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Katherine A. Fenerty

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Running Head: PREFERENCE FOR CHOICE

Assessing Preschoolers' Preferences for the Opportunity to Choose Tasks or Reinforcers

Katherine A. Fenerty

Louisiana State University

### Abstract

Prior research has demonstrated preschoolers may exhibit a preference for contexts in which they are provided with choice-making opportunities relative to contexts in which the same events are delivered independent of the child's choices. Experimenters often identify these preferences by comparing situations in which children are provided a choice between two tasks or between at least two reinforcing stimuli. However, it has not yet been determined if choosing between tasks or choosing between reinforcers for completing tasks differentially influences preferences associated with choice-making. The current study evaluates children's relative preferences for opportunities to engage in choice-making between tasks or between stimuli delivered following the completion of an experimenter assigned task using a paired-choice procedure. Results demonstrated that 3 of 4 participants preferred a choice of edible reinforcer relative to a choice of task.

## Introduction

Prior research has demonstrated that organisms tend to prefer conditions in which they are provided with choices relative to conditions in which they are not provided with choices. For example, Voss and Homzie (1970) designed an experiment in which albino rats were placed in a maze with 2 pathways. One pathway provided a straight route to a box of food. The other pathway was a Y-shape in which there was a choice point between two additional pathways, either of which would lead to food. The rats most often selected the Y-pathway (i.e., the option associated with a choice-making opportunity).

Catania and Sagvolden (1980) similarly demonstrated a preference for choice-making opportunities by providing pigeons the opportunity to earn food reinforcement in one of two contexts. In the first context, termed a free choice condition, four keys were presented and pecks to three of the four keys resulted in food delivery. In the other context, termed the forced-choice condition, four keys were again presented, but pecks to only one key would produce food. In order to select their “context,” pigeons were initially presented two white keys, termed the initial-link; pecks to each key resulted in entrance to one of the two terminal-link contexts. Thus, initial-link selections were used as an indicator of terminal-link preferences. Pigeons responding generally showed a preference for the free-choice context, again indicating the value of the opportunity to make choices.

Similar findings have also been reported with human participants. Fisher, Thompson, Piazza, Crosland, and Gotjen (1997) designed a choice-preference assessment with three children with developmental disabilities referred for the treatment of destructive behaviors, in which each participant was presented with two micro-switch buttons. Pressing one button (i.e., the choice option) resulted in the opportunity to choose from one of two high-preference stimuli (as

identified by a prior preference assessment). Pressing the other (i.e., the no-choice) button resulted in the delivery of one of the higher preferred stimuli without the opportunity to choose. Participants almost exclusively selected the choice button, indicating a preference for the choice making opportunity.

Thompson, Fisher, and Contrucci (1998) found that when an individual with developmental disabilities was given the opportunity to choose between an option of selecting their own reinforcer (in this instance soda), versus receiving the same item without the opportunity to choose it, their participant consistently selected the condition in which they were able to choose the manner in which the soda was received (e.g., with or without a straw), as opposed to the researcher choosing this for the participant. Additionally, these researchers decreased the rate of reinforcement delivered for choice condition selections relative to no-choice selections such that the participant received less reinforcement by selecting the choice condition. The participant still consistently selected this over the no-choice condition.

Tiger, Hanley, and Hernandez (2006) found that five out of six children of both typical and atypical development demonstrated a preference for choice-making opportunities in which they selected from among five identical edible items after completing an academic task relative to receiving a matched reinforcer selected by the experimenter (similar results were also reported by Brigham & Sherman, 1973).

In summary, experimenters have conducted a decent amount of research within both human and non-human populations demonstrating that both prefer a condition in which there is an opportunity to choose reinforcers. These findings have led some to conclude that (a) choice making opportunities may have reinforcing value independent of the stimulus chosen, and (b) incorporating choice-making opportunities within the delivery of reinforcement may enhance or

strengthen the effectiveness of reinforcement-based interventions. Interestingly, however, research that has applied these findings to education and treatment has often done so in a very different manner. Typically, in application, choices are arranged between tasks, rather than between the consequences delivered for engaging in those tasks.

