Effects of Multimedia Social Stories on Knowledge of Adult Outcomes and Opportunities among Transition-Aged Youth with Significant Cognitive Disabilities

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Abstract: Students with significant cognitive disabilities typically experience poor post-school outcomes as adults. Federal legislation and recent research reflect the importance of teaching self-determination skills as a strategy to improve post-school outcomes. However, the National Longitudinal Transition Study-2 (NLTS-2) reported that individuals with mental retardation, autism, and multiple disabilities often lack self-determination skills. The current study investigated the impact of Multimedia Social Stories on knowledge of adult outcomes and opportunities among transition-aged youth with significant cognitive disabilities using a multiple probe across participants design. All students acquired information taught and generalized skills to an informal transition planning meeting and a preference assessment activity. Limitations, as well as recommendations for research and practice, are provided.

Although recent data from the National Longitudinal Transition Study-2 (NLTS-2) have indicated modest improvements in adult success among graduates of special education programs, students with disabilities continue to struggle with unsuccessful adult outcomes. People with significant cognitive disabilities have experienced markedly poorer adult outcomes in comparison to people with more mild disabilities (Blackorby & Wagner, 1996; Cameto, 2005). Adults with significant cognitive disabilities commonly experience unsuccessful outcomes in all four domains of adult life (Lohrmann-O’Rourke & Gomez, 2001), including residential, educational, vocational, and recreational activities.

NLTS-2 data indicate that individuals with significant cognitive disabilities are dependent on other individuals in a variety of ways. According to parents and youth with mental retardation, approximately 50% indicated that independent living was a goal for the youth. Financial dependence was also evident, as only 10% of youth with mental retardation had a personal checking account (Levine & Wagner, 2005). Further, participation in post-secondary education, paid employment, and career preparation among individuals with mental retardation declined from 55.5% in 1987 to 45.8% in 2003 (Wagner, 2005a). Recent reports also indicate that only 13% of adults with mental retardation participated in postsecondary education (Newman, 2005). Finally, in terms of recreation, youth with mild disabilities were twice as likely to participate in community activities in comparison to youth with significant cognitive disabilities (Wagner, 2005b).

In the past decade, several studies have identified self-determination instruction during high school as a strategy to improve adult outcomes among youth with disabilities (Leake & Stodden, 2002; Simon, 2001; Wehmeyer & Schwartz, 1997). For example, Wehmeyer and Schwartz indicated that among students with learning disabilities and mental retardation, those with high levels of self-determination were more likely to (a) desire independent living, (b) take steps towards financial independence by having a bank account, and (c) have a job. More recently, Lachapelle et al. (2005) conducted a discriminant function analysis and found that in an international group of 182 adults with mild cognitive disabilities, those with high levels of...
self-determination also had improved overall quality of life.

A recent NLTS-2 report (2005, June) stated that individuals with higher levels of self-determination are more likely to participate in the transition planning process. However, the report also indicated that individuals with mental retardation, autism, and multiple disabilities lacked self-determination skills that are important to meaningful participation. Specifically, the report indicated that individuals in these disability groups had significantly less confidence in their capacity to realize goals in comparison to the other students with disabilities.

Additionally, the report also stated that to encourage youth to participate in transition planning, educators may implement “specific instruction . . . to train youth . . . to make informed decisions about their transition to adult life” (2005, p. 7). However, Storey (2005) warned that students’ opportunities to express informed choice, rather than simply choice, is essential to determining preferences among individuals with disabilities. According to Lohrmann-O’Rourke and Gomez (2001), assessing preference, which is frequently absent in transition planning, should be embedded in planning for adult life so that the team can create a plan based on the desires, strengths, and needs of the student.

