Preference for Food and Non-food Items of Known Reinforcing Values in People with Developmental Disabilities

by

Ryan Heckert

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Abstract

When presenting reinforcers to individuals with developmental disabilities, many researchers use food. However, there may be other types of reinforcers which may be equally or more effective. Although preference assessment methods have been well-researched, one area that has not yet been resolved is whether food reinforcers are always more preferred than non-food reinforcers, when both are presented in the same assessment. This study compared preference for food and non-food items with similar and dissimilar reinforcing values in three people with developmental disabilities. The study first measured the reinforcing value of food and non-food items and used these items in a subsequent preference assessment. Results showed that (a) when food and non-food items were of approximately equal reinforcing value, or when food was more reinforcing than the non-food items, food tended to be preferred, and (b) when non-food items were much more reinforcing than food items, non-food items tended to be preferred.

Keywords: Preference assessment, reinforcing value, stimulus category

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One way in which desirable behavior can be increased is through the use of positive reinforcement. “The principle of positive reinforcement states that if someone in a given situation does something that is immediately followed by a positive reinforcer, then that person is more likely to do the same thing the next time he or she encounters a similar situation” (Martin & Pear, 2015, p. 32). In order to be most effective, a strong reinforcer that is highly preferred by the person should be selected (Pace, Ivancic, Edwards, Iwata, & Page, 1985).

Identifying reinforcers in individuals with developmental disabilities may be challenged by the difficulties in social interaction and communication they commonly display (Volkmar & Pauls, 2003). The term developmental disability is defined as “a disability attributable to a mental or physical impairment, manifested before 22 years of age, likely to continue indefinitely, resulting in substantial limitation in three or more specified areas of functioning, and requiring specific and life long or extended care” (Developmental Disabilities Bill of Rights Act, Public Law 95-682, 1978). Developmental disability is a broad term, which includes sub-areas such as intellectual disability, but does not require any intellectual deficit (Conyers, Martin, Martin, & Yu, 2002). Individuals who have a developmental disability may not be able to reliably communicate their preference, which further poses challenges in identifying reinforcers.

The strength of a reinforcer can be established through the use of a reinforcer assessment or test in an ABAB design (Martin & Pear, 2015). The procedure involves first establishing a baseline rate of responding through observing the frequency of a target response during the baseline phase (A phase). No reinforcement will be presented following the target response during baseline. Following the establishment of a stable rate of responding, the reinforcement

phase is introduced (B phase). Each instance of the target behavior will be immediately followed by the stimulus or item being tested (e.g., listening to music for 30 s). Following a stable rate of responding during the reinforcement phase, a reversal to baseline (second A phase) will be introduced. Lastly, another reinforcement phase (second B phase) will be conducted. The purpose of this reversal phase is to replicate the results and demonstrate that any change in responding is a result of the experimental manipulation, namely, that the stimulus presented is reinforcing to the individual. If the rate of the target behavior increases during the first reinforcement phase relative to the first baseline, decreases during the second baseline phase, and increases again during the second reinforcement phase, then we may conclude with a high degree of confidence that the stimulus is a reinforcer.

Although the reinforcer assessment described above is the definitive test for reinforcers, the procedure can be quite time consuming. Over the last two decades, considerable research has shown that stimulus preference assessment is a more practical and efficient method that could be used to identify reinforcers (Hagopian, Long, & Rush, 2004; Tullis et al., 2011). In terms of preference between stimulus categories, several studies have shown that food items are preferred to non-food items with people with developmental disabilities (Bojak & Carr, 1999; DeLeon, Iwata, & Roscoe, 1997; Fahmie, Iwata, & Jann, 2015). However, a recent study has found conflicting evidence suggesting no preference between food and non-food items (Andakyan, Fryling, & Benjamin, 2016). One limitation to all these studies is that the reinforcing values of the items were unknown prior to conducting the stimulus preference assessments. Without controlling for the reinforcing value of the items prior to the stimulus preference assessment, it is not clear whether food, as a stimulus category, is more preferred to non-food items by people with developmental disabilities. The aim of this study is to systematically replicate the above

studies, while controlling for the reinforcing value of food and non-food items. In the ensuing sections, I will review the concept of preference, review various procedures used to assess preference, and describe the statement of the problem and purpose of the study. This will be followed by the method, results, and discussion of the current study.

Concept of Preference

From a behavioral perspective, preference is measured as a "pattern of choosing" (Martin, Yu, Martin, & Fazzio, 2006, p. 236). If a typically developing human were to be asked to choose between two alternatives, we would be quite confident of their preference after a single response due to the ability to communicate and confirm with them. However, if we were to examine preference in an individual with developmental disabilities with impairments of communication, replications of the choice would be necessary before preference toward a certain choice could be stated (Martin et al.). Through the use of a stimulus preference assessment, the ability to confidently identify preferred items among individuals with developmental disabilities increases.

Stimulus Preference Assessment Procedures

Preference can be assessed through the use of indirect or direct methods. Indirect methods include the use of checklists or interviews, which can be structured or unstructured. The information collected is based on the opinions of those who are familiar with the individual, such as caregivers or family members (Hagopian et al., 2004). Direct methods include procedures which involve asking an individual to interact or select a stimulus. Indirect measures can be easily implemented and can function with limited resources, whereas direct measures require a greater investment of time and resources. Both approaches have benefits and limitations, but in practice, it would be beneficial to first use indirect measures to identify a list of preferred items,

followed by a direct method to systematically identify those which are most preferred (Hagopian et al., 2004).

There are several different procedures which can be used to assess preference. The most basic procedure is single stimulus, in which a stimulus is presented to a participant, and preference is assessed on the basis of an approach by the participant to engage with the stimulus (Pace et al., 1985). This procedure allows preference toward individual items to be determined, but as the procedure does not compare items through concurrent presentations, a preference hierarchy among the items is difficult to establish because individuals tend to approach the item presented on every trial (Fisher et al., 1992). A preference hierarchy indicates which items among those in the array are the most preferred, moderately preferred, and least preferred.

A second type of procedure, free operant, allows participants non-contingent access to stimuli, and allows the participant to interact with any or all of the stimuli for the duration of the assessment (Roane, Vollmer, Ringdahl, & Marcus, 1998). Participants can demonstrate preference for items through engagement; however, the engagement with the preferred item or items may mask any preference for other items in which engagement was not observed.

Another procedure is the multiple-stimulus procedure, which involves the presentation of an array of items during each trial (Windsor, Piché, & Locke, 1994), and asking the participant to select one item. Following a selection, the item is replaced in the array prior to the next trial. One advantage to this procedure is that it can be conducted in a time-efficient manner. However, this procedure is also limited in its ability to produce a preference hierarchy because it can be masked by a participant selecting the same item on every trial.

In order to better differentiate preference, a multiple-stimulus without replacement assessment can be used. With this procedure, an individual is presented with an array of items on

the first trial and asked to select one item. The selected item is not presented in subsequent trials, and the remaining items are presented. This process continues until the last two items have been presented or until the participant no longer makes selections (DeLeon & Iwata, 1996). This procedure ensures that a participant will select items based on their preference, with the assumption that the most preferred items are being selected first. The resulting outcome is that a preference hierarchy can be established due to items being removed from the array as they are selected.

Another stimulus preference assessment that tends to produce a differentiated preference hierarchy is the paired-stimulus procedure. In this procedure, two items are presented simultaneously on each trial, and all possible combinations of items are presented (Fisher et al., 1992). The pairings can be counterbalanced, to ensure that each pairing is presented in each possible positioning, to account for any potential bias a participant may have to selecting items on a given side (i.e., left or right). This procedure requires more trials to assess the same number of stimuli compared to the multiple-stimulus without replacement procedure, but it does not require the individual to attend to more than two items on each trial. Another advantage with the paired-stimulus procedure is that the preference for each item compared to all other items can be determined. Because all possible combinations of items are presented, the results can be examined to see which items are selected under which conditions, and a preference hierarchy can be determined based on how often each item is selected.

