Do Resident-Induced Motivating Operations for Staff Behavior

Carryover to Other Residents?

By

Ellie Morosohk

A thesis submitted to the Graduate Faculty of
Auburn University
In partial fulfillment of the
Requirements for the Degree of
Master of Science

Auburn, Alabama
December 13, 2025

Keywords: juvenile residential treatment facilities, motivating operations, staff behavior

Committee

Dr. John T. Rapp, Chair, Professor of Psychology
Dr. M. Christopher Newland, Professor of Psychology
Dr. Sarah Richling, Associate Clinical Professor of Psychology

Abstract

In Applied Behavior Analysis, practitioners often train caregivers and staff members to follow a behavior plan; however, few if any studies have evaluated the motivation of the implementer to follow the established rules. For example, it is possible that needing to provide consequences for problem behavior displayed by one individual under a staff member's care affects how that staff member provides consequences to other individuals under their care. This study examines staff members' behavior in Juvenile Residential Treatment Facilities using a reverse translational approach. In this study, simulated staff members were asked to either add or remove tokens following vignettes describing either problem behavior or appropriate behavior. Participants responded to a sequence of behaviors where Resident 1 engaged in four behaviors (some combination of appropriate and problem behavior) and then Resident 2 engaged in one appropriate behavior. The purpose of this arrangement was to evaluate whether the behaviors displayed by the first resident alter the participants' response to the second resident. The results indicate that there are changes in participants' responding to Resident 1 following different amounts of appropriate or problem behaviors; however, responses to Resident 2 were not significantly different between sequences. The findings may be used to inform training strategies for caregivers and staff members. Implications for future research are discussed.

Artificial Intelligence (AI) Use Disclosure Statement

In the preparation this thesis, the following Artificial Intelligence (AI) tools were used: ChatGPT. This tool was used to troubleshoot coding errors in R and to help with creating graphs in R. The author acknowledges full responsibility for the intellectual content of this work and has ensured that all AI-assisted sections have been reviewed and revised for accuracy and appropriate academic style.

Table of Contents

List of Tables

List of Figures

Abbreviations

ABA: Applied Behavior Analysis

AO: Abolishing Operation

CMO: Conditioned Motivating Operation

CMO-S: Conditioned Motivating Operation Surrogate

CMO-R: Conditioned Motivating Operation Reflexive

CMO-T: Conditioned Motivating Operation Transitive

EO: Establishing Operation

JRTF: Juvenile Residential Treatment Facility

MO: Motivating Operation

UMO: Unconditioned Motivating Operation

Chapter 1

Do Resident-Induced Motivating Operations for Staff Behavior Carryover to Other Residents?

Staff Behavior in Juvenile Residential Treatment Facilities

Motivating operations (MOs) have not been studied extensively in previous research; however, behavior analysts use the different subtypes of MOs to describe effects on operant behavior in a variety of settings. This section will focus on applying MOs to Juvenile Residential Treatment Facilities (JRTFs) and specifically staff behavior in this environment. This section will review the effects of MOs in JRTFs, then it will apply the effect of MOs to rule governed behavior. Finally, this section will discuss the lack of opportunities for reinforcement and skill acquisition in JRTFs and how this influences staff behavior.

Effect of Motivating Operations in Residential Treatment Facilities

One area where MOs may influence behavior is in stressful work environments, including residential facilities where staff are responsible for attending to in-patient clients and following behavioral programming. Staff working in residential settings experience high levels of job-related stress (Santos et al., 2023). Therefore, this could result in heightened emotions that ultimately lead to changes in behavior. One example of residential settings where staff are expected to implement behavioral programming is a JRTF. Staff working in residential settings are expected to engage in many different job-related tasks including ensuring safety and security, managing problem behaviors and interacting with the youth daily (Krueger, 2007; Luna et al. 2022). All of these responsibilities combined can result in a high stress work environment. High levels of burnout are experienced by residential staff which involves “emotional exhaustion” (Seti, 2008). Because of these high expectations and emotional exhaustion, MOs will play a role

in changing staff behavior throughout their shift. Ultimately, having a better understanding of how this behavior change related to MOs works could lead to improved staff training as well as interventions that may lead to better outcomes for the staff as well as the youth they are supervising.

Rule Governance and Staff Member Behavior

It is important to have a good understanding of factors contributing to staff behavior including rule governed behavior. Rule governed behavior is contrasted with contingency shaped behavior where individuals directly contact the consequences (Kissi et al., 2017). Staff at juvenile residential facilities have very specific job-related tasks (rules) that they are expected to follow daily. Rule governed behavior has been broken down into different functional classes based on motivational contingencies (Zettle & Hayes, 1982). Pliance is a contingency involving socially mediated reinforcement for rule following and tracking involves contingencies that are not socially mediated. For example, staff working in a JRTF would be engaging in behavior maintained by pliance when they engage in an appropriate interaction with a resident and receive praise from their supervisor. The staff would be engaging in behavior maintained by tracking when they implement behavioral programming correctly and consequently see a student's behavior start to improve. Clearly both pliance and tracking play a role in the rule governed behavior that juvenile residential staff are expected to follow. However, these rules are not always followed and there may be different contributing factors including MOs.

Staff members are supposed to follow a set of rules while they are on the job involving their supervision and interactions with the residents they are overseeing, meaning that their behavior should be rule-governed. As of February 11th 2025, there are 1,322 articles involving parent training and 477,563 articles involving staff training in the *Journal of Applied Behavior*

Analysis (JABA). These studies typically focus on getting staff or parents to following the behavior plan, therefore training rule governed behavior, without focusing on the individual's motivation to follow the plan. As previously discussed, the reinforcers may be social or nonsocial and may also change from moment to moment making the MOs challenging to evaluate. Training staff to follow rules can occur in a variety of ways. For example, the Behavior Analyst Certification Board® (2026) lays out specific requirements that trainees are required to meet to be certified as a registered behavior technician® (RBT®). After these rules are trained, the expectation is that the staff behavior moving forward will match the rules that have been taught which is an example of tracking because it is not socially mediated. Further, the goal is that the individual will follow the rules because the behavior has been reinforced by observing a behavior change in their clients, indicating that following the rules is maintained by an automatic reinforcer. This is common in the field of ABA with RBTs and individuals who are training to be behavior analysts; however, it may not be as common in other fields. Each organization has its own strategy for training staff on the rules they are expected to follow in their roles, and attempting to bring staff behavior under rule governed control. Nevertheless, these rules are not always followed for a variety of reasons. It is important to note that the limited research focusing on MOs has evaluated the effect on the learner's behavior rather than the behavior of the change agent. MOs may be one factor that contribute to changes in staff behavior that was previously rule governed. In this situation we are examining how MOs influence the behavior of the change agent. Therefore, it is important to understand how different contingencies in the environment shape the behavior of the change agent, the staff.

In juvenile residential facilities, there is a lack of opportunities for reinforcement and skill acquisition. Previous research has examined interactions between staff and youth in residential

settings and found that staff typically rely on punishment more than reinforcement (Luna & Rapp, 2022). The goal of this study was to increase the rate of praise staff delivered based on this situation. In an environment with limited opportunities to access reinforcers such as praise, often the residents will engage in problem behaviors to access attention and other forms of reinforcement. This contingency has been studied, and it has been demonstrated that as opportunities for alternative reinforcement decrease there is a resurgence in problem behaviors (Falligant et al., 2022). This can result in a downward spiral where there is limited access to reinforcement, due to the lack of reinforcement residents engage in problem behaviors, then because of the problem behaviors staff continue to rely on punishment. This process involved MOs in every stage and results in a lack of appropriate responding according to the rules and job responsibilities. Having a better understanding of how MOs operate in these scenarios and the effect on staff behavior will lead to better interventions and ultimately more reinforcing environments.

To evaluate MOs in the context of staff behavior in JRTFs it is important to understand principles contributing to staff behavior. This section reviewed the effects of MOs in a stressful work environment and the contingencies involving rule governed behavior. This section also discussed how a lack of opportunities for reinforcement and skill acquisition in this setting modify contingencies of behavior and how this can relate to MOs. Further, it is important to recognize that MOs do not operate in isolation. In the JRTF setting, MOs may be complicated and interact in different ways across time and individuals.

