TEACHING ADULTS WITH INTELLECTUAL DISABILITIES TO COUNT AMERICAN SILVER COINS IN MULTIPLES OF FIVE

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Alyssa M. Marino
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Thesis Approvals:

Dr. Donald Hantula, Thesis Advisor, Department of Psychology

ABSTRACT

This study extended the research of Lowe and Cuvo (1976) to investigate the effects of teaching adults with Autism Spectrum Disorder (ASD) and intellectual disabilities to count American silver coins in multiples of five in a café setting. Participants were first taught to count each coin and then count coin combinations from $0.01 to $0.99 using a finger-counting strategy with a visual cue. A teaching sequence of modeling by the instructor, participant imitation as the instructor modeled, and the participants independently counting was used for training. A multiple baseline across participants design was used to evaluate the effectiveness of the counting strategy on the participants' performance. The results demonstrated that the counting strategy improved two of the three participants' ability to independently sum coin combinations after training, and the skills were generalized to giving customers change while operating a cash register.

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CHAPTER 1

INTRODUCTION

The Americans with Disabilities Act (ADA) was passed in 1990 by the United States Congress to increase social and economic integration of individuals with disabilities by providing civil rights protections to eliminate discrimination based on their disability status (Kruse & Schur, 2003). The ADA protects individuals who have a "physical or mental impairment that substantially limits one or more major life activities, have a record of having an impairment, or are regarded as having an impairment" (U.S. Department of Justice, 2020, para. 2). Title 1 of the ADA focuses on employment and requires that qualified individuals with disabilities receive the same access to jobs as individuals without disabilities. It also requires that employers provide reasonable accommodations for qualified individuals with disabilities to increase workplace accessibility, unless doing so would impose undue hardship on the organization.

In addition to protections provided by the ADA, individuals with disabilities may qualify for Social Security Disability (SSDI) and Supplemental Security Income (SSI). Individuals are eligible for federal disability income if "they establish that they have a disability that prevents them from engaging in substantial gainful activity" (Schur, 2003, p. 607). Individuals who qualify for federal disability income and are employed often limit the number of hours they work due to a risk of losing their federal income and health benefits if they exceed a monthly earnings threshold. Therefore, individuals with disabilities are more likely to seek contingent and part-time work to avoid the potential loss of disability income and health insurance, including Medicare or Medicaid (Schur,

2003). An additional advantage to temporary and part-time jobs include discretion over when to work. Individuals who experience fatigue and other health problems may experience challenges working a 40-hour week on a regular basis. Those who have mobility impairments experience challenges with transportation causing them to need a more flexible work environment. Individuals who have never been employed or unemployed for an extended period of time may need a transition period from employment to full-time work.

The United States Census Bureau conducts a monthly Current Population Survey (CPS) of 60,000 eligible households. Information is collected on the labor force status, demographics, and other characteristics of the nation's civilian noninstitutional population age of 16 and over (U.S. Department of Labor, 2020). Based on the CPS of 2019, 19.3% of individuals with disabilities were employed, and 23% of workers with a disability were employed part-time compared to 17% for individuals without a disability. Roux et al. (2013) found that individuals with intellectual disabilities most commonly held positions related to food preparation, productions, building ground cleaning and maintenance, office and administrative work, sales related jobs, and transportation and material moving occupations. Similarly, individuals diagnosed with ASD most commonly held positions in office, transportation, productions, food preparation, and cleaning.

Literature Review

To successfully maintain an employment position, individuals with disabilities must receive training and appropriate modifications to the environment to facilitate independence to perform essential daily living and vocational skills. Perhaps, one of the

most important employment related skills to learn is counting money. In the school setting, children traditionally start to learn monetary related skills in first grade (Stith & Fishbein, 1996). Prior to the introduction of counting coins, students first must master prerequisite skills of the add-on principle, counting in multiples of five and 10, set comparison, and number comparison. Bellamy and Buttar (1975) taught students enrolled in special education programs a sequence of rote counting skills, which was later applied to identify and count coins. The program primarily used modeling and required approximately 100 hours of instruction. Individuals with intellectual disabilities and Down Syndrome frequently experience challenges acquiring money computation skills even when the prerequisite skills have been obtained (Stith & Fishbein, 1996).

Concrete objects and real-life situations are commonly used to introduce monetary concepts. This includes pictures and photographs of each side of the coins, known as heads and tails. Hastings (1989) taught individuals with learning and intellectual disabilities to recognize coins through coin recognition exercises. A coin was slid behind a participant's hand, face up or face down, as fast as the participant could name the coin. The participants were taught to turn over nickels and quarters to their distinctive sides to increase coin recognition accuracy. In addition to coin recognition, literature suggests students should receive instruction on how to organize coins prior to counting. For example, Fienup et al. (2013) taught a participant with an acquired brain injury to organize money utilizing a three-step visual schedule with the following directions: (a) Sort money left to right (b) Touch each bill, touch each coin (c) count bills/coins in descending order. Similarly, Hastings (1989) taught students to place bills face-up and spread coins on a table. Students were instructed to count the bills then the

coins aloud as separate totals. Teaching change computation commonly follows a curriculum with a four-component sequence: coin value, coin summation, coin selection, and efficiency in coin selection (Stith & Fishbein, 1996).

