functions of contingency descriptions, increasing their effectiveness to link the delayed consequence with the task that would allow it to be contacted (Gómez et al., 2007).

This finding is supported by Barnes-Holmes et al. (2005), who mention that relational learning is a flexible operant response that is not detached from consequence control. In fact, before being able to behave in the face of an event in function of another, the repetition of multiple copies that allow to abstract the function of the key that relates them are necessary, which is still modifiable by experience.

In contrast, it could be said that after experiencing a history of absence of correspondence between descriptions of contingencies and contingencies, relational responding was weakened, preventing the contextual key contained in the description from effectively controlling choice behavior. That is, the learning history generated in this situation affected the effectiveness of the description of contingencies to alter its referred events causing the majority of participants to avoid performing a long and monotonous task (transcription of letters), even though when the description that constituted the situation of choice was the condition to obtain a reinforcer of greater magnitude. As a result, other present conditions (immediate reinforcement) became more relevant in the choice behavior of the participants (Gómez et al., 2007; Gómez & Luciano, 2000).

These results are related to findings from previous studies which have shown that providing real contingency descriptions and continuously reinforcing the behavioural adjustment of individuals to contingency descriptions favors the participant's effectiveness in conditional discrimination

tasks. On the contrary, the falsity of the descriptions, in addition to generating variability in the executions, progressively decreases the follow-up of contingency descriptions and increases the probability of behaving under the control of contingencies (Martínez, Ortiz & González, 2007; Ortiz, González, Rosas & Alcaraz, 2006).

However, although the tendency to choose one or another reinforcer according to the experimented trials was evidenced in the majority of participants, some exceptions were presented. In the first experiment, two participants chose the delayed reinforcer in the self-assessment evaluation independently from the correspondence trials experienced (correspondence or absence of correspondence between contingency and contingency descriptions), and another maintained the choice of immediate reinforcer. In the second experiment, 21 of the 73 participants maintained their behavior in the two self-monitoring measures after the two types of trials, 19 in the delayed option and two in the immediate option. This behavior - which was not the general trend - suggests that the pre-experimental history of the participants (a variable that was not under the control of the investigators), could have interacted with the experimental conditions, so that the functions acquired were not already altered by the contextual key "Yes ... then".

Considering that relational learning is a functionally generalized operant (Gómez et al., 2007), it can be inferred from these results that by fostering a history of correspondence through varied situations and sources during the development of an individual, (Ruiz & Gómez, 2010), it is possible to strengthen the function of contextual keys that facilitate the tracking of contingency descriptions and allow them to be under the control of their own verbal

behaviour favoring the choice of delayed reinforcers of greater magnitude.

This is in line with the approaches of the Acceptance and Commitment Therapy, derived from the RFT, from which it is possible to postulate that the behavior of the participants was regulated through "pliancy", a type of conduct governed by rule in which the function of a verbal formula is established by a history in which the consequences are mediated by others (Hayes et al., 2001; Wilson & Luciano, 2007). In the same sense, the behavior of the participants who evidenced variability in choice behavior in the self-control task was facilitated by a "flexible pliancy", as it allowed them to come into contact with the contingencies they experienced during the phases of correspondence and absence of correspondence between descriptions of contingencies and contingencies, which made their choice during the task of self-control adjusted according to the experimental history, in the delayed or immediate option.

In contrast, in cases where choice behavior was not presented in the expected direction, the possibility arises that this behavior may have occurred due to verbal regulation that can produce a "rigid pliancy" which made it difficult for participants to get in touch with the contingencies of correspondence and absence of correspondence stories. In these cases, it is likely that behavior was regulated by verbal relationships that were previously established in the participant's learning history, relationships that were not altered by the experimental history. Authors such as Valdivia and Luciano (2006) explain this behavior by stating that words and gestures can alter the functions of events in different levels and forms, depending on personal history and the events that occur at a given moment.