Broader Dynamic Effects of MOs

As previously discussed, the three term contingency of behavior including the antecedent, behavior, and consequence is the foundation of operant behavior. Often consequences are

manipulated resulting in changes in future frequencies of behavior. In a JRTF, staff behavior is maintained by consequences that are social and nonsocial. An example of a social consequence would be a staff member engaging in an appropriate interaction with a resident and the resident thanking them for listening and being a good role model. If the staff continues to engage appropriately with the resident in the future, this would be a reinforcing consequence. An example of a nonsocial consequence is a staff completing their paperwork correctly, so they do not have to spend time redoing it. This reinforcing consequence would result in the staff member continuing to complete their paperwork correctly in the future. In addition to behavior change resulting from consequences, MOs can change staff behavior. One example where previously appropriate responding could be disrupted by MOs is when a previously neutral instance of problem behavior becomes continuous or personal towards a specific staff member (Anderson et al., 2025). A staff member might be able to tolerate a problem behavior when they start working with a resident; however, when they must deal with the behavior continuously or it is targeted at them personally, the problem behavior may become conditioned as a CMO by being paired with the UMO. Therefore, when the staff member deals with that resident engaging in problem behaviors in the future it may elicit an emotional response. Staff behavior in a JRTF is shaped by manipulating different components of the three-term contingency.

So far, we have discussed the importance of directly evaluating the effects of MOs and understanding the influence they have specifically on the behavior of change agents. However, MOs are complicated, and the effect of MOs may not be isolated to one stimulus. Previously, MOs were thought to be short lived, however, the effects may be long lasting or potentially permanent (Laraway et al., 2014). With this in mind, MOs will not only affect one stimulus, but potentially multiple stimuli that the individual comes in contact with while the effects of the MO

are in place. This would be very relevant to staff in a juvenile residential setting because they are responsible for attending to the needs of many residents at the same time. Additionally, as we previously established, this is a stressful work environment where MOs are likely to have a large impact on daily tasks. Because of this, it is important to understand how MOs affect staff behavior and how this translates to different situations and residents that they are responsible for responding to.

Research on Motivating Operations in Juvenile Residential Treatment Facilities

Currently, only one study directly examines the effect of MOs on the behavior of the change agent (Anderson et al., 2025). As discussed previously, the goal is for staff behavior to be under rule governed control, and it is often assumed that the staff member's behavior of following the rules will be maintained by tracking if the behavior matches the rules that they are trained on. However, we know that often these rules are not followed, and it is important to understand why this happens to modify future behavior. Anderson et al. (2025) evaluated the effect that MOs have on the behavior of staff operating in a juvenile residential facility using a reverse translational design. They conducted three reverse translational experiments evaluating the effects of MOs on simulated caregiver behavior.

In Experiment 1, Anderson et al. (2025) speculated that staff may experience MOs from outside of the work environment or directly from the work environment, therefore, MOs were evaluated through non-resident behavior induction and resident behavior induction procedures. The non-resident induction procedures were evaluated through an emotion induction procedure using a writing prompt aimed to target the emotions of happy or angry, and a neutral group was asked to detail their past 24 hours. The results from this non-resident induction section of the

study were not significant and the conclusion was that this did not contribute to a change in behavior.

Next, to evaluate MOs induced by resident behavior, Anderson et al. (2025) asked participants to imagine they were a staff member at a JRTF, then they were randomly assigned to a sequence of vignettes involving residents appropriate or problem behaviors. The participant was asked to either provide or take away dollars on a token economy of up to 10 dollars in either direction based on the behavior. Four sequences were used in this section of the study and each participant responded to one sequence of behaviors displayed by one resident. The order of behaviors participants responded to in the four sequences were: (a) problem, appropriate, appropriate problem; (b) appropriate, problem, problem, appropriate; (c) appropriate, problem, appropriate, problem; (d) problem, appropriate, problem, appropriate. There was a significant change in participants responses to the behaviors presented. Each time the participants were exposed to a problem behavior, they removed more dollars for the second instance of problem behavior after responding to an appropriate behavior in the middle (sequences [a], [c], and [d]). After participants responded to an appropriate behavior, they provided fewer dollars in response to the second instance of appropriate behavior when they responded to a problem behavior in the middle (sequences [b], [c], and [d]). In summary, the results of Experiment 1 indicated that staff responding to resident behaviors involved MOs that alter the future frequency of behavior. A limitation identified in the resident induction procedure was that this study only examined the interaction between a staff and one resident. Typically, a staff member would be engaging in multiple interaction simultaneously, therefore, future research should examine the influence of MOs during interactions with multiple residents.

Experiment 2 of Anderson et al. (2025) replicated Experiment 1, but without the non-resident behavior induction procedures. The purpose of this experiment was to rule-out the effects of emotion induction procedures on the resident-behavior induction results. One hundred and eight undergraduate students participated in Experiment 2, which included the same four sequences of problem behavior and appropriate behaviors described in Experiment 1. The results of this study replicated the results of Experiment 1, indicating that the resident induction procedures remain significant independent of the other experimental procedures. The results of a dose analysis indicated that after participants responded to one instance of problem behavior, they decreased the dollars provided for appropriate behavior. Participants further decreased the dollars provided for appropriate behavior after responding to a second dose of problem behavior.

Experiment 3 of Anderson et al. (2025) introduced vignettes depicting the behavior of a second resident. This experiment used Sequences (a) and (b) from Experiment 1; however, in each of these sequences, one resident engaged in the problem behavior and a second resident engaged in the appropriate behavior. Therefore, the sequences were: (a) Resident 1 engages in a problem behavior, Resident 2 engages in two consecutive appropriate behaviors, and Resident 1 engages in a problem behavior; and (b) Resident 1 engages in appropriate behavior, Resident 2 engages in two consecutive problem behaviors, and Resident 1 engages in an appropriate behavior. The results of the experiment indicate that in Sequence (b), when the participant responds to two problem behaviors of Resident 2 in the middle of the sequence, participants increase the reinforcement provided to Resident 1 for an appropriate behavior. By contrast, in Experiment 1 and 2, this sequence resulted in a decrease in reinforcement provided for the second instance of appropriate behavior. These results indicate that including vignettes where the

participant responds to a resident who engages in problem behavior alters the participants delivery of dollars to instances of appropriate behavior that a second resident engages in.

Anecdotal Observations from Staff-Resident Interactions in a JRTF

Based off clinical observations, one common situation that occurs on a dorm at a JRTF is that, while some residents are engaging in problem behaviors, typically at least some of the residents are engaging in appropriate behaviors. The staff are required to respond to the problem behaviors based on the severity, resulting in attention being turned to the residents engaging in problem behaviors and away from the residents engaging in appropriate behaviors. Even if the staff attention is not on students who are engaging appropriately, they are responsible for supervising all residents as well as implementing behavior management contingencies. Therefore, it is relevant to evaluate how staff MOs change when the staff are responding to problem behavior and how this affects the way that they respond to subsequent interactions with different residents who engage in appropriate behaviors. Reverse translational research takes real-life clinical observations and evaluates them in a controlled setting to understand the underlying mechanisms that are operating (Shakhnovich, 2018). This method of research can help us understand the MOs of staff in a JRTF setting where these scenarios have been observed. If we can understand how the staff MOs affect their response to instances of problem and appropriate behaviors across the multiple residents to which they are responsible for attending, we will be better equipped to design training tools to improve staff job performance and overall functioning in these facilities.

Chapter 2

Purpose of the Present Study

The purpose of the current study was to evaluate the extent to which asking a participant to respond (i.e., provide or remove dollars) to vignettes describing appropriate and problem behaviors of one resident (hereafter, Resident 1) influenced their response (i.e., point allocation) following appropriate behaviors displayed by a second resident (hereafter, Resident 2). This study addressed this question using six sequences of behaviors. In each sequence the participant first responded to four behaviors by Resident 1 and thereafter responded to an appropriate behavior by Resident 2. These sequences were designed to establish a history of responding to Resident 1 by including four responses before responding to Resident 2. This study extended Experiment 3 from Anderson et al. (2025) by isolating the effects of the appropriate and problem behaviors when responding to two residents. In part, this study addresses the question of how many instances of problem behavior by Resident 1 are needed to affect the participant's response to Resident 2's appropriate behavior.