Teaching students to state the value of a coin and accurately count coin combinations have been found to be effective through an *I do, We do, You do* model (Lowe & Cuvo, 1976; Cuvo et al., 1993). The instructor first provides a model and then the student imitates synchronously as the instructor models. This process concludes with the student independently practicing the skill. Lowe and Cuvo (1976) used this process to teach individuals with intellectual disabilities to count each American silver coin in multiples of five. Other common methods to effectively teach the value of coins and coin summation are visual prompts, such as a number line with coin segments or a tens number line (Frank, 1978; Frank & Wacker, 1986; Hastings, 1989).

Lowe and Cuvo (1976) used a multiple baseline across coin counting responses design to teach individuals with disabilities to sum combinations of American coins. Participants completed a Coin Summation Test as a pretest, after learning to count each of the five American coins and coin combinations, and four weeks after the final training session. Participants learned to count the coins through an *I do, We do, You Do* teaching model. First, the instructor modeled counting each coin individually. The training sequence was nickel, dime, quarter, half-dollar, and penny. One finger was placed next to the coin each time it was divisible by five and counted by fives until the value was reached. The instructor taught the students to count pennies by placing their index finger next to the coin and count by ones. Next, the participant imitated the counting procedure as the instructor modeled. Lastly, the participant completed a series of practice problems

summing coins amounts under one dollar. A 10-box scoreboard was used to provide feedback on the number of consecutive correct responses. Each time a correct answer was emitted a miniature candy bar was moved on the score board. After the participant emitted 10 consecutive responses, the session ended and the participant earned the candy bar. If an error was emitted, the scoreboard was set back to zero and the participant counted the set of coins with the experimenter. If needed, the experimenter manually guided the participant through the procedure. The failed item was reintroduced three trials later. Lowe and Cuvo found this instructional program to be effective in teaching coin summation skills across all the participants.

Research has demonstrated the effectiveness of direct teaching coin counting skills with and without visual prompts within an instructional setting. However, it is important to consider generalization to employment and store settings within the community. Individuals are frequently receiving change when making a purchase and are often required to give change in a retail employment position (Cuvo et al., 1978). Individuals with disabilities who have difficulty counting change may be stigmatized and experience challenges securing and/or maintaining employment. The purpose of the present study was to extend the research of Lowe and Cuvo's (1976) instructional method to evaluate the effectiveness of teaching a finger counting strategy to sum coins with a visual prompt to individuals diagnosed with (ASD) and intellectual disabilities at their workplace. The research question addressed in the implementation of this study was "Does counting each silver American coin in multiples of five with a visual prompt increase the accuracy of counting change for adults with ASD and intellectual disabilities working in a café setting?

CHAPTER 2

METHODS

Participants

Three women who were employed at a café with a mission to provide inclusive career opportunities to individuals with disabilities served as participants. The participants were selected based on the café manager's recommendation of employees with a skill deficit in counting money while operating the cash register.

Emily, 26 years 2 months of age, had a diagnosis of Autism Spectrum Disorder. She was recommended to be a participant because she experienced challenges counting change with a value greater than 50 cents. The café manager reported that Emily had difficulty distinguishing when to use a dime versus when to use a nickel. She frequently asked the shift supervisor for assistance when counting change for customers.

Alexa, 22 years 2 months of age, had a diagnosis of Intellectual Disability, Hearing Impairment including Deafness, and Speech and Language Impairment. She wears a cochlear implant to assist with hearing. Alexa was recommended to be a participant because she experienced challenges skip counting between non-decade numbers (e.g., 25, 25, 45), counting quarters, and deciphering between dimes and nickels. She required one-on-one assistance while she operated the cash register to correctly count change for the customers.

Maggie, 20 years 11 months of age, had a diagnosis of Autism Spectrum Disorder and Down Syndrome. She was recommended to be a participant due to the challenges she experienced with coin value recognition and inability to skip count (e.g., counting by fives). Maggie also required one-on-one assistance while she operated the cash register to

correctly count change for the customers. Her mother reported the concept of money has always been difficult for Maggie. Maggie's parents and school team had decided to stop working on counting money and shifted their focus to teach Maggie how to buy things with a debit card using a personal identification number (PIN).

Setting

The instructor conducted intervention sessions two times per week in a one-to-one format at a table in the back dining room inside the café. The room was closed to the public due to the COVID-19 pandemic occupancy restrictions. The instructor sat to the left of the participant. The cash register drawer with the instructional plastic coins was placed in front of the participant. The visual prompt was placed on the table in front of the register to the left. The instructor conduced baseline and generalization sessions for all participants during their regularly scheduled shift operating the cash register. The instructor stood to the left of the participant.

Materials and Equipment

Ninety-nine 3" x 5" index cards with all monetary values from $0.01 to $0.99 were printed. A set of plastic coins consisting of 100 pennies, 60 nickels, 50 dimes, and 10 quarters were placed in a cash drawer. A token board with a ten frame and 10 Velcroed stars was used to record the participants' correct responses. A visual illustrating the finger counting procedure for each coin as described by Lowe and Cuvo (1976) and the counting by fives sequence to 100 was printed. This visual aid was available for the participants to reference each training session. A data sheet (shown in Appendix B) was printed for each session to record the participant's accuracy counting each monetary value. To determine the reinforcers, a Multiple Stimulus Without Replacement (MSWO)

preference assessment was conducted prior to the start of the study (Daly et al., 2009). A reinforcement survey was given to each participant to determine the items to include on the preference assessment. Appendix H shows the MSWO data collection sheet and Appendix I shows the reinforcement survey.