Preference Studies on Food versus Non-food

Previous studies have examined the use of food and non-food reinforcers in preference assessment and have generally found that food items were more preferred than non-food items. DeLeon et al. (1997) assessed preference of food items and leisure items separately among 14

individuals who had been diagnosed with an intellectual disability, using a multiple-stimulus without replacement stimulus preference assessment. They then conducted a preference assessment by combining the top three most preferred food items and the top three most preferred non-food items. The general finding was that food items were preferred to non-food items. For 12 of the 14 participants, food was selected as the most preferred item. Furthermore, for eight of the participants, the lowest ranked food item was preferred to the highest ranked non-food item. For two participants, non-food items, which ranked lower than the food items on the preference hierarchy, were subjected to a reinforcer test, and they were found to be reinforcing to the participant. This study was replicated by Bojak and Carr (1999), who included preference assessments conducted before and after meals to account for any possible differences due to satiation. They found that food items were preferred to non-food items with four participants with severe intellectual disabilities, and preference did not vary significantly from pre-meal to post-meal. Finally, Fahmie et al. (2015) conducted a replication of DeLeon et al. (1997), with the addition of acquisition and maintenance components. The acquisition phase involved a most-to-least manual guidance procedure in which the participant was asked to build a structure. Food or non-food items were presented as reinforcement for a correct response. The maintenance component involved training participants to respond on a fixed-ratio 10 schedule (reinforcement was presented after every 10 responses). Following training, maintenance conditions were conducted, in which participants were reinforced with either a food or non-food reinforcer for responding based on the fixed-ratio schedule. The findings with respect to preference showed that food items were preferred to non-food items, and that food items also showed more durable effects in the maintenance component compared to the non-food items. The results of the acquisition task were similar for both groups of reinforcers.

The items used in these studies were selected arbitrarily form a larger list of items (Deleon et al., 1997; Fahmie et al., 2015) or through the use of a structured interview with caregivers (Bojak & Carr, 1999). The structured interview used by Bojak and Carr was the Reinforcement Assessment for Individuals with Severe Disabilities (RAISD) (Fisher, Piazza, Bowman, & Amari, 1996). The RAISD is a 10-question structured interview, which is used to collect information from those familiar with the individual, to help identify possible reinforcers for the individual. The questionnaire also aims to identify under what conditions the possible reinforcers may be most effective. Non-food items were selected based on recommendations of staff, taking into account sensory characteristics of the item (Deleon et al., 1997; Fahmie et al., 2015) or through the use of RAISD (Bojak & Carr).

A recent study by Andakyan et al. (2016) offered another replication of DeLeon et al. (1997). However, two of the four participants displayed preference for non-food items, indicating that food items may not always be preferred to non-food items. The item selection procedure in this study also consisted of using the RAISD (Fisher et al., 1996), with the parents completing the assessment. These results suggest that food should not always be assumed to be more preferred and by implication a stronger reinforcer than non-food items. Therefore, future research should examine variables which may affect the preference toward food and non-food items.

A final study, which provided evidence for preference toward non-food items was conducted by Virués-Ortega, Iwata, Nogales-Gonzalés, and Frades (2012), who found that non-food items were preferred by all of their participants. This study used participants who were diagnosed with dementia, and the authors suggested that the results may have been obtained due to a lack of preference toward food. This is a common occurrence as individuals age, and is more

apparent in individuals who have dementia (Virués-Ortega et al., 2012). Despite these results not involving individuals who have been diagnosed with a developmental disability, it is still important to highlight that there are documented instances where food is not always preferred to non-food items.

Statement of the Problem and Purpose of the Study

In all of the above studies that compared preference for food and non-food items, no attempt was made to assess the reinforcing value of the selected items prior to the preference assessment. Consequently, the reinforcing values of the items were unknown. Therefore, it is not possible to draw a firm conclusion that preference for food to non-food items was a function of the stimulus category, independent of the reinforcing values of the stimuli. Lee, Yu, Martin, and Martin (2010) have shown that preference values are positively correlated with reinforcing values. Therefore, it is possible that the food items used in the studies by Bojak and Carr (1999), DeLeon et al. (1997), and Fahmie et al. (2005), may have been more reinforcing than the non-food items, leading to displacement of non-food items. In contrast, the food and non-food items may have had similar reinforcing values in the study by Andakyan et al. (2016), leading to the mixed results. To clarify the relation between food and non-food items, research should identify and control the reinforcing value of the items prior to preference assessment.

The purpose of my study was to examine whether preference is determined by stimulus reinforcing value (high reinforcing vs. low reinforcing) or by stimulus category (food vs. non-food). This was accomplished by first identifying the reinforcing value of each item through reinforcer tests. Then, preference assessments for food and non-food items of similar and different reinforcing values were conducted. This study received ethical approval from the University of Manitoba Psychology/Sociology Research Ethics Board before it commenced.

Method

Participants

Three adults with severe to profound developmental disabilities were recruited from St.Amant, located in Winnipeg, Canada. St.Amant is a community organization, which provides programs and services to support individuals with developmental disabilities. Two males and one female participated, with an age range of 26-61 years (see Table 1 for more information). The relation between preference towards food and non-food items has not been shown to be affected by age, gender, or specific diagnoses of developmental disability, as the previously described studies contained a wide range of participants in age and diagnoses, as well as a mix of both males and females (Bojak and Carr, 1999; DeLeon et al., 1997; Fahmie et al., 2005). With this consideration, no attempt was made to control for age, gender, or specific diagnosis. However, participants must have been able to press a microswitch and reach for or grasp items during the preference assessments. Participants were required to consume food as part of the inclusion criteria, so those who were unable to consume food items were also excluded from the study. All three participants met the inclusion criteria. Participants were also screened for a suspected or confirmed diagnosis of dementia, which involved reviewing the clients file. No participant had any indication of dementia. Written informed consent was obtained from the legal decision maker for each participant before the study began (see Appendix A). Assent was sought from participants prior to the commencement of each session.

Setting

All sessions were conducted in an assessment room at St.Amant. The room was furnished with a table and chairs, and the participant was seated across from the experimenter during all sessions, except for Participant 2. For this participant, the researcher was seated at the side of the

participant due the necessity of a wheelchair tray, and to allow for a closer and more accessible distance when presenting and removing items.

Equipment and Materials

This study required the use of a microswitch, an X-Keys ® MWII USB interface (Model # XSI-38-US), and a computer containing Excel® with custom macros to record the data. The microswitch was a round blue button (25 cm in diameter) attached to a wooden board with a handle, which allowed for easy presentation and removal of the switch. The microswitch required a slight force (2-3 g) in order to close the connection and allow a response to be recorded. When the connection was closed, an audible click was heard.

During this study, the microswitch was the only device connected to the X-Keys® interface and the X-Keys® interface was connected, via USB, to a notebook computer. When the microswitch was activated, the interface would trigger a simple command to occur on the computer. The command triggered the activation of a macro in an Excel® spreadsheet, which recorded the specific time (with a resolution of 1/100th of a second) of each microswitch press.

During the baseline sessions, the macro recorded each separate timestamp on its own row, computed the interval between timestamps (i.e., inter-response time) after every response, and computed the total number of timestamps recorded (i.e., number of responses) at the end of the session. The spreadsheet also included a timer which was used to ensure each session was completed within a predetermined interval (described later). During the reinforcement sessions, the spreadsheet would pause the recording of further responses after the microswitch was activated, to allow for reinforcement to be presented. After the reinforcement interval had expired, the spreadsheet would be reactivated manually by the researcher via a pop-up dialog box.

This study also required an assortment of food and non-food items. Food and non-food items were initially selected based off staff and family recommendations, using the RAISD (Fisher et al., 1996) to identify the most appropriate items. At least two individuals were consulted to ensure that the items used were enjoyed by the individual. The final items were selected based not only on the opinions, but also the practicality at which a bite-sized portion (for food items) or reasonable interaction (for non-food items) could be presented to the individual. Some examples of food items were coffee, popcorn twists, and Smarties®. Non-food items included a puzzle, music, and marbles. Effort was made to ensure that the items were not typically available in the participant's natural environment in order to minimize the chance of satiation from being exposed to the item before the sessions took place. Two tablecloths of different colors were placed on the table, with each color associated with a different condition during Phase 1 (described below) and counterbalanced across participants. A video camera on a tripod was used to record all sessions.

Phase 1: Reinforcer Tests

The reinforcer tests allowed for the identification of reinforcers to be used in the subsequent preference assessment phase, and to allow for a reinforcing value to be assigned to each item. An ABAB design was used, where "A" referred to the baseline condition, and "B" referred to the reinforcement condition. Participants remained in a condition until a stable rate of responding was achieved (described below). In order to facilitate discrimination between phases, a blue or red tablecloth was placed on the table during baseline sessions and the tablecloth color not used during baseline sessions was used for reinforcement sessions. Participants 1 and 3 had the blue tablecloth during baseline sessions and Participant 2 had the red tablecloth during baseline sessions.

