AN INITIAL EVALUATION OF POSITIVE VERSUS NEGATIVE REINFORCEMENT INCENTIVE PARADIGMS IN EMPLOYEES

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The present study was designed to compare the effects of positive and negative reinforcement incentive conditions on the behavior of two human services employees. After a no incentive baseline both employees were sequentially exposed to an evaluation condition that compared positive and negative reinforcement incentive conditions. After the evaluation condition the participants were directed to choose which condition they would prefer to work in. Results suggested that both reinforcement conditions increased performance relative to baseline, but that there were no significant differences between the conditions. One participant preferred to work in the positive reinforcement condition while the second preferred to work in the negative reinforcement condition.
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Consequence-based procedures are frequently included in intervention packages with employees because they are often indicated as absent by indirect assessments (Echeverria & Wilder, 2024). Despite consequence-based interventions being common in practice (DiGennaro Reed & Henley, 2015), there are still many questions related to implementing such procedures in employees.

Implementing consequence-based interventions containing tangibles (e.g., gift cards, cash) have many different aspects that must be accounted for including preference and delay. For example, preferences in adult participants change over time and managers are not always adept at predicting what their employees would prefer to earn (Wilder et al., 2011). Additionally, when using incentives researchers have found that employees are tolerant of delays up to 30 days after earning the incentives as long as they were sure to receive the incentive (Wine et al., 2019). When constructing incentive plans there are many additional aspects of delivery that could be customized including constructing positive versus negative reinforcement contingencies.

Some authors have recommended avoiding negative reinforcement contingencies because the contingencies inherently involve presenting an aversive stimulus from which the employee must work to avoid (Lee & Oah, 2015). In their popular textbook, Daniels and Bailey (2014) state that positive reinforcement has many benefits while negative reinforcement contingencies must contain an element of fear to be effective. However, conceptually it should be possible to arrange for additional breaks from on-going work tasks for meeting goals and this could very well constitute a negative reinforcement paradigm, although examples like this are not considered in the text. Despite practitioner recommendations, there is little empirical data available to inform practice. The only known empirical study related to positive versus negative reinforcement use in employees was carried out by Lee and Oah (2015).

Lee and Oah (2015) compared the effects of positive and negative reinforcement contingencies in two experiments. The researchers found that there was no significant difference between a group of participants assigned to a base pay plus ability to earn (i.e., positive reinforcement) condition versus a group of participants with a larger base pay but the threat to lose money if errors occurred (i.e., negative reinforcement) condition. In a second experiment the authors added a control condition that included base pay only, along with variable ratio 5 positive and negative reinforcement conditions. The authors found that there was no difference between positive and negative reinforcement contingencies in experiment one, but the positive reinforcement condition produced a statistically significant increase in performance relative to baseline and

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negative reinforcement conditions in experiment two. The authors note that more research is needed in light of their mixed results. The current study was designed to compare positive versus negative reinforcement incentive systems.

METHOD

Participant and Setting

Participants were two employees working at a nonprofit organization serving individuals diagnosed with autism spectrum disorder. The organization included school, early intervention clinic, and adult residential services. Gene identified as an African American man. During data collection he was 34-years old, possessed a high school diploma, and worked as an admissions assistant in the organization. Valerie identified as a Mixed-Race woman. During data collection she was 37-years old, possessed a high school diploma, and worked as an events coordinator in the organization. Data were collected in an office setting in which participants sat at a desk across from the author's desk and were provided with a laptop computer, data sheets, and scratch paper with a writing utensil.

Design and Procedure

All procedures were approved by a research review committee prior to data collection. Both participants were recruited in person by the author. The participants first met with the author individually who obtained informed consent, reviewed the data transcription task, and set a data collection schedule. Data were collected up to two times per week and with no more than two sessions on the same day. All sessions were 15 minutes in duration.