Dependent Variable

The dependent variable was each participant's mean percentage of accuracy counting coins with a visual prompt each session. A correct response was defined as the first response emitted following the instructor's cue (i.e., "Read the card and count out that much money), accurate, and did not require verbal instruction or modeling from the instructor. A response was not marked as correct if the error procedure was implemented for the response or if the coin value did not match the value shown on the card.

Response Measurement

The monetary value displayed on the iPad (baseline and generalization phases) or on the index card (training phase) was recorded for each trail. A positive sign (+) was recorded if a correct response was emitted and a negative sign (-) was recorded if an incorrect response was emitted. The response accuracy was only based on the coin value not the dollar bill value. For example, if the customer's change was $16.12 and the participant gave the customer $10.12 the response was marked as correct. At the conclusion of each session, the instructor calculated the mean percentage of correct responses emitted. The mean percentage of correct responses was calculated by dividing the number of correct responses by the total number of responses multiplied by 100.

Interobserver Agreement.

Interobserver agreement (IOA) data were collected for 25% of randomly selected baseline sessions across participants and 25% of randomly selected training sessions across participants. The first author and another trained observer independently followed the data collecting procedure to record a participant's coin counting accuracy. The observers stood next to the participant on opposite sides. Percentage of agreement was calculated by dividing the total number of agreements by the total number of agreements plus disagreements multiplied by 100.

Treatment Integrity.

Treatment integrity was measured across 30% of randomly selected baseline sessions across participants and 30% of randomly selected training sessions across participants. A trained observer collected data based on the instructor's frequency of implementing the experimental procedures correctly and incorrectly. Appendix C shows the treatment integrity data collection sheet. The treatment integrity percentage was calculated by dividing the number of occurrences implementation was done correctly divided by the total number of opportunities multiplied by 100.

Social Validity.

Two questionnaires were utilized to assess the social validity of the procedures and goals of this study, shown in Appendix D. One parent of each participant, the café manager, one café shift supervisor, and three café customers completed a questionnaire, and the participants completed another questionnaire. The

questionnaire for parents and customers had five questions with multiple choice responses, and the questionnaire for participants had seven questions with multiple choice responses. The café manager asked the participants each question and response choices and recorded their answers. A mean for each response was calculated by adding the number of times the response was selected divided by the sum of the total number of responses for each question.

Baseline

The first author served as the observer to collect baseline data during each participant's scheduled café shift while operating the cash register. The observer stood to the left of the participant with the iPad screen and cash drawer in view. The participants did not receive reinforcement for correct responses or consequences for incorrect responses.

Intervention

Counting Single Coins

The first four training sessions began with an introduction to a single coin and its counting procedure. The teaching sequence was nickel, dime, quarter, and penny. Instruction occurred in a three-step procedure similar to Lowe and Cuvo (1976). First, the instructor modeled counting each coin individually. One coin was placed on the table in front of the participant with either the heads or tails side faced up. For the silver coins the instructor modeled placing a finger next to the coin for each time it is divisible by five and counted by five until its value was reached. The nickel was counted by placing the index finger next to the coin and stating, "five." The dime was counted by placing the index finger next to the coin and stating, "five," and then placing the middle finger next

to it and stating, “ten.” The quarter was counted by placing each of the five fingers on one hand starting with the thumb next to the coin one at a time and counted by fives as each finger was placed down. A penny was counted by placing the index finger next to the coin and stating, “one.” Then, the participant imitated the counting procedure that the instructor modeled. Last, the participant performed the counting method independently. The participant received verbal praise when a correct response was emitted. If an error was emitted, the instructor modeled the response and repeated the initial instruction. When the participant accurately counted the target coin across three consecutive trials, instruction moved to coin combinations.

Counting Coin Combinations

Following the introduction of a single coin, there were three opportunities to practice counting coin combinations before each independent practice trial. Stimulus cards were selected at random and presented on each card was a purchase price similar to Cuvo et al. (1993). The instructor pointed to the card and stated its cost (e.g., “This says 25 cents”). Next, she modeled selecting coins that matched the monetary value. The coins were placed in descending order and counted using the finger-counting procedure. For example, a combination of a dime and nickel was taught by the instructor first modeling placing her index finger next to the dime and stating, “five,” placing her middle finger down and stating, “10,” and then placing her index next to the nickel and stating, “15.”

Following the modeling trial, the same price card was re-presented. The instructor stated, “Read the card and count out that much money.” If the participant correctly read the price card and counted the coins, the participant received verbal praise and a token. If the participant misread the card, the instructor modeled the correct response (e.g., “The

card says “25 cents. What does it say?”) until the participant emitted the correct response. Then, the instructor stated, “Count that much money.” If the participant did not count the coins accurately, the instructor provided verbal instruction to reference the visual, illustrating the finger-counting procedure. If the participant emitted another error, the instructor modeled the response and repeated the initial instruction. When the participant emitted the correct response independently, the next training card was introduced for its modeling trail. This was repeated for all three training items.

After responding correctly to the three training items, a series of practice problems was presented. The participants received a stimulus card with a purchase price. A verbal cue was provided by the instructor to state the change amount and show the corresponding coins. When the participant emitted a correct response, verbal praise was given, and a token was earned. When 10 correct responses were emitted, the participants earned a reinforcer and the session concluded. If the participant did not correctly count a specified monetary amount, the instructor prompted the participant to use the visual aid then the initial instruction was repeated. If the participant failed to respond correctly after the prompt, the instructor modeled the entire response and repeated the initial instruction. When the participant emitted the correct response, the next practice card was presented.

