THE EFFECTS OF PAIRING NON-PREFERRED STAFF WITH PREFERRED STIMULI ON INCREASING REINFORCING VALUE OF NON-PREFERRED STAFF ATTENTION

by

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Abstract

THE EFFECTS OF PAIRING NON-PREFERRED STAFF WITH PREFERRED STIMULI ON INCREASING REINFORCING VALUE OF NON-PREFERRED STAFF ATTENTION

by

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Establishing staff attention as a secondary reinforcer increases the amount of time individuals with intellectual disabilities will engage in on-task behavior when working with these staff; however, increasing the reinforcing value of staff attention by pairing it with primary reinforcing stimuli is an area of research that has not frequently been addressed. In Study 1, three residents aged 42 to 56 years and diagnosed with intellectual disabilities participated in verbal and pictorial preference assessments for staff members. All three residents showed preferences. The experimenter then validated these preferences by instructing the preferred and non-preferred staff to deliver verbal praise and a high five on a progressive-ratio schedule contingent on the completion of socially relevant tasks. All three residents demonstrated higher break points and rates of approach responses when they were attended to by their preferred staff compared to when they were attended to by their non-preferred staff. In Study 2, before each baseline session, non-preferred staff approached the residents on a VT 1 min schedule without presenting any tangible stimuli; break points and approach responses remained unchanged from Study 1. Before each intervention session, non-preferred staff approached the residents on a VT 1 min schedule while presenting them with preferred tangible stimuli. Break points and resident-rate-of-approach responses increased when they worked for attention from their non-preferred staff, but

remained unchanged with their preferred staff. A pairing procedure was successful in improving the relationships between residents and previously non-preferred staff.

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It is important for individuals with intellectual disabilities to have good relationships with their staff because staff attention that is reinforcing should be more successful than staff attention that is not reinforcing at increasing appropriate responses from these individuals. While most research on stimuli that reinforce the behavior of individuals with intellectual disabilities has focused on edible, tangible, and sensory stimuli, more research should focus on the strength of attention from people, especially adults as reinforcers because attention from people is commonly present in many everyday social situations and can be crucial in building appropriate social skills, and there is a dearth of research on adults with intellectual disabilities in comparison to children with intellectual disabilities.

Sturmey, Lee, Reyer, and Robek (2002) partially addressed the issue of relationships between individuals with intellectual disabilities and their staff. Four adults and three children with developmental disabilities participated in the study which assessed consumer preferences for different staff by using modifications of a paired stimulus assessment. Staff stood next to each other in pairs in front of the participants. The experimenter then instructed the participants to approach a staff member. After presenting each participant with all of the possible staff pairs, the experimenters recorded the percentage of approach responses. A preferred staff was one who was approached during 80% or more of the trials by a particular participant. Five of seven participants showed a preference for a specific staff member. The authors concluded that consumers with intellectual disabilities showed preferences for members of direct-care staff. A limitation of the study was that it did not assess the reinforcing value of preferred versus non-preferred staff, and did not attempt to validate its findings of preferences. One way to validate

these findings would be to use progressive-ratio (PR) schedules as a measure of reinforcing value. A PR schedule is a reinforcement schedule composed of fixed ratio (FR) schedules that become incrementally leaner. The PR schedule break point is the last FR schedule requirement reached at which point responding ceases.

One example of an applied human study that used PR schedules was Roane, Lerman, and Vorndran (2001) who evaluated responding under increasing schedule requirements. Four individuals with developmental disabilities participated. Experimenters conducted an initial stimulus preference assessment with each participant to identify an array of preferred stimuli. Then they presented each participant with a task and calculated the number of target responses across all sessions to further determine stimulus preference. They identified between 11 and 16 possibly reinforcing stimuli for each participant, and paired each stimulus twice with every other stimulus in a random order. They then chose two highly ranked stimuli to be used as reinforcers for each participant. Next, the experimenters implemented PR schedules to determine the relative reinforcing strengths of the chosen stimuli using the cumulative number of responses, average breaking point, total number of responses emitted at each schedule requirement (work-rate functions), and the number of reinforcers earned at each schedule requirement (reinforcer-demand functions). All four of the participants systematically approached their most preferred sensory stimuli more frequently than their non-preferred stimuli. PR schedules allowed for a relatively effective examination of shifts in reinforcer value under increasing schedule requirements. Roane, et al. (2001), however, did not evaluate the reinforcing properties of human beings.

Jerome and Sturmey (2008) assessed and validated staff preferences for adults with intellectual disabilities using staff preference assessments and PR schedule break points. Six adults with intellectual disabilities aged 23 to 43 years participated. There were verbal and

pictorial preference assessments. Three of the six participants chose one of their three staff members during 80% or more of trials and another during 20% or less of trials. These three participants also participated in the validation part of the study. The experimenters validated the participants' preferences by presenting the attention from preferred and non-preferred staff members as consequences for task completion on a PR schedule. All three participants showed higher break points when working for verbal praise and a high five from their preferred staff member than from their non-preferred staff member. These findings demonstrated that individuals with intellectual disabilities engaged in a task longer when working for attention from their preferred staff in comparison to their non-preferred staff. While Jerome and Sturmey (2008) demonstrated that attention from certain staff can be more reinforcing than attention from others, they did not demonstrate how to increase the reinforcing qualities of the non-preferred staff attention.

One procedure to demonstrate this is to make the non-preferred staff conditioned reinforcers by pairing them with preferred stimuli. Sundberg, Michael, Partington, and Sundberg (1996) addressed this issue when they examined whether pairing target sounds, words, or phrases with established reinforcers would increase the future utterances of these sounds. Five children, four with developmental delays, aged 2-4 years participated. Experimenters recorded either targeted or non-targeted vocal responses. They identified non-targeted responses as echoic, mand, tact, or intraverbal responses and identified targeted vocal responses as novel words, or words not uttered in the pre-pairing condition. During the pre-pairing condition, the experimenter and an observer recorded all the vocal topographies emitted by the participants without providing reinforcement. During the pairing condition, adults who the participants were familiar with emitted targeted vocal responses, followed immediately by established reinforcers for 1-2 min with approximately 15 pairings per minute. During post-pairing, the conditions were identical to

those of the pre-pairing condition. For all five participants, the pairing of the targeted vocal response with an established reinforcer resulted in the unprompted utterance of that response in the post pairing condition. The study demonstrated that new language could be learned without training or prompting, and could become a conditioned reinforcer by having been paired with an already established reinforcer. While Sundberg, et al. (1996) demonstrated conditioned reinforcement with appetitive stimuli, they did not address the effects of pairing neutral or aversive stimuli with vocalizations.

Smith, Michael, and Sundberg (1996) examined the effects of pairing positive, neutral, or negative stimuli with infant vocal behavior. Two infants aged 11-14 months participated. Initially, the experimenters recorded all participant vocal responses and labeled them as either targeted vocal responses or non-targeted identifiable vocalizations. The experimenters randomly chose specific phonemes as the target responses and measured their cumulative utterances. There were three conditions. In the neutral condition during pre-pairing the participants sat in room with toys and played for several minutes while the experimenter recorded all vocalizations. After pre-pairing, the experimenter emitted a targeted vocal response an average of every 3.6 s, but did not follow this vocalization with any programmed reinforcement. During post-pairing the conditions were identical to those in pre-pairing. In the positive condition during pre-pairing, the conditions were the same as during the neutral condition. After pre-pairing, the experimenter sat by the participants and emitted the targeted vocal response followed immediately by a known reinforcer. The experimenter did not reinforce any response other than their own emission of the targeted vocal response. The conditions in post-pairing were identical to those in pre-pairing. In the negative condition during pre-pairing, the conditions were the same as the neutral and positive pre-pairing conditions, but after pre-pairing, the experimenter emitted a targeted vocal response and immediately followed it with an aversive stimulus an average of once every 4 s.

The conditions in post-pairing were identical to those in pre-pairing. The experimenters used a reversal design to demonstrate experimental control. The neutral condition had little effect on the rate of targeted vocal responses emitted by the participants in post-pairing compared to pre-pairing. The positive condition produced an increase in the rate of targeted vocal responses emitted by the participants in the post-pairing compared to the pre-pairing. The negative condition produced a decrease in the rate of targeted vocal responses emitted by the participants in the post-pairing compared to the pre-pairing.

Smith, et al. (1996) extended Sundberg, et al. (1996) by demonstrating that in addition to an increase in vocal responding following positive pairings, there is no change in vocal responding following neutral pairings and a decrease in responding following negative pairings. Thus, Smith, et al. (1996) demonstrated conditioned punishment in addition to conditioned reinforcement using stimulus pairings.