Koegel, Dyer, and Bell (1987), found that the socially avoidant behavior (defined as looking away from the adult, pushing the adult away, or pushing away activities) of children with autism decreased when these children were engaged in self-selected activities relative to matched teacher-selected activities. Dunlap, et. al., (1994) reported similar findings with two students referred for disruptive and problem behaviors. Both boys were required to work on a teacher-selected task during no-choice conditions but were permitted to choose a task from a list of options during choice conditions. Disruptive and problem behaviors were significantly lower in the choice condition than they were in the no-choice condition, and task engagement was significantly higher when the boys were provided with the option to choose the activity they worked on, though the activities chosen were matched to activities the teacher would have selected for them. Similarly, Parsons, Reid, Reynolds, and Bumgarner (1990) found that on-task work performance of individuals with severe developmental disabilities was higher when participants selected tasks relative to tasks selected by a supervisor.

Despite the divergence in preparations between more basic-oriented choice-assessments and the application of these results in more practical environments, research has not yet determined which means of providing choice-making opportunities will result in the most meaningful enhancement to educational and therapeutic activities. We attempted to do so in the current study by designing an assessment to determine participants' preferences for 4 experimental conditions: (a) a condition in which choices were provided between academic tasks

and an edible item is delivered following task completion, (b) a condition in which students were provided with a task and selected from among an array of similar edible items following task completion, (c) a no-choice condition in which participants were provided an academic task and an edible selected by the experimenter, and (d) a control condition in which the participants were provided with an academic task, but no edible items were delivered for task completion. We then evaluated the predictive validity of this assessment by evaluating the effectiveness of each choice condition in sustaining academic engagement with a subset of participants.

## STUDY I: CHOICE ASSESSMENT

### Method

#### *Participants and Setting*

Four typically-developing, preschool-aged children were recruited from a university affiliated pre-school via letters and consent forms sent home to parents. The first 4 students (three 4 year olds and one 5 year old) who replied to these solicitations were included in the current study. Experimenters conducted sessions at the childcare center in an unused alcove outside of the classroom. The area included child-sized tables and chairs.

#### *Procedures*

Experimenters initially conducted a paired-item preference assessment (Fisher, et.al., 1992) with each participant to identify high-preference edible items (pretzels, raisins, fruit snacks, goldfish, etc.). The two or three most preferred items were used in the remaining assessments. Following the edible preference assessment, experimenters conducted a similar color preference assessment with each participant to identify colored index cards to use as the initial-link stimuli in this study. Color preferences were assessed to specifically rule out the inclusion of highly preferred and non-preferred colors. We selected and randomly assigned four

colors, ranked towards the middle of a preference hierarchy, to each of the four conditions of this study.

We designed a modified concurrent-chains procedure, based in part on the procedures described by Hanley, Piazza, Fisher, Contrucci, and Magliere (1997) and in part on the concurrent operant's preference assessment described by Fisher et al. (1992) in order to assess children's preferences for variations in choice-making conditions. The assessment consisted of four conditions (described more fully below). Each condition was associated with a particular colored index card. During each trial of a session, we presented the participant with two randomly determined index cards and prompted them to select one. This comprised the initial link of the concurrent chain. Depending upon the selected card, they then were prompted to complete the terminal link relevant to the selected condition. Sessions consisted of 6 trials occurring in randomly determined order, in which each initial link was paired with every other initial link once per session.