Based on results of Anderson et al. (2025), the researchers hypothesized that the more problem behavior (i.e., higher the dose) displayed by Resident 1, the greater the number of dollars participants would provide to Resident 2 in response to appropriate behavior. Additionally, the researchers hypothesized that that participants would rank the emotion question higher as the doses of problem behavior they respond to increased. Finally, for the dose analysis, we hypothesized that higher doses of problem behavior would result in a progressive increase in punishment (removing dollars) in repones to additional problem behaviors. For appropriate behavior, we hypothesized that a progressive increase would occur in response to additional doses of appropriate behavior, but based on the results of Experiment 3 from Anderson et al. (2025) this may depend on doses of problem behavior being involved in the behavior sequence.

Method

Participants

Participants were undergraduate students at Auburn University recruited through an online research portal. The participants received course credit for participating in the study. An a-priori power analysis using G-power and determined that 132 participants, with 22 participants in each of six experimental groups, were required to achieve an 80% effect size (Faul et al., 2007, 2009). A total of 172 participants completed the study with 29 participants in five sequences and 27 participants in the last sequence.

Procedure

Each participant completed the study through a Qualtrics survey on their own computer. When they opened the survey, they were provided with an IRB-approved information letter describing their participation in the study, after which they were given the option to consent to participate. If they consented to participate in the study, the survey continued; if they chose not to consent, the survey ended. After consenting to participate, Qualtrics presented the participant with a perspective setting narrative that introduced the scenario. Participants were asked to imagine they were a staff member at a JRTF, and they were expected to implement a token economy to manage residents' behavior. The narrative described that they were authorized to provide or remove up to 10 dollars in response to the behavior, and that residents could spend money on snack and activities. Next, the participants were provided with vignettes describing either a problem behavior or appropriate behavior in which a resident engaged, and they were asked to score the dollars they would award or remove in the token economy. For each vignette, the participants were asked to move a bar on a sliding scale of -10 to 10 to provide the amount of dollars they chose (Qualtrics required an active response even when participants selected 0 dollars).

Behavior Sequences for Residents

Qualtrics randomly assigned each participant to respond to one of six sequences containing vignettes describing the behaviors of residents (see Figure 1). Each sequence was intended to evaluate a separate component of the research question on how much problem behavior by Resident 1 affects the participants' responses to the appropriate behavior of Resident 2. In each sequence, Resident 1 emits four behaviors and Resident 2 emits one behavior.

Sequence 1. In this sequence, Resident 1 engaged in three instances of appropriate behavior, followed by one instance of problem behavior, and then Resident 2 engaged in one instance of appropriate behavior. This sequence evaluated the effect of one dose of problem behavior by Resident 1 immediately before the participant responds to Resident 2.

Sequence 2. In this sequence Resident 1 engaged in one instance of problem behavior followed by three instances of appropriate behavior, and then Resident 2 engaged in one instance of appropriate behavior. Similar to Sequence 1, this sequence evaluates one dose of problem behavior by Resident 1; however, the participant responded to three appropriate behaviors by Resident 1 before responding to appropriate behavior by Resident 2.

Sequence 3. In this sequence Resident 1 engaged in two instances of appropriate behavior followed by two instances of problem behavior, and then Resident 2 engaged in one instance of appropriate behavior. This sequence evaluates two doses of problem behaviors immediately before responding to appropriate behavior by Resident 2.

Sequence 4. In this sequence Resident 1 engaged in two instances of problem behavior followed by two instances of appropriate behavior, and then Resident 2 engaged in one instance of appropriate behavior. Similar to Sequence 3, this sequence included two doses of problem

behavior by Resident 1, however, the participants responded to two instances of appropriate behavior before responding to Resident 2.

Sequence 5 (Control). In this sequence, Resident 1 engaged in four instances of appropriate behavior, and then Resident 2 engaged in one instance of appropriate behavior. This sequence served as a control sequence where the participant only responded to appropriate behaviors from both Resident 1 and 2.

Sequence 6. In this sequence, Resident 1 engaged in four instances of problem behavior, and Resident 2 engaged in one instance of appropriate behavior. This sequence evaluated the effect of four instances of problem behaviors (i.e., the highest dose) before responding to Resident 2.

Emotion Assessment

After responding to the sequence to which they were assigned, each participant was asked a follow up question about how much the behaviors they were asked to respond to upset them on a scale of 0 (not upset at all) to 10 (very upset by the behaviors they responded to). We hypothesized that Sequence 5, which is a control sequence, would produce the lowest scores, and Sequence 6, which involved the highest dose of problem behavior, would produce the highest scores on this question. We hypothesized Sequences 1, 2, 3 and 4, which involved two or three instances of problem behaviors, would fall somewhere in the middle with their answers to the emotion assessment question. After the participants completed their responses to all the vignettes and follow up questions, they were provided with a debriefing letter about their participation in the study.

Statistical Analysis

Multiple statistical methods were used to analyze different components of the data set. Statistics were analyzed using R 4.5.1 and the package tidyverse including ggplot (Wickham et al., 2019). A one-way ANOVA was implemented to conduct a dose analysis involving the number of problem behaviors the participant responded to before responding to Resident 2 engaging in an appropriate behavior. The dose analysis was implemented across all sequences in the experiment, and it evaluated the appropriate behavior by Resident 2 for each sequence. Sequences 1 and 2 had one dose of problem behavior, Sequence 3 and 4 had two doses of problem behavior, Sequence 5 (control) had zero doses of problem behavior, and Sequence 6 had four doses of problem behavior. A second one-way ANOVA evaluated whether participants in each sequence responded differently to the emotion assessment question. A Tukey's post hoc test was conducted to compare the different sequences that differed significantly. Additionally, to evaluate the participants' responses to Resident 1, four ANOVAs were used to evaluate the doses of appropriate and problem behaviors that came before each instance of behavior (Anderson et al., 2025, Experiment 1).

Results

Analyses for Resident 2

A one-way ANOVA was conducted to explore the impact of the sequence of behavior by Resident 1 on participants' responses to the appropriate behavior of Resident 2. The mean scores for Resident 2 across Sequences 1, 2, 3, 4, 5, and 6 were 3.31, 3.10, 4.66, 2.28, 3.14, and 3.74 respectively. Results indicated that there was not a statistically significant difference on dollars provided to Resident 2 $F(5, 166) = 1.959$, $p = .0873$, although the p value can be considered as marginal. This indicates that participants in each sequence provided similar responses to the

appropriate behavior by Resident 2. Thus, the evidence does not support an effect of the sequence on how participants provided dollars for appropriate behavior by Resident 2.

Emotion Assessment Question

A one-way ANOVA was conducted to explore the impact of the sequence on an emotion assessment question that was provided to each participant after they responded to their assigned sequence. Results indicate there was a statistically significant difference on the scores provided on the emotion assessment question $F(5, 166) = 8.89$, $p < .001$ (see Figure 2). Post-hoc comparison using Tukey's test indicated that there were statistically significantly differences between sequences 5 and 6 ($p < .001$), 5 and 1 ($p = .023$), 6 and 1 ($p = .025$), 6 and 2 ($p < .001$), 5 and 3 ($p < .001$), and 5 and 4 ($p = .003$). Overall, the mean for Sequence 5 was significantly lower than the means for Sequences 6, 3 and 4. Additionally, the mean of Sequence 6 was significantly higher than the means of Sequences 5, 1 and 2 (see Figure 3). These findings suggest that participants who responded to more problem behaviors in their assigned sequences were more upset by the behaviors of Resident 1.

Dose Analyses for Resident 1

Four ANOVAs evaluated participants' responses to the four behaviors of Resident 1. There were six sequences of problem and appropriate behaviors. The ANOVAs evaluated the relation between the sequence and doses of the *same* type of behavior that came before the response (i.e., for a response to appropriate behavior, this is the number of appropriate behaviors the participant responded to prior). Separate ANOVAs evaluated the relation between dose of the *different* type of behavior that came before the response (i.e., for a response to appropriate behavior, this is the number of problem behaviors the participant responded to prior). Additionally, problem and appropriate behavior ratings by Resident 1 were evaluated for the

analysis of the dose of same and different types of behaviors, resulting in four separate ANOVAs (See Table 1 and 2 for dose coding).

Same Behavior Type

The ANOVA evaluating problem behavior and doses of the same type of behavior was significant $F(3, 278) = 17.88$, $p < .001$ (see Figure 4). Post-hoc comparison using Tukey's test indicated that there were statistically significant differences between Dose 1 and 0 ($p < .001$), 2 and 0 ($p < .001$), 3 and 0 ($p < .001$), and 3 and 1 ($p = .012$). These results indicate that for each dose of problem behavior, participants removed significantly more dollars. That is, participants progressively removed more dollars following each instance of problem behavior.