Miguel, Carr, and Michael (2002) examined the effects of a stimulus-stimulus pairing procedure on the vocal behavior of children with autism. Three children with autism who emitted a few sounds, but did not emit verbal tacts, mands, and intraverbals participated. The study took place in one of the participant's home and at the other two participants school for one half hour each day, five days a week. The experimenters implemented a stimulus preference assessment to determine which tangible stimuli they would use as primary reinforcers. There were four phases: (a) baseline, (b) control, (c) pairing, and (d) reversal that made up one session. The experimenters observed the participants for 5 min, and recorded all of their vocalizations both before the baseline phase (pre-session), and after the reversal phase (post-session). The target sounds were the two lowest frequency, one-syllable utterances. During baseline, experimenters observed the participants for 5 min and recorded all of their target sounds. During control, the experimenter repeated the target sounds approximately 5 times, and presented the preferred

stimulus after 20 s. If the participant vocalized the target sound within this 20 s interval, the experimenter reset the timer and delayed the presentation of the preferred stimulus by 20 s. During pairing, the experimenter repeated the target sound approximately 5 times and presented the preferred stimulus during the fourth target-sound repetition on every trial. There were 20 trials in a session that varied in duration but never exceeded 20 min. The experimenters used a multiple-baseline design across two vocal behaviors and a reversal design to demonstrate experimental control. Two of the three participants increased target sounds during the pairing conditions when they were observed post-session compared to pre-session. Thus, sounds can become conditioned reinforcers when paired with previously reinforcing tangible stimuli.

Sundberg, et al. (1996), Smith, et al. (1996), and Miguel, et al. (2002) demonstrated that humans can acquire conditioned reinforcers and punishers by pairing appetitive and aversive stimuli with neutral vocalizations leading to an increase or decrease in the future rate of those vocalizations. In each of these studies, the unconditioned stimulus (US) was the preferred tangible item. This US was paired with the utterance of the target vocal response by the experimenter; the neutral stimulus. This pairing of conditioned stimulus (CS) and US led to an increase in the frequency of participant-target-vocal-response utterances; the conditioned response (CR). While these three studies did evaluate classically conditioned pairing procedures, there remains a gap between them and the present study as they did not evaluate whether attention from humans could be paired with reinforcing tangible stimuli and become a conditioned reinforcer. Therefore, the present study will evaluate whether pairing a US, a preferred tangible item, with possibly a neutral or aversive stimulus, attention from a non-preferred staff member, will increase the PR break points and rate of approach responses, CRs, by the resident in the presence of their non-preferred staff.

The aim of Study 1 was to replicate Jerome and Sturmey (2008) while adding a second dependent variable, rate of approach responses. The aim of Study 2 was to increase the resident's preferences for attention from their previously non-preferred staff to a level close to that of their preferred staff by using a pairing procedure.

Study 1: Method

Participants and Setting

Three group-home residents with intellectual disabilities aged 42-56 years participated. Antoine, Jose, and Tommy were aged 44, 56, and 42 years and were diagnosed with mild, mild, and moderate mental retardation, respectively. Two direct care staff members, Evan aged 31 years and Paula aged 35 years also participated. The experimenter asked the staff to name the residents who remained actively engaged in an activity with them for at least 10 min. The experimenter selected three of the residents who met this criterion.

The study took place in a group home where the residents lived and worked, and the experimenters conducted staff preference assessments and validation procedures in a private office in the home where nobody could hear or see the experimenter or participating resident. This office was 3x4 m and contained a desk, three chairs, and a computer. The computer sat in the back left of the room with one chair facing it and the desk was in the far right corner with two chairs by it. The experimenter moved the chair by the computer to the desk while he conducted the study. The experimenter conducted the pairing procedure in any part of the home where interactions between residents and staff typically occurred.

Part 1: Staff Preference Assessments

During staff preference assessments, the experimenter provided the residents with the opportunity to choose which staff member they liked and which they did not like. The experimenter asked the residents who they liked better between their two staff members. The experimenter considered the staff whom the residents chose during 80% or more of the sessions, their preferred staff, and the staff whom the residents chose during 20% or less of the sessions, their non-preferred staff.

Procedure

The experimenter first acquired informed consent from two of the residents' guardians because these residents were not legally able to consent, and then acquired assent from these residents. The experimenter also acquired consent from the third resident who was able to consent, as well as consent from the participating staff.

The experimenter conducted verbal and pictorial staff preference assessments in the same manner as Jerome and Sturmey (2008). The experimenter recorded the percentage of staff choices by residents across verbal and pictorial preference assessments as the dependent variable for this phase of Study 1. Each resident was seated individually in a private office across a desk 1 m away from the experimenter. During 60% of the sessions, a supervisor who worked at the facility was also present to collect inter-observer agreement (IOA) data. Prior to the preference assessments, the experimenter asked the resident: "Would you like to join me in a room where we will play a game?" For each resident, there were two staff members who they usually worked with, to choose between. During the verbal preference assessment, the experimenter asked the residents, "(Name), who do you like better, Staff A (name) or Staff B (name)?" Then the experimenter asked the residents, "(Name), who do you like better, Staff B (name) or Staff A (name)." The experimenter asked each question four times per trial and block randomized these questions so that the same question was never asked more than two times in a row. The experimenter maintained eye contact with the resident and said "OK" within 2 s after each response and recorded the resident's answer on a sheet of paper. The experimenter performed this verbal preference assessment procedure twice – 16 total questions – in one sitting with each participant. This procedure took approximately two minutes.

The experimenter took full-body, 8x15 cm, color photographs of the two participating staff with the same camera and with a blank-white-wall background to minimize variables other

than the actual staff member in the picture affecting the residents' choices. During the pictorial preference assessment, the experimenter showed the residents these photographs and then said: "(Name), point to who you like better." The experimenter then reversed the presentation of the photographs so that the photo that was previously in his right hand was in his left hand and vice versa. The experimenter asked the question "(Name), point to who you like better" four times with each photo in each hand, or eight total times per trial. The experimenter maintained eye contact with the resident and said "OK" following each response and then recorded the resident's answer on a sheet of paper. This procedure also took approximately two minutes and the experimenter performed it twice during the same time period as the verbal assessment. The experimenter defined a trial as beginning with each individual preference assessment – verbal or pictorial, and ending when that preference assessment was conducted once. A session was when these four trials – the two verbal preference assessments and the two pictorial assessments – were completed. Within each session, the experimenter randomized the order of the four trials and presented them in one sitting to each resident. When a resident chose a staff member during at least 80% of all sessions, the experimenter defined that staff member as preferred. When a resident chose a staff member during 20% or less of all sessions, the experimenter defined that staff member as non-preferred. Experimenters did not inform staff whether they were preferred or non-preferred. All three residents met these criteria following five staff preference assessment sessions, and participated in Part 2.

Inter-observer Agreement

The experimenter and a facility supervisor independently recorded IOA data. The observers marked the residents' answers on a sheet of paper and compared the residents' answers that they recorded. When the answers that both observers marked down were the same, they were considered to be in agreement. The experimenter defined IOA as the number of

agreements, divided by the total number of agreements plus disagreements, multiplied by 100. IOA was recorded during 60% of sessions and the observers' data was in agreement 100% of the time.

Part 2: Validation of Preferences

During the validation of preferences, the experimenter instructed each resident to engage in an easy, age appropriate task while either their preferred or non-preferred staff member was present. The staff provided attention to the residents after they completed their task enough times to meet each PR schedule requirement. The experimenter then compared the PR break points and rate of approach responses for each resident after they had received attention from both their preferred and non-preferred staff.

Procedure

The residents engaged in an easy, age appropriate task while they were separately attended to by both their preferred and non-preferred staff. The experimenter determined the task assigned to each resident by asking a staff member who had worked with the resident for at least one year. The task for Antoine was solving two and three digit addition problems, the task for Jose was sorting forks, knives, and spoons into different piles, and the task for Tommy was folding shirts and pants. Next, the experimenter conducted a pre-experimental assessment during which the experimenter instructed the resident to engage in the suggested task, and the break point for this task had to range between a PR-2 and 32. Thus, the participant performed the suggested task 3-63 times. The experimenter implemented this pre-experimental assessment to control for floor and ceiling effects. All three residents met these criteria on their given tasks.