Generalization

The instructor observed each participant during their schedule café shift while operating the cash register. She stood to the left of the participant with the iPad screen and cash drawer in view. The participants’ received praise each time the correct change was given to a customer. If the participant emitted an error, the instructor prompted her to

use the visual aid. If the participant emitted a second error, the instructor stated the correct dollar bills and coins to give the customer.

Experimental Design

A multiple baseline across participants design with three phrases was used. The three phases were baseline, training, and generalization with a visual prompt. During the training phase, participants were trained to count quarters, nickels, and dimes in multiples of five using their fingers. A visual representation of this procedure was presented as shown in Appendix E. The final phase, generalization, involved determining whether the participants were able to independently and accurately count a specified value of coins with the visual prompt while giving customers change.

CHAPTER 3

RESULTS

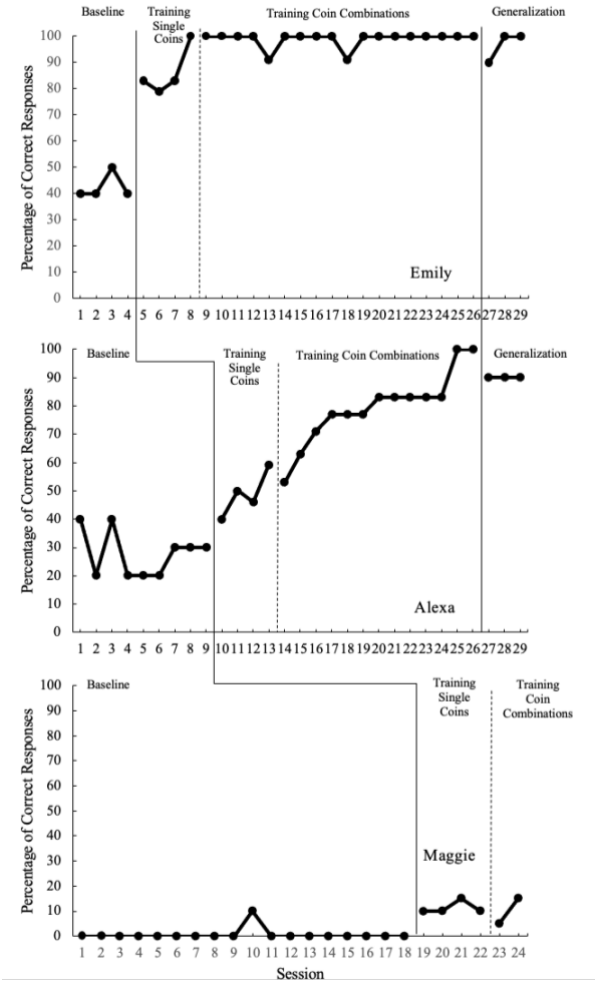
The performance of each of the three participants counting coins across the three experimental phases is presented in Figure 1. Each data point represents the percentage of correct responses during each session. During Baseline, the mean scores for Emily, Alexa, and Maggie were 42.5% (range: 40-50%), 27.78% (range 20-40%), and 0.56% (range 0-10%). The level for Emily was moderate and the level for Alexa and Maggie was low. Data for all participants had a stable trend prior to the start of the training phase.

In the training phase, Figure 1 shows that teaching the participants how to count American silver coins in multiples of five had an observable effect on performance. The percentage of correct responses across all participants increased during the training phase. The mean scores for Emily, Alexa, and Maggie were 96.68% (range 79-100%), 72.24% (range 40-100%), 10.83% (range 10-15%). The percentage of non-overlapping data (PND) for Emily, Alexa, and Maggie were 100%, 94.12%, and 0%. The level for Emily and Alexa was high, and the level for Maggie remained low. The change from baseline to the training phase was an ascending trend for both Emily and Alexa. Additionally, the data for both participants had low variability and stabilized prior to the generalization phase. A trend was not depicted for Participant 3 due to frequent fluctuation of data points.

Figure 1 also shows that Emily and Alexa maintained performance when operating the cash register and giving customers change. Mean scores for Emily and Alexa during the generalization phase were 96.67% and 90%.

Figure 1

The Effects of Counting American Silver Coins by Fives



Note. Percentage of monetary values from $0.01 to $0.99 answered correctly by Emily, Alexa, and Maggie during baseline and training using the finger-counting strategy to count American silver coins in multiples of five, and Emily and Alexa during generalization working the cash register.

Interobserver Agreement

The mean IOA for the eight observed baseline sessions was 100% and the mean IOA for the 13 observed training sessions was 100%.

Treatment Integrity

The mean treatment integrity percentage of the observer implementing the procedures correctly across nine observed baseline sessions was 98.78%. The mean percentage of the instructor implementing the training procedures correctly across 13 observed sessions was 98.04%.

