EFFECT OF THE QUALIFYING AUTOCLITIC "IS" IN CONDITIONAL DISCRIMINATION TRAINING AND EQUIVALENCE TESTS

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Abstract

Reinforcement contingencies have been identified as an important variable for the establishment of conditional discriminations and stimuli equivalence. Studies in this area suggest that verbal behavior can facilitate the formation of discriminative responses and equivalence classes. Nevertheless, researchers have concentrated on studying the effect of the autoclitic behavior on those behavioral processes. The purpose of the present study was to analyze if an instruction that guides the participants to emit a verbal vocal response with a qualifying autoclitic and the assertion "is" between the presentation of the sample stimuli and the choice of the comparison stimuli in a matching to sample task, produces effects in the formation of new equivalence classes and has an influence on the number of trials necessary for the acquisition of conditional discrimination responses. The participants were divided into a Control Group and a Experimental Group where both of them went through three Training Phases and three Quiz Phases. The instruction was given only to the participants in the Experimental Group. The results obtained didn't show differences between the groups for the average of correct responses in the Training Phases nor in the average of correct responses during all of the Equivalence Quizzes. It can be concluded that the initial effect of the autoclitic was to increase the accuracy of the response, making easier the acquisition of the conditional discrimination as well as the formation of the stimuli equivalence.
Key words: autoclitic, verbal behavior, stimulus equivalence

EFECTO DE LA AUTOCLITICA CALIFICATIVA "ES" EN EL ENTRENAMIENTO DE UNA DISCRIMINACIÓN CONDICIONAL Y LAS PRUEBAS DE EQUIVALENCIA

Resumen

Las contingencias de reforzamiento han sido identificadas como una variable importante en el establecimiento de discriminaciones condicionales y equivalencia de estímulos. Diversos estudios en el área sugieren que el comportamiento verbal puede facilitar la formación de respuestas discriminativas y clases equivalentes; sin embargo, algunos investigadores se han enfocado en estudiar el efecto de la conducta autoclítica en dichos procesos comportamentales. El propósito del presente estudio fue el de analizar si una instrucción que orienta a los participantes a emitir una respuesta verbal vocal con un autoclítico calificador y la afirmación "es" entre la presentación del estímulo muestra y el estímulo de comparación en una tarea de igualación de la muestra, produce algún efecto en la formación de nuevas clases equivalentes e influye sobre el número de ensayos necesarios para la adquisición de respuestas discriminativas condicionales. Los participantes fueron divididos en un Grupo Control y un Grupo Experimental, siendo ambos expuestos a tres fases de entrenamiento y tres fases de prueba. La instrucción fue dada únicamente a los participantes en el Grupo Experimental. Los resultados obtenidos no mostraron diferencia entre los grupos en el promedio de respuestas correctas durante las fases de entrenamiento ni en el promedio de respuestas correctas durante las pruebas de equivalencia. Se puede concluir que el efecto inicial del autoclítico fue el de aumentar la precisión de la respuesta, permitiendo la adquisición de la discriminación condicional con mayor facilidad, así como la formación de equivalencia de estímulos.
Palabras clave: autoclítica, conducta verbal, equivalencia de estímulos

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EFEITO DA AUTOCLÍTICA QUALIFICATIVA "É" NO TREINAMENTO DE UMA DISCRIMINAÇÃO CONDICIONAL E OS TESTES DE EQUIVALÊNCIA

Resumo

As contingências de reforço foram identificadas como uma variável importante no estabelecimento de discriminações condicionais e equivalência de estímulos. Diversos estudos na área sugerem que o comportamento verbal pode facilitar a formação de respostas discriminativas e classes equivalentes; porém, alguns pesquisadores enfocaram-se em estudar o efeito da conduta autoclítica nesses processos comportamentais. O propósito do presente estudo foi o de analisar se uma instrução que orienta os participantes a emitir uma resposta verbal vocal com um autoclítico qualificador e a afirmação "é" entre a apresentação do estímulo mostra e o estímulo de comparação em uma tarefa de igualação da mostra, produz algum efeito na formação de novos tipos equivalentes e influi sobre o número de ensaios necessários para a aquisição de respostas discriminativas condicionais. Os participantes foram divididos em um Grupo de Controle e um Grupo Experimental, sendo ambos expostos a três fases de treinamento e três fases de teste. A instrução foi dada somente aos participantes do Grupo Experimental. Os resultados obtidos não mostraram diferença entre os grupos na média de respostas corretas durante as fases de treinamento nem na média de respostas corretas durante os testes de equivalência. Pode-se concluir que o efeito inicial do autoclítico foi o de aumentar a precisão da resposta, permitindo a aquisição da discriminação condicional com maior facilidade, bem como a formação de equivalência de estímulos.
Palavras chave: autoclítica, conduta verbal, equivalência de estímulos

INTRODUCTION

Verbal behavior is subject to the same principles of control as non verbal behavior; its only unique and special characteristic is found in the necessity of mediation for its efficiency in the environment. In other words, it only produces consequences through mediation of a listener that belongs to the same verbal community as the speaker (Skinner, 1957).