Experimenters presented participants with the opportunity to choose one of five identical worksheets containing an academic task (e.g., 5 worksheets with the same pattern completion problem) and following this selection, taught participants using a 2-step graduated prompting procedure to complete the task, and participants received an edible item (e.g., a piece of a fruit snack) following task completion in the *task-choice* condition. Experimenters presented participants with only one worksheet containing the same academic task used in the task-choice condition (e.g., a pattern completion problem), taught them to complete the task using a 2-step graduated prompting procedure, and, following task completion, experimenters provided participants with an array of five identical edible items (e.g., 5 pieces of fruit snacks) from which to select and consume one during the *reinforcer-choice* condition. Experimenters provided



participants with a single worksheet containing the same academic task (e.g., pattern completion problem), taught participants to complete the task using a 2-step graduated prompting procedure, and upon task completion selected an edible item for the participant (e.g., a piece of a fruit snack) during the *no-choice* condition. In this regard, the actual edible items and tasks completed during the task-choice, reinforcer-choice, and no-choice conditions were identical (i.e., all fruit snacks were the same size and color, and all tasks were identical). The only difference between each condition was whether the participant or experimenter selected the task or edible item. Finally, the experimenter presented the participant with a single worksheet containing a task identical to those of the other conditions and taught the participant to complete the task using a 2-step graduated prompting procedure, but the participant did not receive an edible item following task completion during the *control* condition.

Instructions were provided prior to conducting the first trial each day in order to facilitate children's discrimination of the consequences associated with each index card selection (i.e., initial-link selection). For instance, the experimenter said, "If you select the pink card, you will solve this problem, but you won't receive a snack (control condition). If you select the blue card, you will solve this problem, and you will be given this snack (no-choice condition). If you select the yellow card, you may choose which problem you would like to solve, and then you will receive this snack (task-choice condition). If you select the green card, you will solve this problem, and then may select which snack of these 5 you would like to have (reinforcer-choice condition)." Participants were then instructed to select each colored card once to experience the terminal-link consequences associated with each initial-link index card. A diagram of what the table looked like during this time is presented in Figure 1. Immediately following this exposure

period, sessions began with the instruction, “Choose the card you like.” One to three sessions were conducted daily with each participant, typically 3 days per week.

### *Measurement and Reliability*

Each trial consisted of both an initial and a terminal link. Initial links consisted of children selecting one of the colored index cards presented in a paired array on the table, (selection was defined as pointing to or picking up the index card corresponding to one of the conditions). Card selection served as the dependent variable and resulted in the onset of the terminal links in which the children were then prompted to perform a task, and performance was recorded using manual recording (i.e., pencil and paper) as following either a verbal or model prompt.

Interobserver agreement was assessed by having another observer independently collect data on children’s selections and task completion. We calculated agreement percentages by comparing each observer’s recordings on a trial-by-trial basis; agreement was defined as both recorders scoring the same initial-link selection and same type of prompt that preceded task completion. The total number of trials in agreement were summed and divided by the total number of trials, then, multiplied this quotient by 100. Interobserver agreement was collected during 100%, 77%, 65%, and 67% of sessions for Emma, Paula, Ryan, and Sally, respectively. Agreement averaged 99% across participants (range 97% to 100%).

### *Results and Discussion*

Results of the Choice Assessment for all participants are displayed in Figure 2. Individual session data are shown for each participant and are depicted as the percentage of trials each condition was selected when presented. Across her assessment, Emma selected the reinforcer-choice condition each time it was presented (3 of 3 presentations per session;  $M = 100%$ ). The

no-choice condition was consistently selected the second most frequently ( $M = 60\%$ ), and the task-choice condition finished third ( $M = 38\%$ ). The control condition was never selected. Similar results were also obtained for Sally (second panel of Figure 1), who also selected the reinforcer-choice link most frequently ( $M = 94\%$ ). No clear preference was observed between the task-choice ( $M = 55\%$ ) and no-choice conditions ( $M = 49\%$ ). The control condition was never selected. Though Ryan's results (third panel of Figure 1) proved less robust than Emma's and Sally's, similar patterns still persisted. The reinforcer-choice condition was the highest ranked, ( $M = 76\%$ ; particularly during the last 8 sessions of the assessment), with very little differentiation between task-choice ( $M = 58.8\%$ ) and no-choice conditions ( $58.7\%$ ), and negligent selection of the control condition ( $M = 3\%$ ). Paula (fourth panel of Figure 1) did not demonstrate any systematic preferences across reinforcer-choice ( $M = 66\%$ ), task-choice ( $M = 68\%$ ), and no-choice conditions ( $M = 59\%$ ) and negligent selection of the control condition ( $M = 3\%$ ). After 15 sessions her assessment was terminated.

