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EFFECTS OF MONITORING AND VERBAL PRAISES ON INSTRUCTION-FOLLOWING

EFECTOS DEL MONITOREO Y ELOGIOS VERBALES SOBRE EL SEGUIMIENTO DE INSTRUCCIONES

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Abstract

The effects of monitoring and monitoring plus verbal praises on instruction-following were examined when the instructions did not

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correspond to the non-verbal contingency. Twelve undergraduate students responded in a multiple differential-reinforcement-of-low-rate (DRL) DRL schedule with an instruction to respond rapidly. In one component, the experimenter monitored the participants' performances, while in the other, the experimenter was absent. For half of the participants (N=6), the experimenter delivered verbal praises *for* instruction-following during the monitored component. For the other half of the participants (N=6), instruction-following had no programmed consequences. The results indicated that (a) the experimenter's presence or the monitoring itself did not affect the instruction-following, corroborating previous studies, and (b) verbal praises transitory increased the instruction-following for half of the participants.

Keywords: instructions, within-subject comparison, monitoring, verbal-praises, humans.

Resumen

Se evaluaron los efectos de monitorear, y monitorear en conjunto con elogios verbales sobre el seguimiento de instucciones cuando estas no guardaban correspondencia con la contingencia no verbal. Doce estudiantes de licenciatura respondieron de acuerdo a un programa múltiple de reforzamiento diferencial de tasas bajas con la instrucción de responder rápidamente. Para un componente, el investigador monitoreó la ejecución de los participantes, mientras que, en el otro, el investigador no estuvo presente. Para la mitad de los participantes (N=6), el investigador elogió de manera verbal el seguimiento de instrucciones durante el componente con monitoreo. Para la otra mitad de los participantes (N=6), el seguimiento de instrucciones no tuvo ninguna consecuencia programada. Los resultados indicaron que (a) la presencia del investigador o el monitoreo no afectó el seguimiento de instrucción, corroborando resultados previos, y (b) los elogios verbales incrementaron el seguimiento de instrucciones para la mitad de los participantes

Palabras clave: instrucciones, comparación intra-sujeto, monitore, elogios verbales, humanos

Instruction-following is a defining feature of human behavior (Kissi et al., 2018). Instructions (or rules) can control the behavior of others without the need to expose them to the process of shaping behavior by the natural contingencies since instructions can specify contingent relations in the environment (Glenn, 1987; Skinner, 1969). Over the years, researchers conducted multiple experiments to explore variables that may affect instruction-following (e.g., Barrett et al., 1987; Cerutti, 1994; Galizio, 1979; Kroger-Costa & Abreu-Rodrigues 2012; Ramos et al., 2015). Among these variables, the presence of an observer (i.e., monitoring) and the use of social consequences given by him/her are cases of particular interest (Donadeli & Strapasson, 2015).

For instance, Barrett et al. (1987, Experiment 1) distributed 20 undergraduate students into two groups. Monitoring occurred for one group, which consisted of an observer in the experimental room during all experimental sessions. The other group was the control (i.e., without monitoring). In the first phase, any sequences of keypresses (using the four arrow keys on the right end of the keyboard) produced reinforcers, and the participants had no instructions. Stereotyped sequences were established. In the second phase, only the sequence different from the last 10 sequences produced a reinforcer, and the experimenter instructed the participants to vary their sequences. Thus, the instructions (presented on the computer's screen) corresponded to the contingencies in effect. In the third phase, the contingencies were equal to those in the first phase, while the instructions were equal to those in the second phase. In this phase, therefore, the instructions became inaccurate. The monitored participants showed higher degrees of response variability during the third phase than the control participants, suggesting that the observer's presence increased the probability of instruction-following. Kroger-Costa and Abreu-Rodrigues (2012) also obtained increases in instruction-following during monitoring using a fixed-interval (FI) schedule of reinforcement.