By the above, and assuming from the point of view of TMR, the individual behaves in the present according to the functions learned directly and derived through their history (Luciano, Valdivia, Gutiérrez & Páez, 2006). Based on these findings, we suggest the study of other individual factors involved in the behavior of choice under the self-control paradigm, as well as the development of research aimed at explaining the variability of behavior of individuals in situations where self-control is evident. For example, a person may be more inclined to adopt a healthy diet and perform an exercise routine, but spending much of their time watching television, rather than performing their school or work activities.

Likewise, this study can be replicated with participants of different ages in order to verify if the effect of the experimental variation of the history of correspondence between descriptions of contingencies and contingencies, the tendency to choose immediate or delayed consequences, varies in function of age taking into account that the verbal

relationships that are established become more complex as they interact with novel situations or modify the already established language functions.

To conclude, it should be mentioned that these results are preliminary. Before taking them into the applied context, it is necessary to perform other experiments that confirm the functional relationship between language and self-control. It is worth noting that this publication shows the results of a study in a context where control mechanisms allow the isolation of foreign variables and increase the internal validity of the laboratory results (Kerlinger & Lee, 2002) in a simulated natural environment, which, although increasing the probabilities of negatively affecting the internal validity, favors the external validity of the extracted conclusions. All of the above contribute significantly for purposes of science and in particular-contextualism: prediction and control of human behavior (Valdivia & Luciano, 2006).

REFERENCIAS

- Alós, F., Guerrero, M., Falla, D., & Amo, A. (2013). Estímulos compuestos, discriminaciones simples y transferencia del aprendizaje en nuevas discriminaciones simples y condicionales. *International Journal of Psychology and Psychological Therapy*, 13(1), 97-112. Retrieved from <http://www.ijpsy.com/volumen13/num1/349/estmulos-compuestos-discriminaciones-simples-ES.pdf>
- American Psychological Association. (2012). Lo que se necesita saber acerca de la fuerza de voluntad: la ciencia psicológica del autocontrol. Retrieved from <http://www.apa.org/helpcenter/willpower-spanish.pdf>
- Barnes-Holmes, D., Rodríguez, M., & Whelan, R. (2005). La teoría de los marcos relacionales y el análisis experimental del lenguaje y la cognición. *Revista Latinoamericana de Psicología*, 37(2), 255-275. Retrieved from <http://www.redalyc.org/articulo.oa?id=80537203>
- Benabou, R., & Tirole, J. (2004). Willpower and Personal Rules. *Journal of Political Economy*, 112(4), 848-887. Retrieved from <http://www.princeton.edu/~rbenabou/papers/JPE2004.pdf>
- Binder, L., Dixon, M., & Ghezzi, P. (2000). A procedure to teach self-control to children with attention deficit hyperactivity disorder. *Journal of Applied Behavior Analysis*, 33(2), 233-237. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1284241/>
- Cáceres, D., Salazar, I., Varela, M., & Tovar, J. (2006). Consumo de drogas en jóvenes universitarios y su relación de riesgo y protección con los factores psicosociales. *Universitas Psychologica*, 5(3), 521-534. Retrieved from <http://www.scielo.org.co/pdf/rups/v5n3/v5n3a08.pdf>
- Corral, V. (2006). Contribuciones del análisis de la conducta a la investigación del comportamiento pro-ecológico. *Revista*