The verbal community in which the speaker is embedded organizes contingencies that promote correspondences between verbal behavior and non-verbal behavior. Changes in the correspondence between verbal behavior and non-verbal behavior can produce modifications in the acquisition of non-verbal tasks. Matthews, Shimoff, & Catania, (1987) showed that when a verbal description of a non-verbal behavior is reinforced, the non-verbal behavior changes independently from the previously organized consequence of the non-verbal behavior. Similar conclusions are found in Braam & Malott, 1990; Catania, 2003; and Catania, Matthews & Shimoff, 1982.

Rosales-Ruiz, Eikeseth, Duarte and Baer (2000) studied the effect of verbal behavior by manipulating instructions and checking its effects upon the acquisition of conditional discrimination and equivalence tests. The authors noted that a specific verbal behavior of the participants produced a better acquisition in the establishment of conditional discrimination and stimulus equivalence. Twenty six participants were trained, individually, in a *matching to sample* procedure in a notebook with eleven pages. The first two pages had an instruction that described the general procedure of the experiment. The following eleven pages in the book showed relations between a letter and number (A - 1; B - 2; 1 - X; 2 - Y), twelve tests with a sample stimulus and three comparisons trial types, four tests in conditional relations and eight equivalence tests.

Five pages included instructions containing verbs related to conditional discrimination and stimulus equivalence (i.e., equal, is parallel to, goes with) and five pages had instructions containing verbs not related to conditional discrimination and stimulus equivalence (i.e., eat, pay, like, teach etc.). The instructions were given presenting examples at the top of the page. The instructions with related verbs were, for example, *"A equals to 1; B equals to 2; 1 equals to X; 2 equals to Y"*. Instructions with non-related verbs were, for example, *"A pays 1; B pays 2; 1 pays X; 2 pays Y"*.

When the verbs for instructions were related with equivalence tasks, the participants' performances were higher than the ones in which the instructions weren't related with this kind of task. The authors concluded that the participants established meanings, syntactic relations or ordinal sequences among the stimuli and they also concluded that verbs could have been functioned as contextual stimuli for the conditional relations learned. Rosales-Ruiz, Eikeseth, Duarte and Baer (2000) show an instigating research on the effect of verbal behavior upon conditional discrimination and stimuli equivalence. Two critiques can be made in regard to the study: the first, related to the procedure used and the second, to the analysis of the data; (a) it is not possible to guarantee that all the participants read the controlling verbs and (b) an autoclitic

analysis of the controlling verbs was not done since the procedure manipulated only the printed version of different verbs (and not the verbal response of the participants).

The manipulation of verbal behavior, more specifically of the autoclitic, has been demonstrated to be relevant in the control of non-verbal behavior (Hübner, Austin, & Miguel, 2008; Faleiros & Hübner, 2007; Sheyab, Pritchard & Malady, 2014). The function of the autoclitic is ordering and grouping arbitrary verbal stimuli, changing the probability of the listener's behavior. In the phrase "chocolate is good", chocolate and good shared the same discriminative stimulus (the object - chocolate): therefore, the behavior of the listener can be modified, increasing the probability of eating chocolate when both tacts are grouped and ordered by the autoclitic of assertion and prediction "is" (Skinner, 1957; Catania, 1980; Bandini & De Rose 2006).

Keeping in goal the need for continued research about the effect of verbal autoclitics behavior in non-verbal tasks, the purpose of the present research was to study if an instruction that guides the participant to emit a verbal response with a qualifying autoclitic with an assertion of "is", between the presentation of a conditional stimulus and the choice of a discriminative stimulus, in a MTS task, produces effects in the formation of new equivalence classes and influences the quantity of necessary trials for the formation of a responding conditional discrimination.

METHOD

The participants were twenty adults, with higher education level, aged between 18 and 23 years. The selected participants had no previous experience in research with conditional discrimination and stimuli equivalence. All the participants signed the consent form that reported about the registers of choice, images and audios recorded.