As students with disabilities experience challenges in making the transition from high school to adulthood, educators have a unique chance to implement strategies to increase success for adults with disabilities (Cameto, 2005). Social Story instruction is one teaching strategy that is used to increase skills and knowledge among students with disabilities that has emerging evidence in the research literature. A Social Story “describes a situation, skill, or concept in terms of relevant social cues, perspectives, and common responses in a specifically defined style and format. The goal of a Social Story is to share accurate social information” which may “lead to more effective responses” among individuals with disabilities (The Gray Center, 2007, ¶ 2). Special educators have used social stories to effectively improve abilities and behaviors of students with a wide range of disabilities, including autism and cognitive disabilities. A number of studies have indicated that social stories have been used effectively to decrease aggression and inappropriate behaviors (e.g., cheating; Kuoch & Mirenda, 2003) as well as disruptive behavior (Scattone, Wilczynski, Edwards, & Rabian, 2002). Researchers have also demonstrated that social stories are effective in increasing students’ appropriate behaviors and skills (e.g., Delano & Snell, 2006; Hagiwara & Myles, 1999).

A number of studies have reported implementing social story interventions with unique characteristics by (a) employing an innovative multimedia social story presentation format (Hagiwara & Myles, 1999; Ozdemir, 2008), (b) teaching skills related to self-determination, including choice-making (Barry & Burlew, 2004) and self-evaluation (Thiemann & Goodman, 2001), and (c) implementing a social story intervention with older students (e.g., Bledsoe, Myles, & Simpson, 2003). For example, Hagiwara and Myles and Ozdemir implemented a multimedia social story intervention displayed on a computer screen for students with autism. Hagiwara and Myles indicated that two students learned to wash their hands and one student increased time on task. Similarly, Ozdemir found that all participants improved social engagement with peers.

Next, Barry and Burlew (2004) successfully improved self-determination skills by implementing a social story intervention with two children with autism. Authors reported that students both (a) increased appropriate play duration and (b) increased independence in choice making (i.e., a component skill of self-determination) related to selection of play materials.

Finally, two research teams implemented a social story intervention with teenage participants. First, Bledsoe et al. (2003) indicated that the social story intervention improved lunchroom behaviors in a teenager with Asperger syndrome and attention deficit hyperactivity disorder. Second, Quirmbach, Lincoln, Feinberg-Gizzo, Ingersoll, and Andrews (2008) randomly assigned 45 children diagnosed with autism spectrum disorder aged 7–14 to standard, directive, or control story conditions and found that standard and directive story formats were effective in improving social skills among participants who had game playing and verbal comprehension skills.

Although social story interventions con-
tinue to gain support in the research litera-
ture (e.g., Soenksen & Alper, 2006), few stud-
ies included (a) a multimedia presentation
format, (b) transition-aged participants with
significant cognitive disabilities, or (c) depen-
dent variables related to self-determination.
Further, no research exists that addresses all
of these considerations. Therefore, the pur-
pose of this study was to investigate the effects
of multimedia social stories on knowledge of
adult outcome areas and opportunities among
high school students with significant cognitive
disabilities.

Method

Participants and Setting

Three participants were included in the social
story intervention. Participants were students,
aged 17 to 21, with significant cognitive dis-
abilities who (a) planned to work in a sup-
ported employment setting, and (b) lived in
their family home at the time of this study.
Three additional students, who met the same
criteria, participated in a videotaped session
for the purposes of collecting social validity
data (i.e., comparison of participants who re-
ceived the social story intervention to non-
participants) but were not included in the
social story intervention. All training and as-
sessment sessions took place in a conference
room in a public separate school in the south-
eastern United States. Additionally, students
were excluded from this study based on the
following characteristics: (a) poor attendance
records (i.e., greater than 10 absences in the
past school year) or (b) past participation in
instructional activities related to residential,
educational, vocational, and recreational op-
portunities of adult life or in instruction de-
dsigned to increase their ability to participate in
or lead formal educational planning meetings
(e.g., IEP meetings or transition meetings).

Alex. Alex was an 18-year-old Asian male
with autism and a moderate intellectual dis-
ability. At the time of this study, Alex planned
to attend school for 3 more years. Currently,
his transition plan indicates that he will exit public school at age 22 in June 2012.