Baseline condition. The procedures for the baseline sessions were similar to those described by Lee et al. (2010). The participant had the microswitch within reach. The experimenter then demonstrated the response of pressing the switch and asked the participant to press the switch by saying *"name*, press the switch". If there was no response after 5 seconds, the experimenter provided physical guidance to evoke the response. After the participant pressed the switch, the session began with an instruction to press the switch. The instruction was repeated approximately once per minute during the session. The participant received a brief statement of praise (e.g., "good job") after each switch press. After 3 minutes, the switch was removed, and the session was complete. An exception was made for Participant 1, in which the session length was reduced to 30 seconds due to an extremely high response rate. This was necessary for the reinforcement phase (described below) in order to limit the session duration. There was a 5-minute break between each session.

The rate of responding, in responses per minute, was automatically calculated by the spreadsheet for each session. Baseline sessions continued until a stable rate of responding was observed across three sessions, based on the same criterion used by Lee et al. (2010). In order to be considered stable, there could not be a trend in the same direction among 3 consecutive sessions, unless it was a decreasing trend in the baseline phases, and the rate of responding for each session among three consecutive sessions must not deviate from the 3-session mean by more than 20%. One exception was made to Participant 3, in which there was a very low rate of responding and a change of one response would exceed the 20% in some instances. Therefore, if the total number of responses did not deviate by more than one response between the three sessions, Participant 3's responding was considered stable. Once the stability criterion was met, each participant moved to the reinforcement condition.

Reinforcement condition. The reinforcement condition followed the same procedure as the baseline condition, but it included the presentation of the item being tested each time the microswitch was pressed. When the switch was pressed, the session timer was paused, the switch was removed, and the participant was presented with either the food or non-food item. Participants were given 30 seconds to interact with the non-food item or were allowed to consume the food item during a period of 30 seconds. After the participant was provided with the reinforcer, the switch was put back in place, and the timer resumed until the participant pressed the switch again, or until the timer reached 3 minutes (or 30 seconds for Participant 1). Responses per minute were computed for each session. Sessions continued until stability was achieved, using the same criterion as described above, but a decreasing trend would not be considered. If an item showed a decrease in responding during the reinforcement condition, relative to baseline, it was eliminated from the study. No item was eliminated for this reason during the study.

Determining Reinforcing Value. After completing the baseline and reinforcement conditions, in the ABAB design, the reinforcing value was computed for the item tested. The reinforcing value was operationalized as the mean percent change in response rate during reinforcement conditions relative to baseline conditions. This value was determined by: (1) taking the last 3 sessions from each of the two baseline conditions and determining the mean responses per minute across the 6 sessions; (2) taking the last 3 sessions from each of the two reinforcement conditions and determining the mean responses per minute across the 6 sessions; and (3) calculating the mean percent change in response rate using the following formula: (mean reinforcement response rate – mean baseline response rate) / mean baseline response rate x 100%.

For each participant, four items were identified: one food and one non-food item that were weak reinforcers and one food and one non-food item that were strong reinforcers. The weak and strong reinforcing values were relative. That is, there was no specific reinforcing value associated with a weak or a strong reinforcer, but attempts were made to maximize the difference between items that were weaker and stronger reinforcers and to minimize the difference between items that were supposed to have similar reinforcing values.

Phase 2: Preference Assessment

This phase included all four items previously identified as reinforcers in Phase 1. The participant was first allowed to individually sample each item being assessed (either the food or non-food items). Each item was presented one at a time, and the participant was allowed to consume the item, or interact with it for up to 30 seconds. After sampling, items were presented using the paired-stimulus procedure. There were four unique pairings for the two food and non-food items as shown in the table below.

		Food Reinforcing Value	
		High	Low
Non-Food Reinforcing Value	High	2 trials	2 trials
	Low	2 trials	2 trials

A session consisted of 8 trials in order to present each unique pairing twice, such that the two items appeared in counterbalanced positions. Moreover, the trials were presented in a randomized order. The sessions were repeated three times for a combined total of 24 trials for the paired-stimulus preference assessment. All three sessions were completed in one day with successive sessions separated by at least 5 minutes.

On each trial, the experimenter held each item at the participant's eye-level and instructed him/her to "look" at the item before placing it on the table. The items were placed equidistant from the participant and from each other, and the participant was instructed to "pick one". A selection was defined as either hand coming into contact with an item within 10 seconds after the instruction, without rejecting it (e.g., by pushing it away). If a selection was made, the participant received a statement of praise, the unselected item was removed from the table, the participant was allowed to consume the selected food item or engage with the non-food item for 30 seconds, and the next trial was presented. If no selection was made after 10 seconds, the items were removed, and the next trial was presented. If the participant attempted to select both items, the experimenter blocked the participant, removed all items from the table, and repeated the trial.

For trials in which an item was selected, that item was scored as selected. If a participant grabbed both items, no score was assigned and the trial was re-presented. If no selection was made after 10 seconds, this was noted as "no selection" and both items were scored as not selected. Once all trials have been completed, the preference of each item was determined using the formula: (number of trials the item was selected) / (number of trials the item was presented) × 100%.

The latency for each trial was determined after the session was completed. Latency was defined as the interval between the time the participant was instructed to make a selection, until they actually made a selection. To determine the latency, the researcher reviewed the videos, and using a stopwatch, calculated the length of the interval using the definition above.

Reliability Checks on Phase 1 Reinforcer Tests

Interobserver reliability checks were not completed for the reinforcer tests due to the nature of the data recording system being automated. However, the recording system was

checked by the researcher before each session. This involved pressing the switch a small number of times and ensuring that the same number of responses were recorded on the spreadsheet. No malfunction of the system was encountered throughout the study.

Reliability Checks on Phase 2 Preference Assessment

Observer training. Observer training consisted of training the observer on how to score selections made during the preference assessment phase. Mock videos were developed for training purposes. The observer and experimenter independently scored a session and computed a percent agreement score (described below). If agreement was less than 100%, the experimenter and observer reviewed the disagreement before scoring another session. Training continued until the observer achieved 100% agreement for one session with the experimenter. The observer achieved 100% agreement with the experimenter after 2 training sessions.

Reliability checks were also conducted on the latencies measured during the preference assessment. Training involved first describing when the timer should be started and when it should be stopped. The timer was started after the researcher finished saying “pick one” and was stopped after the participant made contact with the selected item. Several practice trials were conducted to ensure that both the researcher and observer were in agreement.

Interobserver reliability. Reliability checks were conducted for all preference assessment sessions in Phase 2. The observer scored each session independently of the researcher, with 66% of sessions being scored live and 33% of sessions being scored via video. An agreement consisted of both the experimenter and observer indicating the same outcome on a trial (selection of the same item or of no item). Percent agreement was calculated for each session by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. The agreement was 100% for all sessions.

Interobserver reliability checks were conducted on the calculated latencies. These checks were all completed via video, and the researcher and observer scored each video independently. Percent agreement was calculated for each trial by taking the smaller value of the latencies between the researcher and observer, dividing it by the larger of the two values, and multiplying by 100%. The average agreement across all trials was 89.9%. The range obtained was 49.7% to 100%. Upon examining the data points where low agreement occurred, there were two possible reasons for the low values. The first is that a small number of trials were difficult to decipher, and it was unclear when a selection was actually made. For example, the participant may have placed their hand over the item and blocked the camera's view, such that it was not completely clear when the selection was made. The second reason may be that the response interval was very short (i.e., under half a second); therefore, it was more difficult to start and stop the timers at the correct time.

Procedural Reliability Checks

Observer training. Training followed the same procedure described above for reliability checks on Phase 2, but the observer was trained to score the behaviors of the experimenter. Training required the researcher and observer to attain 100% agreement for both the reinforcer tests and preference assessments, and this was completed after 2 training sessions. Training involved explaining and demonstrating the procedure and highlighting what would be considered correct for each of the criteria. During practice, feedback was provided on any disagreements, so the observer could determine when a response was to be marked as correct.

Reliability checks. Procedural reliability checks were conducted for all of the sessions in each condition in Phase 1. The observer was asked to score whether or not the experimenter followed the planned procedures during each session using a checklist (see Appendix B). During

each session, the observer scored whether the correct color tablecloth was used, whether the experimenter correctly administered the initial demonstration of the switch-pressing task, whether verbal instructions to press the switch were given once per minute, and whether or not the consequence was correctly provided (praise during baseline or praise plus item during reinforcement phases). The percentage of correct behaviors was calculated for each session using the following formula: (number of correct responses) / (number of response opportunities) × 100%. Procedural integrity checks were completed for 196 out of the 197 available reinforcer test sessions, with 64.3% of sessions scored via video and 35.7% of sessions being scored live. One session was not scored due to a camera failure near the beginning of a session. The mean procedural integrity score across sessions was 99.7%, with a range of 90% to 100%.