Validation of Preferences. Before the experimenters made staff attention available as a consequence, they assigned each staff name to a number and used a random numbers table. The order in which the experimenter pointed to the numbers was the order in which the experimenter

presented staff attention as a consequence. Following every instance in which the experimenter pointed to both names once and each staff's attention was a consequence, the experimenter repeated the procedure. This way, no staff member attended to the participant for more than two consecutive sessions.

The experimenter sat 1m away, directly across a table from the resident. Either the preferred or non-preferred staff sat 2m to the left of the experimenter, diagonally across from the resident. After the experimenter selected the tasks for each of the three residents, he said: "OK (Name), let's start working." The experimenter instructed each staff to give a high five while smiling, and say "good job" to the resident within 2 s upon completion of the schedule requirement. The experimenter arranged the PR schedule using a geometric progression so that staff provided attention first after an FR1 (one response), then after an FR2 (three cumulative responses), then an FR4 (seven cumulative responses), FR8 (15 cumulative responses), FR16 (31 cumulative responses), FR32 (63 cumulative responses), etc, with FR schedule requirements doubling each time. The experimenter required the resident to complete each FR value in order for their staff to provide them with attention. For example, when the resident completed their task for the first time, staff consequated their task completion with a high five, within 2 s of responding. Then the experimenter required the resident to complete the task twice before receiving a high five, etc. The experimenter conducted the validation of preferences procedure once a day for each resident.

Dependent Variables

The experimenter recorded two dependent variables: (a) PR break points, and (b) rate of approach responses per minute. The experimenter defined the residents' PR break points as the final FR schedule requirement they have reached after which they emitted no more responses for 2 consecutive min. The experimenter defined an approach response as: (a) a smile or laugh from

the resident while they were oriented to or looking at the staff, (b) reaching for, asking for, or looking at the staff, or (c) touching the leg, rubbing the arm, patting the shoulders, or giving a hug to staff. When any of these responses occurred, the experimenter made a mark on a blank sheet of paper, and the total tally of these marks divided by the number of minutes they occurred in represented the rate of approach responses per minute.

Integrity of Independent Variable

The experimenter and a facility supervisor recorded data on the integrity of the independent variable. The experimenter defined a session as when the resident engaged in their task until they failed to reach a certain PR schedule criterion, and subsequently stopped engaging in their task for 2 min consecutively. The following was an example of a session: When the observers saw the staff consequate the resident's behavior within 2 s after an FR 1, they marked a check on a data sheet with successive FR schedule values. When the observers saw the staff consequate the resident's behavior within 2 s after an FR2, they marked a check. When the resident completed an FR 4 next, and the observers did not see the staff consequate their behavior within 2 s, the observers marked down an "X". This process continued until the resident stopped performing the task for 2 min consecutively. The experimenter and the observer each had separate data sheets that contained boxes to either check off that the staff consequated the residents' behavior correctly, or mark an "X" when the staff did not consequate the behavior correctly. Following the session, the experimenter and the observer compared their data sheets to measure the integrity of the independent variable. The experimenter defined an agreement as an instance in which they both marked either a check or an X in their corresponding boxes. The experimenter defined IOA as the number of agreements, divided by the total number of agreements and disagreements, multiplied by 100. The experimenter recorded IOA on the integrity of the independent variable during 44% of the sessions, with 100% agreement.

Experimental Design

The study used an alternating-treatments design for all three residents to demonstrate experimental control. The presentation of preferred staff attention and non-preferred staff attention were the alternating independent variables.

Study 1: Results

Staff Preference Assessments

Figure 1 shows the results for the staff preferences: Antoine chose his preferred staff (Paula) during 100% of sessions across verbal and pictorial assessments, and chose his non-preferred staff (Evan) during 0% of sessions. Jose chose his preferred staff (Paula) during 94% of sessions across verbal and pictorial assessments (88% during verbal and 100% during pictorial), and his non-preferred staff (Evan) during 6% of sessions (12% during verbal and 0% during pictorial). Tommy chose his preferred staff (Evan) during 96% of sessions across verbal and pictorial assessments (96% during both), and his non-preferred staff (Paula) during 4% of sessions (4% for both). See Figure 1.

Validation of Preferences

PR Break Points. Figure 2 shows that all three residents emitted more responses when they were attended to by their preferred staff compared to when they were attended to by their non-preferred staff. Antoine's PR break points ranged from PR-8 to PR-16 with his preferred staff member and from PR-2 to PR-4 with his non-preferred staff member. Jose's PR break points ranged from PR-4 to PR-16 with his preferred staff member and from PR-0 to PR-8 with his non-preferred staff member. Tommy's PR break points ranged from PR-4 to PR-8 with his preferred staff member and from PR-1 to PR-2 with his non-preferred staff member. The consistently higher PR break points when all three residents worked for attention from preferred staff compared to non-preferred staff demonstrated experimental control. See Figure 2.

Approach Responses. Figure 3 shows that all three residents exhibited a higher rate of approach responses per minute when being attended to by their preferred staff compared to their non-preferred staff. Antoine engaged in an average of 9.6 approach responses per minute with his preferred staff and an average of 4.4 approach responses per minute with his non-preferred staff. Jose engaged in an average of 4.7 approach responses per minute with his preferred staff and an average of 1.6 approach responses with his non-preferred staff. Tommy engaged in an average of 1.7 approach responses per minute with his preferred staff and an average of 0.7 approach responses with his non-preferred staff. The consistently higher rate of approach responses by all three residents in the presence of their preferred staff compared to their non-preferred staff demonstrated experimental control, and further validated the preference results found by the staff preference assessments. See Figure 3.

Study1: Discussion

Terminal PR value and rate of approach responding were systematically higher when the residents worked for attention from their preferred staff compared to when they worked for attention from their non-preferred staff. Thus, the break points and rates of approach responses were both a function of the preference for the staff for whose attention the resident worked. The study demonstrated both reliability – through verbal and pictorial preference assessments, and validity – by using PR break points, in the assessment of staff preferences. The staff preference validation showed that preferred staff attention acted as a potent reinforcer for the residents' behavior. Attention from non-preferred staff was less reinforcing for the residents' behavior.

Study 1 replicated Jerome and Sturmey (2008) with the staff preference assessments and the PR schedules, and extended Jerome and Sturmey (2008) with the addition of a new dependent variable – rate of approach responses. Study 1 also extended the findings of Roane, Lerman, and Vorndran (2001) who demonstrated that individuals with intellectual disabilities

would work to increasing PR break points for access to tangible reinforcers, by demonstrating that preferred staff attention also acted as a reinforcer. This suggests that education programs should use similar staff preference assessments so that they can determine which staff are preferred and which are not, and can then decide how they want to pair staff and residents. Future research may investigate the effects of pairing staff determined to be non-preferred with primary reinforcers so that they too should become reinforcing staff members. Study 2 addressed this issue. Future research may also seek to determine what behavior and what other aspects of certain staff make their attention reinforcing, and if determined, these behaviors could be transferred to non-reinforcing staff; however, rather than observable staff behaviors, physical properties such as facial features, expressions, clothing or any other variables could be the determinants that make staff more preferred than others. These variables, however, may be difficult to control for. A limitation to the present study was that the preferences of each participant were only demonstrated through the measure of one task. Future research should measure responding to multiple tasks for access to staff attention.

Study 2

In Study 2, the experimenter attempted to increase the reinforcing properties of non-preferred staff attention from Study 1 by instructing the non-preferred staff to approach the residents and to present preferred items to them on a VT 1 min schedule prior to each validation procedure. The experimenter predicted that the pairing of non-preferred staff attention and preferred stimuli would lead to an increase in PR schedule break points and rate of approach responses by the residents to levels similar to those demonstrated when the residents were attended to previously by their preferred staff.

Method

Participants and Setting

The five people who participated in Study 1 participated in Study 2. The experimenter conducted the study in the same group home and conducted the baseline and pairing conditions in the same office as in Study 1.

Part 1: Pre-Pairing Condition

Procedure

Stimulus Preference Assessments. The experimenter conducted a stimulus preference assessment with each resident every day, 10 min before conducting the pre-pairing or pairing procedures. The experimenter chose seven stimuli based on answers given by staff to the question: “Please show me some items that the resident (Name) likes,” and to answers given by the residents to the question: “Please tell me some items that you like.” The experimenter placed these stimuli side by side, approximately 10 cm apart on a table in front of the resident and while pointing to the table then said to the resident: “(Name), take one.” After the resident walked over to the items and picked one up, the experimenter allowed them to engage with this item for 2 min. After 2 min, the experimenter asked for the preferred item back and put it in a place where

the resident could no longer see it. The experimenter then pointed to the remaining six items and said: “(Name), take one.” After the resident engaged with this item for 2 min, the experimenter did the same thing as he did with the first item. The experimenter then pointed to and repeated the instructions for the five remaining items, and the resident had the opportunity to engage with this third item for 2 min. The three items that the resident chose were the items that were used as preferred stimuli in the pairing procedure.

