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THE DIFFERENTIAL EFFECTS OF DIRECT INSTRUCTION FLASHCARDS ON SIGHT-WORD IDENTIFICATION FOR TWO PRESCHOOL STUDENTS WITH AUTISM SPECTRUM DISORDERS

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ABSTRACT

The purpose of this study was to determine the effectiveness of DI flashcards on sight-word identification for two students with Autism Spectrum Disorder (ASD) in a special education preschool program. A multiple baseline across word sets and participants; with a variation in the ratio of mastered to unknown sight-words was implemented. When a participant appeared has difficulty, an edible reward was added to increase his performance. This use of an additional contingency was somewhat effective. The results for the second participant indicated that the DI flashcards system was effective in increasing acquisition, accuracy, fluency, and retention of previously un mastered sight-words. Data collection was e practical to implement and was easily incorporated into the classroom setting. Suggestions for future research and applications of reading racetracks and DI flashcards were outlined.

Keywords:preschools students with Autism Spectrum Disorder (ASD), sight-word identification, flashcards, edible reward, classroom research, DI flashcards

INTRODUCTION

In our progressive society, our nation's elementary schools welcome and accommodate all children regardless of disability. Regardless of their varying degrees of disabilities, all educators have a common goal of ensuring all children have the best opportunity for a quality education (Ravich, 2010). Educators agree that literacy is one of the key skills necessary to apply in functional living in our complex society and world (National Reading Panel, 2000; Weaver, 1990).

Current research indicates that children who are proficient readers generally have a higher probability of achieving significant success in school and adulthood (Carnine, Silbert, Kameenui, & Tarver, 2004). When reading skills are not acquired, mastered, and retained, children have a substantial chance of dropping out of school, as well as lacking the necessary life skills to perform successfully in the professional and personal sector of our intricate society (Howard, McLaughlin, &Vacha, 1996; National Reading Panel, 2000). Unfortunately, there remains substantial disagreement among educators, policy-makers, and the public of how to advance the reading skills of students, while ensuring all students will leave the public school system literate and fluent (Anthony, Rinaldi, Hern, & McLaughlin, 1997; Rinaldi& McLaughlin, 1996; Rinaldi, Sells, & McLaughlin, 1997). These passionate and ceaseless debates have been labeled by some as "the reading wars" (National Reading Panel, 2000).

Across numerous experiences in elementary classrooms, researchers have noted that students with autistic characteristics are the individuals who often are habitually dismissed from their literate peers

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and subsequent community (Heward, 2013; Kliewer, 1998; Kluth 1998; Kluth&Darmondy-Latham, 2003; Thompson, 2007). In fact these students need most, is the best early intervention practices that come from a large body of empirical evidence (Rogers &Vismara, 2008). While the trend shifts to assure students are being served in their least restrictive environment, namely in general education classrooms, students still experience exclusion from prosperous and relevant literacy experiences such as story-telling, journaling, theatrical play, and writing workshops. It is common for students with autism to follow a distinctly different curriculum than the established, conventional curriculum of their typically developing peers (Kluth, 1998; Kluth& Armory-Latham, 2003). These students may not become literate simply because their teachers are uncertain of how to differentiate instruction for diverse students with autism, or they may not do not appreciate the cognitive abilities of these students, or simply do not value literacy development for all children (Kluth, 1998; Kluth& Armory-Latham, 2003). In turn, teachers exclude students from literacy experiences because of the social construction of the activity. The harsh reality proves that numerous people, including teachers, lower expectations for children with disabilities because they appeal to the notion that a disability is a fixed, social reality rather than a culturally generated and regenerated label (Kluth, 1998; Kluth& Armory-Latham 2003).