The ANOVA evaluating appropriate behavior and the Doses of the same type of behavior was significant $F(3, 402) = 5.41$, $p = .001$ (see Figure 5). Post-hoc comparison using Tukey's test indicated that there were statistically significant differences between Dose 1 and 0 ($p = .005$), and 2 and 0 ($p = .009$). These results indicate that with additional doses of appropriate behavior, participants provided more dollars. However, the largest increase was from Dose 0 to Dose 1. The subsequent increases were smaller, and the increase from Dose 0 to Dose 2 was significant but the increase from Dose 0 to Dose 3 was not significant.

Different Behavior Type

The ANOVA evaluating problem behavior and the Doses of different behavior was significant $F(2, 279) = 3.12$, $p = .05$ (see Figure 6). Post-hoc comparison using Tukey's test indicated that there were statistically significant differences between Dose 3 and 2 ($p = .037$). These results indicate that participants provided significantly less dollars to residents after responding to three doses of appropriate behavior compared to two doses of appropriate behavior.

The ANOVA evaluating appropriate behavior and the Doses of different behavior was significant $F(2, 403) = 9.69$, $p < .001$ (see Figure 7). Post-hoc comparison using Tukey's test indicated that there were statistically significant differences between Dose 1 and 0 ($p = .011$) and 2 and 0 ($p < .001$). These results indicate that as doses of *problem* behaviors increased, the participants provided less dollars in response to *appropriate* behaviors.

Discussion

This study randomly assigned 172 participants to one of six sequences of vignettes. Thereafter, participants were exposed to a combination of four problem and appropriate behaviors by Resident 1 followed by an appropriate behavior by Resident 2. The purpose was to evaluate whether participants' responses to Resident 2 changed based on the sequence of behaviors by Resident 1. The study also examined the effect of the dose of same and different type of behaviors and the impact on participants response. The results indicate that participants' response to the appropriate behavior by Resident 2 were not significantly different based on the sequence of behaviors by Resident 1. However, their response to an emotion assessment question was significantly different based on the sequence of behaviors by Resident 1. Specifically, participants who responded to the control sequence, which did not involve any problem behavior, reported they did not find the behaviors to be upsetting. By contrast, participants who responded to more instances of problem behaviors reported the behaviors to be more upsetting. Specifically, Sequence 6, which involved the most problem behavior, produced the highest emotions for participants. Therefore, the results suggest that participants' emotion changed based on the sequence of behaviors. Finally, the dose analysis of the same behavior type demonstrates that subsequent instances of problem behavior result in participants removing more dollars in response to each behavior, and subsequent instances of appropriate behavior result in participants

adding more dollars in response to each behavior. The dose analysis of the different behavior type for Resident 1 (only) demonstrates that after responding to three doses of appropriate behavior, participants provided less dollars in response to a problem behavior, and the more problem behaviors the participants responded to, the less dollars participants provided in response to appropriate behavior.

The dose analysis for Resident 1 replicates the effect of doses of the same behavior type described by Anderson et al. (2025) and extending the previous analysis by analyzing doses of different behavior types. The results of doses of the same and different behavior type on problem and appropriate behaviors resulted in significant findings, indicating that the participants' responses to previous behaviors affects their responses to subsequent behaviors. For problem behavior and the dose of previous problem behaviors, there was a large decrease in removing dollars for each subsequent dose.

The finding that participants progressively remove more dollars in response to each instance of problem behavior may relate to previous studies that have evaluated progressive schedules of punishment. For example, a study that evaluated self-adjusting progressive shock strength in rats and showed that the break point is sensitive to motivational variables like the value of the reinforcer (Desmercieres et al., 2022). They implemented a self-adjusting progressive shock strength procedure which measured the break point to work for a reward when an electric foot shock progressively increased in duration. This study examined a measure of resistance to punishment, which may relate to the results of this study because participants removing additional dollars in response to subsequent problem behaviors may be in response to their perceived resistance, of Resident 1's problem behavior, to punishment. It is important to

recognize these patterns of increasing punishment because people are inconsistent with their responses.

For appropriate behavior and dose of the same behavior type, there was a significant increase with dose 1 and 2; however, the largest increase was between Dose 0 and Dose 1. This result indicates that after responding to one appropriate behavior, the participants increased the reinforcement provided in response to the next appropriate behavior. After that initial increase, they provided slightly more reinforcement in response to appropriate behaviors, but punishment results in a larger increase. Based off the results of Experiment 3 of Anderson et al. (2025), the researchers believed that the progressive increase in reinforcement for appropriate behavior may require a contrast between appropriate and problem behaviors within a sequence. However, the results of this study indicate that the progressive increase in reinforcement occurred in the control sequence, where participants did not respond to any problem behaviors. This result indicates progressive reinforcement is a trend of responding to consecutive instance of appropriate behavior. A progressive-ratio schedule of reinforcement involves an increase in the response requirement to earn a reinforcer following the previous response and reinforcer delivery (Roane, 2008). Clinically, this schedule is typically used to assess the potency of reinforcers. Progressive reinforcement has been evaluated in basic research, for example, by comparing progressive ratio to progressive hold schedules, where rats must hold a lever down (Alvarez-Sekely et al., 2023). This study found that post-reinforcer pauses, work time, and time between reinforcers increased as the response requirements increased. They also found that progressive hold schedules may be easier than progressive ratio schedules for the rats.

Although previous studies have evaluated schedules of progressive reinforcement, there are limited clinical evaluations with the schedule. Also, studies evaluating schedules of

progressive reinforcement typically evaluate the behavior of the individual receiving the reinforcer, not the behavior of the change agent who is providing the reinforcer. Additional research should be conducted to explore progressive increases in reinforcement. The analysis of doses of different behavior verifies the results of the doses analysis of the same behavior type. The results of doses of appropriate behavior on dollars provided for problem behavior indicates that after responding to three doses of appropriate behavior, participants remove less dollars in response to problem behavior. In terms of appropriate behavior, after each subsequent dose of problem behavior, the participants provide less reinforcers. It is important to understand how responding to both the same and different behavior type influence staff responses because on a daily basis staff are responding to all behavior types from multiple residents.

The results of this study indicate that staff progressively provide more reinforcement or punishment as the residents engage in appropriate or problem behaviors. Therefore, on a dorm where a resident is helpful and listening to staff consistently, they will progressively gain access to more reinforcers. Although this sounds like a positive outcome, in the long run it could be detrimental because the resident is not receiving consistent reinforcement for the same behaviors. For example, the next day, the same resident may engage in the same behavior but not be able to access the same amount of reinforcement which could be frustrating and result in problem behavior. Additionally, other residents may see this progressive increase in reinforcement and expect the same amount of reinforcement themselves. Ultimately, providing consistent and predictable amounts of reinforcement is crucial for long-term behavior change.

The results also indicate the staff progressively increase punishers in response to problem behaviors by removing additional dollars. On a dorm, if a resident is consistently engaging in problem behaviors, such as ignoring staff or telling them “no”, the staff may remove more

dollars throughout the evening in response to each behavior. Similar to reinforcement, this can result in negative consequences when the staff are responding inconsistently to the same behaviors. One study evaluated different parameters of negative punishment (time-out) and found that both conditions evaluated resulted in the same decrease in problem behavior (Donaldson et al., 2013). It is important to experimentally evaluate different parameters of punishment because we have a limited understanding of how different strategies of implementing punishment effect behavior. Understanding how different parameters of punishment effect behavior can lead to more effective behavioral interventions.

Most behavioral programming does not involve progressive schedules of reinforcement and punishment due to the negative consequences, so the patterns of responding observed in this study may represent challenges to treatment integrity. Treatment integrity which involves accurately implementing the independent variable, is imperative to creating lasting behavior change through behavioral interventions (Gresham et al., 1993; Wilkinson, 2007). Previous research has evaluated how programmed errors to treatment integrity prevent skill acquisition (Bergmann et al., 2021). This study used a computer program that errored on delivering a reinforcer on different percentages of trial. As treatment integrity decreased skill acquisition decreased, and in a second phase where treatment integrity was 100%, some participants failed to acquire the skill after being exposed to a low treatment integrity condition. In addition to this issue of treatment integrity in behavior analytic programming, there is also the issue to adherence to programming by parents and other caretakers (Allen & Warzak, 2000).