Procedural reliability checks were conducted for all of the stimulus preference assessment sessions in Phase 2. During stimulus preference assessment sessions, the observer assessed whether or not the experimenter presented the correct stimuli in the correct positions on each trial, provided the correct verbal prompts (e.g., “look” and “pick one”), gave access to the chosen item, and removed the unselected item from the table (see Appendix C). A trial was scored as correct if all behaviors were performed correctly. The percentage of trials delivered correctly was calculated for each session using the following formula: (number of correct trials) / (number of correct trials plus number of incorrect trials) × 100%. The procedural integrity score for all preference assessment sessions was 100%, indicating that all steps from the procedure were carried out as intended.

Results

Phase 1: Reinforcer Tests

Four items were tested during the reinforcer tests in Phase 1 for Participant 1 (Coffee,

Puzzle, Popcorn Twists®, and Card Game). The response rate (responses per minute) during baseline and reinforcement sessions for each item are shown in Figure 1. Participant 1 had reinforcer test sessions reduced from 3 minutes to 30 seconds due to a high response rate after 12 sessions for the first item (Coffee). The session duration remained at 30 seconds for all other items tested.

For the first item (Coffee), stability criteria were met after 7 sessions during the first baseline phase, after 3 sessions during the first reinforcement phase, after 3 sessions (after switching to 30-second sessions) during the second baseline phase, and after 3 sessions during the second reinforcement phase (Figure 1). The reinforcing value of Coffee was 55.6%. For the second item (Puzzle), stability criteria were met after 5 sessions during the first baseline phase, after 4 sessions for the first reinforcement phase, and after 3 sessions each for the second baseline and reinforcement phases. The reinforcing value of the Puzzle was 129.9%. For the third item (Popcorn Twists®), stability criteria for each of the two baseline and each of the two reinforcement phases were met after three sessions per phase. The reinforcing value of the Popcorn Twists® was 125.8%. For the final item (Card Game), stability criteria were met after 5 sessions for the first baseline phase, and 3 sessions for each of the remaining phases. The reinforcing value for the Card Game was 45.3%.

For Participant 1, the two items identified for the low reinforcing value category were a Card Game and Coffee. The coffee was slightly more reinforcing than the card game; however, the reinforcing values only differed by about 10%. The two items identified for the high reinforcing condition were a Puzzle and Popcorn Twists®, with the puzzle being slightly more reinforcing. The reinforcing values between the two items differed by less than 5%.

Five items were tested during the reinforcer tests in Phase 1, for Participant 2 (Music,

Popcorn Twists®, Spinning Light, Cheetos®) with one item (Videos) being dropped after the first reinforcement phase due to its similarity in reinforcing value with the high non-food item, whose reinforcing value had previously been established. See Figure 2 for detailed results obtained during Phase 1. This participant had limited physical mobility with his arms, so the researcher sat beside him for all reinforcer tests. This facilitated the presentation and removal of the microswitch and items.

For the first item (Music), stability criteria were met after 5 sessions during the first baseline phase, and after 3 sessions during each of the remaining three phases (Figure 2). The reinforcing value of Music was 389.1%. For the second item (Popcorn Twists®), stability criteria were met after 3 sessions for each of the first baseline and reinforcement phases, after 9 sessions for the second baseline phase, and after 5 sessions for the second reinforcement phase. The reinforcing value of Popcorn Twists® was 94.2%. For the third item (Spinning Light), stability criteria were met after 7 sessions during the first baseline phase, after 4 sessions during the first reinforcement phase, after 3 sessions for each of the second baseline and reinforcement phases. The reinforcing value of the Spinning Light was 98.8%. For the final item (Cheetos®), stability criteria were met after 3 sessions for the first baseline phase, after 4 sessions for the first reinforcement phase, after 11 sessions for the second baseline phase, and after 3 sessions for the second reinforcement phase. The reinforcing value for the Cheetos® was 212.8%

For Participant 2, the two items identified for the low reinforcing value category were a Spinning Light and Popcorn Twists® (see Figure 2). The Popcorn Twists® were slightly more reinforcing than the spinning light, however the reinforcing values only differed by less than 5% (see Table 2). The two items identified for the high reinforcing condition were music, played through portable speakers, and Cheetos® (see Figure 2). The non-food item was found to be

much more reinforcing than the Cheetos®, with a difference of about 175%. Even though their matching was not as close as would have been preferred, the difference was still accepted to understand how items are selected when the non-food item is significantly more reinforcing than the food item.

Four items were tested during the reinforcer tests in Phase 1 for Participant 3 (Smarties®, Marbles, Popcorn Twists®, Plasma Ball). During the initial baseline sessions, it was noted that the participant would press the switch in small bursts, which involved pressing the switch two times in quick succession, followed by a short pause. As this trend occurred almost consistently throughout baseline sessions and attempts to press the switch twice during reinforcement intervals were also observed (but not recorded due to the spreadsheet locking out after one press), a decision was made to exclude a switch press if it occurred within 1.7 seconds of a previous switch press. This value was determined through close examination of the data and 1.7 seconds was the longest interval in which the bursts occurred during the initial baseline sessions. In several instances, this reduced the actual number of valid presses of the microswitch (as recorded by the spreadsheet) by up to 50%.

For the first item (Smarties®), stability criteria were met after 6 sessions during the first baseline phase, after 4 sessions during the first reinforcement phase, after 8 sessions during the second baseline phase, and after 4 sessions during the second reinforcement phase (Figure 3). The reinforcing value of Smarties® was 443.3%. For the second item (Marbles), stability criteria were met after 5 sessions during the first baseline phase and after 3 sessions for each of the remaining three phases. The reinforcing value of the Marbles was 3,246.8%. For the third item (Popcorn Twists®), stability criteria for each of the two baseline and each of the two reinforcement phases were met after three sessions per phase. The reinforcing value of the

Popcorn Twists® was 16.3%. For the final item (Plasma Ball), stability criteria were met after 5 sessions during the first baseline phase, after 3 sessions during the first reinforcement phase, after 6 sessions during the second baseline phase, and after 3 sessions during the second reinforcement phase. The reinforcing value for the Card Game was 45.3%.

For Participant 3, the two items identified for the low reinforcing value category were a Plasma Ball and Popcorn Twists®. The Plasma Ball was slightly more reinforcing than the Popcorn Twists®; however, the reinforcing values were close and only differed by about 7%. The two items identified for the high reinforcing condition were Marbles and Smarties®, with the marbles being more than 7 times as reinforcing as the Smarties®. The reinforcing values between the two items differed by about 2,800% (see Figure 3).

Phase 2: Preference Assessment

Figure 4 shows the results of the preference assessment for the three participants. The bar graphs (read against the left vertical axes) show the percent reinforcing value of each item and the line graphs (read against the right vertical axes) show the percentage of trials each item was selected during the preference assessment. Participant 1 showed a consistent and exclusive preference for food items (Figure 4, top graph), with the food items being selected 100% of the time, regardless of their reinforcing values relative to the non-food items. Participant 2 showed an equal preference for both high reinforcing items, with each item being selected 58.3% of the time they were presented (Figure 4, second graph). The low reinforcing food item (Popcorn Twists®) was selected more often (50% of the trials when presented) than the low non-food item, the Spinning Light (33.3% of the trials when presented). The preference assessment for Participant 3 showed the highest preference for the high reinforcing value non-food item (Marbles), which was also the item with the highest reinforcing value. This item was selected on

83.3% of the trials. The second most preferred item was the Popcorn Twists®, the low reinforcing food item, with this item being selected during 58.3% of the preference assessment trials. The third most preferred item was the high reinforcing food item (Smarties®), being selected on 50% of the trials. This result was a bit surprising given that there was a large relative difference between the reinforcing values of the two food items (Smarties® 443% vs. Popcorn Twists® 16.3%). However, both food items might also be considered weak reinforcers, relative to the Marbles, with a reinforcing value of 3,246.8%. Finally, the least preferred item was the Plasma Ball, being selected only during 8.3% of the preference assessment trials.

During the preference assessments, the average latency for the selection responses for each item is reported in Table 2. In general, items that were more preferred (higher percentage of trials selected) had shorter latencies than items that were less preferred. Although Participant 1 selected both food items equally frequently, her mean latency was 3.4 times shorter for Popcorn Twists® with the higher reinforcing value (125.8%) than for Coffee (55.6%). For Participant 2, although Music and Cheetos® were tied in preference (58.3%), Music had a higher reinforcing value than Cheetos® (389.1% vs. 212.8%), and a shorter mean latency was observed for Music than for Cheetos® (2.8 s vs. 5.8 s) (see Table 2). Popcorn Twists® was the lowest reinforcing value item and had the highest average latency at 8.1 s, in spite of it being a food item. For Participant 3, Popcorn Twists®, the item with the lowest reinforcing value, had the longest mean latency at 2.1 s. The latencies for the other three items, however, were quite similar at 1.3 and 1.5 s.