Pre-pairing. During pre-pairing, prior to each validation procedure, the experimenter instructed each non-preferred staff member to approach the resident who determined them to be non-preferred on a variable time (VT) 1 min schedule. The experimenter arranged the VT 1 min schedule using a rectangular distribution with reinforcement being delivered in a random order at 50 s, 55 s, 60 s, 65 s, or 70 s. The experimenter also block randomized these five time periods so that he presented all of them once before he presented any of them a second time. When the staff member approached the resident, they smiled and said “how are you doing,” but did not present the resident with any tangible stimulus. Each session was 15 min long, so the non-preferred staff member approached the resident fifteen times approximately once every minute. After approaching the resident, smiling, and saying “how are you doing,” the staff walked away from the resident and did not return until the next schedule interval. The experimenter ran each pre-pairing session once a day, and the pre-pairing procedure was completed after individual stable baselines for both dependent variables were reached and staggered for each participating resident.

Validation of Preferences. The experimenter conducted the first validation of preferences procedure of Study 2, they same way he did in Study 1.

Part 2: Pairing Condition

Procedure

Stimulus Preference Assessments. The experimenter conducted a stimulus preference assessment with each resident in the exact same manner as before.

Stimulus pairings. This condition was identical to the pre-pairing condition except the non-preferred staff presented the preferred items as determined by the stimulus preference assessments to the residents. Prior to each validation procedure, experimenters paired non-preferred staff with preferred stimuli on a VT 1 min schedule. Each pairing session was 15 min long. The experimenter used a random numbers table to determine which of the three possible reinforcing stimuli he paired with the staff member. On an average of once every minute, the non-preferred staff member approached the resident with one of their three preferred items and offered it to them while they smiled and said "how are you doing." The experimenter ran each session once a day for each resident during intervention, and the pairing procedure was completed when effects in the validation of preferences procedure were found for all three residents.

Validation of Preferences. The experimenter conducted the validation of preferences procedure in the same manner as the previous validation of preferences procedures.

Integrity of Independent Variable

The experimenter and a facility supervisor recorded data on the integrity of the independent variable for both the validation of preference procedures and the pairing procedure.

Validation of Preferences. During the validation of preferences procedure, the experimenter and a facility supervisor recorded data on the integrity of the independent variable the same way they did in Study 1. Integrity of the independent variable was recorded during 51% of the sessions, with 98% agreement.

Stimulus Pairings. For the integrity of the independent variable during pairing, the experimenter defined a session beginning when the staff first approached and presented a preferred stimulus, smiled, and said “how are you doing” to the resident. After each session ended, the observers used a data sheet which contained fifteen rows of four boxes. Each of the fifteen rows represented the fifteen staff approaches during a session. The four boxes within each row represented each of the four tasks the staff were required to successfully do during the pairing condition: 1) approach the resident within 5 s of the scheduled time, 2) present the correct preferred stimulus, 3) smile, and 4) say “how are you doing.” The observers marked a check in each box when the task was correctly done by the staff, and an “X” in the box when the task was done incorrectly. The two observers had separate data sheets. Following the session, the two observers compared their data sheets to measure the integrity of the independent variable. The experimenter defined an agreement as an instance in which both observers marked either a check or an X in their corresponding boxes. The experimenter defined IOA on the integrity of the independent variable as the number of agreements, divided by the total number of agreements and disagreements, multiplied by 100. The experimenter recorded the integrity of the independent variable during 43% of the sessions with 92% accuracy, (range of 73-100%).

Experimental Design

Study 2 used an alternating-treatments design embedded within a multiple-baseline-across-participants design to demonstrate experimental control. The alternating-treatments design controlled for the differences in responding by the residents when given access to their preferred versus non-preferred staff across non-pairing and pairing conditions. The multiple-baseline design controlled for the effects of the pairing procedure across all three residents.

The experimenter made a procedural violation during pairing in Figures 4 and 5 for Jose. The experimenter should have presented attention from preferred and non-preferred staff to the

residents in blocks of four with two presentations of preferred and two presentations of non-preferred staff, however, during the third block of four, the experimenter presented attention from non-preferred staff three times and preferred staff one time.

Debriefing

One week after data collection terminated, the experimenter debriefed the participating staff. The experimenter told the two staff members that the participating residents initially chose one of them as their preferred staff member and one of them as their non-preferred staff member. The experimenter then told the staff that during the pairing procedure, the residents' frequency of responding and rate of approach responses while working for attention from their non-preferred staff increased to levels similar to those of their preferred staff member. The staff appeared to be pleased to hear this, and claimed that they were unaware that they were either preferred or non-preferred prior to or during the study.

Study 2: Results

PR Break Points

Figure 4 shows that all three residents emitted more responses when working for attention from their previously non-preferred staff during pairing than they did before pairing. With his non-preferred staff, during pre-pairing Antoine's PR break points ranged from PR-2 to PR-4 and during pairing his PR break-point-range increased to PR-4 to PR-16. With his non-preferred staff, during pre-pairing Jose's PR break points ranged from PR-2 to PR-4 and during pairing his PR break-point-range increased to PR-8 to PR-16. With his non-preferred staff, during pre-pairing Tommy's PR break points ranged from PR-1 to PR-2 and during pairing his PR break-point-range increased to PR-2 to PR-4. PR break points remained constant for all three residents from pre-pairing to pairing when they worked for attention from their preferred staff. The increased PR break points for all three residents when they worked for attention from their

non-preferred staff during pairing compared to when they worked for attention from their non-preferred staff during pre-pairing, staggered across three time periods, demonstrated experimental control. See Figure 4.

Approach Responses

Figure 5 shows that all three residents had higher rates of approach responses when working for attention from their previously non-preferred staff during pairing than they did before pairing. With his non-preferred staff, during pre-pairing Antoine's rate of approach responses ranged from 2-5 per min with a mean of 3.3 per min and during pairing his rate of approach responses increased to a range of 4-10 per min with a mean of 7.4 per min. With his non-preferred staff, during pre-pairing Jose's rate of approach responses ranged from 1-3 per min with a mean of 1.9 per min and during pairing his rate of approach responses increased to a range of 3-7 per min with a mean of 5.3 per min. With his non-preferred staff, during pre-pairing Tommy's rate of approach responses ranged from 0-4 per min with a mean of 0.9 per min and during pairing his rate of approach responses increased to a range of 1-6 per min with a mean of 3.3 per min. Results also showed an increasing trend across sessions in the rate of approach responses for all three residents when working for attention from their non-preferred staff. This increasing trend occurred during the first six pairing sessions for all three residents during pairing after which they appeared to reach asymptotic level. Rate of approach responses remained constant for all three residents from pre-pairing to pairing when they worked for attention from their preferred staff. The increased rate of approach responses for all three residents when they worked for attention from their non-preferred staff during pairing compared to when they worked for attention from their non-preferred staff during pre-pairing, staggered across three time periods, demonstrated experimental control. See Figure 5.

Post-experimental Staff Preference Assessments

Six weeks after the experimenter stopped recording data, the experimenter conducted follow-up verbal and pictorial preference assessments in the same manner as Study 1. Antoine chose his previously preferred staff (Paula) during 100% of sessions across verbal and pictorial assessments, and chose his non-preferred staff (Evan) during 0% of sessions. These results were identical to Antoine's results during the staff preference assessments in Study 1. Jose chose his preferred staff (Paula) during 88% of sessions across verbal and pictorial assessments (80% during verbal and 96% during pictorial), and his non-preferred staff (Evan) during 12% of sessions across verbal and pictorial assessments. Tommy chose his preferred staff (Evan) during 92% of sessions across verbal and pictorial assessments (92% during both), and his non-preferred staff (Paula) during 8% of sessions (8% for both).