In summary of these results, 3 of the 4 participants demonstrated a preference for the reinforcer-choice condition relative to the other test conditions. None of the participants demonstrated a systematic preference for the task-choice condition, nor was this condition ranked higher than the no-choice condition for any participant.

Preference assessments such as those conducted in this study are relatively brief assessments designed to predict items or interventions that will be most effective in improving educational and therapeutic programming. In order to determine the predictive validity of these assessments, we conducted a follow-up assessment with 2 participants in which 2 simultaneous educational activities were arranged, one similar to conditions in the reinforcer-choice condition and one similar to the task-choice condition.

## STUDY II: EDUCATIONAL ENGAGEMENT ASSESSMENT

## Method

*Participants and Materials.* Sally and Ryan participated in this assessment. Sally demonstrated a preference for reinforcer-choice conditions in the prior assessment while Ryan demonstrated a weaker preference for this condition. Sessions were conducted in the same alcove described in study 1. Similar academic materials were presented to each participant.

*Procedure.* The procedure used was similar to that described in Cote, Thompson, Hanley, and McKerchar (2007). Two identical tables were placed on opposite sides of the session area. On one table experimenters placed materials associated with the *task-choice* condition (five identical worksheets from which to select one and a plate with one experimenter selected edible item) and the materials for the *reinforcer-choice* condition (one experimenter selected worksheet and a plate with five identical edible items from which to select one) on the other table. Prior to beginning sessions each day, experimenters instructed participants to sit at each table and experience the teaching situation associated with that table. Experimenters told participants that they could switch tables at any time during sessions. Sessions began by placing participants in the middle of the session area and prompting them to select the table they wished to attend. Each child participated in fifteen 3-min sessions. The experimenters randomized and counterbalanced conditions across both table locations.

*Measurement and Reliability.* The duration of time allocated to each table was recorded using handheld stopwatches for each participant. We calculated agreement percentages on a session-by-session basis, and by dividing smaller times recorded by larger times recorded and then multiplying by 100. Reliability data was collected using a wristwatch for 47% and 53% of sessions for Ryan and Sally, respectively. Agreement averaged 97.6% (range 91% to 100%).

### *Results and Discussion*

Figure 2 displays the results of the Educational Engagement Assessment for Sally and Ryan. Similar to her initial choice assessment, Sally (top panel of Figure 2) allocated a large majority of her time to the reinforcer-choice educational activity ( $M = 132.6s$ ) relative to the task-choice activity ( $M = 47.33s$ ). A dependent samples t-test indicated that these differences were statistically significant ( $p = .001$ ). Ryan's results (bottom panel of figure 2) were also similar to his initial preference assessment in that he allocated a slightly greater duration of time to the reinforcer-choice condition than he did to the task-choice condition ( $M = 108.66s$  and  $71.93s$ , respectively;  $p = .381$ ). Thus, the results of the initial assessment corresponded well to the outcomes of this follow-up educational assessment.