Donna. Donna was a 21-year-old African-
American female with a moderate intellectual
disability. At the time of this study, Donna
planned to attend school for five more
months. She exited public school at age 22 in
June 2008.

Eric. Eric was a 17-year-old Caucasian male
with a moderate intellectual disability. At the
time of this study, Eric planned to attend
school for 5 more years. Currently, his transi-
tion plan indicates that he will exit public
school at age 22 in June 2013.

Multimedia Social Stories (MMSS)

Six MMSSs were developed by the researcher
on the following topics: (a) four adult out-
comes, (d) three residential opportunities,
(b) three educational opportunities, (c) three
vocational opportunities, (e) three recrea-
tional opportunities, and (f) a summary of all
outcomes and opportunities. Microsoft Power-
Point was used as the presentation format.
Presentations ran automatically; therefore,
the researcher was able to include participants
who could not use a computer mouse or com-
puter keyboard in the study. MMSSs included
an audio recording of the text read by the
researcher. MMSSs ranged in duration from
2 to 3 minutes, excluding the summary MMSS
which was approximately 10 minutes long.

Two additional software packages were also
used to develop MMSSs. First, Writing with
Symbols 2000, a computer program that gen-
erates picture symbols for text entered, was
used to create picture symbols (i.e., text with
matched picture). Next, the researcher used
SnagIt (n.d.), to place images of picture sym-
bols in PowerPoint presentations to create the
MMSSs.

Content Validity of the MMSSs

Two doctoral students in special education
with experience using and developing social
stories for students with disabilities assessed
the content validity of the six MMSSs. Using
a guide developed by Gray (2004), Social Stories
10.0: The New Defining Criteria and Guidelines,
students evaluated each MMSS to determine
if they met criteria to be social stories and
provided feedback to better align MMSSs
with Gray’s guidelines. Students provided one
suggestion to make the title of each MMSS
more descriptive. For each MMSS, the re-
searcher developed a more descriptive title.
After adapting the titles, each student validated that the MMSSs met all criteria.

**Dependent Variables**

**Knowledge of adult outcome areas and opportunities.** The primary dependent variable was number correct on a 16-item quiz. To assess students’ knowledge of adult outcome areas and opportunities, the primary researcher read 16 randomly-ordered questions from a script during each assessment session. The 16 questions were composed of (a) 4 questions related to the four adult outcome areas (i.e., residential, educational, vocational, and recreational) and (b) 12 questions related to three opportunities for adult life within each of the four adult outcome areas.

To respond to all questions posed, the students had a response field with three potential response options, including one correct answer and two distracter responses. A correct response was defined as being: (a) initiated within 10 seconds, (b) completed without any prompting within 15 seconds, and (c) correct. Mastery criterion for completing intervention was set at 13 of 16 questions for two consecutive assessment sessions after viewing all six MMSS. See Table 1 for four outcome areas and three opportunities within each area.

**Preference assessment.** The researcher assessed generalization of knowledge of adult outcome areas and opportunities by assessing preference including (a) opportunity preference within each adult outcome area and (b) rationale statements related to each preference expressed. The researcher asked students to identify (a) one preferred opportunity within each adult outcome area and (b) a maximum of three rationale statements that describe reasons they prefer the selected opportunity.

For each adult outcome area, the researcher asked students to identify one preferred opportunity. For example, the researcher posed the question: Where do you want to learn? The researcher evaluated the responses using a score of “0” for “no preference expressed” and “1” for “preference expressed,” resulting in four potential points (i.e., one point for each adult outcome area).

The researcher then asked the student to provide three rationale statements for the preferred opportunity verbally or by touching picture symbols. For example, a student may have expressed a preference to learn at a community college as an adult. To prompt three rationale statements for each preferred opportunity, the researcher posed the following direction to the student three times: “Tell me why you want to (name preferred opportunity).” If a student did not identify three rationale statements for the preferred opportunity (i.e., incorrect response or no response) in an adult outcome area, the researcher posed the direction again while presenting a response field to provide a maximum of three opportunities to express rationale. Each researcher-developed response field was composed of three picture symbols (i.e., one picture symbol illustrating a salient characteristic of that opportunity that duplicated the information presented in the MMSS and two distracter picture symbols). For example, one response field for community college may include (a) the picture symbol illustrating the salient characteristic learning about money and reading and (b) two distracter picture symbols.