Study 2: Discussion

All three participating residents responded to higher PR break points and engaged in a higher rate of approach responses when they worked for attention from non-preferred staff during the pairing procedure in comparison to when they worked for attention from non-preferred staff before the pairing procedure. During the pairing procedure, the residents responded for attention from, and approached their previously non-preferred staff at rates comparable to their preferred staff from both before and during pairing. Furthermore, an increasing trend developed in the rate of approach responses during the first six pairing sessions for all three residents when working for attention from their non-preferred staff. While Antoine and Jose had similar PR break points and rates of approach responses throughout both Studies 1 and 2, Tommy responded to lower PR break points and demonstrated fewer approach responses per min. This may have been simply due to the fact that Tommy responded less overall, including during the pre-experimental condition when he responded for attention from the

experimenter. Tommy did, however, demonstrate the same proportionate increase in responding when working for attention from his non-preferred staff during pairing as did Antoine and Jose.

Based on the phenomenon of behavioral contrast (Reynolds, 1961), the experimenter predicted that responding in the presence of preferred staff during pairing would decrease to levels lower than levels before pairing. This did not happen. Reynolds (1961) described behavioral contrast as when a change in the rate of reinforcement on one component of a multiple schedule produces an opposite change in the rate of responding on another component. Two concurrent operants in Study 2 were when the residents worked for attention from their preferred staff or non-preferred staff. During pre-pairing, non-preferred staff approached the residents but did not present them with any tangible stimuli, and this resulted in a certain rate of responding when the resident worked for attention from both their preferred and non-preferred staff. During pairing, non-preferred staff again approached the residents but this time presented them with a reinforcing tangible stimulus. The apparent increase in rate of reinforcement during pairing with non-preferred staff should have led to a decrease in the rate of responding when the residents worked for attention from their preferred staff during pairing. Powell, Symbaluk and MacDonald (2005), however, noted that these contrast effects do not always occur because behaviors should not be analyzed in isolation. In other words, there could be external factors not accounted for within the multiple schedule that could prevent the occurrence of positive or negative behavioral contrast. Therefore, two possible reasons why behavioral contrast may not have occurred are: a) the latency between the pairing sessions which the experimenter conducted about once every two days could have been too long for a behavioral contrast effect to have occurred, and b) external variables or other events in the residents' lives other than the concurrent operants which the experimenter did not control for may have interfered with behavioral contrast (Powell, et al., 2005).

The two main contingencies that contribute to learned behavior in the field of applied behavior analysis are classical and operant conditioning. Study 2 uses what appears to be a classical conditioning procedure – the pairing of primary reinforcing stimuli (US) with non-preferred staff attention (CS) – to demonstrate changes in behavior – on task responding measured in PR break points and rates of approach responses (CRs). However, it is not clear that classical conditioning truly occurred. One could argue that Study 2 used an operant conditioning intervention since the approaches of non-preferred staff may have been discriminative stimuli, or set the occasion for the residents to engage in a specific, possibly covert response which led to the delivery of the reinforcing stimuli. Furthermore, the validation procedures in Study 2 also appear to be examples of operant conditioning as experimenters reinforced on task responding on a PR schedule. The fact is, one can never be certain which process is occurring in any given conditioning situation and the likelihood is that both classical and operant conditioning may be interacting.

Rescorla and Solomon (1967) presented a review of the distinction between classical and operant conditioning – in operant conditioning, reinforcement is dependent on a response, in classical conditioning reinforcement is independent of a response and contingent upon the occurrence of a stimulus. Rescorla and Solomon (1967) also examined how these two contingencies could interact to produce learned behavior – called the two process theory. They determined that classical conditioning plays an important role in the learning of motivations, and these motivations set the occasion for goal directed, operant behavior. Thus, in Study 2, the classical conditioning pairing of preferred tangible stimuli and non-preferred staff on a VT 1 min schedule could have had what Rescorla and Solomon (1967) referred to as “an internal motivating effect” on the residents. Then, during the validation procedure, the availability of

non-preferred staff attention motivated the residents to respond on their given tasks and this goal-directed behavior was reinforced by the verbal and social reinforcement from the staff.

Schwartz, Wasserman, and Robbins (2002) discuss three situations in which classical and operant conditioning appear to be interacting: a) Conditioned suppression or conditioned emotional responding, b) the two-factor theory of avoidance, and c) conditioned reinforcement. In conditioned suppression (Estes and Skinner, 1941), first an operant response such as key-pecking for food is established. Next, a CS-shock association is made. Then, when the CS is presented to the organism engaging in the operant response, the CS will suppress the already established rate of responding. So the initial CS-US pairing has an effect on operant responding and the two contingencies interacted. The two-factor theory of avoidance (Mowrer, 1947) demonstrated that a dog would avoid a shock by jumping from a box when a tone sounded. The tone was the discriminative stimulus that set the occasion for the jumping response which was reinforced by the avoidance of the shock. However, maybe the dog jumped because it was trying to escape the tone which had become a CS that elicited the same responses as the shock (US) due to their pairings. Again, classical and operant conditioning interacted. During conditioned reinforcement, classical conditioning pairings of neutral stimuli and reinforcers can give the neutral stimuli the ability to reinforce future behavior – another interaction. Thus, in this study conditioned reinforcement may have served as the primary explanation for the results of Study 2 since initially the experimenter paired preferred tangible stimuli with non-preferred staff in a classical conditioning contingency. These pairings may have given the non-preferred staff similar reinforcing properties to the preferred stimuli, and in turn led to the increase in on task responding (PR break points) and rate of approach responses toward the non-preferred staff when the experimenter made their attention available.

Behavior analysts have conducted an extensive amount of research to determine how these two contingencies interact and if they are not always interacting, which contingency is occurring. At this point there is no conclusive answer to these questions, but from a theoretical perspective it is important to note that these interactions occur, and that an interaction may have occurred in Study 2. The pairing procedure appears to be an example of classical conditioning while the validation procedures appear to illustrate operant conditioning, but we can't be certain for either. Thus, the experimenter can conclude from Study 2 that either: a) previously non-preferred staff attention became a conditioned reinforcer, b) the presentation of the paired staff and preferred stimulus became a discriminative stimulus for future responding, or c) the staff became conditioned stimuli that elicited conditioned responses. In all three of these cases the operating contingency could be classical conditioning, operant conditioning, or both.

In past research on operant-classical interactions, researchers concluded that while both contingencies may theoretically operate, it is more important to determine which contingency the experimenter manipulated and evaluated for the purpose of their study. In Study 2, the experimenter initially arranged the pairing procedure as a classical conditioning procedure. While some may argue that the manipulation also used some operant conditioning procedures, it holds up as a classical conditioning procedure because it was the pairing of the preferred stimuli (US) with the non-preferred staff (CS) that controlled PR break points and rates of approach responses (CS's).

Study 2 replicated some of the findings of Sundberg, et al. (1996), Smith, et al. (1996), and Miguel, et al. (2002), who all paired established reinforcers with neutral vocalizations, leading to an increase in the future rate of vocalization utterances. These studies also investigated possible interacting contingencies. In Study 2, the experimenter paired established preferred stimuli with staff attention leading to a future increase in on-task responding and rate of

approach responses toward these staff. Another similarity between Study 2 and Sundberg, et al. (1996), Smith, et al. (1996), and Miguel, et al. (2002) was that all of these studies paired a pre-determined preferred stimulus with human behavior. In the case of the three previous studies, the experimenter paired the preferred stimuli with adult vocalizations with which participants were familiar. In Study 2, the experimenter paired the preferred stimuli with attention from staff. The difference between these two cases however, was that with Sundberg, et al. (1996), Smith, et al. (1996), and Miguel, et al. (2002), it was the human vocalizations that were the conditioned stimuli, because the conditioned response was an increase in those vocalizations. In Study 2, however, the conditioned stimuli may be staff attention, but it may also be any number of variables associated with the staff. The staff presented the preferred stimuli, but everything about them – their clothing, the way their face looks, their overall demeanor, not just their attention, is paired with the stimuli. While possibly not as conclusive in determining whether conditioned reinforcement occurred, the findings of Study 2 address more directly the pairing of preferred tangible stimuli with human beings.

The fact that the experimenter conducted the pairing procedure prior to each validation procedure – during which he recorded PR break points and rates of approach responses – improved the likelihood of an emergence of an acquisition curve. While there did not appear to be an acquisition curve for the PR break point dependent variable (Fig. 4), there did appear to be one for the rates of approach responses (Fig. 5). Since rates of approach responses increased across pairing sessions for all three residents, the pairing procedure could be viewed as a training procedure on how to incrementally improve staff-resident relationships. Future research should evaluate whether continuous pairings of reinforcing stimuli and staff will lead to a continued increase in approach responses and other demonstrations of an improved resident-staff relationship. Furthermore, future research could evaluate whether thinning out reinforcement

schedules over time would maintain the staff-resident relationship, continue to improve it, or if measurements of the relationship would undergo extinction. Future experimenters should also address the maintenance of the staff-resident relationship by investigating the frequency of pairings, reinforcer potency, and the magnitude of reinforcement during pairings necessary to maintain intervention effects to increase resistance to extinction.

