Acquisition, Translativity and Transfer of a Matching to Sample Task Under Different Language Modes

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The linguistic modes during its acquisition are identified as complementary pairs (King & Quigley, 1985; Marschark, 1993; Rondal, 1980). These pairs are named active and reactive based depending on its functional relationship. The acquisition of the reactive modes precedes the active one and it is necessary to give feedback to the precision and efficiency of the active modes. The pairs gesticulating/ pointing-observing, writing-reading and speaking-listening can therefore, be identified. The reactive modes represent functions of the individual such as reader listener and observer. The active modes work as mediators of other modes. They represent the individual's actions such as: pointer/gesticulator, speaker and writer (Ribes, 1990; Gómez Fuentes, & Ribes, 2008).

The purpose of this study was to evaluate the acquisition, translativity and transference of the performance of the language modes in two different arrangements related to conditional discrimination, matching to sample of first and second orders, using direct and arbitrary relationships among stimuli and techniques to evaluate the effect of the intrinsic feedback provided by the reactive modes on the active ones.

METHODS AND TECHNIQUES USED

A pre-test and post-test design are used, five training sessions and three transference tests for each language mode. The language modes during the training, and the transference conditions were presented in three different sequences. The order for presenting the transference tests in each mode remained constant in all the experiments. The participants were 96 children experimentally unaware, aged 8-12, from fourth grade of elementary school of Veracruz, México.

The program, tasks and data gathering were designed by using the Toolbook Instructor of Windows. The independent variable used was the intrinsic feedback: the presence of the intrinsic feedback performed by the reactive mode before the active one or its absence when the active modes are performed without the active ones. The dependent variables used were: 1) speed and completion level of the acquisition of behaviors during the first stage in the training sequence; 2) translativity of a same kind of performance from one mode to another during the training sequence; and 3) transference of behaviors as a result of the previous training with stimuli, modalities or diverse criteria.

A first package of four experiments was carried out, then a second package of four experiments. In the two packages, experimental arrangements were used: matching to sample of first and second orders, under the active modes with or without reactive feedback. The only difference was the kind of relationship between the stimuli used and the tasks. In the first package, criteria of direct matching among stimuli were used. In the second one, an arbitrary matching only.

The tasks of the first order were designed using a sample stimulus and three for comparison. One of the comparing stimuli was identical to the sample, others were similar in shape, color or size, and the third was different in shape, color or size. In a direct matching, geometrical shapes were used. In the arbitrary matching, the geometrical shape stimulus was substituted by a rectangle that included numerical stimuli, roman and arabic numbers. The first ones were able to identify the shape and the second ones, the color or the size of the figure.

In the matching to sample of the second order, two stimuli were presented in the upper part of the screen, indicating the matching criteria. In the middle part of the screen, a sample stimulus was used, and in the lower part, four comparing stimuli. One of the comparing stimuli was identical to the sample; two were similar in shape, color or size. In direct matching, some geometrical stimuli were used. In the upper part of the screen, in arbitrary matching, one of the geometrical stimuli was substituted by a rectangle that included roman and arabic numbers. In the

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middle part, the sample geometrical stimulus was substituted by roman and arabic numbers.

The language modes in conditions of training were presented in three possible sequences, each one of them integrated by the three modes. In addition to the pretest and posttest, each experiment included transference tests. In each experiment 36 trials by session appeared, five consecutive sessions for each phase of training and a session for each test. In each session, half of trials were of similarity and other half by matching the different ones, except in the tests of extra relational transference that they used inclusion and exclusion matching. In the matching to sample of first order, the sessions were divided in two parts, each one of 18 trials; in one of them the trials of matching by similarity in color and forms and the other were distributed at random, those of difference.

In each session, when finalizing half of the trials, the computer system presented a screen that informed to the subject that the matching criterion would change. Under matching to sample of second order, the presentation of the trials during the training and trials of transference were at random. In the training, the subject received feedback of trial to trial and the number of successes at the end of the session. In the transference tests, at the end of the session, the subject received information on the number of successes obtained. Each session was preceded by appropriate instructions.

EXPERIMENTAL METHOD
Pre-test and Post-test. These tests were presented in the first and last sessions of each experiment. In the pre-test and post-test the stimuli were similar to the ones used during the training phase. The subject used the mouse of the computer placing the arrow that appeared in the screen on the chosen figure and pressed the left button of the mouse. In these tests no information was provided to the children in relation to what was correct or incorrect about their answers.

Training phase: Writing/Reading. The subject chose a stimulus of comparison based on the criterion of matching established by the task. The features of the chosen figure were written on rectangles placed in the lower part of the screen. In the first rectangle, the shape was written and in the second, the color. In the active mode without reactive feedback, the writing response was carried out without reading what was written due to the fact that the rectangle where it was written was black. When the reactive feedback was used before the active mode, the subject read what he/she wrote simultaneously on a white rectangle.

Training phase: Speaking/Listening. In this phase, the subject was trained to speak/listen to the features of the figures. When the active mode was carried out without the reactive feedback, the subject listened to a tune with sounds of nature through the earphones with functions of "white

noise" while he/she pronounced the shape of the selected figure. After that, using the same procedure pronounced the color of the figure. When the reactive feedback was used, the tune with noise functions was eliminated. The speaking answer was achieved pronouncing in a loud voice and listening at the same time the shape or the color of the selected figure.

Training phase: Pointing/Observing. When the active modes were achieved without the reactive feedback, the task consisted of observing the figures in a first screen briefly (of the first or second orders). Soon after that, in a second screen, the task consisted of pointing with the mouse at the blank space that corresponded to the selected figure. When the reactive feedback was incorporated, the subject observed the task and responded by pointing out in the same screen.

Transference tests. The transference tests were applied in three different subsequent sessions, one session for each test, after each training phase. In the first one, the subject responded at new geometrical figures with a different color. In the second one, the same stimuli of the training process were used. The shape of the figures remained and the size was substituted as modality. In the third one, geometrical and numerical figures were included with or without stripes and shade. Inclusion and exclusion relationships were used. When each test was concluded, the subjects received information about the obtained score of their right answers.

CONCLUSIONS
The methods and techniques used have demonstrated the effect of the intrinsic feedback provided by the reactive modes on the active and confirmed the prediction that the active and reactive modes are complementary. The analysis of these processes can provide information about the development of the linguistic modes and its application to human behavior analysis, as well as to the development of methods and techniques in behavioral research to promote learning and the functional use of the linguistic modes.

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