- Mexicana de Análisis de la Conducta*, 32(002), 111-127. Retrieved from <http://redalyc.uaemex.mx/pdf/593/59332203.pdf>
- Dixon, M., & Cummings, A. (2001). Self-control in children with autism: response allocation during delays to reinforcement. *Journal of Applied Behavior Analysis*, 34(4), 491-495. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1284343/pdf/11800188.pdf>
- Dixon, M., Rehfeldt, R., & Randich, L. (2003). Enhancing tolerance to delayed reinforcers: The role of intervening activities. *Journal of Applied Behavior Analysis*, 36(2), 263-266. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1284440/pdf/12858992.pdf>
- García, C. (2008). Riesgos del uso de internet por niños y adolescentes. Estrategias de seguridad. *Acta Pediátrica México*, 29(5), 273-279. Retrieved from <http://nietoeditores.com.mx/download/actapediatrica/Sep-Oct2008/ActaPediatri-273-9.pdf>
- Gómez, I., & Luciano, C. (1991). Autocontrol en niños: un estudio experimental sobre dos procedimientos en la adquisición de conductas de espera. *Psicothema*, 3(1), 25-44. Retrieved from <http://www.psicothema.com/psicothema.asp?id=2002>
- Gómez, I., & Luciano, C. (2000). Autocontrol a través de reglas que alteran la función. *Psicothema*, 12(003), 418-425. Retrieved from <http://redalyc.uaemex.mx/src/inicio/ArtPdfRed.jsp?iCve=72712314>
- Gómez, M., López, F., & Mesa, H. (2007). Teoría de los marcos relacionales: algunas implicaciones para la psicopatología y la psicoterapia. *International Journal of Clinical and Health Psychology*, 7(2), 491-507. Retrieved from <http://redalyc.uaemex.mx/redalyc/pdf/337/33717060015.pdf>
- González, J., Ávila, R., Juárez, A., & Miranda, P. (2011). ¿Es la "abstención" de comer comida disponible un ejemplo de conducta de autocontrol en palomas? *Acta comportamental*, 19(3), 255-267. Retrieved from http://redalyc.uaemex.mx/src/inicio/VentanaResumenTabs.jsp?claveArt=27452012_9001
- Grosch, J. & Nuringer, A. (1981). Self-control in pigeons under the Mischel paradigm. *Journal of applied behavior analysis*, 35(1), 3-21. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1333016/>
- Guevremont, D., Osnes, P., & Stokes, T. (1986). Preparation for effective self-regulation: The development of generalized verbal control. *Journal of Applied Behavior Analysis*, 19(1), 99-104. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1308046/>
- Hayes, S., Barnes-Holmes, D., & Roche, B. (2001). *Relational frame theory: A post-Skinnerian account of human language and cognition*. New York: Kluwer Academic.
- Hernández, A., & Sandoval, M. (2003). La actividad simbólica humana: una revisión de las tendencias contemporáneas en el análisis del comportamiento verbal. *Acta Colombiana de Psicología*, 1(10), 73-87. Retrieved from <http://www.redalyc.org/pdf/798/79801006.pdf>
- Kerlinger, F., & Lee, H. (2002). *Investigación del comportamiento* (4ª. Ed.). México: McGraw-Hill.
- Luciano, C. (1992). La conducta verbal a la luz de recientes investigaciones. Su papel sobre otras conductas verbales. *Psicothema*, 4(2), 445-468. Retrieved from <http://redalyc.uaemex.mx/src/inicio/ArtPdfRed.jsp?iCve=72704210>
- Luciano, C., Gómez, S., Hernández, M., & Cabello, F. (2001). Alcoholismo, evitación experiencial y Terapia de Aceptación y Compromiso (ACT). *Análisis y Modificación de Conducta*, 27(113), 333-371.
- Luciano, C., Valdivia, S., Gutiérrez, O., & Páez, M. (2006). Avances desde la terapia de aceptación y compromiso (ACT). *Edupsykhé*, 5(2), 173-201. Retrieved from http://www.ucjc.edu/pdf/publicaciones/edupsikhe/vol-5/cap3_vol5-2.pdf
- Martin, G., & Pearl, J. (2006). *Modificación de Conducta. Qué es y cómo aplicarla*. Madrid: Prentice Hall.
- Martínez, H., Ortíz, G., & González, A. (2007). Efectos diferenciales de instrucciones y consecuencias en ejecuciones de discriminación condicional humana. *Psicothema*, 19(1), 14-22. Retrieved from <http://dialnet.unirioja.es/servlet/articulo?codigo=2231448>
- Montgomery, W. (2008). Teoría, investigación y aplicaciones clínicas del autocontrol. *Psicothema*, 11(2), 215-225. Retrieved from <http://www.scielo.org.pe/pdf/rip/v11n2/a13v11n2.pdf>
- Msetfi, R., Wade, C., & Murphy, R. (2013). Context and Time in Causal Learning: Contingency and Mood Dependent Effects. *PLoS ONE*, 8(5), 1-15. Retrieved from <http://www.readcube.com/articles/10.1371%2Fjournal.pone.0064063>
- Naciones Unidas Oficina contra la Droga y el Delito (2012). *Informe mundial sobre las Drogas, 2012*. Nueva York. Retrieved from https://www.unodc.org/documents/data-and-analysis/WDR2012/WDR_2012_Spanish_web.pdf
- Organización Mundial de la Salud & Ministerio de Sanidad y Consumo (2006). *Tabaco. Mortífero en todas sus formas*. Retrieved from <http://www.who.int/tobacco/resources/publications/wntd/2006/translations/BrochureSpanish.pdf>
- Organización Mundial de la Salud (2010). *10 datos sobre medio ambiente y prevención de enfermedades*. Retrieved from http://www.who.int/features/factfiles/environmental_health/es/index.html
- Organización Mundial de la Salud (2012). *Obesidad y sobrepeso*. Retrieved from <http://www.who.int/mediacentre/factsheets/fs311/es/index.html>
- Ortiz, G., & Cruz, Y. (2011). El papel de la precisión instruccional y la retroalimentación en la ejecución y descripciones poscontacto. *Revista Mexicana de Análisis de la Conducta*, 37(1), 69-87. Retrieved from <http://www.redalyc.org/pdf/593/59319102006.pdf>