However, in other studies, the mere presence of an observer did not control instruction-following. For instance, Albuquerque et al. (2004) exposed 12 children, who were distributed in two groups (mo-

nitored and no-monitored), to a matching-to-sample (MTS) task. The experiment consisted of five phases. Phases 1, 3, and 5 had corresponding instructions, and Phases 2 and 4 had non-corresponding instructions. Ten of 12 participants stopped following the instructions during Phases 2 and 4, irrespective of whether they were monitored. The results suggested that the presence of the observer did not control instruction-following. Ramos et al. (2015) obtained similar results by exposing undergraduate students to a multiple FI FI schedule of reinforcement. Monitoring occurred in only one component of the multiple schedule. The participants followed the instructions, but their performances did not differ between the monitored and the no-monitored components.

Donadeli and Strapasson (2015) also did not obtain the effects of the mere presence of an observer on instruction-following but did obtain the effects of reprimands by the observer. They conducted three experiments exposing undergraduate students to an MTS task divided into four phases, which differed regarding the presence or absence of monitoring and the correspondence or non-correspondence instructions on how to behave. In Experiments 1 and 2, the monitoring alone did not affect instruction-following. In Experiment 3, the observer reprimanded (e.g., "Remember that I asked you to click on Diagonal 1") for *not* following the instructions. The results indicated that the observer's reprimands as social consequences increased the probability of instruction-following.

Overall, while some studies demonstrated that the presence of an observer (i.e., monitoring) increased the probability of instruction-following (e.g., Barrett et al., 1987; Kroger-Costa & Abreu-Rodrigues, 2012), others did not (e.g., Albuquerque et al. 2004; Donadeli & Strapasson, 2015, Experiments 1 and 2; Ramos et al., 2015). Donadeli and Strapasson (2015, Experiment 3) found that when reprimands by an observer were contingent on *not* following the instructions, the presence of an observer controlled instruction-following. Although the reprimands seem to be useful, they are forms of and often function as punishment (cf. Van Houten et al., 1982). The use of social consequen-

ces *for* instruction-following can be an alternative procedure (cf. Reis et al., 2013) that need investigation.

The present experiment examined the effects of verbal praises as social consequences on instruction-following. Additionally, the present study used a multiple differential-reinforcement-of-low-rate (DRL) DRL schedule rather than an interval schedule of reinforcement (e.g., Albuquerque et al., 2004; Kroger-Costa & Abreu-Rodrigues, 2012; Ramos et al., 2015). During interval schedules, the response patterns can vary and yet produce the consequences. Thus, when the instructions do not describe the actual contingency, the participants can follow the noncorresponding instructions and yet obtain the reinforcers (e.g., Galizio, 1979; Kaufman et al., 1966). The DRL schedule, by contrast, requires more specific response patterns for reinforcement. Therefore, variations produced by following a noncorresponding instruction are hardly reinforced. Thus, the DRL schedule would permit the assessment of instruction following not only by response rates but also by reinforcement rates.

Method

Participants

Twelve undergraduate students, seven females (P4, P6, P7, P8, P11, P12, and P14) and five males (P3, P5, P9, P10, and P13), aged 19-28 years old, without prior experimental histories, participated. The invitation informed the participants that they would participate in a study about human behavior and spend approximately 10 min in each laboratory visit. At the end of the experiment, the experimenter explained the aims of the study to all participants. The Committee for Ethical Human Research of the Universidade Estadual de Londrina, Londrina-PR, Brazil, approved all procedures performed with the participants (protocol number: 761.968/2016).

Setting and Apparatus

The observer/experimenter was a 25-year-old female dressed in jeans, a white laboratory coat, and shoes during all experimental sessions. Sessions occurred in a 3 m^2 room, with a desk, two chairs, a computer with a 17-inch color monitor, a keyboard, and a mouse. White noise reproduced through headphones connected to the CPU masked extraneous sounds. The software ProgRef v4 (Becker, 2011) executed and recorded experimental events, and the software StabilityCheck (Costa & Cançado, 2012) calculated response-rate stability.

Figure 1 shows an example of the screen layout during experimental sessions. The screen layout consisted of a gray background with a 10.0 X 2.0 cm response button in the screen's lower center. A press to the left mouse button with the mouse cursor above the response button on the computer screen was defined as a response. The color of the response button changed depending on the component of the multiple schedule of reinforcement. Above the response button, an 8.0 X 2.9 cm point counter presented the number of points earned in each session (blue number on a black background). At the end of each experimental session, the screen displayed the total points earned during the session and the message "Call the Experimenter".