### General Discussion

The results of the current study are similar to previous research demonstrating children's preference for choice-making conditions (e.g., Tiger et al., 2006) but extended this literature base by delineating children's preferences for variations of choice making conditions. Specifically, we found that (a) 3 out of 4 children preferred the reinforcer-choice condition and (b) somewhat surprisingly that the task-choice condition was no more preferred than the no-choice condition for any participant. This second finding is particularly surprising given the results of previous research suggesting that task-choices improved the effectiveness of behavioral interventions (Koegel et. al., 1987; Dunlap et. al., 1994; and Parsons et. al., 1990). These results indicate that the optimal effectiveness of programmed choice-making opportunities may be obtained by providing choices between reinforcing stimuli. These results may somewhat call into question the outcomes of previous research demonstrating the effectiveness of interventions similar to our task-choice condition. However, it is important to note that these prior studies not only used

atypically developing populations, but also used qualitatively different tasks in their task choices, indicating that this difference in task (and not the choice-making opportunity itself) may have accounted for the preference for task choice. The current study, however, equated tasks across conditions as well as within in the task-choice condition to determine whether that task choice-making *opportunity* itself possessed any value, and our results indicated that that choice-making opportunity is no more valued than no choice-making opportunity at all.

Previous demonstrations of the utility of task-choice conditions have typically involved providing children the opportunity to select among different tasks (e.g., choosing to spell on a key board in lieu of pencil and paper; choosing to iron a Miami Dolphins T-shirt relative to a Pittsburgh Steelers T-Shirt) and thus the results of those studies may have been due to qualitative differences in the selected materials rather than the provision of choice-making opportunities. That is, children may be more likely to engage in preferred activities and refrain from problem behavior regardless of whether or not the activity was child or experimenter selected. The current study eliminated this potential confound by equating the consequences across each condition (i.e., the identical task was provided in choice and no-choice conditions). Additional research will be needed to evaluate this possibility.

This study also introduced a novel assessment format. Specifically, this is the first study of which we are aware that has presented the initial-links of concurrent chains in paired arrays<sup>1</sup>. For instance, Tiger, Hanley and Heal, 2006 and Layer, Hanley, Heal, and Tiger (2008) presented 3 and 4 initial-link stimuli simultaneously and used repeated measurement and restriction criteria to determine preference hierarchies. The current procedure may be more likely to yield definitive preferences in that (a) it minimizes the necessity of a scanning repertoire between options (particularly concerning with individuals with limited histories of discriminating between

multiple stimuli such as young children and individuals with developmental disabilities) and (b) rapidly determines a preference hierarchy within each session. While this format was not directly compared with those of previous research, it appears that such preference determinations can be made more rapidly given the current procedure.

One potential concern in evaluating the results of the current study is that the stimuli presented in the terminal links (e.g., the academic task and reinforcers) were present during the time the initial-link selections were made (see figure 2) and that a prior learning history related to these stimuli may have influenced responding. That is, seeing 5 edible items may have historically been associated with greater access to food and 5 worksheets may have historically been associated with more work, and thus participants may have been predisposed to prefer the reinforcer-choice condition. We included the presence of these stimuli in the initial link to facilitate discrimination between each condition and attempted to minimize the influence of this potential previous history. Specifically, participants were prompted prior to each session to experience each of the terminal-link conditions as associated with the initial-link ones and were assessed over a number of days and repeated experiences with each condition. Thus, the children had multiple experiences to override any pre-experimental biases. Further, a recent study by Schmidt and Hanley (in press) indicated that children's choice preferences were not affected by the presence or absence of the choice stimuli in the initial links, removing this as a potential concern.

It is not clear at this time why reinforcer-choice conditions would be preferred to task-choice conditions (or why the latter did not appear to be preferred to no-choice conditions), but plausible explanations exist. One may involve the behavior regarding the mechanism by which choice making affects preference. Two such theories have been offered in previous research. One

explanation claims that choice making serves as an establishing operation increasing the value of a selected stimulus. The second explanation maintains that the opportunity to make a choice itself may serve as a reinforcer. It may be possible to understand these results in terms of the latter assertion. Specifically, if choice making can serve as a reinforcer, it would make sense that a condition in which delivering a reinforcer after a target response proves more effective than a condition in which experimenters deliver the reinforcer prior to a target response. In the same vein, if choice making simply enhanced (or established) the value of an item or event as a reinforcer, then one would expect the temporal proximity of this event to the target academic response to be less relevant.