Social Validity

Table 1 shows the mean percentage of parents and customers who selected each response, and Table 2 mean percentage of participants who selected each response**.**

Table 1

Social Validity Questionnaire for Parents of Participants and Customers

Question	Not important	Somewhat important	Neutral	Important	Very important
How important of a skill is counting change for employees working a cash register?	0%	0%	0%	12.5%	87.5%
How important is it for employees to learn to count the change independently?	0%	0%	25%	0%	75%
	Never	Sometimes	Neutral	Often	Always
If you are given the incorrect amount of change as a customer, how likely are you to tell the cashier?	0%	0%	0%	25%	75%
	Not effective	Somewhat effective	Neutral	Effective	Very effective
How effective do you think a visual prompt will be to assist with counting change accurately?	0%	0%	12.5%	37.5%	50%

	Not appropriate	Somewhat appropriate	Neutral	Appropriate	Very appropriate
How appropriate do you think a visual prompt presented near the cash register is to count coins?	0%	0%	12.5%	25%	62.5%

Note. Mean percentage of responses from parents of the participants and café customers.

Table 2

Social Validity Questionnaire for Participants

Question	Not important	Somewhat important	Neutral	Important	Very important
How important of a skill is counting change for employees working a cash register?	0%	0%	0%	0%	100%
How important is it for employees to learn to count change independently?	0%	0%	33.33%	66.67%	0%
How important is it for customers to receive the correct amount of change?	0%	0%	0%	0%	100%
	Not likely	Somewhat likely	Neutral	Likely	Very likely
How likely are you to use a visual prompt to assist with counting coins accurately?	0%	0%	33.33%	33.33%	33.33%
	Never	Rarely	Neutral	Often	Always
How often were you able to count coins independently prior to the start of this study?	66.67%	0%	0%	33.33%	0%
How often are you able to count coins independently now?	0%	0%	33.33%	33.33%	33.33%
	Did not like	Somewhat liked	Neutral	Liked	Loved
Did you like being taught counting coins this way?	0%	0%	0%	33.33%	66.67%

Note. Mean percentage of responses from participants.

CHAPTER 4

DISCUSSION

The purpose of this study was to examine the effects of teaching adults with Autism Spectrum Disorder and intellectual disabilities to count American Silver coins in multiples of five with a visual prompt. Experimental control was demonstrated by a multiple baseline across participants design, which showed the mean score for counting change under $1.00 increased only after the intervention was introduced. This suggests the counting strategy for counting American silver coins in multiples of five was responsible for the increase in performance for two of the participants. The findings were consistent with those of Lowe and Cuvo (1976) for two of the three participants.

Replications like this study are valuable to provide clarification of whom a particular intervention is more or less effective and features of the intervention (Tincani & Travers, 2019). As shown in Figure 1, all three participants were unable to accurately count all amount of change under $1.00. There was an immediate significant level change from baseline to training for Emily. Her percentage of correct responses increased from 40% in session four to 83% in session five. The instructor noted that Emily's baseline errors were frequently due to incorrectly deciphering between when to use a nickel and a dime. The significant increase in correct responses may have been attributed to Emily already having the skills to count coins in her repertoire and the training sessions built the skill back up again. Alexa's performance also increased when the intervention was introduced. Figure 1 shows an ascending trend in Alexa's performance throughout the training phase. As Alexa was introduced to each single coin and their counting method

and received practice opportunities for counting coin combinations, her performance gradually increased to 100% accuracy. Additionally, both participants demonstrated an ability to generalize the counting strategy when giving customers change while operating the cash register.

In addition to the success of Emily and Alexa, the failure of the intervention effects for Maggie must also be acknowledged. Although Maggie's performance increased when the intervention was introduced, there was high variability with frequent fluctuation of data points. The percentage accuracy remained in the low level with a mean percentage of correct response being 11.7%. Maggie's low percentage of accuracy during the training phase could be attributed to a number of factors. One possible factor is the inability to discriminate between the stimuli due to overlapping components (Halbur et al, 2021). The nickel, dime, and quarter are the same color with similar looking portraits of a man on one side. Maggie may have benefited from discrimination training prior to learning the counting strategy for each coin. Additionally, the monetary value of the coin does not match the shape size. In other words, a dime's physical size is smaller than a nickel, but the value of the dime is worth more than the nickel. Maggie's behavior of selecting a coin may have been under the control of irrelevant antecedent stimuli (i.e., coin size).

Maggie had significantly fewer training sessions compared to the other two participants due to an unexpected family trip out of state. The trip delayed the start of her training causing a limited number of sessions prior to the conclusion of this study. Additionally, Maggie displayed an inconsistent ability to count by ones and fives to 100 and number identification from one to 99, which are perquisite skills to counting coins.

Maggie may have benefited from a program similar to Bellamy and Buttar (1975), which utilized modeling and 100 hours of instruction to teach a sequence of rote counting skills and then applied those skills to identify and count coins. It is likely the strategy of counting American silver coins in multiples of five would have been more successful for Maggie once the prerequisite skills had been learned.

The intervention not only taught the participants to count in multiples of five, but also to organize the coins while counting. Fienup et al. (2013) successfully taught a participant to sort money left to right in descending order and touch each coin while counting. Participants in this study were also taught to place the coins on the table in descending order and place their fingers next to the coin while using the finger-counting strategy. Fienup et al. used a three-step visual to teach the steps of organizing dollar bills and coins. Although this study did not provide a specific visual demonstrating the steps to organizing coins, it did illustrate the coins in descending order on the visual aid. The visual schedule used by Fienup et al. was successful in increasing the participant's accuracy in money organization but did not increase the participant's accuracy of counting money. This current study did not measure the participants' ability to accurately organize the coins in descending order.