Materials

A *Sony Full* HDR-PJ200 camcorder was used to record the participants' verbal and non-verbal responses. A computer with speakers and mouse was used, with a software named *Equivium* (Pimentel, Piccolo, & Baldani, 2008) for training the conditional relations and testing the equivalence ones.

Stimulus

Abstract figures were employed, 12 of them removed from the search Dougher, Augustson, Markham, Greenway and Wulfert (1994) and other 15 figures designed for the experiment. All figures are visual in nature with black lines and white background. Figures were separated into three sets: Set 1, Set 2 and Set 3. Each set represents the stimuli used in the phase of training and the experimental tests.

Table 1 lists all the stimuli used in the experiment. The stimuli named A1, A2, A3, B1, B2, B3, C1, C2, C3, belong to set 1. Stimuli named A1', A2', A3', B1', B2', B3' C1', C2', C3' belong to set 2. And stimuli named A1', A2', A3', B1', B2', B3', C1', C2', C3' belong to set 3.

Each set of stimuli was used only during the training phase and the conditional discrimination stimulus equivalence test. Set 1 was used in Phase I; Set 2 was used in Phase II and set 3 was used in Phase III. None of the stimulus was repeated or used for a different purpose than the experimental task.

Design

The experiment was conducted using a group design, with a Control Group and Experimental Group. *Matching to Sample* (MTS) tasks were applied to train conditional discrimination between abstract figures and for testing stimuli equivalence. There were two relations taught in conditional discrimination training (relations AB and AC) and two stimuli equivalence tests (BC-CB). This training and test sequences were repeated three times, named Phase I, Phase II, and Phase III. The choice to use an experiment with three experimental phases, with new visual stimuli in each phase, was selected with the goal of producing an experiment that allowed a repeated analysis of the effect of the independent variable in the formation of conditional discriminations and stimuli equivalence. In each phase a new set of stimuli was used. The participants went through all the phases individually and had the same training and test sequences. The difference between the groups was the instructions given to the participants of the Experimental Group: they were asked to emit a vocal response during the MTS tasks.

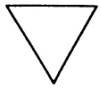
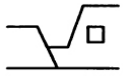
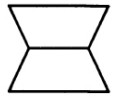
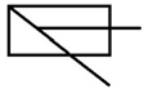
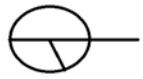
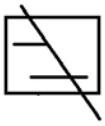
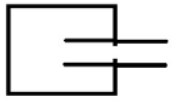
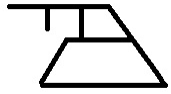
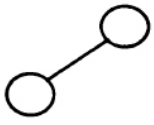
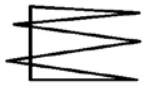
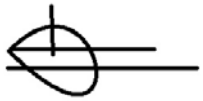
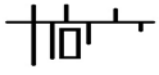
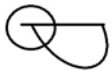
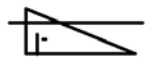
Procedure

Control Group Procedure

The experiment began with the experimenter reading the following instruction to the participant:

"Hello (participant name), here on the computer screen a figure will appear; you should use the mouse to click on it. After clicking on the first figure, another three figures will appear on the top part of the screen. You should choose one of these three figures by clicking on it. Every time that you choose a right answer, you will hear applause and I will put a token in this container; when you make a mistake you won't hear any sound and a token won't be placed inside.

Table 1.
Stimuli belonging to Set 1, Set 2 and Set 3

A1	A2	A3
		
B1	**B2**	**B3**
		
C1	**C2**	**C3**
		
A1'	**A2'**	**A3'**
		
B1'	**B2'**	**B3'**
		
C1'	**C2'**	**C3'**
		
A1''	**A2''**	**A3''**
		
B1''	**B2''**	**B3''**
		
C1''	**C2''**	**C3''**
		

To end the activity you have to have a certain amount of continuous correct answers*; each time that you make a mistake the count of correct answers will be reset. So at the end of the activity you can change your points for photocopies credits according to the table of exchange.*

After the instructions were read, the participants began the trainings for Phase I, where they were trained in the relations: A1B1, A2B2, A3B3 and in the relations A1C1, A2C2, A3C3. Each training phase was composed of 12 trials. Each trial type presented one sample and three comparisons; each figure was shown four times as a sample. The criterion for the conclusion of training was 100% of correct responses continually in a block (12 correct responses). When the participant emitted an incorrect response the block was repeated. For each correct response, the program automatically emitted an applause sound and the experimenter delivered a token to the participant. For each incorrect response, the program didn't produce any sound and the participant didn't earn a token. At the end of each training session the tokens were counted and exchanged for photocopies credits according to Table 2.