Figure 1. Screen layout during experimental sessions

Note. Screen layout during experimental sessions. The left panel represents the non-corresponding instruction component with monitoring (NCI-M), and the right panel represents the non-corresponding instruction component without monitoring (NCI).

Procedure

We distributed the participants into two groups: Group 1 – no verbal praises (P3-P8) and Group 2 – verbal praises (P9-P14). On the first laboratory visit, participants read and signed an informed consent describing the number and duration of the sessions and that every point gained would be exchanged for R$ 0.10 at the end of each session (approximately U$ 0.028). A maximum of two sessions occurred per day. Then, the experimenter asked the participants to leave all materials, such as watch and cell phone, at a table outside of the experimental room and to read these general instructions in Portuguese:

This research is not about intelligence or personality. Your goal is to earn as many points as you can using only the mouse. Points will appear in a window (point counter) in the top center of the computer screen. The experimenter is not allowed to give any additional information. If you have any questions, please reread this text and continue the experiment. Good job!

Before each experimental session, the observer/experimenter said: *"Now, follow this instruction"* and then presented a paper with the following written non-corresponding instruction: *"You must press the button rapidly to gain points"*. The participants read this instruction aloud. Thereafter, they were asked to use the headphone that reproduced a white noise and to start the session.

Participants were exposed to 10-min sessions under a multiple DRL 5-s DRL 5-s schedule of reinforcement. A response that occurred after an interval equal to or longer than 5 s since the last response added a point to the point counter. Responses which interresponse times (IRTs) were shorter than 5 s reinitiated the timer. Each component was 5 min and was separated by a 30-s intercomponent-interval (ICI) during which the entire screen was black with "WAIT" printed in red on the center, and the experimenter presented the non-corresponding instruction again. Monitoring occurred in one component (NCI-M), whereas it did not occur in another component (NCI). For that purpose, the observer left the experimental room during the ICI whenever the next component was the NCI and returned to the room during the ICI that preceded NCI-M component.

For Group 1, the NCI-M component was always the first for P3 and P4; the NCI component was always the first for P5 and P6. At the beginning of each session, the experimenter randomly assigned the first component for P7 and P8. For Group 2, four participants initiated the experiment in the NCI-M component (P9, P10, P11, and P12), and two participants initiated the experiment in the NCI component (P13 and P14). From the second to the last session, the first component occurred in a semi-random order assigned at the beginning of the session, and the same component did not occur as the first more than twice in a row.

Monitoring. The monitoring consisted of the presence of the observer/experimenter in the experimental room. When the session started with the NCI-M component or during the ICI that preceded this component, that is, immediately before the NCI-M component, the observer/experimenter presented the non-corresponding instruction, sat aside from the participant, and said: *I will stay here for 5 min.* If the participant had any questions, the observer/experimenter said: *Unfortunately, I cannot talk or explain anything to you to the experiment be validated* (cf. Barrett et al., 1987; Ramos et al., 2015). When the session started with the NCI component or during the ICI that preceded this component, the observer/experimenter said: *Now, you will be alone without any observation. I will be back in 5 min.* Then, the observer/experimenter left the experimental room.

Verbal praise delivery. For Group 2, the experimenter administered verbal praises for the instruction-following during the NCI-M component. The experimenter used two criteria to deliver praises: First, the praises should occur in specific intervals. In the first two minutes of the first two sessions, the experimenter administered verbal praises according to the following intervals: 10, 20, 10, 20, 20, 10, 20, and 10 s, in that order. From the third minute and in the following sessions, the praise intervals used were: 10, 20, and 30 s. These praise intervals were randomly distributed at each minute of the NCI-M. The observer/experimenter used an earphone that reproduced a recording that signaled the praise intervals. The earphone was used in only one

ear and was hidden by the observer/experimenter's hair. Second, the first response after the praise interval was praised (if its IRT was shorter than 5 s) or produced points (if its IRT was equal to or longer than 5 s). Then, the next praise interval started. The verbal praises used were randomly chosen among the following options (in Portuguese): "*very good!*"; "*great!*"; "*that is right!*"; "*good!*"; "*excellent!*"; "*perfect!*".