In order to provide literacy experiences for all students, Kliewer (1998) proposed that teachers must "re-conceptualize the literate community," while rejecting stereotypes regarding disabilities and adopting a foundation of beliefs where all students are learners with individual needs. To accomplish this elaborate philosophy, teachers must first break school practices which marginalize learners and mold communities which motivate all students to take risks, create and collaborate with other learners, and view themselves as capable learners (Kliewer, 1998; Kluth& Armory-Latham 2003). As a result, it becomes our responsibility to recognize all forms of literacy. As educators we must capitalize on student interests to invoke motivation; use a broad range of visual aids, including pictures and drawing; avoid analogies, abstract concepts and language with children with autism; choral read; read aloud; and use varying tones to instill reading with expression. To assure all students, especially those with autism, leave the public educational system literate and with a solid foundation of reading skills, the previously mentioned principles and practices are the necessary steps educators and schools districts must implement.

Both academic and social domains of life require reading skills. As educated adults, we take for granted our ability to read menus at a restaurant, read a bus schedule, translate a recipe into a particular meal, comprehend safety laws and rules, complete a homework assignment, or enjoy the latest newspaper or magazine. Daily life is surrounded by literacy and our ability to function effectively in our society depends on our reading abilities. In general, the majority of people understand and appreciate the importance of this proficiency, yet countless school districts lack a unified approach to reading instruction and have adopted an all encompassing term of "whole language" (Carnine et al., 2004; Weaver, 1990). This language approach is confident that the process of learning to read is gained naturally, comparable to how one learns to walk or talk (Altwerger, Edelsky, & Flores, 1987). For a small percentage of individuals, this approach has validity. Yet, the majority of children require an abundance of structured and systematic strategies to acquire literacy skills (Carnine et al., 2004).

The DI flashcard system, initially developed to teach basic math facts, has been successfully employed to teach sight words (Bishop, McLaughlin, & Derby, 2011; Erbey, McLaughlin, Derby, & Everson, 2011; Kaufman, McLaughlin, Derby, & Waco, 2011; Ruwe, McLaughlin, Derby, & Johnson, 2011). An additional advantage of this and other flashcard systems, is the ease at which it can be implemented across all academic subject areas and classroom settings (Herberg, McLaughlin, Derby, & Williams, 2012; Standish, Neyman, & McLaughlin, in press; Travis, McLaughlin, Derby, &Carosella, 2012; Van Houten&Rolider, 1989). In addition, DI flashcards have been paired with reading racetracks (Anthony et al, 1997; Falk, Band, & McLaughlin, 2003; Kaufman et al., 2011; Printz, McLaughlin, & Band, 2006; Rinaldi& McLaughlin, 1996; Rinaldi et al., 1997) to teach various basic skills with a wide range of students and classroom settings.

The purpose of this particular study was to increase the accuracy and fluency of pre-primer and primer sight-words with two special education preschool students with ASD. The ultimate goal was to

prepare these students for their upcoming transition to kindergarten in the next school year. Finally, an additional goal was to determine of DI flashcards and reading racetracks could be implemented and evaluated in a preschool classroom with children with autism. At this writing, very little research using these two procedures either in combination or alone has been completed with children with ASD.

METHOD

Participants and Setting

There were two students selected by their preschool special education teacher (fourth author) as participants. They were chosen because she was preparing each participant for enrollment in an integrated kindergarten classroom next year.

The first participant was a five-year-old African-American male with an autism spectrum disorder (ASD). He attended the special education preschool since the age of 3 focusing on individualized, specific cognitive, social, and fine motor goals. In addition, the participant had an older male sibling with an ASD, which presents unique challenges for the participant at home and school.

The second participant was a five-year-old Caucasian male with an Autism Spectrum Disorder (ASD). He had also attended the same special education preschool since the age of three. His focus involved specific cognitive, social, fine motor, and speech language goals. Although not formally diagnosed, the participant also showed characteristics of attention deficit hyperactivity disorder (ADHD) and often struggled to maintain focus on a given task for an extended period of time.