Discussion

If preference was determined solely by reinforcing value, then we would have expected to see: (a) a stronger preference for items with higher reinforcing values, regardless of the

stimulus category, and (b) approximately equal preference for items with similar reinforcing values. On the other hand, if preference was determined solely by the stimulus category (e.g., food is preferred to non-food), then we would have expected to see a stronger preference for food items, regardless of the reinforcing values. Participant 1's results clearly showed that her preference was determined by stimulus category. That is, her results showed that even though the items were closely matched in reinforcing values, food was always the more preferred item. Furthermore, in instances where the more reinforcing non-food item was presented with the less reinforcing food item, the food items were still consistently selected, suggesting that a higher reinforcing value did not result in an increased preference toward that item. It is important to highlight that Participant 1 had a short session duration, restricted to 30 seconds of switch access. However, there was no major discrepancy between the response rates obtained for the baseline sessions of 3 minutes in length and the baseline sessions of 30 seconds in length.

In contrast, Participants 2's results appeared to be influenced more strongly by reinforcing value than by stimulus category. Participant 2 showed stronger and similar preferences (58.3%) for the non-food (Music) and food items (Cheetos®) that had higher reinforcing values than for the non-food (Spinning Light, preference 33.3%) and food items (Popcorn Twists®, preference 50%) that had lower reinforcing values (see Table 2). The low reinforcing items showed that the food item was slightly more preferred than the non-food item, which suggested that when items were of similar reinforcing value, the food item was more preferred.

The results of Participant 3 appeared to be influenced by both reinforcing value and stimulus category. Participant 3 showed his strongest preference for the non-food item (Marbles, preference 83.3%), which had a substantially higher reinforcing value relative to all other items

(see Table 2). However, his preference for the remaining items appeared to be determined more strongly by stimulus category (food) than by reinforcing value.

The response latency during preference assessments appeared to be affected mainly by reinforcing value instead of stimulus category. This is true for Participant 1 for the two food items, where the more reinforcing item (Popcorn Twists®) was selected 3.4 times more quickly than the less reinforcing item (Coffee, see Table 2). This was also the case for Participant 2 in which the more reinforcing non-food item (Music) was selected 2.9 times more quickly than the less reinforcing food item (Popcorn Twists®). Lastly, Participant 3 had the longest latency (2.1 s) for the least reinforcing food item (Popcorn Twists®), and he showed very similar latencies (1.3 and 1.5 s) for the remaining items.

Overall, the results suggest that neither the reinforcing value nor the particular stimulus category is a controlling variable that applies to all participants. Participant 1's preference was influenced by stimulus category, Participant 2's preference was influenced by reinforcing value, and Participant 3's preference was influenced by both. There is evidence to suggest that an interaction between the two variables exists – when the items are approximately equally reinforcing, or when food is more reinforcing, food is more preferred; but when a non-food item is significantly more reinforcing than a food item, preference shifts towards the non-food item.

The obtained results for Participants 2 and 3 in the present study seem to replicate those of Andakyan et al. (2016), in which unique preference for food items was not observed. Given that the current study expanded on previous research by considering the reinforcing value, it would be fair to speculate that the non-food items in Andakyan et al. may have held higher reinforcing values than the food items. When comparing to other studies which found that food items were preferred over non-food items (Bojak & Carr, 1999, Deleon, et al., 1997; Fahmie, et

al., 2015), the results of Participant 1 in the present study appear consistent with that finding.

Although the conditions under which preference is determined by stimulus category versus reinforcing value remains unclear, the results of the present study suggest that the magnitude of the reinforcing value of the stimuli may be a factor. For Participant 1, whose preference was determined solely by stimulus category, the highest reinforcing value of the non-food item (Puzzle, 129.9%) was 2.3 times stronger than the weakest reinforcing value of the food item (Coffee, 55.6%). For Participant 2, whose preference was determined by reinforcing value, the highest reinforcing value of the non-food item (Music, 389.1%) was 4.1 times stronger than the weakest reinforcing value of the food item (Popcorn Twists®, 94.2%). For Participant 3, whose preference was determined partially by reinforcing value, the highest reinforcing value of the non-food item (Marbles, 3,246.8%) was 199.2 times stronger than the weakest reinforcing value of the food item (Popcorn Twists®, 16.3%). It is possible that where the relative reinforcing values of two items are similar or where the difference is small, food is more preferred than non-food. However, the non-food item is more likely to be preferred than the food item if the relative difference in reinforcing value increases. This may suggest that some threshold exists, at which point preference may completely shift towards a non-food item. Future research is needed to address this question. Overall, the results of the present study provide evidence that food is not always preferred to non-food items.

A major strength of the present study is the determination of the reinforcing values prior to assessing preference. This allowed us to further explain why certain categories of items (i.e., food or non-food) may have been selected in certain situations. Prior research had not considered reinforcing value as a variable when assessing preference, and therefore the results may be skewed by reinforcing values. This may be one reason why the studies conducted by Bojak and

Carr (1999), DeLeon et al. (1997), and Fahmie et al. (2005) all showed preference toward food reinforcers.

A second strength of the study was the use of automated data recording for the reinforcer tests. As the system recorded every press of the microswitch and ignored those when a reinforcer was to be presented (thereby preventing a double press), the risk of experimental error of manual recording was eliminated. This also allowed for decisions to stay at a current phase or move to the next phase to be made much more quickly, and with a higher degree of confidence. The system also allowed for a higher degree of resolution, resulting in the latencies being added as additional data.

Some limitations of this study should be noted. The first one is the limited number of items tested for each participant. Despite identifying at least one matching pair per participant, more items would allow for a greater understanding of how reinforcing value interacts with preference, especially when there are large discrepancies in the reinforcing values of two items. In order to identify whether or not there is a point where preference may completely shift from one stimulus category to another, a larger number of items with different relative reinforcing values would need to be identified and compared with each other. Second, there were a number of participants who may have been excluded based on restriction toward food items. Individuals who consume food based on modified diets or food preparation may show different preference towards non-food items, as was observed in Virués-Ortega et al. (2012) with individuals with dementia. Future replications with participants diagnosed with both a developmental disability and a secondary diagnosis, such as dementia, will extend the generality of the results of the present study. Furthermore, future replications with additional participants will also extend the generality of the present results.

The obtained results suggest that there may exist a threshold where the reinforcing value of the non-food item is significantly higher than that of the food item, which results in an increasing preference toward the non-food item as the reinforcing value increases. Future studies should aim to better understand if a threshold does exist, and if so, whether the threshold is specific to the individual, or the general trends are consistent across a number of individuals.

There are several implications in which these results may be of benefit in clinical applications. First, in teaching situations, where reinforcers are provided, teachers or instructors may be able to consider non-food items to be used in place of food items. This may have health benefits for individuals, as a higher quantity of a non-food reinforcer can be provided in a shorter amount of time. The use of non-food reinforcers may also expand on the array of reinforcers available to an individual, as food and non-food items could be offered. Finally, providing more options also removes the barrier of limiting choices to an individual.

This study is important from a scientific standpoint because it helps us to better understand how food and non-food stimulus categories interact with reinforcing value. From an applied standpoint, the assumption that food is always preferred to non-food may cause an over-reliance on using food as a reinforcer in teaching situations and limit the variety of reinforcers available to a client. In conclusion, this study provides an additional piece of evidence which suggests that food is not always preferred to non-food items.