Positive and negative reinforcement incentive paradigms were compared in a multiple baseline with a multielement component design. Participants were first exposed to a baseline condition and then sequentially exposed to a positive reinforcement condition and a negative reinforcement condition, which were alternated in a semi-randomized manner. The order of the two conditions were decided by a coin-flip model but no condition was allowed to occur more than two times in a row. After the reinforcement evaluation condition participants were exposed to a choice condition where they were allowed to select which condition they would work under.

Dependent Variable
Participants completed a simulated data transcription task that was developed to mirror a common task performed by direct care staff in the organization. In the natural environment, direct care staff recorded frequency or duration data for clients on a paper data sheet throughout the course of the day. Eight different staff worked with each client throughout the day, resulting in eight different frequency or duration measures for each target. At the end of each day a staff member had to sum the totals for each target behavior and enter the data into an Excel sheet to be graphed. For the simulation, each paper data sheet contained nine written targets being tracked for one client. One hundred unique scenarios were generated for this current study. That is, enough unique scenarios were generated so that while the participants saw the same scenarios two or three times throughout the experiment, it was unlikely that participants could memorize the data sheets. Participants added up data collected on the data sheets and entering them into an Excel spreadsheet (i.e., summing up eight numbers for each of the nine targets and transcribing them correctly). Targets on the data sheets consisted of aggression toward peers, aggression toward staff, self-injury, elopement, property destruction, frequency of uncooperativeness, duration of uncooperativeness, frequency of tantrum, duration of tantrum. The dependent variable was the total number of accurate transcriptions completed in the session—correctly adding all nine targets for a simulated clients counted as one transcription. During the study, only data sheets completed correctly were counted. During the study the primary data collector verified that all data sheets were transcribed with 100% accuracy across all study conditions. Formerly, both participants spent multiple years as direct care staff and were familiar with the task. Both participants were informed before data collection that the behavior data was not from actual clients.

Baseline
Baseline was designed to evaluate the number of transcriptions participants would complete when not incentivized financially. In baseline, participants sat with sample data sheets and a laptop and were told: "You will not be earning any money in addition to your hourly wage. You may complete as many or as few data

transcriptions as they would like over the next 15-minutes. If you would like to stop before the 15 minutes are up, just say 'I'm done.'" Baseline continued until steady state responding occurred, as measured by visual inspection. No participant elected to stop working before time elapsed during the study.

Incentive Evaluation Condition

The purpose of the incentive evaluation condition was to expose both participants to two different incentive paradigms and evaluate their effects on data transcription. In this condition the mean baseline responding plus 20% was used as the criteria in each session to earn $3 in cash. Three dollars was selected because $12 was the minimum wage at the time of data collection and data collection lasted for one quarter of an hour. During the positive reinforcement condition participants were told:

> In addition to your hourly wage you will now earn $3 if you can complete ___ transcriptions in 15 minutes. You may complete as many or as few data transcriptions as you would like over the next 15 minutes. If you would like to stop before the 15-minutes are up, just say 'I'm done.' I will give you the $3 as soon as I count the transcriptions to make sure you achieved the goal.

Immediately after data collection was complete the author counted the transcription and if the participants achieved the goal, they were given $3. In the negative reinforcement condition participants were told:

> In addition to your hourly wage you will now earn $3 if you can complete___ transcriptions in 15 minutes. You may complete as many or as few data transcriptions as you would like over the next 15 minutes. If you would like to stop before the 15-minutes are up, just say 'I'm done.' I want you to take the $3 now and afterward I will count the transcriptions to make sure you achieved the goal and can keep the money. I will let you know if you can keep the money or have to give it back.

After the directions but before data collection the participant was given $3. Participants then completed transcriptions for 15 minutes. Immediately after data collection was complete

the author counted the transcriptions and if the participants achieved the goal, they were told they could keep the $3. If they failed to meet the goal, they had to give the $3 back to the author.