One challenge with behavioral interventions is that time and consistent implementation are required to create lasting behavior change. This study points to the importance of teaching staff/caregivers what to expect when implementing behavioral interventions; specifically,

understanding that it will take time to see the change in behavior. Ultimately, in the JRTF setting where staff are responsible for implementing token economies with the goal of increasing appropriate behavior, it is imperative that they implement procedures with fidelity. There is currently no literature to our knowledge on strategies to change patterns of progressive reinforcement and punishment, but this would be an important area for future research. Overall, the findings from the dose analyses are crucial to understanding how staff respond to consecutive instances of appropriate and problem behaviors, and this understanding can lead to developing strategies such as staff training to mitigate these patterns.

There are a few limitations of the current study that are important to address. First, because this is reverse translational research we are examining a population that is different from the ultimate target population of JRTF staff. Therefore, a limitation of the current study may be generality of the findings with college students to JRTF staff. The goal of this research is to gain an understanding of the patterns of how people respond in a controlled situation, and then to ultimately bring the research question to the target population to ensure that the patterns of responding remain consistent. Another limitation is that participants were able to complete study procedures quickly, and most participants completed the study within several minutes. Ultimately, 28 participants were excluded because they took less that 1 min to complete all study procedures, which was not enough time to read and answer all questions. This could be a problem with all online studies through Qualtrics. In future studies, providing additional tasks to mimic the JRTF dorm environment could improve the translational quality of the study. For example, staff typically take a couple of minutes to score token economies for all residents on the dorm. However, at the same time, they are also completing other paperwork (i.e., recording resident movements and documenting that searches were completed) and interacting with the

residents (i.e., talking to residents about their day and providing instructions). Including additional tasks in the study procedures such as completing unrelated paperwork and observing or participating in some interaction may simulate the JRTF setting more closely and ensure that participants attend to the study.

One interesting result in the current study is that participants response to Resident 2 were not significant; however, the emotion assessment question was significant based on the sequence. This may indicate that reported difference in emotion could be a result of MOs. Emotions typically have received little attention as MOs, however, if an emotion is "made public" it becomes associated with the behavior and is therefore under the control of consequences (Layng, 2017). This study provides an example of how this can be studied experimentally. Although the participants' emotion changed based on the sequence, their response to Resident 2 did not, which indicates that their behavior may have been under stimulus control of the individual who emitted the behavior.

It is possible that participants' behavior could be influenced by unstated rules. Edwards et al. (2019) examined the relation between the antecedent events of MOs and stimulus control and recommended that the concept of MOs should include "the control of behavior by discriminative stimuli historically related to those events" (p. 6). In the current study, the response to Resident 2 may be under stimulus control, indicating that participants may be operating under rule governed control. For example, staff receive initial training on how to implement token economy procedures, including that each resident should be scored based on their own behavior, not as a group. After this training, a staffs' behavior may be maintained by seeing the behavior of residents' change based on their individual consequences, which is an example of tracking. However, the emotion assessment question may represent a change in emotion or motivation.

One way to further examine stimulus control, would be to evaluate the participants response if they return to Resident 1 after responding to Resident 2, and see if their behavior returns to the same levels as before. If their behavior does return to the level of previous responding, this would indicate that their responding is under stimulus control based on the resident to which they are responding.

Based on the results of this study, there are future research questions that would help to gain a more complete understanding of staff motivation and responding. First, the current study only uses very mild instances of both appropriate and problem behaviors. Appropriate behaviors involved situations where the resident follows some instruction, and problem behaviors involved a situation when the resident is noncompliant with an instruction or tells the staff no. It would be interesting to examine how motivation changes in response to higher intensity behaviors such as aggression or property destruction which frequently occur in this setting. Similar procedures could be implemented with different samples of participants recruited through crowd sourcing platforms such as Prolific. For example, procedures could be implemented with samples of participants that are more similar to JRTF staff such as caregivers and parents. Additionally, the current study only evaluates the participants response to a token economy on a scale from -10 to 10. However, in the JRTF setting there are other consequences that could be delivered in response to resident behaviors such as placing them in confinement or allowing the resident to have special privileges such as staying out of their room to clean or talk to staff. When these different consequent options are at play, the situation is complicated further, and this interaction should be evaluated in future studies.

Ultimately, the goal of this research is to understand how staff behave naturally, and then to develop strategies to mitigate the responding such as providing training and rules to establish

different patterns of responding. These approaches can be studied through reverse translational research to develop the most effective strategies and then implementing these with staff in the JRTF setting. To translate the research questions back to the population of interest, JRTF staff, it is vital to examine these research questions directly with them. Because the current study found significant results in the emotion assessment question and the doses of responding to the same and different type of consecutive behaviors, these questions could be examined with JRTF staff using the same procedures.

In conclusion, this study reveals patterns of responding to different sequences of appropriate and problem behaviors and its effect on responding to a second resident. Participant's emotion changed based on the behaviors they responded to, and responding to behaviors impacted the subsequent responses. These patterns of responding should be explored further to develop a more complete understanding of staff responding.

References

Allen, K. D., & Warzak, W. J. (2000). The problem of parental nonadherence in clinical behavior analysis: Effective treatment is not enough. *Journal of applied behavior analysis*, *33*(3), 373-391.

Alvarez-Sekely, C. S., Toscano-Zapien, A. L., Salles-Ize, P., Zepeda-Ruiz, W. A., Lopez-Guzman, M. A., & Velazquez-Martinez, D. N. (2023). Comparison of progressive hold and progressive response schedules of reinforcement. *Behavioural processes*, *205*, 104822. https://doi.org/10.1016/j.beproc.2023.104822

Anderson, A. N., Rapp, J. T., & Morosohk, E. (2025). *Emotion as a motivating operation for providing consequences: A reverse translational simulation*. Manuscript under review.

Behavior Analyst Certification Board. (2026). *RBT 40-hour training requirements and curriculum outline*. Behavior Analyst Certification Board. https://www.bacb.com/wp-content/uploads/2023/12/2026-RBT-40-Hour-Training-Curriculum-241122-a.pdf

Bergmann, S., Kodak, T., & Harman, M. J. (2021). When do errors in reinforcer delivery affect learning? A parametric analysis of treatment integrity. *Journal of the experimental analysis of behavior*, *115*(2), 561–577. https://doi.org/10.1002/jeab.670

Desmercieres, S., Lardeux, V., Longueville, J.-E., Hanna, M., Panlilio, L. V., Thiriet, N., & Solinas, M. (2022). A self-adjusting, progressive shock strength procedure to investigate resistance to punishment: Characterization in male and female rats. Neuropharmacology, 220, 109261. https://doi.org/10.1016/j.neuropharm.2022.109261

Donaldson, J. M., Vollmer, T. R., Yakich, T. M., & Van Camp, C. (2013). Effects of a reduced

time-out interval on compliance with the time-out instruction. *Journal of Applied Behavior Analysis*, *46*(2), 369-378.

Edwards, T. L., Lotfizadeh, A. D., & Poling, A. (2019). Motivating operations and stimulus control. *Journal of the experimental analysis of behavior*, *112*(1), 1–9. https://doi.org/10.1002/jeab.516

Falligant, J. M., Hagopian, L. P., Kranak, M. P., & Kurtz, P. F. (2022). Quantifying increases in problem behavior following downshifts in reinforcement: A retrospective analysis and replication. *Journal of the Experimental Analysis of Behavior*, *118*(1), 148–155. https://doi.org/10.1002/jeab.769

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyzes using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*, 1149-1160. https://doi.org/10.3758/BRM.41.4.1149

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175-191. https://doi.org/10.3758/BF03193146

Gresham, F. M., Gansle, K. A., & Noell, G. H. (1993). Treatment integrity in applied behavior analysis with children. *Journal of applied behavior analysis*, *26*(2), 257-263.