Study 2 had three main limitations. First, was the use of the pre-pairing condition as the control condition. During the control condition, the experimenter should have instructed the staff to present some tangible stimulus other than the preferred tangible stimulus to the resident when they approached them on the VT 1 min schedule; however, if the experimenter had chosen a random tangible stimulus, this stimulus may have had reinforcing properties but was not made available as a choice during the stimulus preference assessments. Furthermore, if the experimenter specifically chose stimuli not chosen during the stimulus preference assessments to pair with the staff, these stimuli may have been aversive to the residents and consequently could have led to a decrease in responding during attention from these already non-preferred staff. In short, there was no guarantee that a stimulus that was neither reinforcing nor aversive could have been paired with staff approaches during baseline, so the experimenter decided that the risks to the experimental control were greater using some stimulus than none at all during the control condition. Therefore, the experimenter decided to implement the pre-pairing condition and to keep all other variables stable between the pairing and pre-pairing conditions. Future researchers may use a more sound control condition such as a truly random control procedure. Second, the experimenter did not determine the parameters of the frequency and latency of the pairings. It is possible that the experimenters would have found a larger effect if they used a VT-30 s schedule, or the same effect with a less intrusive VT-5 min schedule. Future research should evaluate more practical reinforcement schedules that could be more easily applied by services. Future should

research should then determine the most efficient reinforcement schedule using a cost-benefit analysis. Third, this experiment did not evaluate the quality of attention as reinforcement. Kodak, Northup, and Kelley (2007) addressed the quality of attention when they found that some forms of attention such as reprimands and unrelated comments reduced problem behaviors in children with intellectual disabilities, while others such as tickles, eye contact, praise, and physical attention did not. In Study 2, staff only said “good job” while smiling and giving a high five to the residents as the form of attention. Future research should evaluate other forms of attention to determine if they would also lead to an increase in responding on PR schedules and rate of approach responses.

Future research should look at other ways to increase the reinforcing potency of staff. Non-preferred staff may be paired with preferred staff as another possible form of conditioning reinforcement. Pairing two staff members would be more in line with what typically occurs in these residential settings in comparison to pairing staff with preferred items. Experimenters may also study similarities in preferred-staff-behavior and train non-preferred staff how to engage in these behaviors around the residents. Experimenters may evaluate what types of responses emitted by staff occur more frequently in preferred staff than in non-preferred staff, and instruct the non-preferred staff to engage in these responses.

Future research should also examine what would happen if previously non-preferred staff would introduce demands or other aversive stimuli to the residents outside of the experimental setting, such as asking them to take a walk when they were tired or to do the dishes when they were watching their favorite television program. Future researchers should fade in these commonly occurring demands to help decrease the likelihood of relapses in the built relationships. Furthermore, the improved staff-resident relationships demonstrated by increased PR break points and rate of approach responses might undergo either classical or operant

extinction when the pairing stopped. The continued presentation of the CS (staff attention) without the presence of the US (preferred stimulus) may lead to a decrease in on-task responding in the presence of the previously non-preferred staff. Follow-up data could help determine whether this would occur.

PR schedules may be difficult for practioners to implement in applied settings, although researcher has not yet evaluated the feasibility of doing so. Therefore, future researchers or clinicians could develop alternate procedures such as measuring persistence of on-task responding under extinction or by using video modeling to teach practitioners to use PR schedules. Additionally, some participants may not be able to respond to the question: "(Name), who do you like better, Staff A (name) or Staff B (name)?" that was asked during the staff preference assessments. If necessary, future research should evaluate other ways of determining preferences such as using other wording and/or having all staff members stand in a row and recording the percentage of approaches to each staff member (Sturmey, et al. 2002).

Study 1 demonstrated that resident choices of staff using verbal and pictorial preference assessments agreed with both PR break point data and rates of approach responses when residents worked for attention from their preferred and non-preferred staff. Study 2 demonstrated that pairing non-preferred staff with preferred tangible stimuli on a VT 1-min schedule increased PR break points and rates of approach responses when the residents worked for attention from these staff; however, follow-up data on staff preference assessments showed that the choices of staff preferences did not change following the pairing condition. Therefore, while the pairing procedure had an effect on the overall responding of the residents during the validation procedures, the pairing procedure may not have increased actual preferences, however, though the experimenter conducted staff preference assessments after the pairing procedure and found no differences from the results of the first staff preference assessment, the experimenter cannot

conclude that there was no effect on preferences. The staff preference assessment presented a dichotomous choice opportunity in which residents had to either choose one or another staff member. It is possible that the increases in PR break points and rates of approach responses when working for attention from non-preferred staff could have represented increases in preference which would not be evident when evaluating the less sensitive staff preference assessments. Perhaps asking residents to rank how much they like their staff members on a Likert scale would solve this problem and actual preferences would be able to be definitively determined.

Conclusion

Study 1 demonstrated that clients with mild intellectual disabilities can reliably express preferences for staff members using either verbal of pictorial preference assessments and that these preference assessments accurately predicted break points and rates of approaches to staff members. Study 2 demonstrated that an increase in PR schedule break points and rates of approach responses was a function of stimulus pairing which may give residents the opportunity to engage in more age appropriate, functional activities, regardless of whether or not long-term preferences were changed.

Fig. 1

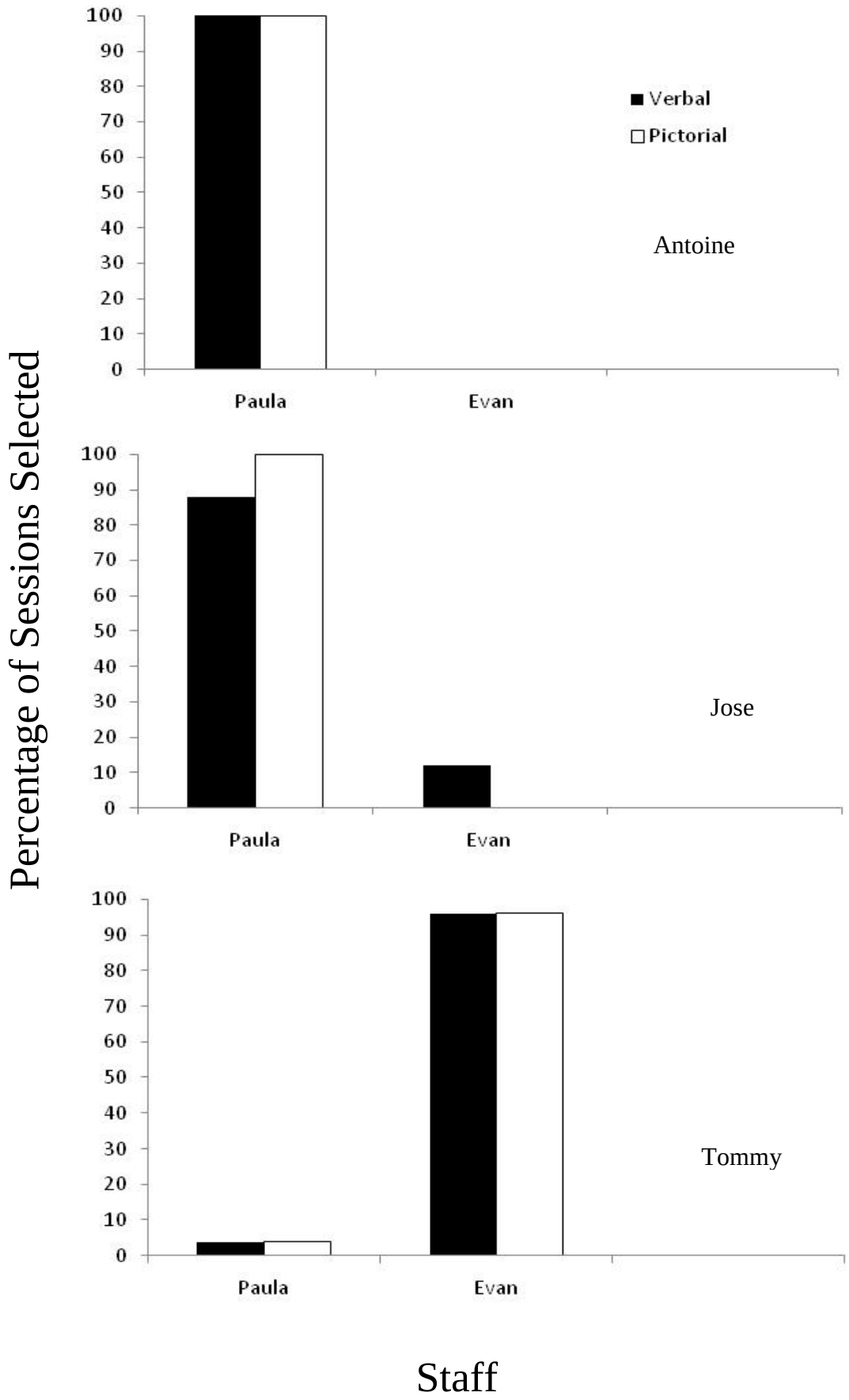

Percentage of Sessions Selected
100
90
80
70
60
50
40
30
20
10
0
Verbal
Pictorial
Antoine
Paula
Evan
Jose
Tommy
Staff