**TABLE 1**

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational</td>
<td>Community College</td>
</tr>
<tr>
<td>Employment</td>
<td>Work with a Job Coach</td>
</tr>
<tr>
<td>Residential</td>
<td>Family Home</td>
</tr>
<tr>
<td>Recreational</td>
<td>Join a Group or a Team</td>
</tr>
<tr>
<td></td>
<td>Continuing Education</td>
</tr>
<tr>
<td></td>
<td>Work in an Enclave</td>
</tr>
<tr>
<td></td>
<td>Group Home</td>
</tr>
<tr>
<td></td>
<td>See a Movie, Concert, or Other entertainment</td>
</tr>
<tr>
<td></td>
<td>Job Training</td>
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<tr>
<td></td>
<td>Work in a Mobile Work Crew</td>
</tr>
<tr>
<td></td>
<td>Supported Apartment</td>
</tr>
<tr>
<td></td>
<td>Relax at Home</td>
</tr>
</tbody>
</table>
symbols that illustrate salient characteristics of
the other two opportunities in the educational
outcome area. A cumulative preference assess-
ment score was calculated by adding the sum
of the four preference scores plus the four
rationale scores. The possible range for each
student’s preference assessment score was 0
to 16.

Situation generalization. To assess skill gen-
eralization, the primary researcher assessed stu-
dents’ knowledge of adult outcomes and op-
portunities at informal transition planning
meetings held during baseline and the first
week of maintenance. The primary researcher
read the 16 questions used in assessment of
the primary dependent variable during general-
ization assessment sessions, but followed the se-
quence of topics provided by the transition com-
ponent of the student’s IEP [i.e., education/training, employment, independent living (i.e.,
residence and recreation)].

Social Validity

The researcher assessed the social validity of
the MMSS intervention from the perspective
of a variety of stakeholders, including (a) direct
consumers (i.e., study participants), (b) indi-
rect consumers (i.e., parents of participants),
(c) members of the immediate community
(i.e., participants’ classroom teachers), and
(d) members of the extended community
(i.e., prospective special educators at a local
university; Schwartz & Baer, 1991). Addition-
ally, as recommended by Wolf (1978), three
measures of social validity (i.e., goals, proce-
dures, and outcomes) were collected.

First, to assess social validity of procedures
as perceived by direct consumers, the re-
searcher asked participants to express their
opinions of the research study verbally or by
touching picture symbols. Second, to assess
social validity of goals and procedures as per-
ceived by indirect consumers (i.e., parents)
and members of the immediate community
(i.e., classroom teachers), the researcher as-
sessed the feasibility and impact of the inter-
vention from the perspective of participants’
parents and teachers via questionnaire. Third,
to assess social validity of outcomes as per-
ceived by the extended community, the re-
searcher showed 14 prospective special educa-
tors a videotaped session of 3 participants and
3 non-participants responding to questions re-
lated to their preferred residential, educa-
tional, vocational, and recreational plans for
adulthood. Prospective teachers responded to
eight items developed by the researcher to
evaluate each student’s skill levels using a
Likert-type scale with scores ranging from 0
to 2. Range of possible scores for each student
was 0 to 16.

Interobserver reliability. Interobserver reli-
ability data were collected for during all phases
of the study. A second observer viewed vide-
tapes to assess students’ individual perform-
ance for 34.5% of the probes. The experi-
menter and second observer compared these
results using an item-by-item method and cal-
culated the reliability percentage by dividing
the number of agreements by the sum of
agreements and disagreements. Interobserver
reliability ranged from 87.5% to 100%, with a
mean of 99.2%.