Kissi, A., Hughes, S., Mertens, G., Barnes-Holmes, D., De Houwer, J., & Crombez, G. (2017). A systematic review of pliance, tracking, and augmenting. *Behavior Modification*, *41*(5), 683–707. https://doi.org/10.1177/0145445517693811

Krueger, M. (2007). Four areas of support for child and youth care workers. *Families in Society: Journal of Contemporary Social Services*, *88*(2), 233–240. https://doi.org/10.1606/1044-3894.3621

Laraway, S., Snycerski, S., Olson, R., Becker, B., & Poling, A. (2014). The motivating operations concept: Current status and critical response. *Psychological Record*, *64*(3), 601–623. https://doi.org/10.1007/s40732-014-0080-5

Layng, T. J. (2017). Private emotions as contingency descriptors: Emotions, emotional behavior, and their evolution. *European Journal of Behavior Analysis*, *18*(2), 168-179. https://doi.org/10.1080/15021149.2017.1304875

Luna, O., & Rapp, J. T. (2022). Increasing praise delivery within dorms of a juvenile justice facility. *Behavior Modification*, *46*(3), 651–685. https://doi.org/10.1177/0145445520982976

Luna, O., Rapp, J. T., & Brogan, K. M. (2022). Improving juvenile justice settings by decreasing coercion: One lab's perspectives from behind the fence. *Perspectives on Behavior Science*, *45*(1), 295–325. https://doi.org/10.1007/s40614-022-00325-2

Roane, H. S. (2008). On the applied use of progressive-ratio schedules of reinforcement. *Journal of applied behavior analysis*, *41*(2), 155.

Santos, L., Ferreira, A., Silva, D. R. da, Pinheiro, M., & Rijo, D. (2023). Assessing occupational stress in residential youth care settings: Validation of the stress questionnaire for residential youth care professionals. *Residential Treatment for Children & Youth*, *40*(2), 217–237. https://doi.org/10.1080/0886571X.2022.2073940

Seti, C. (2008). Causes and treatment of burnout in residential child care workers: A review of the research. *Residential Treatment for Children & Youth*, *24*(3), 197–229. https://doi.org/10.1080/08865710802111972

Shakhnovich, V. (2018). It's time to reverse our thinking: The reverse translation research

paradigm. *Clinical and Translational Science*, 11(2), 98–99. https://doi.org/10.1111/cts.12538

Wickham, H., Averick, M., Bryan, J., Chang, W., McGowan, L. D. A., François, R., ... & Yutani, H. (2019). Welcome to the Tidyverse. *Journal of open source software*, *4*(43), 1686.

Wilkinson, L. A. (2007). Assessing treatment integrity in behavioral consultation. *International Journal of Behavioral Consultation and Therapy*, *3*(3), 420–432.

Zettle, R. D., & Hayes, S. C. (1982). Rule-governed behavior: A potential theoretical framework for cognitive-behavior therapy. In P.C. Kendall (Ed.), *Advances in cognitive-behavioral research and therapy* (Vol. 1, pp. 73–118). Academic.

Table 1

Doses of the Same Type of Behavior

	Vignettes							
	1		2		3		4	
Sequence	Type	Dose	Type	Dose	Type	Dose	Type	Dose
1	ABX	A0	ABX	A1	ABX	A2	PBX	P0
2	PBX	P0	ABX	A0	ABX	A1	ABX	A2
3	ABX	A0	ABX	A1	PBX	P0	PBX	P1
4	PBX	P0	PBX	P1	ABX	A0	ABX	A1
5	ABX	A0	ABX	A1	ABX	A2	ABX	A3
6	PBX	P0	PBX	P1	PBX	P2	PBX	P3

Note: PBX = Problem behavior vignette. ABX = Appropriate behavior vignette. A0 = Dose 0 of appropriate behavior. A1 = Dose 1 of appropriate behavior. A2 = Dose 2 of appropriate behavior. A3 = Dose 3 of appropriate behavior. P0 = Dose 0 of problem behavior. P1 = Dose 1 of problem behavior. P2 = Dose 2 of problem behavior. P3 = Dose 3 of problem behavior. Doses of appropriate behavior indicate how many instances of appropriate behavior the participant had responded to before the current appropriate behavior vignette. Doses of problem behavior indicate how many instances of problem behavior the participant had responded to before the current problem behavior vignette.

Table 2

Doses of the Different Type of Behavior

	Vignettes							
	1		2		3		4	
Sequence	Type	Dose	Type	Dose	Type	Dose	Type	Dose
1	ABX	P0	ABX	P0	ABX	P0	PBX	A3
2	PBX	A0	ABX	P1	ABX	P1	ABX	P1
3	ABX	P0	ABX	P0	PBX	A2	PBX	A2
4	PBX	A0	PBX	A0	ABX	P2	ABX	P2
5	ABX	P0	ABX	P0	ABX	P0	ABX	P0
6	PBX	A0	PBX	A0	PBX	A0	PBX	A0

Note: PBX = Problem behavior vignette. ABX = Appropriate behavior vignette. A0 = Dose 0 of appropriate behavior. A1 = Dose 1 of appropriate behavior. A2 = Dose 2 of appropriate behavior. A3 = Dose 3 of appropriate behavior. P0 = Dose 0 of problem behavior. P1 = Dose 1 of problem behavior. P2 = Dose 2 of problem behavior. P3 = Dose 3 of problem behavior. Doses of appropriate behavior indicate how many instances of appropriate behavior the participant had responded to before the current problem behavior vignette. Doses of problem behavior indicate how many instances of problem behavior the participant had responded to before the current appropriate behavior vignette.

Figure 1

Sequences Outlining Behavior for Resident 1 and Residents 2

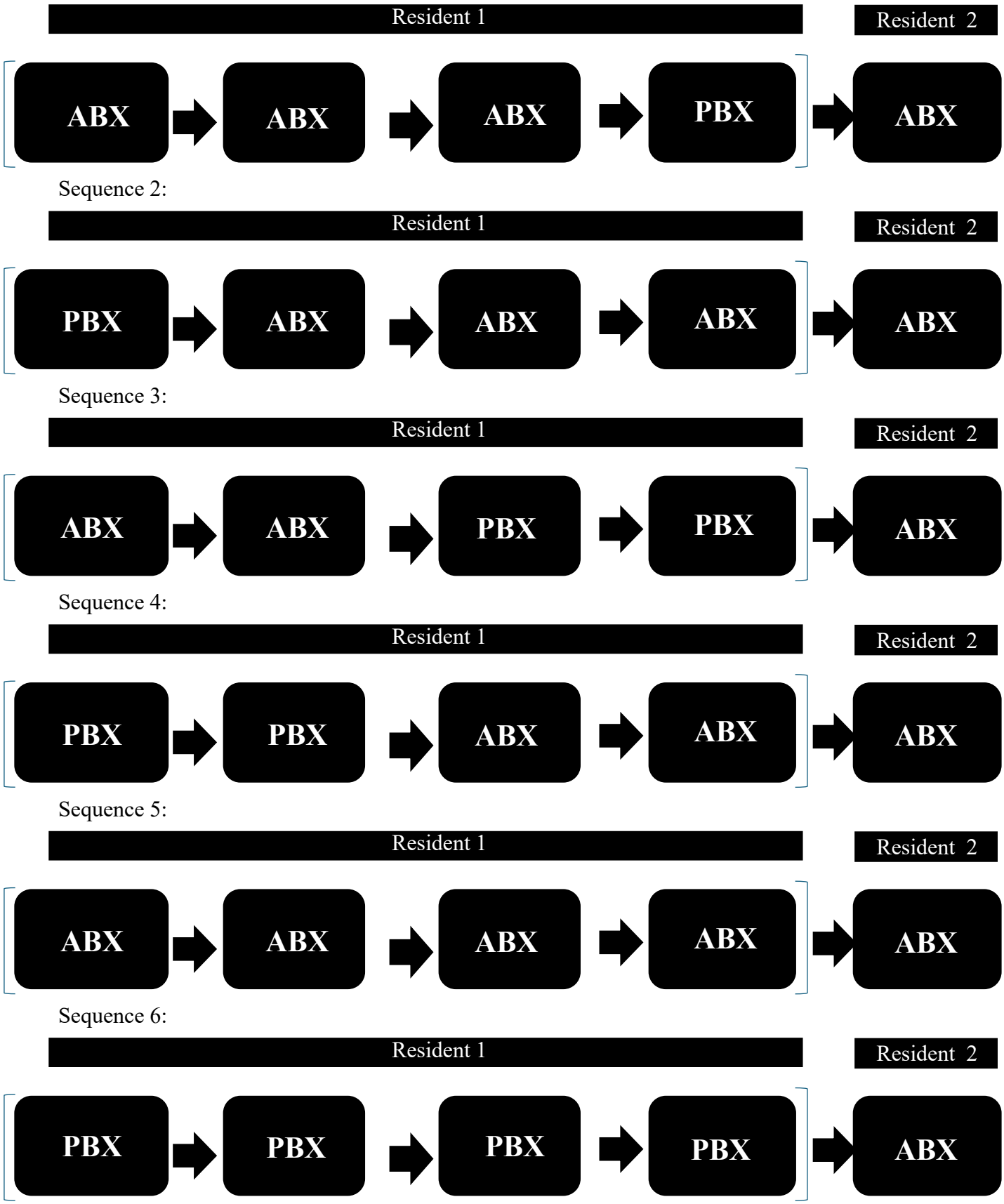
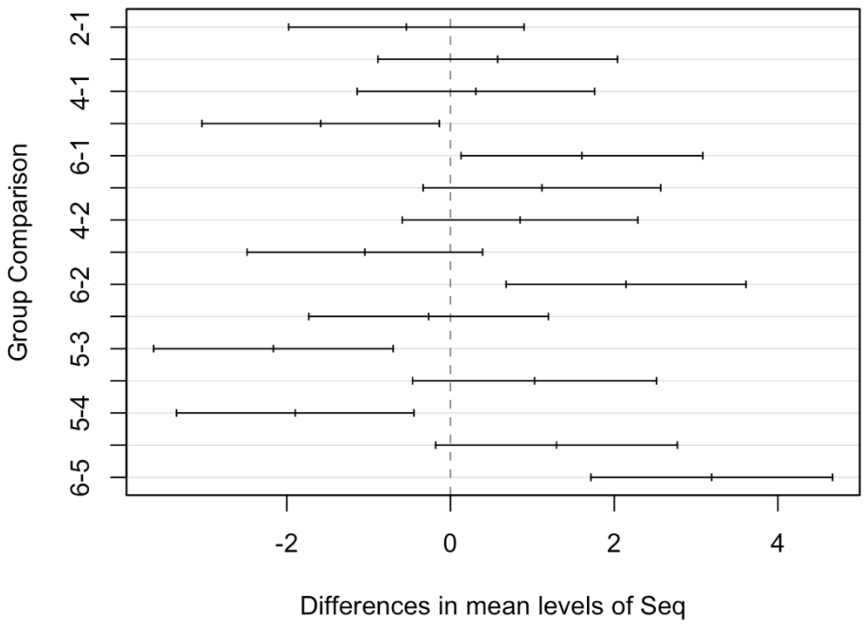