The current study was not ideally suited to answering the question regarding the role of temporal ordering of choice-making opportunities and target responding since the choice-making opportunity varied in form across conditions. Future research may better evaluate this question by arranging a choice of a reinforcer (e.g., edible items) either prior to or following task completion.



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Footnote

- 1.) This procedure was recommended in a discussion with Wayne Fisher, Ph.D. and we are grateful for this excellent suggestion.

### Figure Captions

Figure 1. The table layout during instructions including initial- and terminal-link stimuli.

Figure 2. A sample trial with two links presented concurrently in a paired array.

Figure 3. Initial-link selections for all four participants.

Figure 4. Sample session area layout during Educational Engagement Assessment.

Figure 5. Results from Study 2 for Sally and Ryan. Graphs present the mean amount of educational time allocated to each condition and error bars depict the standard deviation.

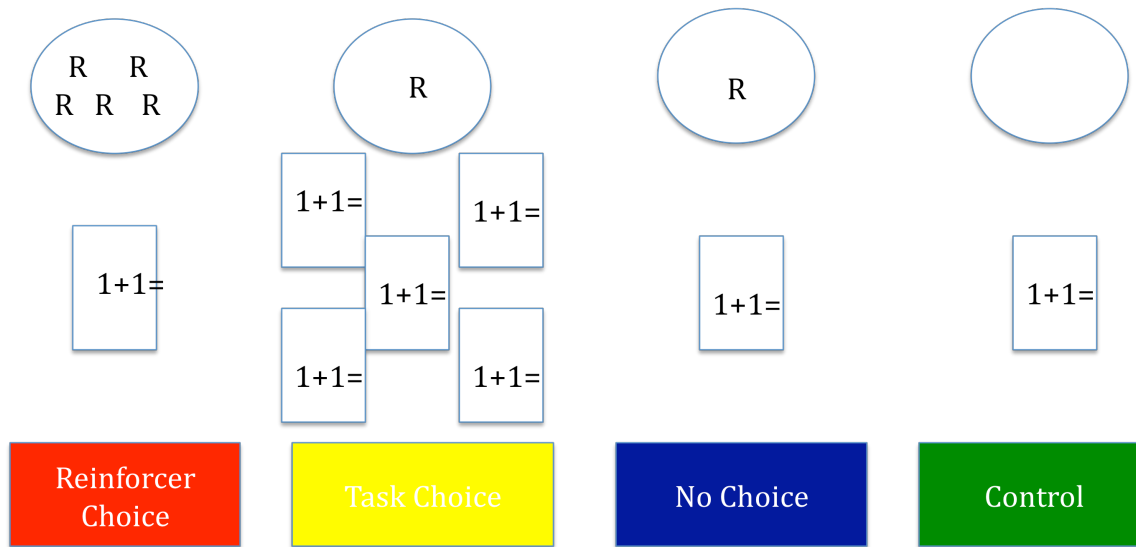


Figure 1.