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Table 1

Participant Demographics

Participant	Age	Gender	Diagnosis
1	61	Female	Developmental delay
2	26	Male	Developmental delay
3	53	Male	Profound developmental disability

Table 2

Mean Latency (s) of Selection Response for Each Item during Preference Assessments for each Participant

Item	Stimulus Group	Preference (% of Trials Selected)	Mean Latency (s) When Selected
Participant 1			
Puzzle	Leisure High	0	N/A
Popcorn Twists	Food High	100	1.4
Card Game	Leisure Low	0	N/A
Coffee	Food Low	100	4.8
Participant 2			
Music	Leisure High	58.3	2.8
Cheetos	Food High	58.3	5.8
Spinning Light	Leisure Low	33.3	5.2
Popcorn Twists	Food Low	50	8.1
Participant 3			
Marbles	Leisure High	83.3	1.5
Smarties	Food High	50	1.5
Plasma Ball	Leisure Low	8.3	1.3
Popcorn Twists	Food Low	58.3	2.1

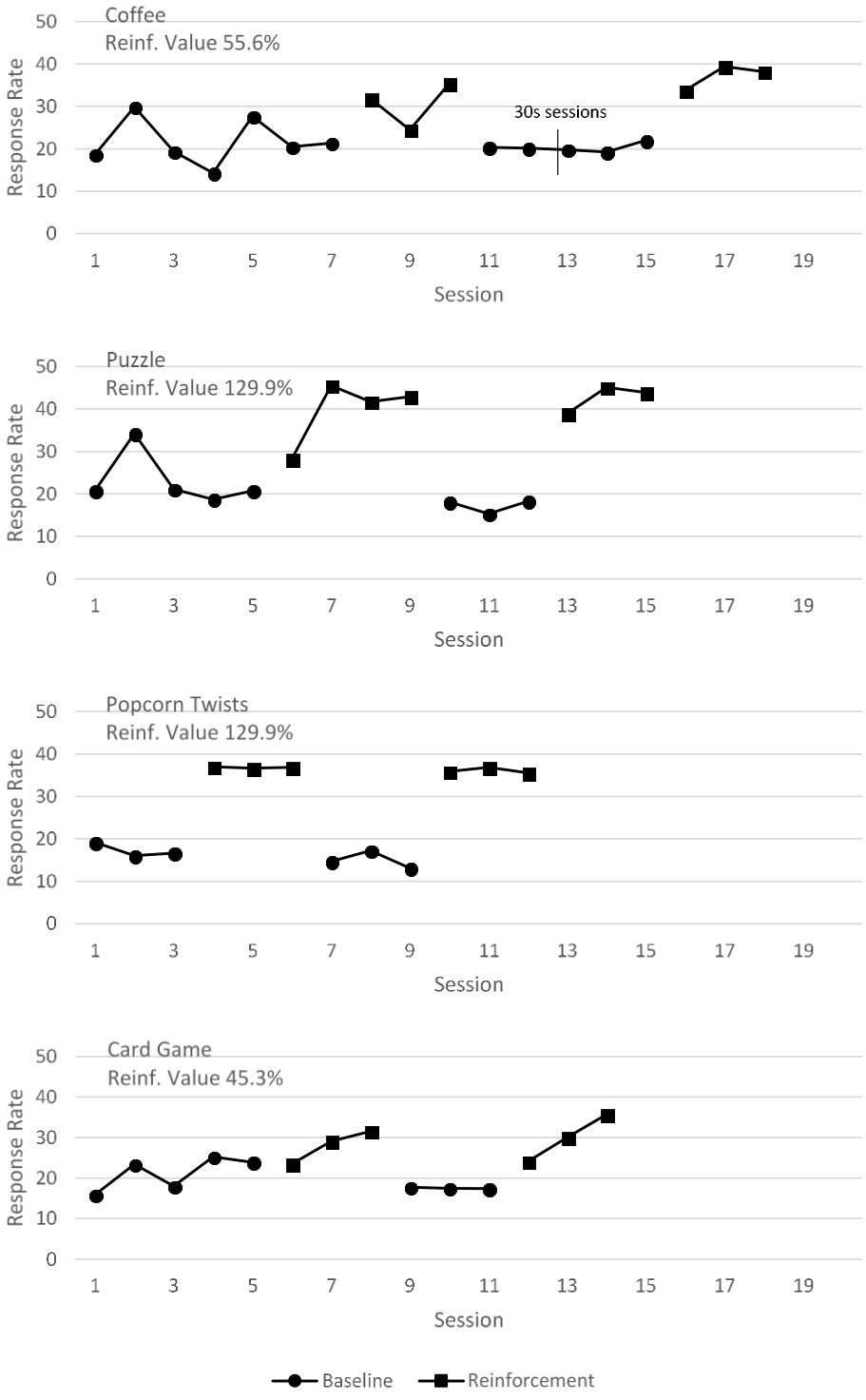

Figure 1. Response rate (responses per minute) during baseline and reinforcement phases for Participant 1. Session duration changed from 3 min to 30 s after 12 sessions for the first item (Coffee) and was 30 s for all sessions of the other items. The computed reinforcing value of each item is shown in each graph.

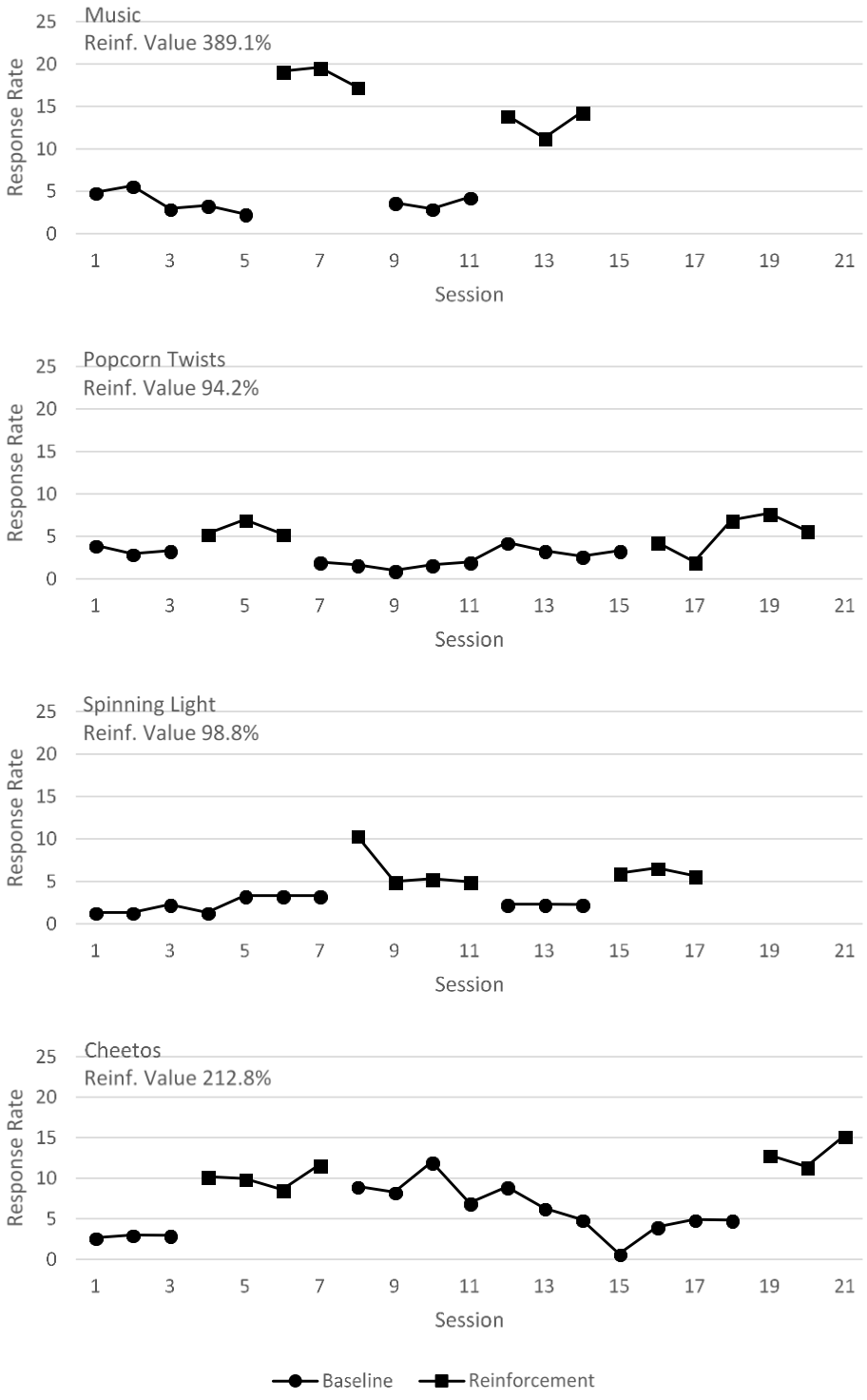

Figure 2. Response rate (responses per minute) during baseline and reinforcement phases for Participant 2. The computed reinforcing value of each item is shown in each graph.