This study was conducted in a self-contained special education classroom built on an Alternative Instructional Model (AIM) in an urban preschool center in a low-socioeconomic area in the Pacific Northwest. The participants attended the afternoon (p.m.) session of the preschool. This overlapped with the morning session of the preschool for an hour and 30 minutes. The remaining two and one half hours of the school day were spent integrating into an Early Childhood Education and Assistance Program (ECEAP) located across the hall. During this overlap period, there was an average of 10 students with varying disabilities, all of which had been either formally diagnosed with ASD or showed significant signs of an ASD. Of the 10 students, six students had a formal ASD diagnosis with the remaining four being diagnosed with developmental delays. There was one certified teacher and five educational assistants to teach academic, social and life skills to the students. The first author worked with each participant during their intervention time for 15 minutes at a designated table in the corner of the classroom. Finally, for the second participant, a preference assessment was conducted to determine his preferred reinforcement for working. He chose “M&M’s” and was presented with mini M&M’s contingent upon his active participation in the session.

Materials

A variety of materials were utilized in the study: two sets of flashcards, printed in basic black font on white paper with a black border; a black pen; pre and posttest data sheets of sight words (see Figure 1); a calculator; pre-primer and primer Dolch word lists; and a preferred reward consisting of mini M&M’s. Data was collected using prep-made data collection sheets, which were also the pre and posttest sheets of sight words that were typed out in a column and row fashion and three-cycle graph paper, which was later transferred to an Excel finalized graph sheets.

Dependent Variables and Measurement

There was one dependent variable measured in this study. It was the number of correctly identified sight-words by each participant. A correct response was defined as the participant stating the word or self-correcting within five seconds of the flashcard being presented. A response was scored, as an error if a participant stated an incorrect word, did not self-correct, or failed to respond within five-seconds of presentation of the sight word. If a participant incorrectly labeled a sight word but self-corrected within that five seconds, the response was tallied as a correct response.

Data Collection and Interobserver Agreement

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The first author collected data at the end of each session. Both correct and errors were scored. The first author went through the flashcards with each participant without providing assistance or feedback to the responses of each individual.

Interobserver agreement data were collected on 1 of the 3 (33%) sessions for baseline 1, for Set 1, for both participants. During DI flashcards for Set 1, interobserver agreement was collected on 6 of the 18 (33%) sessions for both participants. In baseline 2 for Set 1, interobserver agreement was assessed on 2 of the 3 (67%) sessions for both participants. In addition, interobserver agreement data were collected on 5 of the 12 (42%) sessions of baseline 1 for Set 2, with both participants. During intervention of Set 2, interobserver agreement data were taken on 3 of the 9 sessions (33%) for both participants. Finally for Set 2, interobserver agreement data were collected on 1 of 3 (33%) sessions for both our participants.

The certified special education classroom teacher gathered interobserver agreement data. She was positioned behind the student and made an independent tally on a separate data-recording sheet. This data-recording sheet was identical to the one used by the first author. The number of correct and errors were recorded by each observer on their individual recording sheet, was then compared. The smaller number of corrects and errors were divided by the larger and multiplied by 100. Mean agreement was 100% across all sessions and participants.

Experimental Design and Conditions

A single subject, multiple baseline design (Kazdin, 2010) across different sets of sight-words was used to evaluate the effectiveness of the direct instruction flashcards with and without an edible reward. The design was implemented after three sessions of baseline for both participants. Each session was last a school day. Each participant was introduced to two sets of sight-words. These sets were introduced in a staggered fashion, and the introduction of a new set of sight-words was dependent on each participant's performance with the previous set of sight-words. Each intervention session lasted roughly 15 minutes.

Baseline

During the baseline sessions, the first author prompted the participant to join her at a designated table. This table was separated from the other students and adults in the classroom. During baseline, the first author individually presented sight-words in random order on flashcards. As each word was presented the first author prompted, "What word?" to the participant, and their responses were recorded. The participant was given a "+" sign if he read the word correctly in five seconds and a "-" sign if he was not able to correctly identify the word or self-correct within five seconds. The participants were not given any feedback regarding the accuracy of their responses during this portion of the study. However, they were encouraged to do the best they could and non-contingent, specific praise was given for participation. Baseline was in effect for three school days.