Limitations

There are several limitations of this study that must be addressed. First, a pretest was not administered prior to the start of the study to ensure the participants had the prerequisite skills of number identification and counting by ones and fives to 100; instead, participants were selected based on the recommendation of the café manager. Second, only six training sessions took place for Maggie due to an unexpected family

vacation and the conclusion of the project. Third, the finger counting visual aid was not fading out. Fading the prompt would ensure the individual did not become prompt dependent. Fourth, plastic coins were used for training rather than real coins. This may have caused challenges with generalizing the coin counting skills to real-life situations (i.e., operating a cash register). Plastic coins may appear to look differently (e.g., color, size) and feel different (e.g., ridged edges, thickness). Lastly, there was not a systematic introduction of monetary target amounts.

Future Research

In the current research base, no published, empirical studies have taught elementary students with and without disabilities how to count American silver coins by fives. Traditionally, students learn monetary related skills in first grade; and therefore, future research should examine this technique with elementary-age populations. Future studies should also administer a pretest similar to Lowe and Cuvo (1976). A pretest would ensure the participants have the necessary prerequisite skills of counting by ones and fives to 100 and ability to recall the names and values of the five American coins when presented. Further considerations towards fading the finger counting visual aid is necessary to determine the effectiveness of the strategy. Additionally, future studies should examine the effectiveness of teaching the strategy to groups of students at a time to reach more than one student at a time. Finally, applying this strategy to American dollar bills should be examined.

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APPENDIX A

PARTICIPANT CONSENT FORM

RESEARCH SUBJECT CONSENT FORM

Title:	Teaching Adults with Intellectual Disabilities to Count Coins in Multiples of Five
Investigator:	Dr. Donald Hantula 1701 N 13th Street Philadelphia, PA 19122 United States of America
Daytime Phone Number:	(215) 204-5950

RESEARCH CONSENT SUMMARY

You are being asked for your consent to take part in a research study. This document provides a concise summary of this research. It describes the key information that we believe most people need to decide whether to take part in this research. Later sections of this document will provide all relevant details.

What should I know about this research?

Someone will explain this research to you.
Taking part in this research is voluntary. Whether you take part is up to you.
If you don't take part, it won't be held against you.
You can take part now and later drop out, and it won't be held against you
If you don't understand, ask questions.
Ask all the questions you want before you decide.

How long will I be in this research?

We expect that your taking part in this research will last 6 weeks.

Why is this research being done?

The purpose of this research is to evaluate the effectiveness of a counting American coins in multiples of five to increase the accuracy of giving change. The purpose of this study is to extend on previous research to assess whether the coin counting skills are generalized to an employment setting.

What happens to me if I agree to take part in this research?

If you decide to take part in this research study, the general procedures include the experimenter observing you give change to customers prior to the start of training. Training will include a 30-minute session with an instructor two times a week to learn how to count coins with a visual prompt. These sessions will take place one-on-one in the back room of the café. Each time you count a specified value of coins correctly you will receive a token. When you answer 10 problems in a row correctly you will receive a reward. Rewards can be a favorite drink or favorite food item, time spent on a cellphone or tablet, listening to music, reading a book, or drawing a picture. At the end of 6 weeks, the instructor will observe you using the number line while giving change to customers.

Could being in this research hurt me?

The most important risks or discomforts that you may expect from taking part in this research include embarrassment for an incorrect response or fear or anxiety about responding incorrectly. There will be no aversive consequence given when a response is emitted incorrectly. The instructor will provide verbal instruction and model the response until you are able to emit the correct response independently.

Will being in this research benefit me?

The most important benefits that you may expect from taking part in this research include being able to count change independently while working on the cash register during your scheduled shift at GET Café. The skills you will learn by participating in this study will increase the number of times you are able to give a customer the correct change without a supervisor's assistance.

Possible benefits to others include that the customer will receive the correct amount of change and the supervisor on the shift can focus on preparing the customer's order and training employees and volunteers.

Statement of Consent:

Your signature documents your permission for the individual named below to take part in this research.

Signature of adult subject capable of consent or adult subject's legally authorized representative	Date

Printed name of adult subject capable of consent or adult subject's legally authorized representative

Printed name of subject
(not required if subject personally provided consent)

Signature of person obtaining consent	Date

Printed name of person obtaining consent

Your signature documents your permission for the individual named below to take part in this research.

Signature of adult subject capable of consent or adult subject's legally authorized representative	Date

Printed name of adult subject capable of consent or adult subject's legally authorized representative

Printed name of subject
(not required if subject personally provided consent)

Signature of person obtaining consent

Date

Printed name of person obtaining consent

APPENDIX B

COUNTING ACCURACY DATA RECORDING SHEET

Participant Name	Date	Session

Trial	Monetary Value	Correct (+) or Incorrect (-)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Total Number of Correct Responses	
Total Number of Incorrect Responses	
Percentage of Accuracy	_____ /_____ x 100 = _____

APPENDIX C

TREATMENT INTEGRITY DATA COLLECTION SHEET (BASELINE)