Experimental Design

A multiple probe across participants design
(Horner & Baer, 1978) was used to measure
the effects of the MMSS on students’ knowl-
edge of adult outcomes and opportunities.

Procedure

Baseline. First, an informal transition plan-
ning meeting was conducted to gather the
two generalization measures: (a) adult out-
come and opportunity knowledge in the non-
intervention setting and (b) preference for
each adult outcome area. One participant,
the participant’s classroom teacher, and the
researcher attended this meeting, held one
week prior to collecting baseline data on the
primary dependent variable. Next, data were
collected on the primary dependent variable
for a minimum of three days.

Multimedia social stories intervention. Each
of the MMSS included three components:
(a) a visual picture symbol representation of
the outcome area or outcome opportunity,
(b) an audio explanation of the outcome area
or outcome opportunity and corresponding
picture symbol with text explanation, and
(c) a visual picture representation of the out-
come area or outcome option. Each day, prior
to viewing the MMSS, the researcher provided
students with a paper copy of picture symbols of each outcome or opportunity to be presented in that day’s MMSS in the order that they were viewed. For example, the educational MMSS presents three educational post-secondary opportunities, including Community College, Continuing Education, and Job Training.

To present the MMSS, the experimenter assisted students as necessary to run the MMSS presentations on a computer. Once the presentation began, the experimenter did not intervene or comment on any part of the intervention. Students watched a different social story each day for six consecutive sessions.

On the first day of intervention, the first social story viewed was the overview of the four adult outcome areas including residence, education, vocation, and recreation. However, viewing order for participants for remaining MMSSs was determined through analysis of need determined from each student’s daily baseline assessment data by identifying the adult outcome area with the lowest score from baseline probe data. If student data for any adult outcome areas indicated the same level of need, the researcher ordered the adult outcome areas randomly. All instructional sessions began with the researcher assessing students on the primary dependent variable, prior to viewing that day’s MMSS.

Skill builders (if needed). After viewing all six MMSSs on consecutive sessions, if a participant did not reach mastery criteria, the student entered a skill builder phase. Skill builder phase consisted of a targeted review of the MMSS(s). That is, in Skill Builder 1, a student watched the MMSS that corresponded to the area (i.e., adult outcomes, residential opportunities, educational opportunities, vocational opportunities, recreational opportunities) in which the student scored the lowest according to daily assessment of the primary dependent variable. If a student’s lowest score was the same for more than one area, the researcher randomly selected one of the areas. Both Alex and Eric needed Skill Builder 1.

If a participant did not reach mastery criteria after three days of viewing Skill Builder 1, the student entered Skill Builder 2, which consisted of a targeted review of the MMSS(s) with embedded experimenter-led opportunities for active student responding. That is, for the area (i.e., adult outcomes, residential opportunities, educational opportunities, vocational opportunities, recreational opportunities) in which the student scored the lowest on the previous assessment of the primary dependent variable, the student watched the MMSS presentation on that area. During the presentation, the presentation was paused intermittently by the experimenter to ask questions related to the content, which provided opportunities for student active responding. For example, in Skill Builder 2 related to residential opportunities, the researcher asked the primary dependent variable questions (e.g., “Which one means living with your family?”) immediately following the corresponding content provided in the presentation. If a student’s lowest score was the same for more than one area, the researcher randomly selected one of the areas. Only Alex required Skill Builder 2.

After seven sessions participating in Skill Builder 2, Alex did not reach mastery criteria and entered Skill Builder 3, which included a targeted review of the MMSS(s) with embedded experimenter-led opportunities for active responding and reinforcement with a preferred snack item (e.g., corn chip) for correct responses within training sessions. That is, for the knowledge area in which Alex scored the lowest on the previous assessment of the primary dependent variable, he watched a MMSS presentation that was paused intermittently by the experimenter to provide opportunities for a student response. If his lowest score was the same for more than one area, the researcher randomly selected one of the areas.