Direct instruction flashcards

Two sets of sight-words were created for the participants. The order sight-words was dependent on each participant's performance during baseline. For Participant 1, Set 1 consisted of nine known sight-words and 21 unknown sight-words, and Set 2 consisted of eight known sight-words and 17 unknown sight-words. For Participant 2, Set 1 consisted of fourteen known sight-words and 16 unknown sight-words, and Set 2 consisted of nine know sight-words and 16 unknown sight-words.

At the beginning of each session, the first author went through the flashcards of the current instructional set of flashcards with the participant. The set was practiced three times before taking data on the responses of the participants. During practice rounds, the participants were given contingent, specific verbal praise and high-fives for correct responses. When an incorrect response was given a model, lead, test correction format was implemented and the missed flashcard was placed three places back in the stack. Data was taken during the fourth presentation of the flashcards. During this presentation, the first author made a pile of correct responses and a separate pile of incorrect responses. The same model, lead, test correction procedure was used by the first author with the flashcards in the incorrect pile at the end of the presentation to review unknown sight-words. The first author then recorded the number of correct responses and the number of incorrect responses for each

participant on the data collection sheets. This recorded baseline data on sight-words that participants had not yet mastered while also recording maintenance data on sight-words that had been previously mastered.

Baseline 2

We carried out a return to baseline to determine if there was a functional relationship between number correct and our procedures. This condition lasted for three sessions.

DI flashcards + edible reward

About half way through the study Participant 2 appeared to lose total interest in his performance, as well as working with the first author. The first author made the decision to implement an extra reward system for this participant. This was employed in an attempt to increase his motivation and overall performance. The reward system consisted of allowing him to earn one mini M&M contingent for correctly identifying one sight-word. This supplementary condition was only implemented in conjunction with the original DI flashcards condition for Participant 2. Participant 1 never was exposed to this additional reward system.

RESULTS

Baseline-1

As seen in Figures 1 and 2, Participant 1 correctly identified an average 8.33 words out of 30 (range 8-9) in baseline 1 for Set 1. For Set 2 he correctly identified an average 7.75 words out of 25 (range 7 to 8). For Set 1, Participant 2 correctly identified an average 13.67 words out of 30 (range 13 to 14 sight words). His baseline performance with Set 2 found he could correctly identify an average 9.83 words out of 25 (range 9 to 13 sight words).

Direct Instruction Flashcards

Following the implementation of DI flashcards, Participant 1 demonstrated mastery of Set 1. He correctly identified an average of 13.5 sight words out of 25 (range 8 to 19).

The results for this condition for Participant 2 are presented in Figure 2. Following the implementation of DI flashcards, Participant 2 demonstrated improvement of Set 1. He could correctly identify an average of 23.7 words out of 30 (range 23 to 26). For Set 2, he correctly identified an average of 13.2 words out of 25 (range 9 to 17).

Baseline 2

The return to baseline resulted in a maintenance of Set 1 for Participant 1 and his performance remained high (M = 27.3; range 28 to 28 sight words). Participant 2 displayed variable performance, but he improved from an average of 13.2 to 18.0 words out of 25 during Baseline 2.

DI Flashcards Participant 1 and DI Flashcards + Edible Rewards for Participant 2

A return to this procedure resulted in continued mastery of Set 1 sight words for Participant 1. Also, for Set 2, Participant 1 increased the number of correct sight words he could identify. He improved from an average of 13.5 during the first DI flashcard phase to 24.9 during the second DI flashcards condition. For Participant 2, the use of DI flashcard and an edible reward resulted in a high level of sight word acquisition with Participant 2's Set 1 sight words (M = 26.0 words). However, this improvement was not found for Participant 2 for his Set 2 sight words. The participant correctly identified an average of 18 words in Baseline 2 and improved to an average of 19 words.