Observer	Date	Session

Trial	Procedure	Yes	No
1	Did not provide any prompts for the participant's response		
	Reinforcement not delivered for a correct response or consequence for incorrect response		
2	Did not provide any prompts for the participant's response		
	Reinforcement not delivered for a correct response or consequence for incorrect response		
3	Did not provide any prompts for the participant's response		
	Reinforcement not delivered for a correct response or consequence for incorrect response		
4	Did not provide any prompts for the participant's response		
	Reinforcement not delivered for a correct response or consequence for incorrect response		
5	Did not provide any prompts for the participant's response		
	Reinforcement not delivered for a correct response or consequence for incorrect response		
6	Did not provide any prompts for the participant's response		
	Reinforcement not delivered for a correct response or consequence for incorrect response		
7	Did not provide any prompts for the participant's response		
	Reinforcement not delivered for a correct response or consequence for incorrect response		
8	Did not provide any prompts for the participant's response		
	Reinforcement not delivered for a correct response or consequence for incorrect response		
9	Did not provide any prompts for the participant's response		
	Reinforcement not delivered for a correct response or consequence for incorrect response		
10	Did not provide any prompts for the participant's response		
	Reinforcement not delivered for a correct response or consequence for incorrect response		

TREATMENT INTEGRITY DATA COLLECTION SHEET (TRAINING)

Observer	Date	Session

Model Procedure	**Trial**		
	1	**2**	**3**
Point to card and state its cost			
Select coins that match the monetary value			
Place coins in descending order and count using finger-counting procedure			
Represent the same price card			
Instructor state, ““Read the card and count out that much money.”			
Praise for correct responses / prompt to use visual for incorrect response; if error is emitted again, model response and repeat instruction			

Practice Procedure	**Trial**																			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Present price card																				
Instructor state, ““Read the card and count out that much money.”																				
Praise and token for correct responses / prompt to use visual for incorrect response																				
If error is emitted again, model response and repeat instruction																				
Session concludes when after 10 consecutive correct responses or duration of 30 minutes																				

Total correct (+) _____

Total opportunities _____

APPENDIX D

SOCIAL VALIDITY QUESTIONNAIRE FOR PARENTS AND CUSTOMERS

Name: _____ Date: _____

1. How important of a skill is counting change for employees working on a cash register?

○	○	○	○	○
Not all Important	Somewhat Important	Neutral	Important	Very Important

2. How important is it for employees to learn to count the change independently?

○	○	○	○	○
Not all Important	Somewhat Important	Neutral	Important	Very Important

3. If you are given the incorrect amount of change as a customer, how likely are you to tell the casher?

○	○	○	○	○
Never	Sometimes	Neutral	Almost Always	Always

4. How effective do you think a visual prompt will be to assist with counting coins accurately?

○	○	○	○	○
Not all Effective	Somewhat Effective	Neutral	Effective	Very Effective

5. How appropriate do you think a visual prompt presented near a cash register is to count coins?

○	○	○	○	○
Not all Appropriate	Somewhat Appropriate	Neutral	Appropriate	Very Appropriate

SOCIAL VALIDITY QUESTIONNAIRE FOR PARTICIPANTS

Name: _____ Date: _____

1. How important of a skill is counting change for employees working on a cash register?

○	○	○	○	○
Not all Important	Somewhat Important	Neutral	Important	Very Important

2. How important is it for employees to learn to count the change independently?

○	○	○	○	○
Not all Important	Somewhat Important	Neutral	Important	Very Important

3. How important is it for customers to receive the correct amount of change?

○	○	○	○	○
Not all Important	Somewhat Important	Neutral	Important	Very Important

4. How likely are you to use visual prompt to assist with counting coins accurately?

○	○	○	○	○
Not all Likely	Somewhat Likely	Neutral	Likely	Very Likely

5. How often were you able to count coins independently prior to the start of the study?

○	○	○	○	○
Never	Rarely	Sometimes	Often	Always

6. How often are you able to count coins independently now?

○	○	○	○	○
Never	Rarely	Sometimes	Often	Always

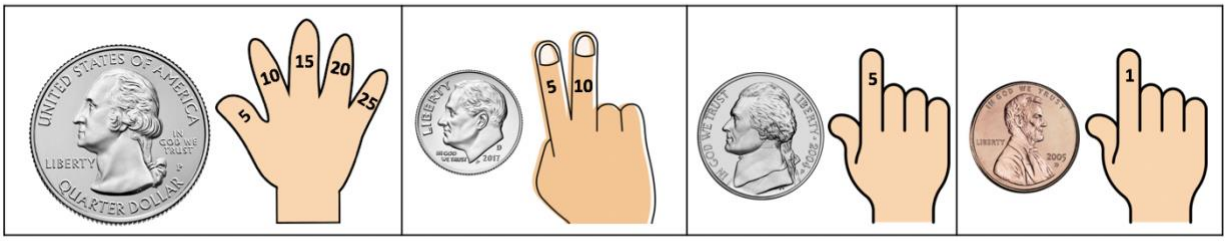
7. Did you enjoy being taught how to count coins this way?