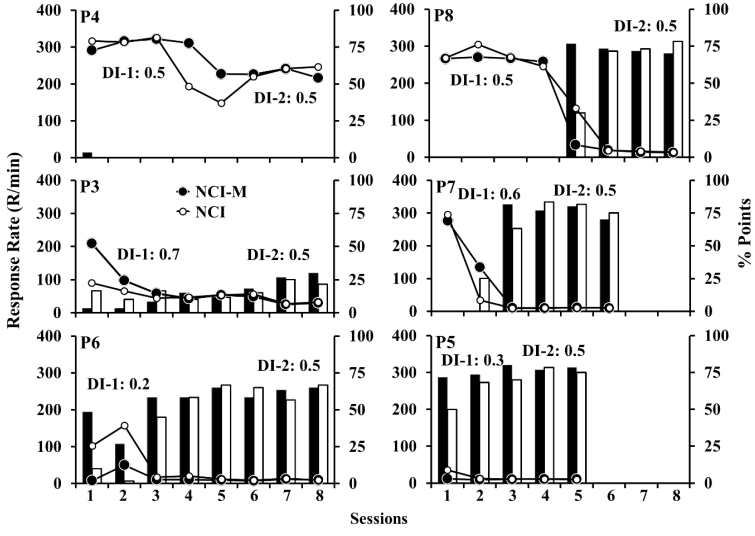
The experiment lasted for a maximum of eight sessions or until response rates were stable. In each schedule component, if each response rate of the final four sessions did not exceed 15% of the mean response rate of these four sessions, then the multiple DRL DRL schedule performance was considered stable (cf. Costa & Cançado, 2012; Joyce & Chase, 1990; Ramos et al., 2015). We used an arbitrary criterion to determine whether the participants' performances were under the control of the non-corresponding instruction or the nonverbal contingency. We considered participants' performances were insensitive to the contingency in a component when they obtained a maximum of 25% of the total of points available in that component. In this case, it would be highly probable that the non-corresponding instructions controlled the responding. If the participants obtained more than 25% of the total points available in one component, we considered that they were under the control of the nonverbal (programmed) contingency in this component. The total of points available in each component was 60 points.

Additionally, differentiation indexes (DI) were used to analyze response-rate differences between components. DI values were calculated by dividing the mean response rate in the NCI-M component by the sum of the mean response rates in both components (cf. Porto et al., 2011; Ramos et al., 2015; Rosenfarb et al., 1992). DI values equal to 0.5 indicate that response rates were equal between components; DI values higher and lower than 0.5 indicate that response rates were higher in the NCI-M and the NCI component, respectively.

Results

Figure 2 shows response rates and the percentage of points earned in each component for all participants in Group 1 – no verbal praises. Participants' graphs are presented according to the occurrence of instruction-following. Open and closed symbols and bars represent the data during the NCI and NCI-M components, respectively. The left *y*-axis and the lines represent response rates. The right *y*-axis and the bars represent the percentage of points earned. The DI values were obtained from the first (DI-1) and last (DI-2) three sessions for all participants but P5. For P5, the first and last two sessions were used because his experiment was completed on Session 5.