Table 2.
Exchanges: Tokens for photocopies.

Number tokens	Photocopies
12-18	25 Photocopies
19-24	23 Photocopies
25-30	21 Photocopies
31-36	19 Photocopies
37-42	17 Photocopies
43-48	15 Photocopies
49-54	13 Photocopies
+ 55	11 Photocopies

After the participant reached the training performance criteria they began the tests in Phase I and the experimenter read the following instruction to the participant:

"(participant name), *here on the computer screen a figure will appear; you should use the mouse to click on it. After clicking on the first figure another three figures will appear at the top part of the screen. You should choose one of the three figures by clicking on it. This time you won't hear any applause and I won't deposit tokens; you should only choose the combination that you think is correct."*

After reading the instructions, the equivalence tests were conducted with stimuli relations B1C1, B2C2, B3C3 and C1B1, C2B2 and C3B3. During the tests, the performance criterion was simply the occurrence of one block (12 responses). In this condition, the program didn't emit any applause sound and the experimenter didn't deliver tokens.

After training and tests in Phase I, trainings and tests in Phase II began, giving the same instructions and criteria applied in Phase I. The trained relations were A1'B1', A2'B2', A3'B3' and A1'C1', A2'C2', A3'C3'. After the training, the equivalence tests were carried out with the stimuli relations B1'C1', B2'C2', B3'C3' and between the stimuli C1'B1', C2'B2', C3'B3'.

After training and tests in Phase II, training and tests in Phase III began using the same instructions and criteria applied in Phase I.

The trained relations were A1"B1", A2"B2", A3"B3" and A1"C1", A2"C2", A3"C3". After training, the equivalence tests were carried out with the stimuli relations B"1"C1", B2"C2", B3"C3" and C1"B1", C2"B2", C3"B3".

Experimental Group Procedure

The procedure applied to the Experimental Group was similar to the one applied to the Control Group. The Experimental Group did the same sequence of training and tests, using the same stimuli and performance criteria. As it was already described, the difference between the Experimental Group and the Control Group was the inclusion of an instruction specifying the need for the participant to emit a vocal response during the experimental tasks.

The Experimental Group procedure began with the experimenter reading the following instruction to the participant:

"Hello (participant's name), here on the computer screen a figure will appear; you should use the mouse to click on it. After clicking on the first figure, another three figures will appear on the top part of the screen. You should choose one of these three figures by clicking on it. Every time that you choose a right answer, you will hear an applause and I will put a token in this container; when you make a mistake you won't hear any sound and a token won't be placed inside. To end the activity you have to have a certain amount of continuous correct answers; each time that you make a mistake the count of correct answers will be reset. So to end the activity you can change your points for photocopies of academic texts according to the exchange table. ***During the entire activity, you must say "is". You must look at the sample figure (at the bottom) and say "this figure 'is' this other figure" (a figure that will appear at the top of the screen). You will only receive a token if the combination said out-loud as guided is correct****."*

Before the beginning of all the test phases the experimenter announced the second instruction:

"(Participant's name), *here on the computer screen a figure will appear; you should use the mouse to click on it. After clicking on the first figure another three figures will appear at the top part of the screen. You should choose one of the three figures by clicking on it. This time you won't hear any applause and I won't deposit tokens; you should only choose the combination that you think is correct.* ***During the entire activity you should say "is". You should look at the sample figure (at the bottom) and say "this figure 'is' this other figure", (the figure that will appear at the top of the screen). You will only receive a token if the combination said out-loud as guided is correct.***"

The black bold part in the instructions indicates the specific procedure for the experimental group, that is to say, asking the participant to respond verbally during the task of choosing the sample stimuli and comparisons. In case the participant didn't emit a verbal vocal response specified in the instruction during trainings and tests, the experimenter should intervene by rereading the instruction to the participant.

Consequences

For each correct response, during the conditional discrimination training, the participant won a token. Each participant changed the tokens won during the experiment for photocopies of academic texts.

RESULTS

The individual results (number of correct and incorrect responses in each group) were converted to average and standard deviation of the mean (DP) for group analysis. The significance was assessed by variance analysis (ANOVA), followed by the *Tukey* multiple comparison test. The variance analysis (ANOVA) and the *Tukey* multiple comparison test, compares and validates the averages of different populations to verify whether these populations possess equal averages or not. Thus, this technique allows for various groups to be compared.