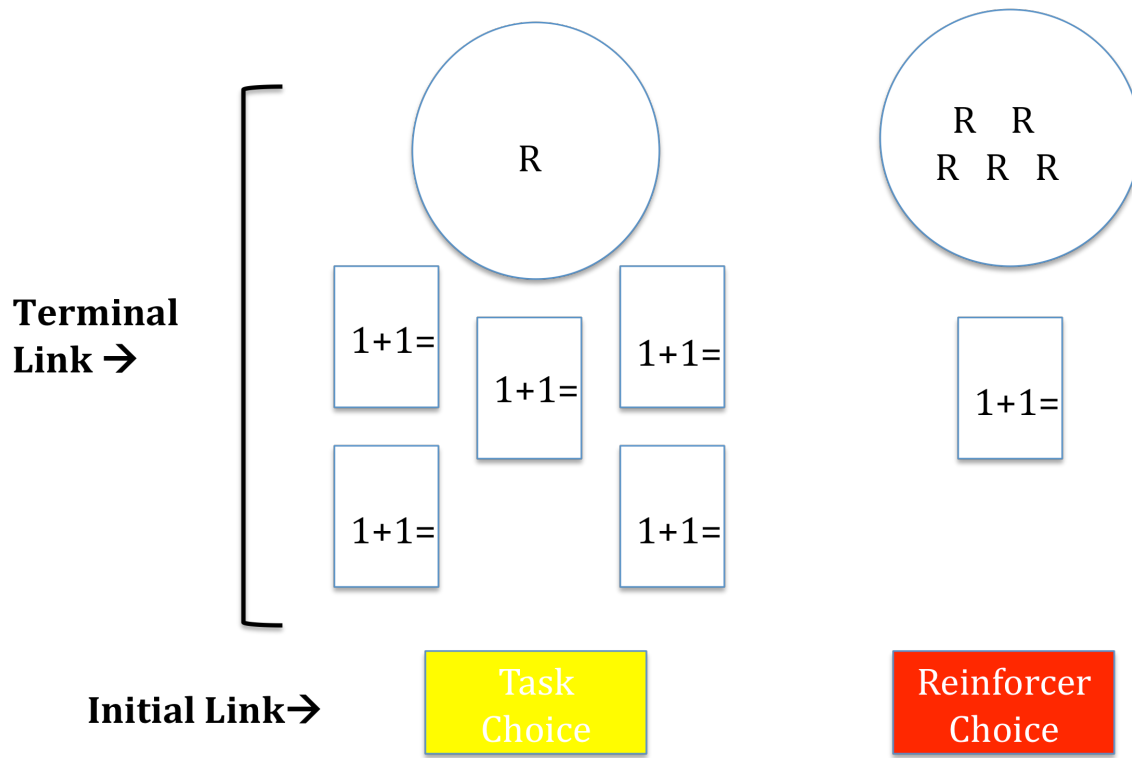
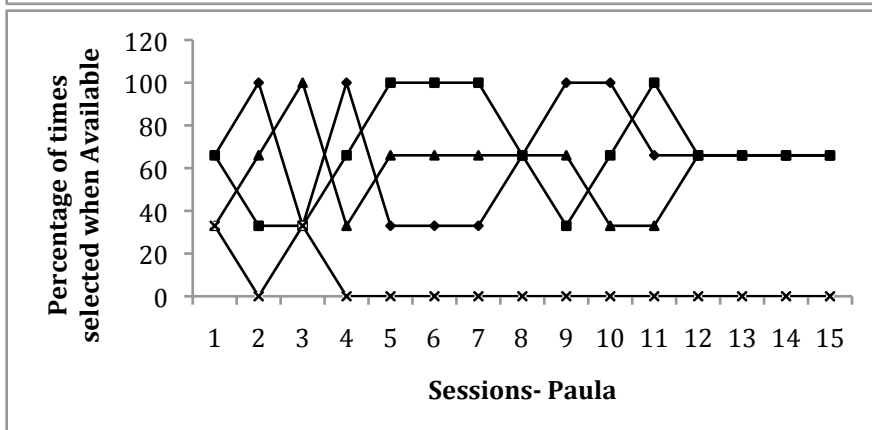
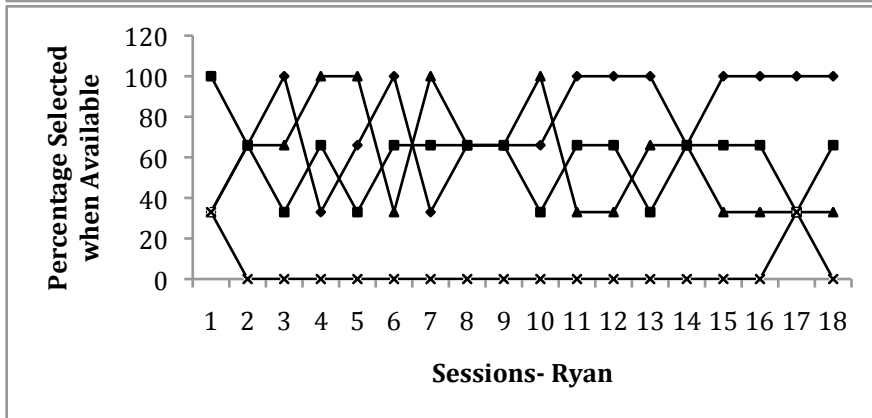
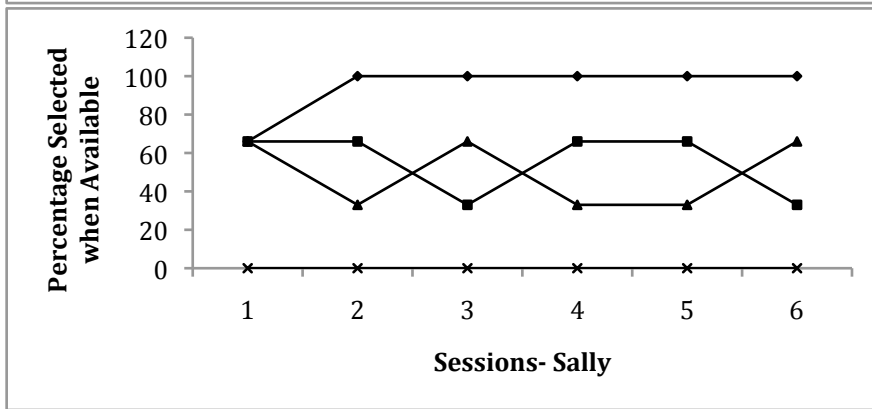