Figure 2. Response rate and percentage of points for Group 1

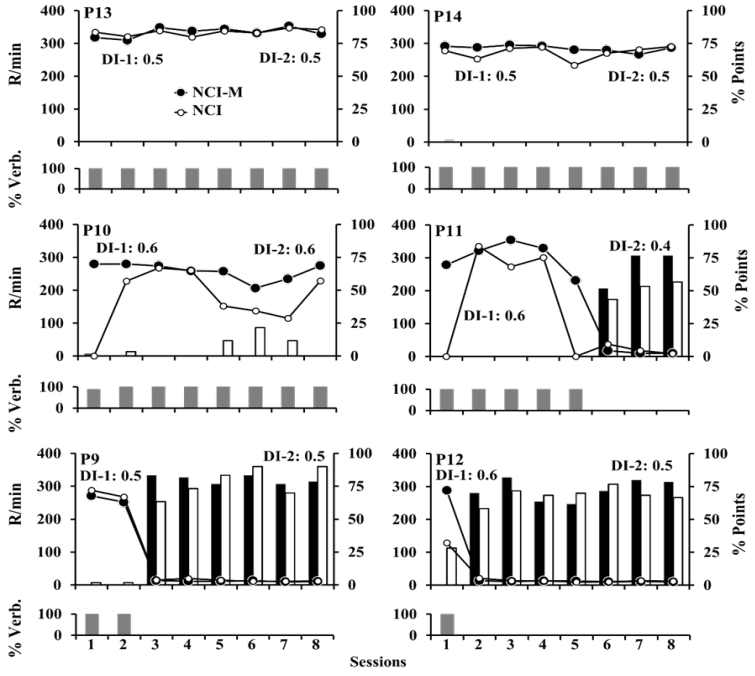


Note. Response rate (R/min) and percentage of points (% Points) earned in both components for Group 1. The left *y*-axis and the lines represent response rates. The right *y*-axis and the bars represent the percentage of points earned. Open and closed symbols and bars represent the data during the NCI and NCI-M components, respectively.

P4 presented relatively high response rates and obtained less than 25% of the points available in both components during all experimental sessions. P3 showed similar results as P4 during sessions 1-6. During Sessions 7 and 8, P3 obtained more than 25% of the total points available in either or both components. P8, P7, and P6 presented high response rates and earned few points during both or either components of the initial two or four sessions. However, response rates became lower, and these participants obtained more than 25% of the points available during the remaining sessions. P5 presented low response rates and obtained more than 25% of the points available in both components during all experimental sessions. DI-1 values were higher than 0.5 for P3 and P7, 0.5 for P4 and P8, and lower than 0.5 for P6 and P5. DI-2 values were 0.5 for all participants.

Figure 3 shows response rates, the percentage of points earned in each component, and the percentage of verbal praises delivered for all participants in Group 2 – verbal praises. Participants' graphs are presented according to the occurrence of instruction-following. The left *y*-axis and the lines represent response rates. The right *y*-axis and the bars (black and white) represent the percentage of points earned. Open and closed symbols and bars (black and white) represent the data during the NCI and NCI-M components, respectively. The left *y*-axis and the gray bars represent the percentage of verbal praises delivered. The DI values were obtained from the first (DI-1) and last (DI-2) three sessions for all participants.

Figure 3. Response rate and percentage of points for Group 2



Note. Response rate (R/min), percentage of points earned (% Points), and percentage of verbal praises delivered (% Verb.) in both components for Group 2. The left *y*-axis and the lines represent response rates. The right *y*-axis and the bars represent the percentage of points earned. The left *y*-axis and the gray bars represent the percentage of verbal praises delivered. Open and closed symbols and bars represent the data during the NCI and NCI-M components, respectively.

The participants P13, P14, and P10 presented relatively high response rates and obtained less than 25% of points in both components during all experimental sessions. Also, these participants obtained approximately 100% of the verbal praises during all sessions. Participants P11, P9, and P12 presented relatively high response rates, obtained less than 25% of points, and received approximately 100% verbal praises during the first 5, 2, and 1 sessions, respectively. During the remaining sessions, they showed relatively low response rates, obtained

more than 25% of points, and received no praises. DI-1 values were higher than 0.5 for P10, P11, and P12, and 0.5 for P9, P13, and P14. DI-2 values were around 0.5 for all participants.

The comparison between the two groups suggests that the non-corresponding instructional control was more likely to occur during the initial sessions. In these sessions, response rates during the NCI-M component were higher than those during the NCI component only for 1 (P3) of 6 participants in Group 1, whereas the rates were those for 3 (P10, P11, and P12) of 6 participants in Group 2. These results suggest that when an observer delivered social consequences depending on the instruction-following, the instruction-following increased. Nonetheless, this effect was short-lived. For both groups, in general, once the response rates decreased and produced points, the performances remained during the following sessions.