All of the differences mentioned were significant when comparing the phases of the Experimental and Control Groups. The differences were represented with an asterisk symbol (*) where one asterisk (*) represents $p< 0.05$, two asterisks (**) represent $p< 0.01$, and three asterisks (***) represent $p< 0.001$. The higher the number of asterisks the greater the statistical difference will be. For example, if A has one asterisk (*) in the difference compared with B, and C has two asterisks (**) different from D, we would say that the difference between A and B is smaller than the difference between C and D. All of the statistical analyses were carried out with the GraphPadPrism version 5.0 *(GraphPad* Software, San Diego, CA).

The choice for representing the results using the statistical method was made for two reasons: (a) the need to compare the results between the groups (since a group design was used), (b) the need to have statistical tests to validate the significant differences in performance between the two groups.

The comparison of performances of the Control and Experimental Groups was organized in three ways: (a) average of blocks of trials to reach the task criteria (b) average of correct responses in the training phases and (c) average of correct responses in the testing phases.

Following instructions and reliability

During the entire experiment all the participants followed the instructions. All of the participants in the Experimental Group emitted the vocal autoclitic response "is" in all trials of the training and test phases. There was an agreement of 100% between observers on this matter (following or not the instructions). The observers were naive in relation to the objectives of the experiment.

Comparison of the averages of block trials in the Experimental and Control Groups in order to meet the criteria

Figure 1 shows the results of the average number of block trials needed to reach the criteria in the Control and Experimental Groups in the three phases of training.

The Control Group reached an average of 7.1 blocks in Training Phase I with the figures of Set 1 (A/B and A/C), an average of 5.4 blocks in Training Phase II with the figures of Set 2 (A'/B' and A'/C'), and an average of 4.2 in Training Phase III with the figures of Set 3 (A''/B'' and A''/C'').

The Experimental Group reached an average of 6.1 blocks Training Phase I with the figures of Set 1 (A/B and A/C), an average of 5.0 blocks in Training Phase II with the figures of Set 2 (A'/B' and A'/C') and an average of 4.7 blocks in Training Phase III with the figures of Set 3 (A''/B'' and A''/C'').

There weren't any statistical differences when comparing the averages of the Control and Experimental Groups in all phases of training.

Comparison of the averages of correct responses in the Experimental and Control Groups found during the training phases

Figure 2 shows the average of correct responses in the Control and Experimental Groups in the three phases of training of the experiment. The Control Group reached an average of 69.1% correct responses in Training Phase I with the figures of Set 1 (A/B and A/C), an average of 76.9%

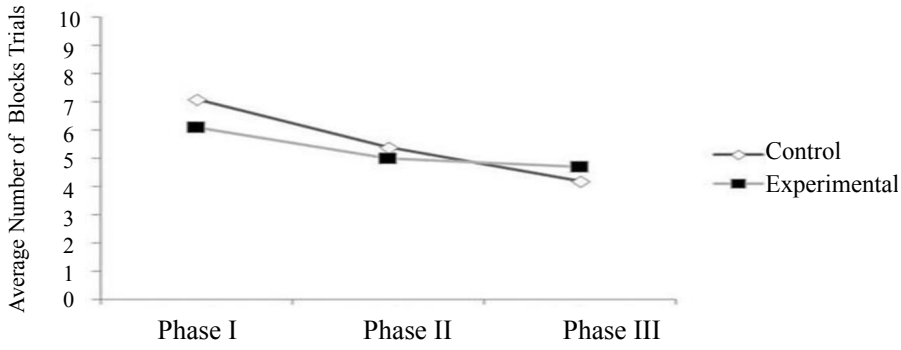


Figure 1. Average number of blocks trials in all training phases of both groups (control and experimental).

correct responses in Training Phase II with the figures of Set 2 (A'/B' and A'/C') and an average of 85.3% of correct responses in Training Phase III with the figures of Set 3 (A''/B'' and A''/C'').

The Experimental Group reached an average of 77.7% correct responses in Training Phase I with the figures of Set 1 (A/B and A/C), an average of 82.3% correct responses in Training Phase II with the figures of Set 2 (A'/B' and A'/C') and an average of 83.7% correct responses in Training Phase III with the figures of Set 3 (A''/B'' and A''/C'').

Comparing the average of correct responses of training phases between the groups, during Phase I, the difference was classified with an asterisk (*); therefore the number of correct responses in Training Phase I (A/B and A/C) in the Control Group is smaller than the number seen in Training Phase I (A/B and A/C) for the Experimental Group.

The comparison between the Experimental and Control Groups in Training Phases II and III shows no statistical difference.

In this analysis it is possible to observe that the initial performance in the Experimental Group resembles the final performance in the Control Group.