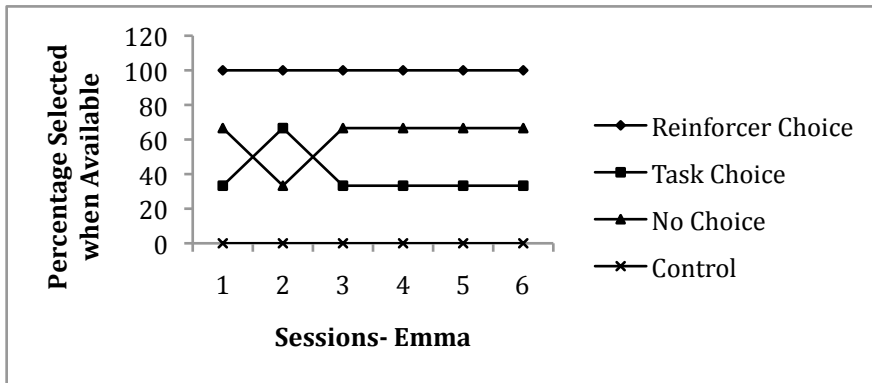


Figure 2.



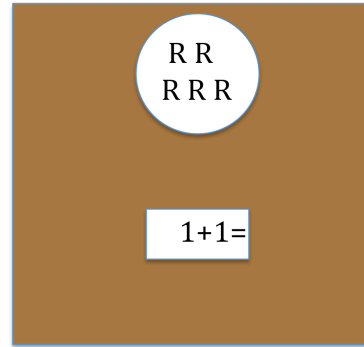
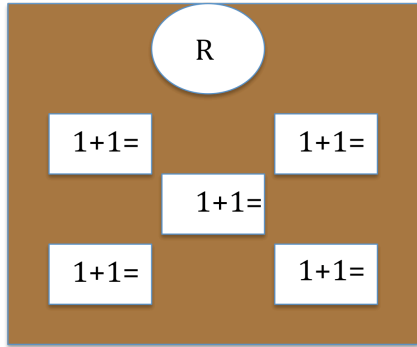


Figure 3.