DISCUSSION

Our outcomes for teaching sight word to children with autism warrant further research and analysis. The present research found that both participants made some progress when DI flashcards were employed. The addition of an edible for the second participant, also improved his performance.

The data for Participant 1 clearly replicates our previous research with sight words (Falk et al., 2003; Kaufman et al., 2011; Printz, McLaughlin, & Band, 2006; Rinaldi et al., 1996, 1997). The use of an

additional consequence for the second participant provides some evidence that preschool students with ASD may require additional consequences to improve their academic skills (B. Williams & R. Williams, 2011). Also, it provides a replication of our earlier research in teaching math facts (Standish, McLaughlin, &Neyman, in press; Treacy et al., 2012) or spelling (Skarr, McLaughlin, Derby, Meade, & Williams, in press).

Most of the time, both students were enthusiastic when working with the first author during every session. After considering the progress made by both participants through the use of our procedures, there is no reason not to believe that more novel academic content such as spelling or number identification could be taught using this teaching approach. Recently we have been able to teach color recognition using these procedures (Herberg et al., 2012).

Participant 1 responded very well to the intervention and made substantial progress throughout the study. He was willing and excited to work with the first author when asked, and enjoyed the individual attention provided by the first author during each session. Across all sessions and sets, the participant remained positive and hard working. Often be became visibly excited with mastery of a word and found joy in counting how many words were correctly identified during every session. The participant responded very well to specific and general praise, such as high fives and the occasional "Wow! You are working hard. You are ready for Kindergarten!" He did not get bored with either intervention, and never appeared frustrated when presented with words he could not identify. The intervention, for both sets, should have continued for at least a total of two consecutive mastered sessions; however, due to time constraints, the first author was unable to do so. Participant 1's previous performance and response to intervention, indicates that he would have been able to demonstrate mastery with one or two additional sessions.

Participant 2 improved his sight-word identification when edibles were added to the DI flashcard procedure. He would have occasional difficulties transitioning from a preferred activity to intervention with the first author. To minimize this response, the first author started his sessions immediately upon his arrival to the classroom. Often, the participant would complain or negotiate with the first author, regarding the quantity and the presentation of his reward. However by the end of data collection, this participant still stated he enjoyed working with the first author, especially when he was given individual attention. Throughout the study, this participant struggled with remaining still and concentrating throughout the sessions. In several sessions, this participant would begin "scripting" lines or interactions from mainstream movies and television shows. In addition, he required additional verbal, gestural, or physical prompts to attend to the procedures. The introduction of a reward had some effect on his ability to stay on task, yet only minimally affected his accuracy.

The procedure was practical to employ in the preschool classroom by the available school personnel. Each session took between 15 and 20 minutes. The DI flashcard procedures should be very easy to teach an educational assistant, parent or classroom volunteer. Data collection was very simple and easy to carry out. The DI flashcard procedure as well as the edible reward was inexpensive, and could be carried out with present classroom materials or minimal financial support from a teacher's classroom budget. The only materials necessary were the flashcards, data collection sheets, pen, and the preferred reward (Mini M&M's). Overall, it was a very easy study to be carried out in the preschool setting.

The variable outcomes with Participant 2 warrant additional research. It is possible employing a different reward could be improved his outcomes. Also, carrying out an additional preference assessment could have provided one with an additional consequence to use with such a student. The failure for each participant to return to baseline levels when DI flashcards were removed is of interest. It is quite possible that the use of DI flashcards provided enough practice to have their sight word vocabulary to become firm (Marchand-Martella, Slocum, &Martella, 2004). It is also quite possible that other activities and curricula employed in the classroom make use of the sight words, providing even more opportunities for our participants to use their new sight words. This will have to be assessed in future research.