Comparison between the averages of correct responses found during the test phases in the Experimental and Control Groups

Figure 3 shows the average of correct responses presented by both groups in the three phases of testing.

The Control Group reached an average of 36.2% of correct responses in Test Phase I with the figures of Set 1 (B/C and C/B), an average of 43.2% correct responses in Test Phase II with the figures of Set 2 (B'/C' and C'/B') and an average of 54.1% correct responses in Test Phase III with the figures of Set 3 (B'/C' and C'/B').

The Experimental Group reached an average of 62.8% of correct responses in Test Phase I with the figures of Set 1 (B/C and C/B), an average of 67.4% correct responses in Test Phase II with the figures of Set 2 (B'/C' and C'/B') and an average of 63.4% correct responses in Test Phase III with the figures of Set 3 (B''/C'' and C''/B'').

Comparing the average of correct responses in the test phases between the groups, during Phase I, there was a difference classified with two asterisks (**). Therefore, the number of correct responses in Test Phase 1 B/C and C/B of the Control Group is smaller than the one seen in

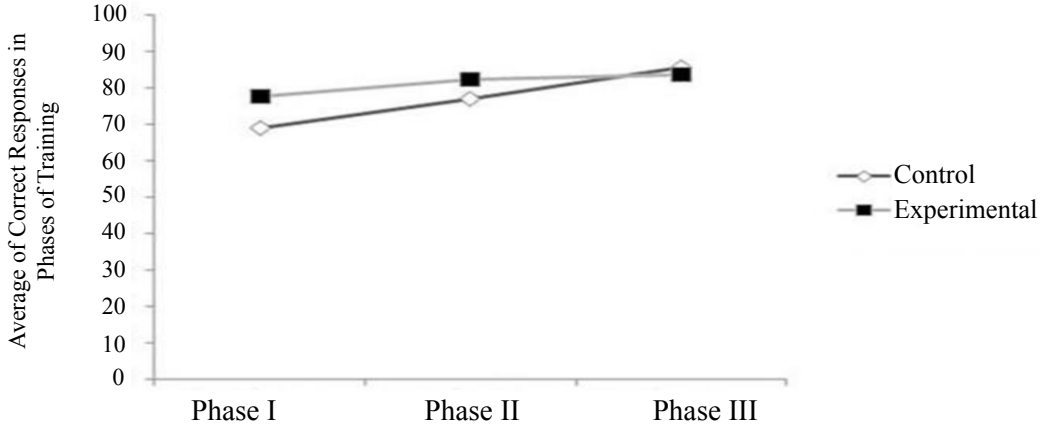


Figure 2. Average of correct responses in all training phases for the Control and Experimental Groups.

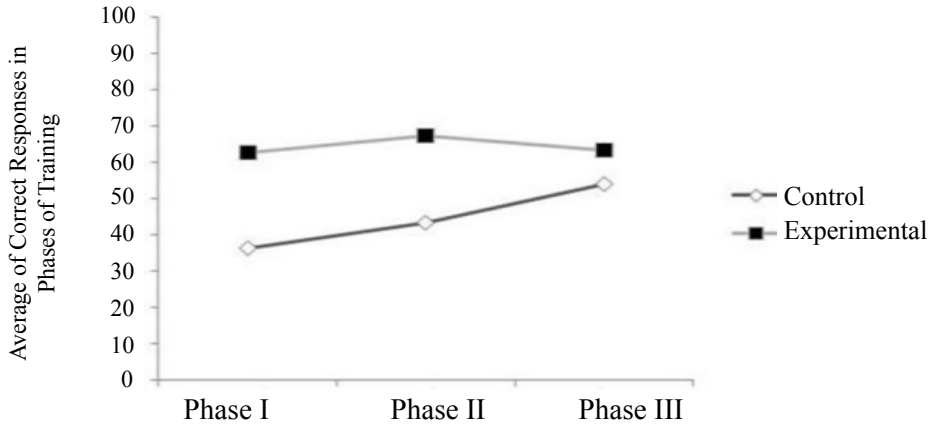


Figure 3. Average number of correct responses in all testing phases for the Control and Experimental groups.

Test Phase I B/C and C/B for the Experimental Group. The comparison between the groups for Test Phase II B'/C' and C'/B', and Test Phase III shows that there wasn't a statistical difference.

In this analysis it is possible to observe that the initial performance of the Control Group was inferior to the initial performance of the Experimental Group. The performance of the Experimental Group remained higher than the Control Group in all phases.