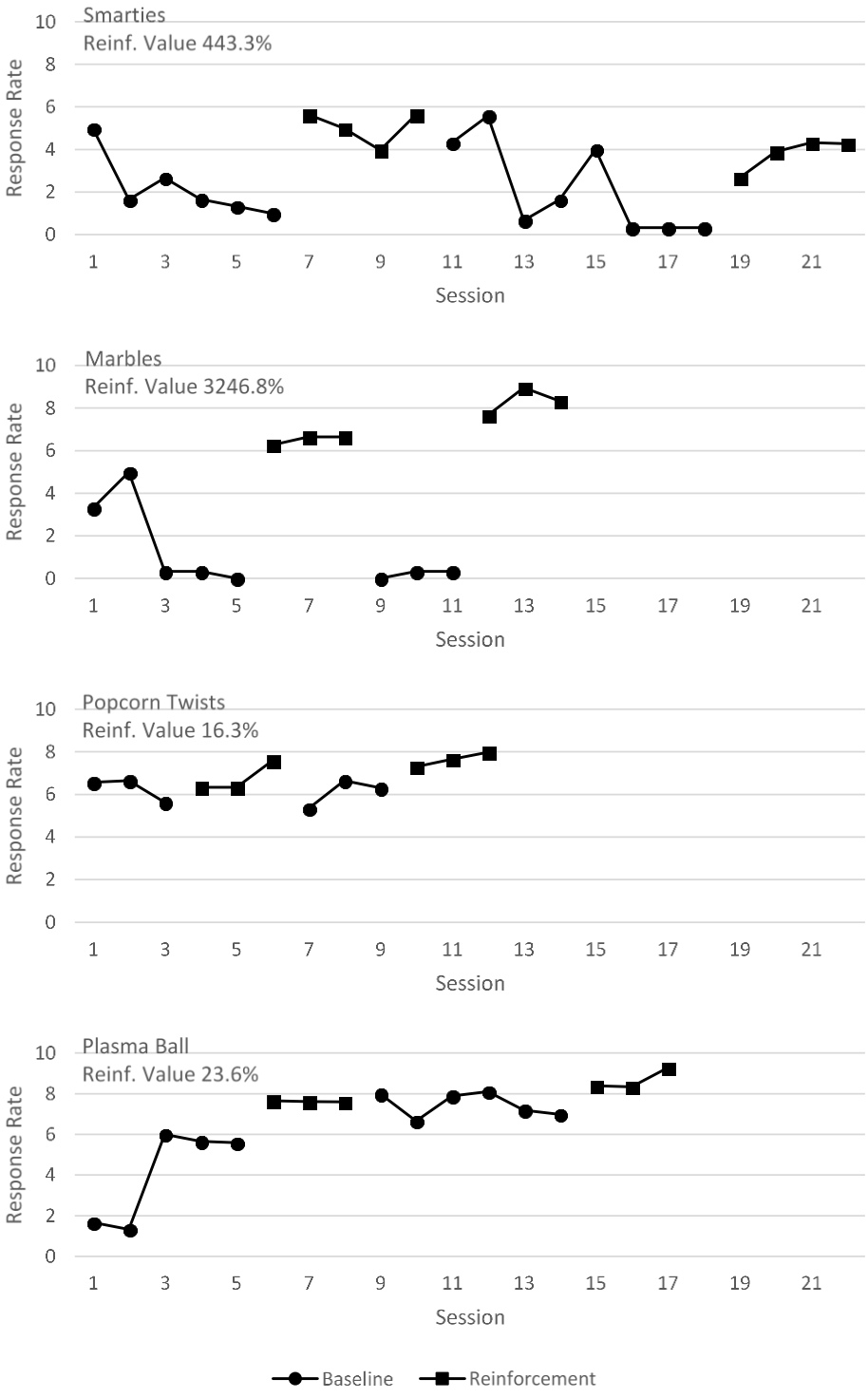

Figure 3. Response rate (responses per minute) during baseline and reinforcement phases for Participant 3. Baseline data represents data where bursts of switch pressing were excluded. The computed reinforcing value of each item is shown in each graph.

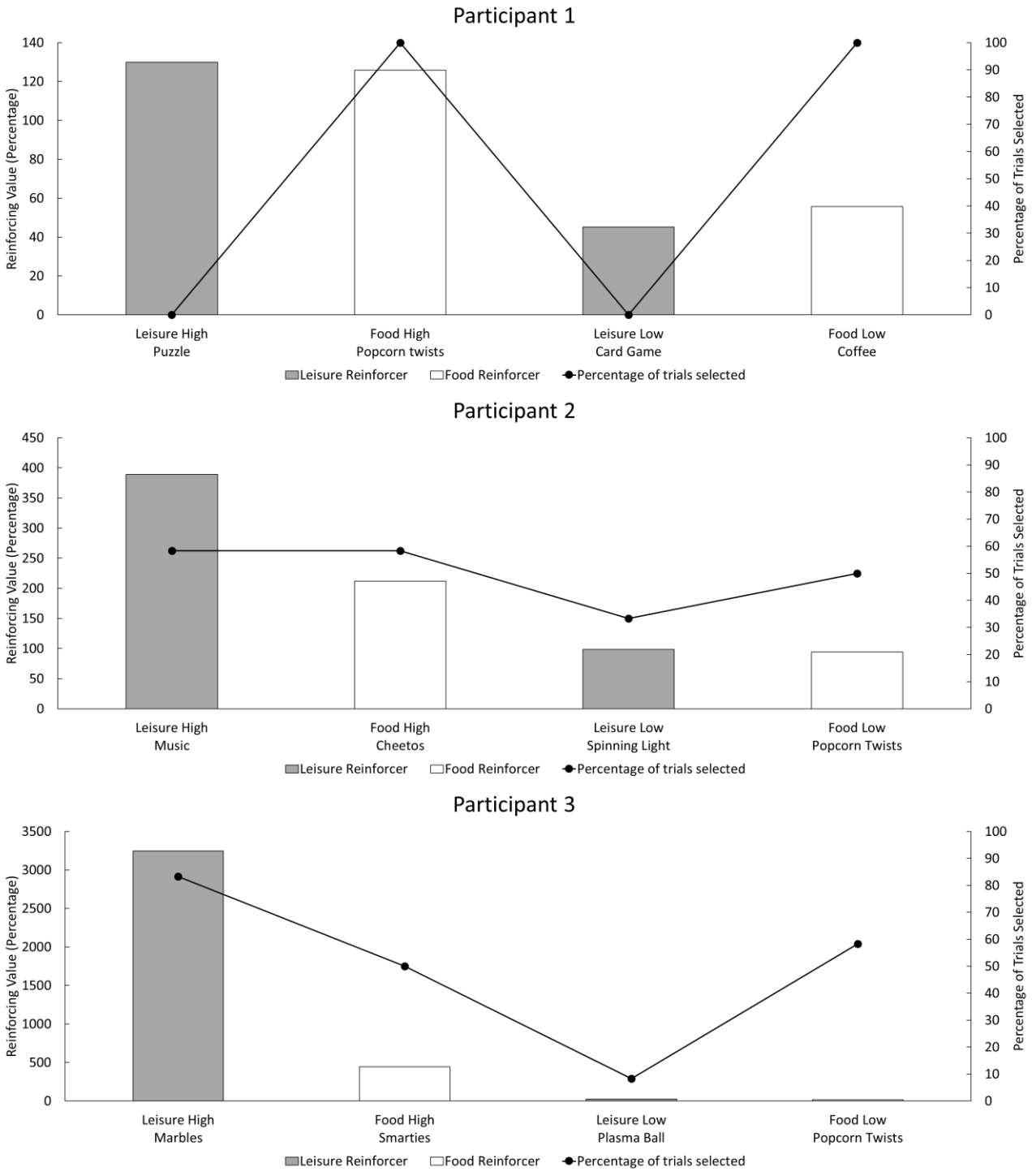

Figure 4. Preference assessment results for Participants 1 through 3. For each participant, the bar graph shows the relative reinforcing value of each item (left vertical axis) and the line graph show the percentage of trials each item was selected during the preference assessment (right vertical axis).

Appendix A: Project Description and Informed Consent Form

Research Project Title: Preference for Food and Non-food Items of Known Reinforcing Values in People with Developmental Disabilities

Principal Investigator: Ryan Heckert, MA student, Psychology Department, University of Manitoba.
Ph: 204-256-4301 ext. 5445
Email: umhecke2@myumanitoba.ca

Supervisor: Dr. C.T. Yu, Professor of Psychology, University of Manitoba.
Ph: 204-474-9453
Email: ct.yu@umanitoba.ca

This study is being conducted by Ryan Heckert, as his Master's thesis, supervised by Dr. Yu. This project description and consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

What is the purpose of the project?