Choice Condition

The choice condition was designed to evaluate the participants' preferences for the positive versus negative reinforcement paradigms. The choice condition was identical to the incentive evaluation condition except that at the start of each session the author said: "In addition to your hourly wage you will now earn $3 if you can complete ___ transcriptions in 15 minutes. You may complete as many or as few data transcriptions as you would like over the next 15 minutes. If you would like to stop before the 15-minutes are up, just say 'I'm done.' You can choose whether you would like to hold the $3 while you work, and I will let you know if you can keep it or have to give it back, or you can wait until you finish working and I will count the transcriptions and give you the $3 if you have completed enough transcriptions. Let me know your choice." The author then implemented the indicated procedure. Participants chose the reinforcement paradigm they were to work in at the beginning of each session.
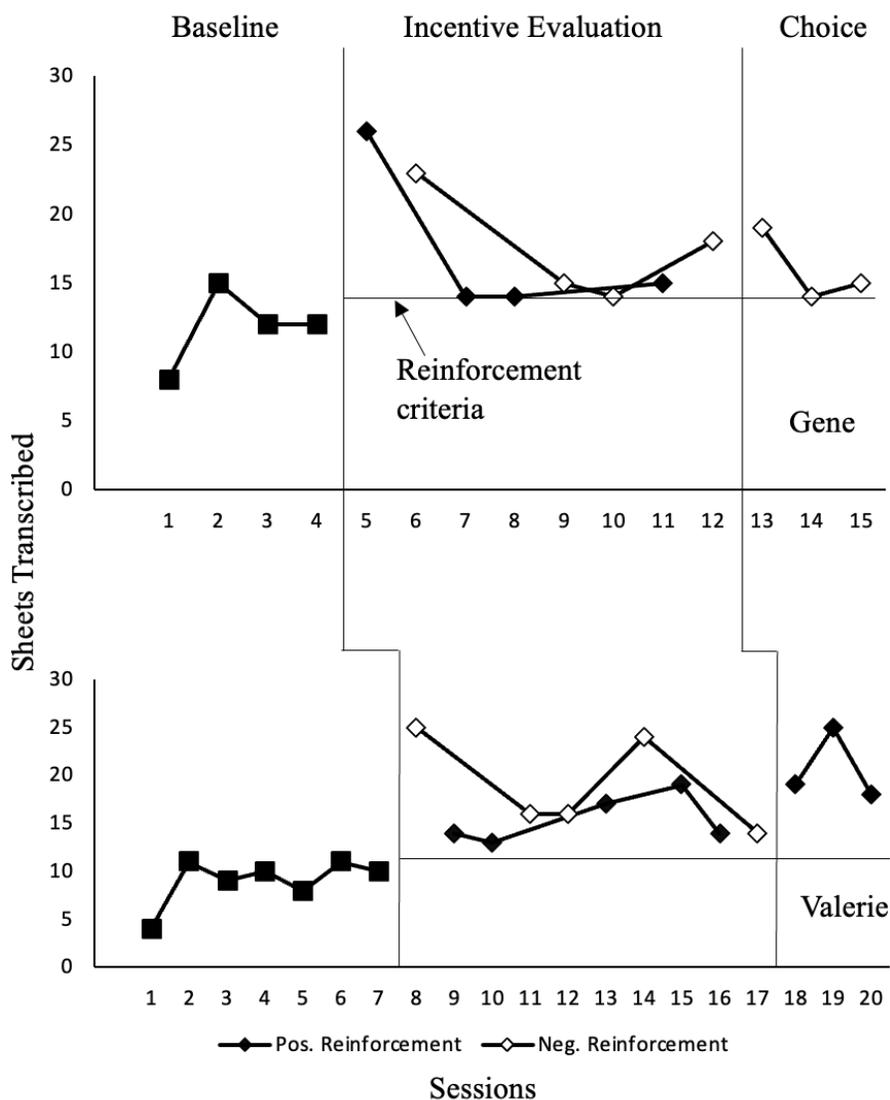
Data Integrity

Interobserver agreement (IOA) data were collected by having a second independent observer count the number of transcriptions completed in 34% of randomly determined sessions across all conditions for both participants. An agreement was noted if the number of transcriptions recorded between the primary and secondary observer in a given session matched. IOA was calculated by dividing agreements by agreements plus disagreements multiplied by 100. Total IOA was 100%.