○	○	○	○	○
Did not like	Somewhat enjoyed	Neutral	Liked it	Loved it

APPENDIX E

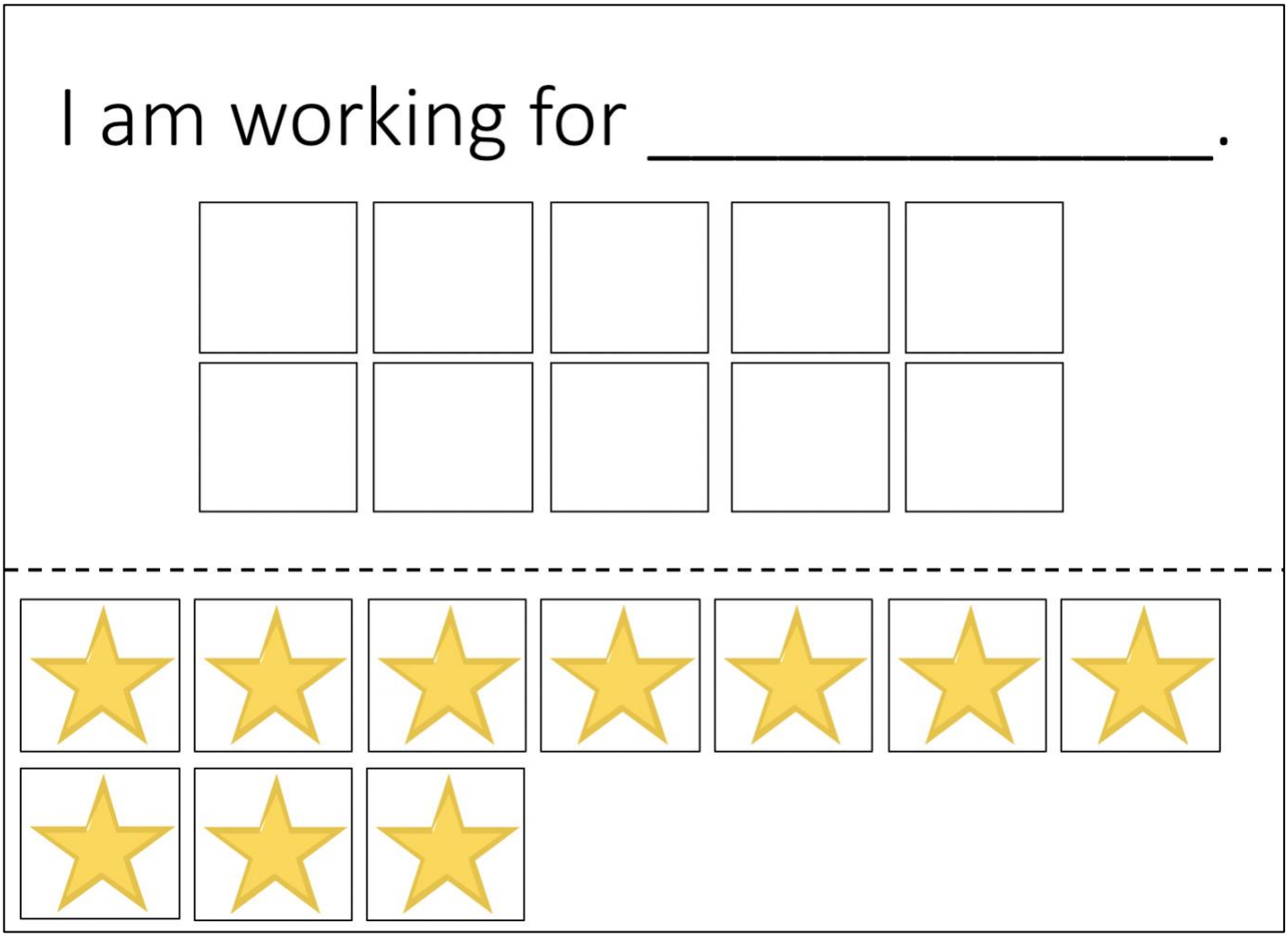
COUNTING STRATEGY VISUAL

5	10	15	20	25	30	35	40	45	50
55	60	65	70	75	80	85	90	95	100



APPENDIX F

TOKEN BOARD



APPENDIX G

PURCHASE CARDS

$0.01	$0.02
$0.03	$0.04
$0.05	$0.06
$0.07	$0.08
$0.09	$0.10

$0.11	$0.12
$0.13	$0.14
$0.15	$0.16
$0.17	$0.18
$0.19	$0.20

$0.21	$0.22
$0.23	$0.24
$0.25	$0.26
$0.27	$0.28
$0.29	$0.30

$0.31	$0.32
$0.33	$0.34
$0.35	$0.36
$0.37	$0.38
$0.39	$0.40

$0.41	$0.42
$0.43	$0.44
$0.45	$0.46
$0.47	$0.48
$0.49	$0.50

$0.51	$0.52
$0.53	$0.54
$0.55	$0.56
$0.57	$0.58
$0.59	$0.60

$0.61	$0.62
$0.63	$0.64
$0.65	$0.66
$0.67	$0.68
$0.69	$0.70

$0.71	$0.72
$0.73	$0.74
$0.75	$0.76
$0.77	$0.78
$0.79	$0.80

$0.81	$0.82
$0.83	$0.84
$0.85	$0.86
$0.87	$0.88
$0.89	$0.90

$0.91	$0.92
$0.93	$0.94
$0.95	$0.96
$0.97	$0.98
$0.99	

APPENDIX H

MULTIPLE STIMULUS WITHOUT REPLACEMENT PREFERENCE ASSESSMENT

Participant Name: _____ Date:_____

Items

Preference Assessment #1:

Order of Items	# of times selected / # times presented

Preference Assessment #2:

Order of Items	# of times selected / # times presented

Preference Assessment #3:

Order of Items	# of times selected / # times presented

Summary of Data:

Item	Total Percentage Selected

APPENDIX I

REINFORCEMENT SURVEY

Participant Name: _____ Date: _____

What is your favorite drink to order at the café?

_____

_____

What is your favorite food to order at the café?

_____

_____

What do you enjoy doing when you are on break at work?

_____

_____

What activities do you like to do when you are alone?

_____

_____

What is the best reward your boss could give you for good work?

_____

_____