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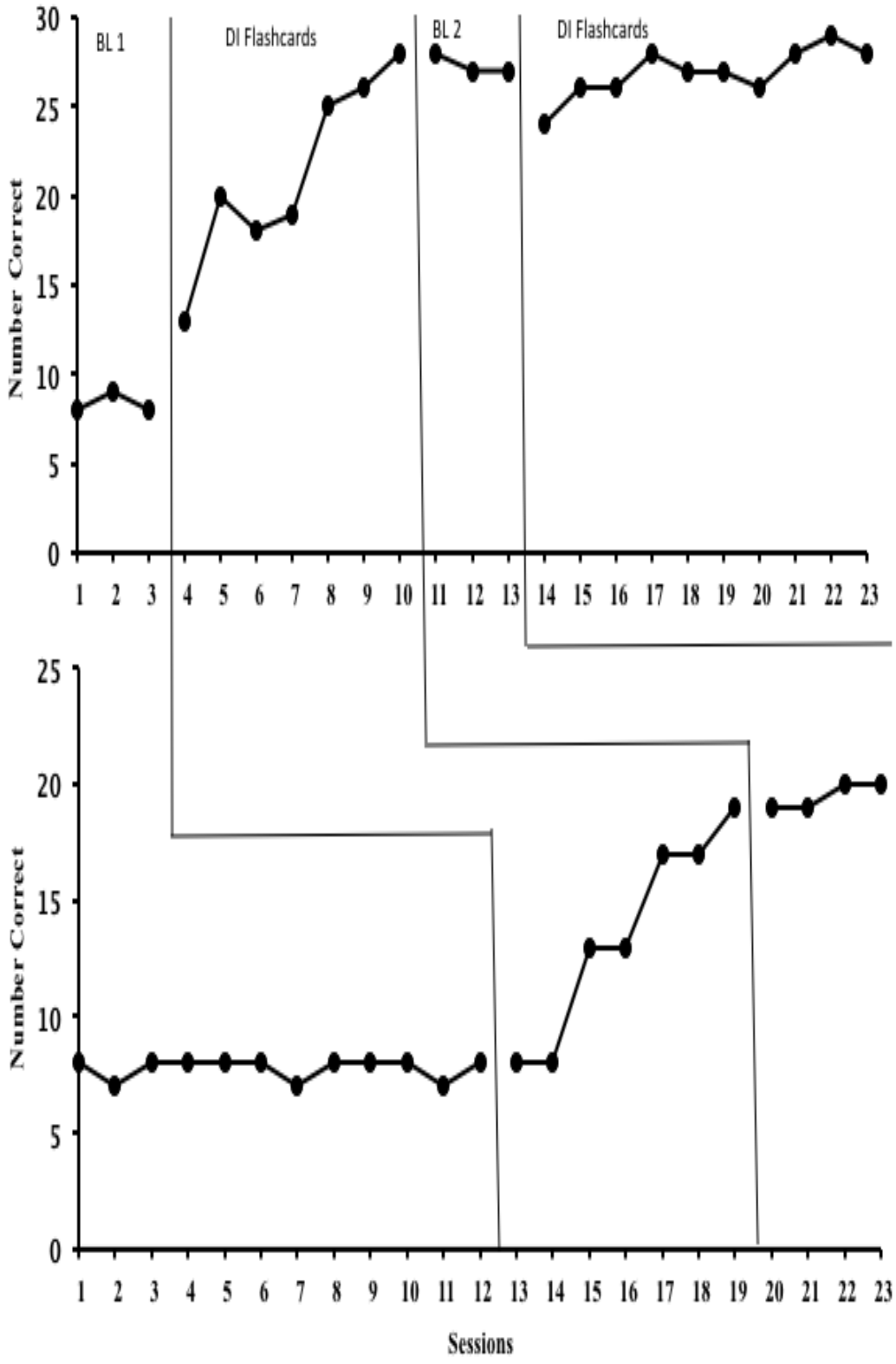

Figure 1.Number of correct sight words for both Sets 1 and 2 during Baseline 1 and 2, and DI flashcards and DI flashcards for Participant 1