The purpose of this study is to examine whether preference is determined by stimulus reinforcing value (high vs. low) or by stimulus category (food vs. non-food). A reinforcer is any item given to an individual, to increase a specific behavior. A stimulus category is the group to which a reinforcer belongs (such as food or non-food). The results may help us to better understand how food and non-food stimulus classes items interact with reinforcing value. From an applied standpoint, the assumption that food is always preferred to non-food (leisure) may cause over-use of food as a reinforcer in teaching situations and limit the variety of reinforcers available to an individual. The purpose of this study is to examine whether preference is determined by a specific group of reinforcers (ie. food vs. non-food), or determined by the reinforcing value (how much an item can change the frequency of a behavior) of an item. The results may help us to better understand how we can use reinforcers in teaching situations.

What are the project procedures and how long will the project take?

The study will involve two phases. The first phase will involve identifying a set of reinforcers. We will first ask the participant to press a large round button and reinforce each button press with praise during some sessions and with praise plus an item they like during other sessions. Difference in button presses between the two types of sessions will tell us whether the item is a reinforcer.

The process will identify four reinforcers during this phase: two food items and two leisure items. Each session during this phase will take an average of approximately 15 minutes and it will take up to 100 sessions to complete the entire phase, which will occur over a period of approximately 12 weeks. These sessions will be scheduled up to three times each week at convenient times for the client.

The second phase will be a preference assessment using the four items identified in the first phase. The items will be presented, two at a time, in order to identify which items are the most and least preferred. This phase will only take approximately 35 minutes to complete.

All sessions will be individual sessions. Sessions will be conducted on separate days, scheduled at mutually convenient times. The assessment will be held at St.Amant and conducted by a graduate student. Parents/substitute decision makers are welcome to observe the sessions from an observation room.

We would like your permission to video record the sessions so that we can check the accuracy of our observations after the session. The videos will be deleted at the end of the study in approximately July 2018. If you decide not to allow video recording, you may still participate and we will conduct the accuracy checks live.

Will the client's personal information be kept confidential?

The client's personal information will be kept confidential. We will give each client an arbitrary code to mask his/her identity on all research records. The data will be stored on a password-protected research network at the St.Amant Research Centre. Name and contact information for each client will be stored in a password-protected file on a secured network at the St.Amant Research Centre. Only the researchers associated with this project will have the password to open this file. This file will be erased and unrecoverable within three months after the completion of data analysis (approximately July 2018).

If you have given us permission to video record the assessments, the videos will also be erased in approximately July 2018.

What if abuse is discovered during the course of this project?

All researchers working on this project have a legal responsibility to immediately report any instance of abuse to the Manitoba Child and Family Services authority, as specified by The Vulnerable Persons Living with a Mental Disability Act of Manitoba and the Child Protection Act. We would report abuse even if doing so conflicted with our confidentiality obligations.

What are the risks and benefits in taking part in the project?

Risks in participating in this project are no greater than what may be typically encountered in everyday situations.

The results of the reinforcer and preference assessments may or may not be useful. However, we will share them with the client's care team, if you authorize us to do so (see question at the end of this form).

Benefits of this study are that there will be a better understanding as to how the reinforcing value of an item relates to preference, and there may be preferred items identified for the participants, which were previously not considered. Moreover, since the sessions involve using only reinforcers (preferred items), we anticipate that the participant will find the sessions enjoyable.

Is participation voluntary?

Participation is voluntary. Moreover, even after you give consent, you can stop the client's participation at any time and for any reason by simply letting any of the researchers know. Your decision to participate or not, or your decision to withdraw from the study after you have given consent, will not affect any services you or the client is receiving now or in the future from St. Amant or any educational or student services you may be receiving now or may receive in the future from the University of Manitoba.

For clients, assent will be obtained by their willingness to come to the assessment room with the researcher. If the client declines after approximately 5 minutes of prompting, the assessment will be rescheduled. If a client declines to come to the assessment room with the researcher for three consecutive sessions, it will be taken as an indication that the client no longer wish to continue with the study. Participation for that client will be discontinue.

Is there any payment or cost for participating?

There is no cost for participating. We will reimburse the substitute decision maker for parking at St.Amant if he/she needs to drive the client to St.Amant for the sessions. The client will receive an honorarium of $30 in the form of a gift card at the end of their participation. The honorarium will be provided even if the client withdraws from the study.

How will the results be disseminated?

The results of the reinforcer and preference assessments may be shared with the care team of the client, if you authorize us to do so (by indicating this at the end of this form).

If you wish to receive a summary of the results for the entire study, please indicate the method you wish to receive the summary at the end of this form. The summary should be available by approximately July 2018.

The results of the study will be distributed in various forms accessible by the public so that others may learn from it. Forms of distribution may include presentations at professional and scientific meetings, and written summaries, reports or publications that are publicly accessible electronically or in hardcopy. At no time, however, will the client's or your identity be revealed.

Signing the Consent Form

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree for your son/daughter/family member to participate. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

This research has been approved by the Psychology/Sociology Research Ethics Board. If you have any concerns or complaints about this project you may contact the Principal Investigator listed at the beginning of this form or the Human Ethics Coordinator at 204-474-7122 or humanethics@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.

Signatures

I hereby consent for _____ **(print name of client)** to participate in the project entitled Preference for Food and Non-food Items of Known Reinforcing Values in People with Developmental Disabilities.

I **do / do not (circle one)** give permission for the researcher to video record the assessments.

I **do / do not (circle one)** authorize the researcher to share the assessment results obtained in this study with the client's care team at St.Amant.

I **do / do not (circle one)** wish to receive the summary of results for this project. If you wish to receive the summary, provide an address for your preferred method:

Email address: _____

or

Surface mailing address (number, street, city, postal code): _____

_____

I understand that:

The client will participate in individual sessions to identify reinforcers and assess preference for food and leisure items.

The results of the study will be disseminated in various written and electronic forms accessible by the public, but the client's or my identity will not be revealed.

I can withdraw my consent at any time and for any reason.

Print your name: _____

Signature: _____ Date: _____

Please return all pages of this *Project Description and Consent Form* in the enclosed stamped envelope to the researcher. An extra copy has been enclosed for your records. Thank you.

Appendix B: Reinforcer Test Procedural Integrity Datasheet

Reinforcer Test Procedural Integrity Datasheet

Client:_____ Session Code:_____ Scored by:_____ Date:_____

Circle one: Baseline Reinforcement (specify reinforcer:_____)

A. Pre-session and during session

Task	Completed by researcher?
Correct table cloth color	
Camera recording (unless consent not provided)	
Button pressing is demonstrated, physical guidance provided if no response within 5 seconds	
Non-contingent praise is presented once every minute	

Score:_____ /4

B. During session

For each instance of participant behavior (button pressing), place a check mark only if **all** of the following behaviors were completed by the researcher. Otherwise, place an X:

If the session is a baseline session: Statement of praise is issued for each instance (or each burst if responses are in rapid succession)

If the session is a reinforcer session: Statement of praise is issued, button is removed, reinforcer is presented (up to 30s), button is replaced, and timer is resumed

Score:_____ /_____(total # of opportunities)

C. Post-session

Task	Completed by researcher?
Session is terminated after access to button totals approximately 3 minutes	
If another session is to occur, a 5-minute break is offered	

Score:_____ /2

Scoring: Total of Part A + Part B + Part C = _____ /4 + _____ /_____ + _____ /2 = _____ /_____

Appendix C: Preference Assessment Procedural Integrity Datasheet

Preference Assessment Procedural Integrity Datasheet

Date:_____ Participant:_____ Session code:_____ Observer:_____

Pre-assessment	Item	1	2	3	4
	Item Sampling (30s)				

			Session 1								Session 2								Session 3							
		Trial	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
	Trial Presentation	Instruct client to "look", present items one at a time																								
		Place correct item in correct location																								
		Instruct client to "pick one"																								
Fill out only one section for each trial	Appropriate Selection	Allow interaction with object (30s), if selection is made																								
		Remove unselected object from table																								
		Retrieve object after 30s																								
	Two items selected simultaneously	Block access to items or remove 2nd object																								
		Re-present instruction to "pick one"																								
		If selection made, allow access to object																								
		Remove unselected object from table																								
		Retrieve object after 30s																								
	No response within 10 seconds	Repeat instruction to "pick one"																								
		No response to second "pick one"																								
		Remove all items																								
		Initiate next trial (if applicable)																								
		Response within 10 seconds																								
		Allow access to item																								
		Remove unselected object from table																								
		Retrieve object after 30s																								
		Number correct																								
		Total possible correct																								

$$Total\ score = \frac{Number\ correct}{Total\ possible\ correct} = \frac{\quad}{\quad} = \_\_\_\_\_\%$$