DISCUSSION

The objective of the experiment was to examine whether an instruction that guided the participant to emit a vocal response with a qualifying autoclitic of assertion and prediction "is", between the presentation of a conditional stimulus and the choice of discriminative stimulus in MTS tasks, would influence the formation of conditional discriminations and the formation of stimuli equivalence. The results obtained in this experiment show favorable differences in the performance of the Experimental Group in comparison to the Control Group in two aspects: (a) the average of correct responses during training of conditional conditions and (b) the average of correct responses during equivalence testing.

The data in the current experiment reveal effects of the autoclitic verbal operant in the formation of conditional discriminations and stimuli equivalence. The performance of the Experimental and Control Groups differed in the comparison of the average of correct responses emitted during the training phases. The Experimental Group showed a larger number of correct responses than those that were seen in the Control Group (77.7% compared to 69.1%) in Phase I of training. As the experiment evolved, the performances of the groups became statistically equal in Training Phases II and III.

The performance of the participants in the Experimental Group corroborates the results of Rosales-Ruiz, Eikeseth, Duarte and Baer (2000). The authors noted that participants that were under the control of verbs related to equivalence showed a higher performance than those who were under the control of verbs not related to equivalence. In the present experiment, it is possible to affirm that the autoclitic "is" is related to equivalence and that its positive effect was observed in the initial trials of conditional discriminations training. The programmed consequences (points and photocopies) acted in the selection of the correct choice responses. In this stage of the experiment (training, Phase I), the reinforced autoclitic response produced a more precise choice response, facilitating the selection of relations between sample and comparisons. The precision produced by the autoclitic led the participants in the Experimental Group to a performance of correct responses that was only reached by the Control Group in Training Phase II (82.3% compared to 76.9%). The performances in Training Phase III of both groups were statistically equal (83.7 compared to 85.3%).

It can be inferred the that initial effect of the observed autoclitic in the performance of the Experimental Group, in Training Phase I, is equal to the effect produced by an entire phase of the experiment, since the Control Group only reached the performance of Experimental Group in Training Phase II.

The effect of the autoclitic in the difference of the groups' performances was more evident when the comparison is made among the average of correct responses during the three phases of equivalence tests. The Experimental Group showed an average of correct responses higher

than the Control Group in Phase I of equivalence tests (36.2% compared to 62.8%). During Phases II and III the Experimental Group continued having a higher average of correct responses when compared to the Control Group. Nevertheless, without statistical differences (43.2% compared to 67.4% and (54.1% compared to 63.4%).

The autoclitic manipulated in the current experiment didn't provide discriminative clues of task in the experiment. In the current experiment, the effect of the autoclitic can make the participant's job easier, as a speaker or listener, and direct and intensify the response, like Skinner noted:

> *A very important group of responses, which have been the subject of extensive logical and linguistic analysis, serve this autoclitic function of qualifying the tact in such a way that the intensity or direction of the listener's behavior is modified.* (Skinner 1957, p. 322).

Skinner described that an autoclitic directs and intensifies the responses by means of two effects, of *assertion* and *prediction*; (1) therefore like "*no*" can have a function of interrupting a response, an autoclitic "*and*" possesses the effect of assertion in the resembling response "*yes*", intensifying the response that accompanies it (Skinner, 1957, p. 326). (2) The effect of prediction is the one in which two tacts are organized, revealing an autoclitic of relation, of ordering and grouping, that also contains an autoclitic of assertion (Skinner 1957, p. 334).

The effects of assertion and prediction of an autoclitic made it easier for the participants to organize the relations between the stimuli, directing them and intensifying their responses both as speakers and listeners. This effect, assertion and prediction, seems to be responsible for an increase in precision (an increase in correct answers) of the response. This facilitated the formation of conditional discrimination and equivalence in the participants of the Experimental Group.

The precision produced by the qualifying autoclitic of assertion and prediction could have helped the participant to emit a verbal operant correspondent to the discriminations taught and tested, presented in this experiment, since all the participants in the Experimental Group emitted a vocal verbal response "*this is this*", accompanied by a correct choice response between conditional and discriminative stimuli.

The argument that a vocalization made the conditional discrimination and the equivalence of stimuli easier is justified by Skinner (1969), who states: "In front of a complex contingency, responses that construct discriminative stimuli anticipate a presentation of subsequent reinforcement". In other words, in a MTS task, emitting a vocal response —the qualifying autoclitic of assertion and prediction between the presentation of a conditional stimulus and a choice of a discriminative stimulus— makes easier the emission of an operant that orders and groups the stimuli, thus favoring the learning of the contingency.