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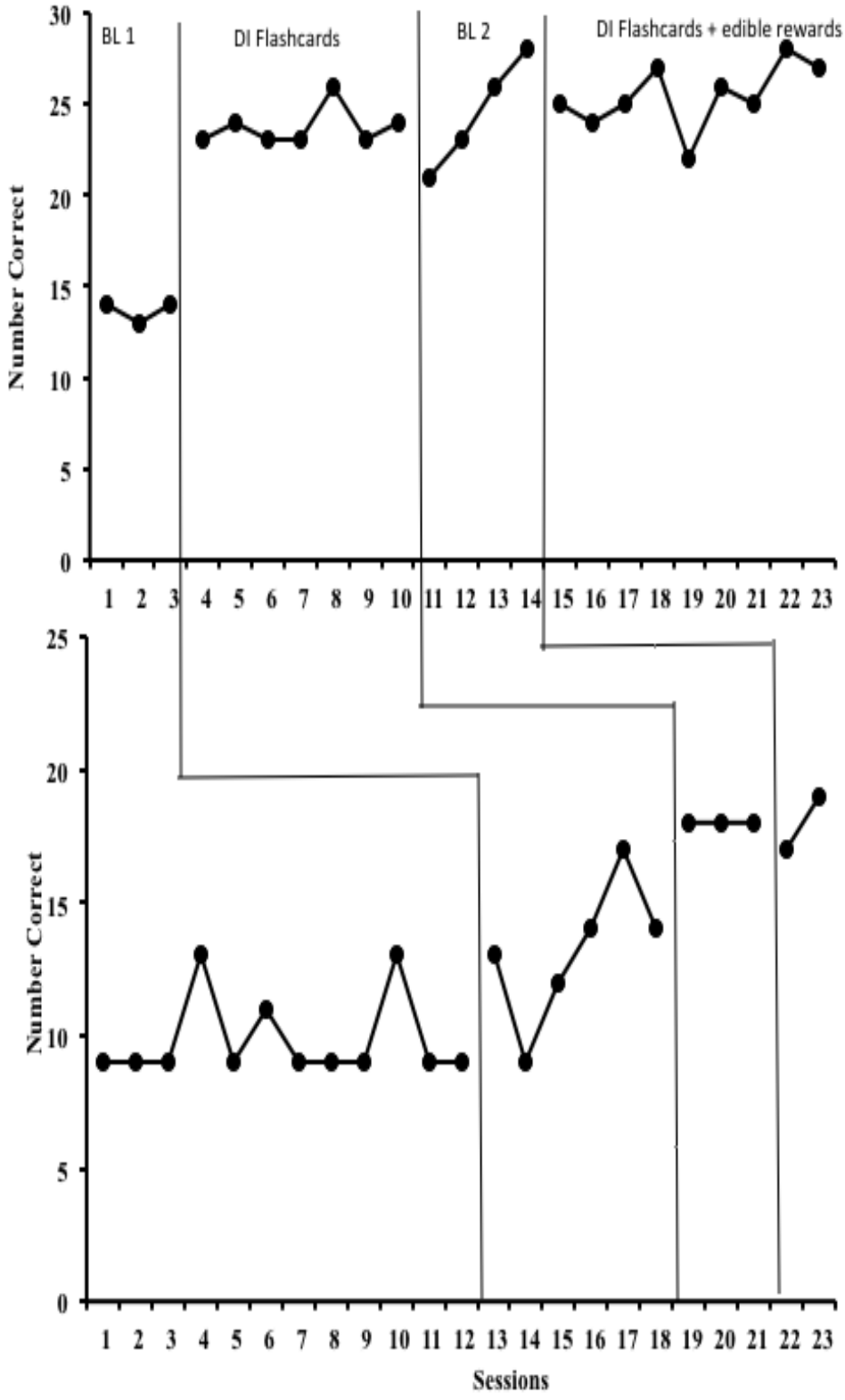

Figure 2.Number of correct sight words for both Sets 1 and 2 during Baseline 1 and 2, and DI flashcards and DI flashcards + edibles for Participant 2