Discussion

The present study examined the effects of monitoring and monitoring plus social consequences (i.e., verbal praises) on instruction-following when the instructions did not correspond to the contingency. As noted earlier, findings on the effects of an observer's presence have been inconsistent (Albuquerque et al., 2004; Barrett et al., 1987; Donadeli & Strapasson, 2015; Kroger-Costa & Abreu-Rodrigues, 2012; Ramos et al., 2015). Our results are consistent with some of them (Albuquerque et al., 2004; Donadeli & Strapasson, 2015; Ramos et al., 2015) that indicated that the observer's presence or the monitoring itself was not sufficient to control instruction-following.

Cottrell et al. (1968) demonstrated that observers not imposing social consequences on instruction-following did not affect participants' performances. Donadeli and Strapasson (2015) obtained similar results and showed that observer's reprimands as social consequences were necessary to increase the probability of instruction-following. Unlike Donadeli and Strapasson, the present experiment used *verbal praises* as social consequences for *instruction-following*, and the results

were different across the participants. For P13, P14, and P9, we did not observe systematic differences in the response rates or the points earned between the components. On the other hand, for P10, P11, and P12, response rates were higher during the component in which the observer was present and delivered verbal praises (i.e., NIC-M) than during the component in which no observer was present (i.e., NCI) during the initial sessions. These results suggest that the observer's verbal praises increased the instruction-following temporarily for some participants and partially replicate the results obtained by Donadeli and Strapasson using not reprimands but verbal praises as social consequences.

Two limitations can be pointed out concerning the present results of the effects of verbal praises. The first is that the effects were generally short-lived. The schedule used may have been relevant to this. Torgrud and Holborn (1990) named the degree that one or more schedules produce specific response rates as *discriminative schedule control*. Thus, if the reinforcers are produced only by a specific response rate, the schedule of reinforcement exerts a strong discriminative control on responding. However, if the reinforcers are produced even with variations in response rates, the discriminative-schedule control on responding is weak. Torgrud and Holborn found that participants' verbal descriptions of their responses affected the subsequent response when the discriminative schedule control was weak but did not when it was strong. In the present experiment, we used a DRL schedule of reinforcement that imposes a contingency in which the reinforcers are produced only by a specific response rate (relatively low response rates). The discriminative schedule control of the DRL schedule, therefore, is strong. Thus, although multiple assessments of instruction following were accomplished by the DRL schedule, verbal praises' effects may have disappeared or weakened with the continued exposure to that DRL schedule.

Also, the present study used general praises rather than behavior-specific praise. That is, the experimenter did not specify the behavior that would produce praises. Donadeli and Strapasson (2015) used a behavior-specific reprimand (i.e., "Remember that I asked you to click

on Diagonal 1") and obtained long-lasting effects. Therefore, it is not implausible to expect that behavior-specific praises will contribuite to increase and maintain the relationship between the response pattern and verbal praises. The comparison between general praises and behavior-specific praises awaits future experiments.

The second limitation remains in the inter-individual variability of the effects of verbal praises. While some participants (P10, P11, and P12) responded differently between the components during, at least, the initial sessions, others (P13, P14, and P9) did not respond differently between the components. An important feature of our experiment is that we have used a within-subject design and a multiple schedule of reinforcement, so we tested the effects of our independent variables with the same subject and in successive conditions separated by an ICI. This feature might have affected the inter-individual variability. For instance, instruction-following was very strong in both components for P13, P14, and P9. The results of these three participants suggest the possibility of interactions between the components of the multiple schedule (e.g., Nevin & Shettleworth, 1966; Reynolds, 1961). Thus, the instructions' effects or the verbal praises' effects during the NCI-M component could have extended to the NCI component. Future experiments using phases instead of the multiple schedule of reinforcement or increasing the ICI (e.g., 60 s or 120 s) may contribute to obtain the effects of verbal praises that are consistent across the individuals.

Conflicts of interest

The authors reported no potential conflict of interest.

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