These assumptions are consistent with the De Rose's proposal (1996). The author states that verbal responses suitable to an experimental design usually are accompanied by a formation of stimuli classes.

> *Verbal formulations compatible with experimentally designed classes are usually accompanied by consistent performance in tests for class formation. Verbal formulations incompatible with experimentally designed classes are often accompanied by failure in equivalence tests. When verbal formulations arise "spontaneously" in the conditional discrimination, rather than being directly trained, it is not clear whether the verbal formulations control selections in equivalence tests, or whether both verbal formulations and selections in test are jointly controlled by other variables.* (De Rose, 1996, p. 262).

The main variable responsible for the formation of conditional discriminations and stimuli equivalence was, with no doubt, the reinforcement contingency programmed in the experiment, as proposed by Sidman (2000). This claim has evidence in the present experiment, since both groups presented conditional discrimination and stimuli equivalence. The qualifying autoclitic of assertion and prediction showed itself efficient in raising response precision (the average of correct answers and fewer trials to reach the criteria) allowing a quicker effect of response selection in the reinforcement contingency.

Due to the use of a group experimental design, there is no guarantee that the participants in the control group didn't respond verbally during the task, since all the participants in the experiment were verbally able to do so, even with the experimental strategy of guaranteeing this verbalization in the Experimental Group and cancelling it in the Control Group.

There is a suggestion for future research to refine the experimental control of an autoclitic, with the objective to determine whether the facilitation of the acquisition of conditional discriminations and stimuli equivalence in human beings is an unequivocal effect of the presence of verbal behavior.

The current experiment cannot conclude about the need of verbal behavior for the establishment of conditional discrimination and stimuli equivalence. It only reveals that a verbal operant can be a facilitator.

REFERENCES

Bandini, C.S.M.; de ROSE, J.C.C. (2006). Tecnologia comportamental no contexto de ensino: favorecimento da aprendizagem e do surgimento de comportamentos criativos. In: Helio José Guilhardi; Noreen Campbell de Aguirre. (Org.). Sobre comportamento e Cognição: Expondo a variabilidade. 1 ed. Santo André: ESETEC - Editores Associados, v. 17, p. 72-80.

Braam, C., & Malott, R. W. (1990). "I'll do it when the snow melts": The effects of deadlines and delayed outcomes on rules-governed behavior in preschool children. *The Analysis of Verbal Behavior, 8*, 67-76.

Catania, A. C. (1980). Autoclitic processes and the structure of behavior. *Behaviorism, 8*(2), 175-186.

Catania, A. C. (2003). Verbal Governance, verbal shaping, and attention to verbal stimuli. In K. A. Lattal, & P. N. Chase (Orgs.), *Behavior Theory and Philosophy* (pp. 301-321). New York: Plenum Publishers.

Catania, A. C., Matthews, B. A., & Shimoff, E. (1982). Instructed versus shaped human verbal behavior: interactions with nonverbal responding. *Journal of the Experimental Analysis of Behavior, 38*(3), 233-248. doi:10.1901/jeab.1982.38-233

De Rose, J. C. (1996). Controlling Factors in Conditional Discriminations and Test of Equivalence. *Advances in Psychology*, 253-277.

Faleiros, T. C., & Hübner, M. M. C. (2007). Efeitos do reforçamento diferencial de respostas verbais referente à leitura sobre a duração da resposta de ler. *Revista Brasileira de Psicoterapia Comportamental e Cognitiva*, *9*(2), 307-316.

Hübner, M. M. C., Austin, J., & Miguel, C. F. (2008). The effects of praising qualifying autoclitics on the frequency of reading. *The Analysis of Verbal Behavior, 24*, 55-62.

Matthews, B. A., Shimoff, E., & Catania, A. C. (1987). Saying and doing: a contingency-space analysis. *Journal of Applied Behavior Analysis, 20*, 69-74.

Rosales-Ruiz, J., Eikeseth, S., Duarte, A., & Baer, D. M. (2000). Verbs and verb phrases as instructional stimuli in the control of stimulus-equivalence effects. *The Psychological Record*, *50*(1), 173-187.

Sheyab, M.; Pritchard J.& Malady, M. (2014). An Extension of the Effects of Praising Positive Qualifying Autoclitics on the Frequency of Reading. *The Analysis of Verbal Behavior*, *30*, 141-147.

Skinner, B. F. (1957). *Verbal Behavior*. Englewood: Prentice-Hall.

Skinner, B. F. (1969). *Contingencies of Reinforcement: a theoretical analysis*. New York: Appleton Century Crofts.