Figure 2

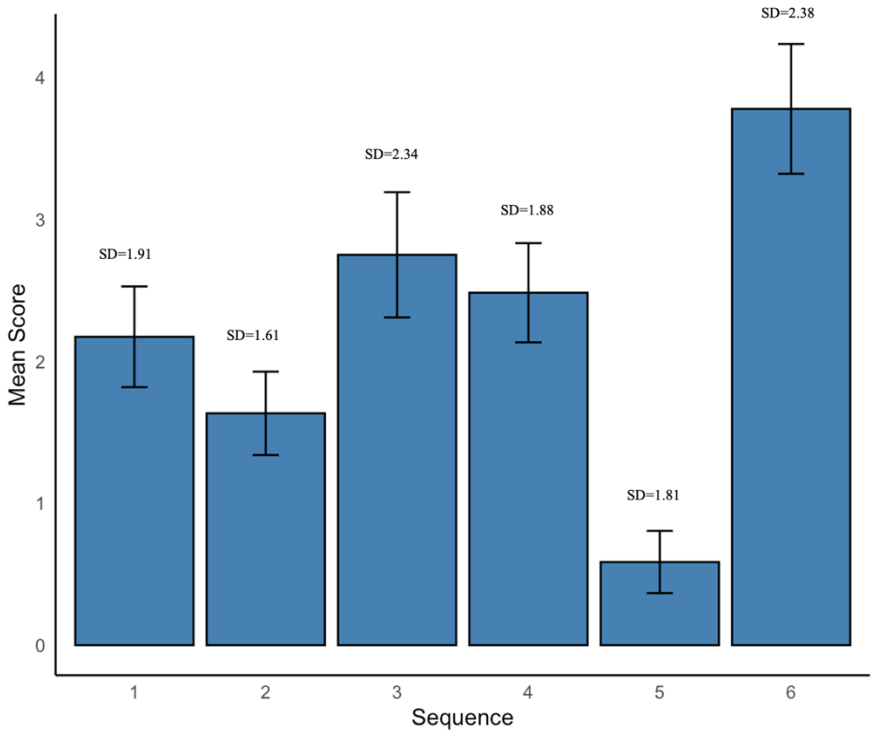
Emotion Assessment Question Graphs. Confidence Intervals and Mean Scores



Note: Comparisons for each sequences contain 95% confidence intervals.

Figure 3

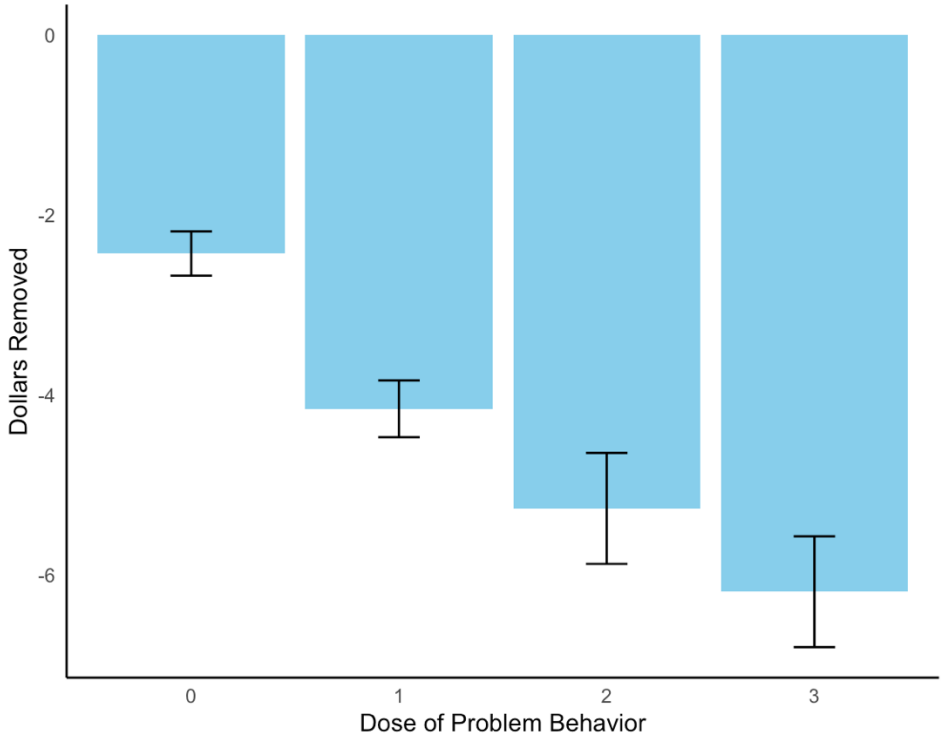
Mean Scores on Emotion Assessment Question by Sequence



Note: Sequences 1 and 2 involve 1 Dose of Problem Behavior. Sequences 3 and 4 involve 2 Doses of Problem Behavior. Sequence 5 involves 0 Doses of Problem Behavior. Sequence 6 involves 4 Doses of Problem Behavior.