Fig. 2

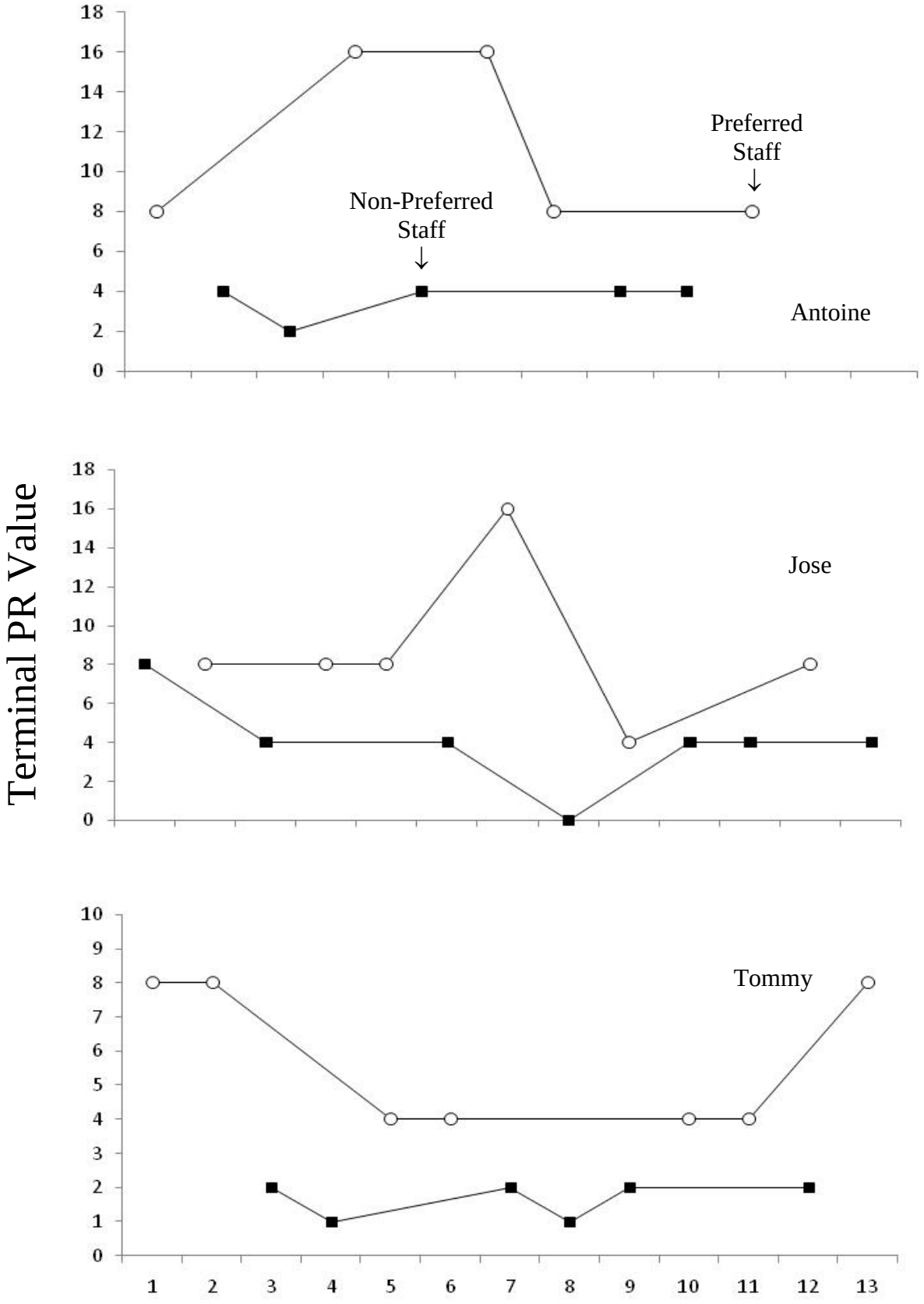

Terminal PR Value
Preferred Staff
Non-Preferred Staff
Antoine
Jose
Tommy
Sessions

Fig. 3

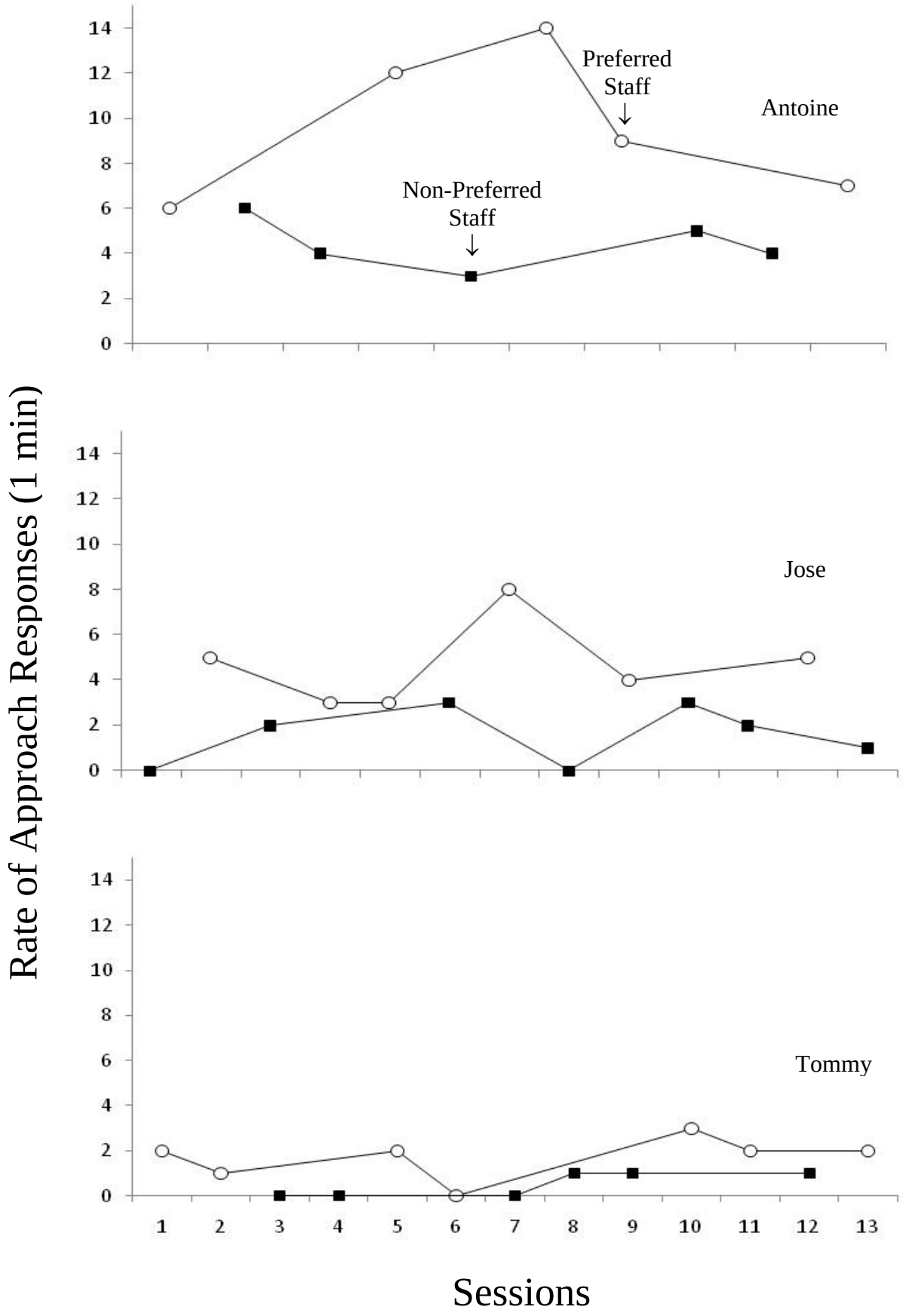

Rate of Approach Responses (1 min)
Preferred Staff
Non-Preferred Staff
Antoine
Jose
Tommy
Sessions