- Ortiz, G., González, A., Rosas, M., & Alcaraz, F. (2006). Efectos de la precisión instruccional y la densidad de retroalimentación sobre el seguimiento, la elaboración y transmisión de descripciones en tareas de discriminación condicional. *Acta Comportamentalia*, 14(2), 103-130. Retrieved from <http://www.redalyc.org/articulo.oa?id=274520152001>
- Ruiz, D., & Gómez, I. (2010). Transformación de funciones: Marcos de coordinación y oposición de acuerdo con equivalencia. *Revista Latinoamericana de Psicología*, 42(2), 311-322. Retrieved from <http://www.redalyc.org/articulo.oa?id=80515381011>
- Ruiz, D., & Gómez, M. (2016). Papel del control instruccional en el estudio de las tendencias de regulación verbal. *Universitas Psychologica*, 15(2), 135-152. Retrieved from <http://revistas.javeriana.edu.co/index.php/revPsycho/article/viewFile/11986/13902>
- Sidman, M. (1971). Reading and auditory-visual equivalences. *Journal of Speech and Hearing Research*, 14, 5-13. Retrieved from <http://jslhr.pubs.asha.org/article.aspx?articleid=1749398>
- Skinner, B. (1981). *Conducta verbal*. México: Trillas.
- Theiler, R., & Shefrin, H. (1981). An economic theory of self-control. *Journal of Political Economy*, 89(2), 392-406. Retrieved from <http://www.jstor.org/discover/10.2307/1833317?uid=3737808&uid=2129&uid=2&uid=70&uid=4&sid=21101153672451>
- Törneke, N., Luciano, C., & Valdivia, S. (2008). Comportamiento gobernado por reglas y problemas psicológicos. *Journal of Psychology and Psychological Therapy*, 8(2), 141-156. Retrieved from http://conductual-contextual.es/files/7713/3881/5865/Torneke_Luciano_ValdiviaESPAOL.pdf
- Valdivia, S., & Luciano M. (2006). Una revisión de la alteración de las propiedades reforzantes de los eventos en humanos. *International Journal of Psychology and Psychological Therapy*, 6(3), 425-444. Retrieved from <http://www.redalyc.org/articulo.oa?id=56060310>
- Wechsler, D. (1981). WISC-R. Escala de inteligencia revisada para el nivel escolar. México: El Manual Moderno.
- Wilson, K., & Luciano, C. (2007). *Terapia de aceptación y compromiso (ACT)*. Madrid, España: Pirámide.
- Zentall, T., Galizio, M., & Critchfield, T. (2002). Categorization, concept learning, and behavior analysis: an introduction. *Journal of the Experimental Analysis Behavior*. 78(3) 237-248. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1284898/>