Social Validity

After data collection both participants were interviewed about their experience with the positive and negative reinforcement conditions. Both participants were asked which of the two conditions they preferred, if either of the conditions evoked negative feelings, and if they would like to work in the actual environment with either of the conditions in place. During the

Figure 1

Evaluation of Positive versus Negative Reinforcement Conditions

RESULTS

Results from both participants are presented in Figure 1. During baseline Gene completed an average of 11.6 data transcription tasks, making his reinforcement criteria 14 during the incentive evaluation and choice conditions. During the incentive evaluation condition Gene met the reinforcement criteria in all sessions. There was little difference between the positive reinforcement and negative reinforcement conditions. Seven of the eight data points overlapped. In the choice condition Gene exclusively selected the negative reinforcement paradigm and met the reinforcement criteria in all three sessions.

During baseline Valerie completed an average of nine data transcription tasks, making her reinforcement criteria 11 during the incentive evaluation and choice conditions. During the incentive evaluation condition Valerie met the reinforcement criteria in both conditions in all sessions. The mean responding in the negative reinforcement condition was slightly greater

interview, examples, clarification, and follow up questions were provided as needed.

than the positive reinforcement with two non-overlapping data points. In the choice condition Valerie always selected the positive reinforcement paradigm and met the reinforcement criteria each session.

After data collection, both participants were interviewed separately. Gene reported that he preferred to hold the money and work to keep it. In response to which condition evoked negative feelings he stated that the positive reinforcement condition because he could not see the money. In response to which condition he would prefer to work in he said either condition would be effective, and he had no strong preferences. Valerie stated that she did not like to hold the money and much preferred it when the author held it. She stated that the idea of having to give the money back was not pleasant, but she found both conditions stressful. In response to what condition she would like to work in, she stated that she would like to work in the positive reinforcement condition but that the negative reinforcement condition would likely be more effective.

DISCUSSION

This study adds to the limited data available on positive versus negative paradigms when using incentives. There were no significant differences in responding in the positive and negative reinforcement conditions between the two participants and each had their own preference for what condition they would like to work in. These data replicate the first experiment described by Lee and Oah (2015) showing no difference between incentive paradigms. Additionally, the participants both had different responses to the procedures with one describing them both as stressful while the other participant did not like the positive reinforcement condition because he could not see the money. These results are at odds with recommendations from popular textbooks that state positive reinforcement paradigms are required to create discretionary effort (i.e., employees completing more work than the minimum requirements). Valerie in particular preferred positive reinforcement but seemed to perform better in the negative reinforcement paradigm. If these results are confirmed in replications, it could be that the downsides of negative reinforcement contingencies often noted in textbooks (i.e., negative reinforcement will result in employees completing only the minimum amount of work

to avoid a penalty) are overstated. It could also be that the nature of incentives lessens the aversive effects of these contingencies. For example, telling someone they must finish their paperwork by Friday or they are terminated describes a negative reinforcement contingency but is qualitatively different than losing incentives that were provided on top of one's base pay. Future research should replicate this study in an applied setting and measure positive versus negative reinforcement paradigms with incentives. It could be that negative reinforcement produced greater responding in some circumstances, or perhaps that it is important to provide employees with the choice of paradigms under which they would prefer to work.

This study is not without limitations. A third participant started the experiment but dropped out before completing the baseline, and this limits the confidence in generalization to other participants. Relatedly, no measures of maintenance or generality were collected. Also, the increase from baseline to intervention was relatively small, but the dependent variable involved a real work task that was effortful so a 20% change would have been significant in the natural environment. Finally, although a second observer conducted an independent count of the data sheets transcribed for 34% of sessions, the sheets were already set aside by the primary data collector (i.e., the second observer did not verify that the sheets were transcribed accurately).

This manuscript presents some of the first data on effects and preference for positive versus negative incentive conditions for employees. While preliminary, the data suggest that there was little difference in responding between the positive and negative reinforcement contingencies, but there were clear idiosyncratic preferences.

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