Fig. 4

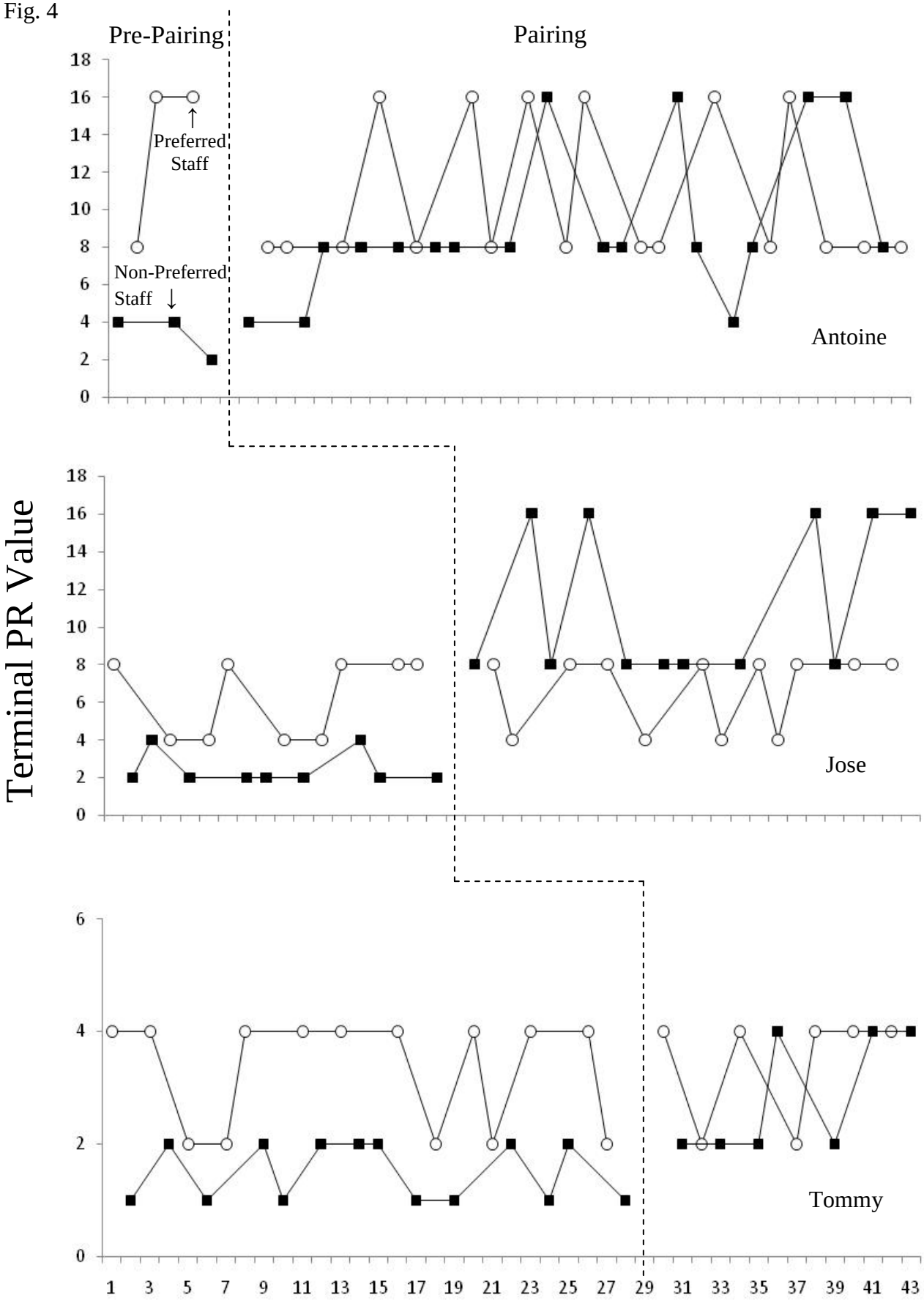
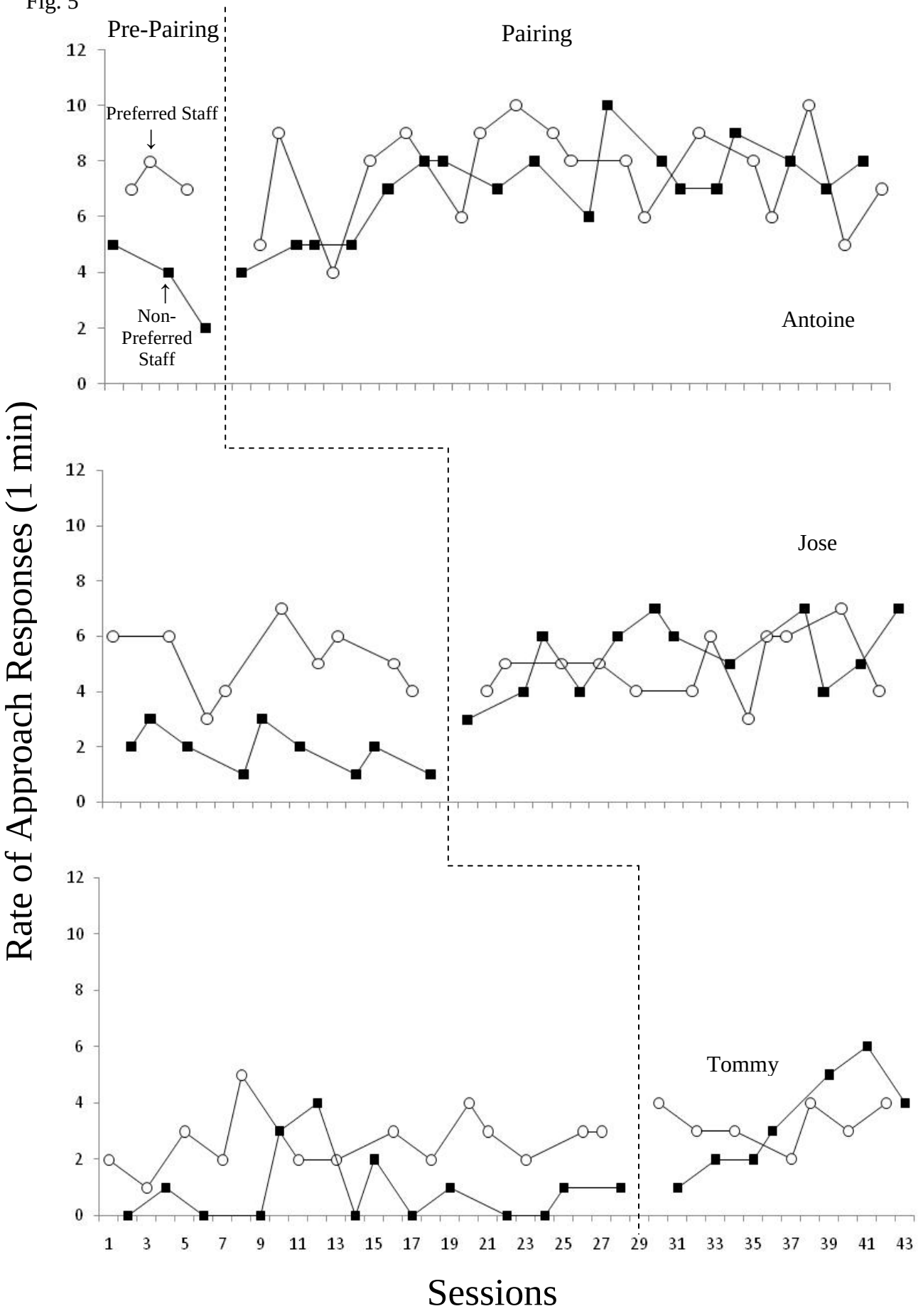

Pre-Pairing
Pairing
Preferred Staff
Non-Preferred Staff
Antoine
Jose
Tommy
Terminal PR Value
Sessions

Fig. 5


Pre-Pairing
Pairing
Preferred Staff
Non-Preferred Staff
Antoine
Jose
Tommy
Rate of Approach Responses (1 min)
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6
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12
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