Figure 4

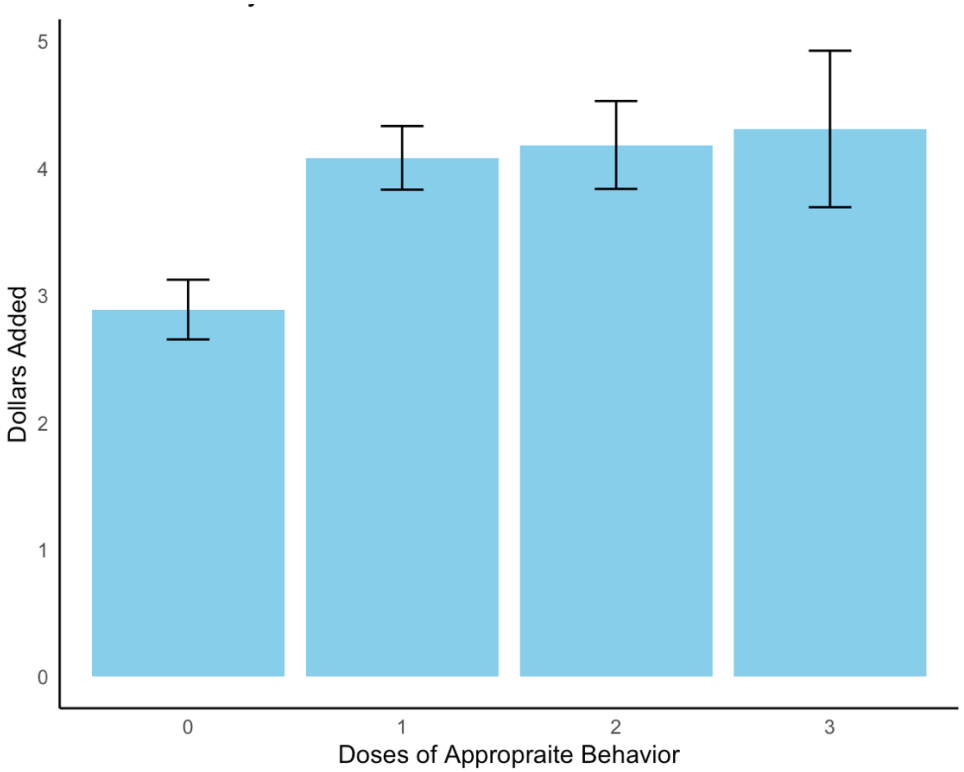
Problem Behavior Dose of Same Type of Behavior and the Mean Score



Note: $N = 143$, Dose 0. $N = 85$, Dose 1. $N = 27$, Dose 2. $N = 27$, Dose 3. Range bars display the standard error of the mean. Mean score (y-axis) includes the addition or removal of hypothetical money in response to each vignette. Statistically significant differences were between Dose 1 and 0 ($p < .001$), 2 and 0 ($p < .001$), 3 and 0 ($p < .001$), and 3 and 1 ($p = .012$).

Figure 5

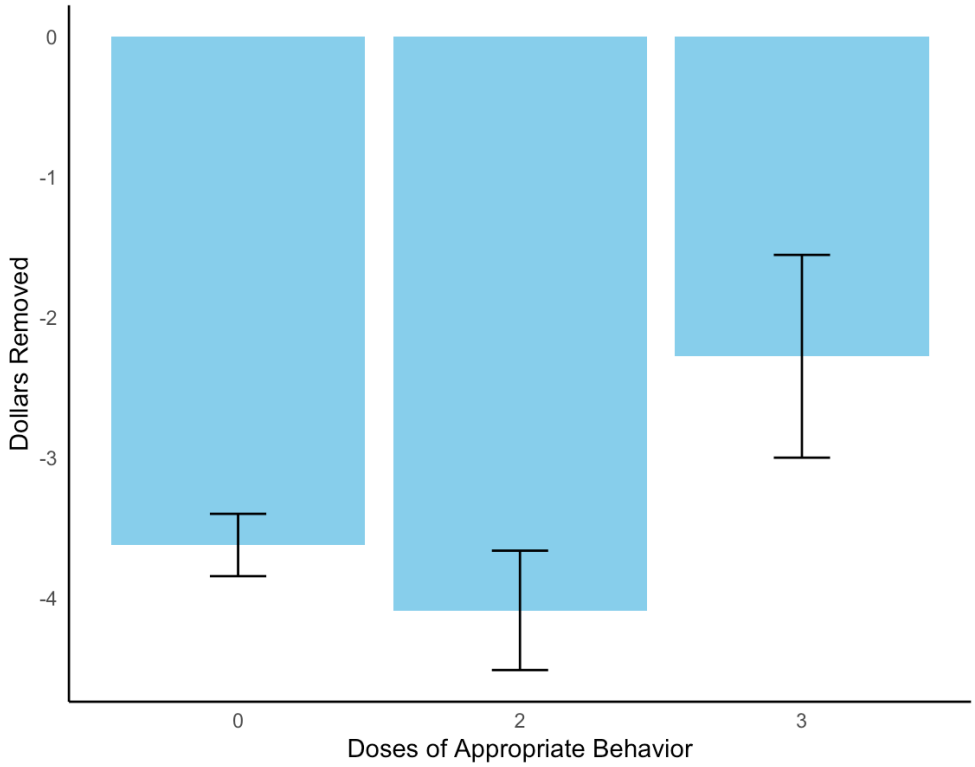
Appropriate Behavior Dose of Same Type of Behavior and the Mean Score



Note: $N = 145$, Dose 0. $N = 145$, Dose 1. $N = 87$, Dose 2. $N = 29$, Dose 3. Range bars display the standard error of the mean. Mean score (y-axis) includes the addition or removal of hypothetical money in response to each vignette. Statistically significant differences were between Dose 1 and 0 ($p = .005$), and 2 and 0 ($p = .009$).

Figure 6

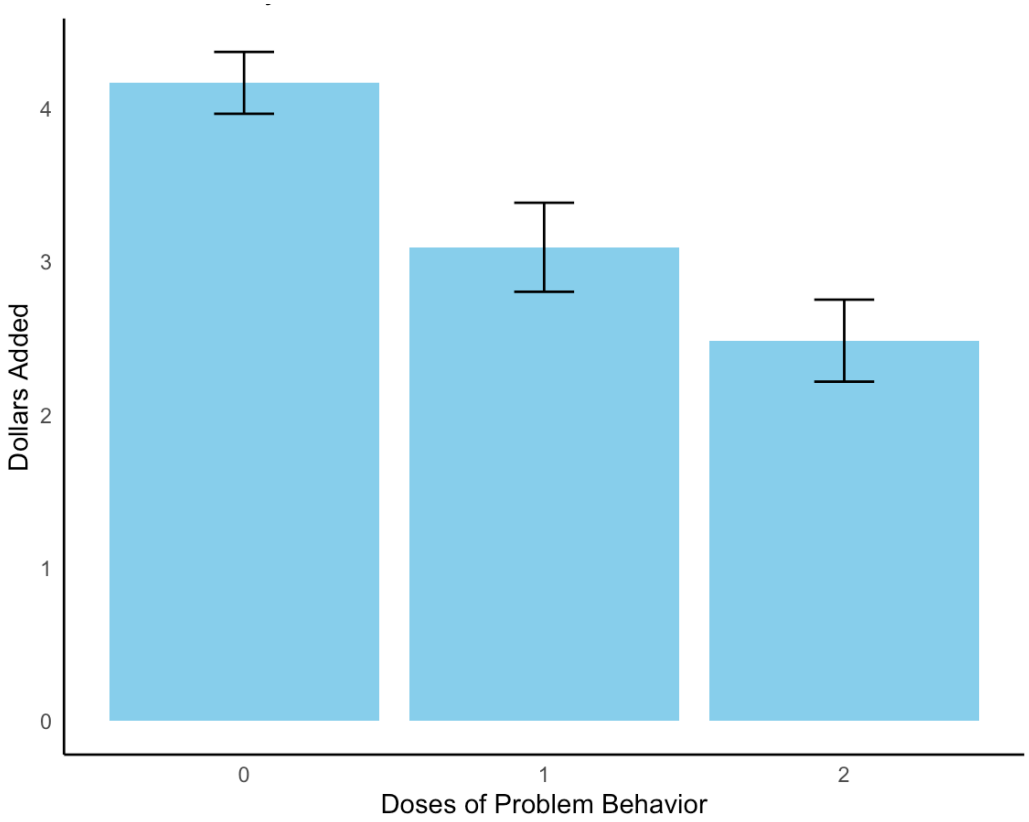
Problem Behavior Dose of Different Type of Behavior and the Mean Score



Note: $N = 195$, Dose 0. $N = 58$, Dose 2. $N = 29$, Dose 3. Range bars display the standard error of the mean. Mean score (y-axis) includes the addition or removal of hypothetical money in response to each vignette. Statistically significant differences were between Dose 3 and 2 ($p = .037$).

Figure 7

Appropriate Behavior Dose of Different Behavior and the Mean Score



Note: $N = 261$, Dose 0. $N = 87$, Dose 1. $N = 58$, Dose 2. Range bars display the standard error of the mean. Mean score (y-axis) includes the addition or removal of hypothetical money in response to each vignette. Statistically significant differences were between Dose 1 and 0 ($p = .011$), and 2 and 0 ($p < .001$).