Maintenance. Maintenance data were collected at one-week intervals for three weeks after a student met mastery criteria. Students were asked the 16 randomly ordered questions, but they did not view the MMSS during maintenance.

Generalization. The researcher conducted a second situation generalization probe for each student, a minimum of one week after completing intervention using another informal transition planning meeting. The re-
searcher used the same procedures for assessing generalization in baseline. During the same informal transition planning meeting, the researcher also assessed students’ abilities to express (a) preferences among adult opportunities in each of the adult outcome areas and (b) rationale statements for the preferred opportunity through vocal response or by touching of picture symbols.

Procedural Reliability

To determine treatment adherence, data were collected throughout the study by videotaping 20.8% of the intervention sessions. Second observers used a detailed checklist to measure the integrity of intervention implementation. Results indicated that procedural reliability for the MMSS intervention was 100%.

Results

Effects of Multimedia Social Stories on Knowledge of Adult Outcomes and Opportunities

Figure 1 presents the total number of correct responses on the 16-question probe related to the dependent variable, knowledge of adult outcomes and opportunities for each participant.

Alex. During baseline, Alex’s scores ranged from 4 to 5, with a mean of 4.6. During intervention, his scores ranged from 6 to 11 with a mean of 8.2. Since Alex did not meet mastery criteria during intervention, he entered the Skill Builder 1. During Skill Builder 1, Alex’s scores ranged from 4 to 6 with a mean score of 5.3. Since Alex’s scores decreased, he entered Skill Builder 2. During Skill Builder 2, probe scores ranged from 6 to 9 with a mean score of 7.9. While Alex’s scores in Skill Builder 2 increased above his scores in Skill Builder 1, he still did not reach mastery. Therefore, he was placed in Skill Builder 3. During the third skill builder phase, his probe scores ranged from 7 to 8 with mean score of 7.3. During maintenance, Alex’s scores ranged from 7 to 9 with a mean score of 7.7.

Donna. During baseline, Donna’s scores ranged from 8 to 9, with a mean of 8.8. During intervention, her scores ranged from 10 to 15 with a mean score of 12.4. During maintenance, Donna’s scores ranged from 14 to 15 with a mean score of 14.3.

Eric. During baseline, Eric’s scores ranged from 7 to 11, with a mean of 9. During intervention, his scores ranged from 11 to 13 with a mean score of 12. Since Eric did not meet criteria for mastery during intervention, he entered Skill Builder 1. During the Skill Builder 1, Eric’s scores ranged from 13 to 15 with a mean score of 14. During maintenance, Eric’s scores ranged from 14 to 15 with a mean score of 14.3.

Generalization

Situation generalization. The researcher assessed the ability of each participant to exhibit knowledge of adult outcomes and opportunities in a novel situation, an informal transition planning meeting. All participants’ setting generalization scores increased from pre-intervention to post-intervention (see Table 2). Pre-intervention scores ranged from 6 to 12, with a mean of 8. Post-intervention scores ranged from 9 to 15, with a mean of 12.7.

Preference assessment. The researcher asked students to identify one preferred opportunity within each adult outcome area and up to three rationale statements that described why they preferred the opportunity selected in a new situation during a preference assessment activity. Table 3 summarizes student responses. All participants’ preference assessment scores increased from pre-intervention to post-intervention. Pre-intervention scores ranged from 4 to 9, with a mean of 5.7. Post-intervention scores ranged from 9 to 12, with a mean of 10.7.

Social Validity

First, all participants rated all components of the intervention favorably. Second, parents and teachers rated the intervention favorably. Third, prospective teachers indicated that overall, participants were better able to express plans for adult life in comparison to non-participants. For participants, total scores ranged from 0 to 16, with a mean of 7.9. For non-participants, total scores ranged from 0 to 11, with a mean of 1.9.

Discussion

The purpose of the current study was to investigate the effects of MMSSs on knowledge
Figure 1. Students’ scores on 16-item probe. Note. SB=Skill Builder. Diagonal line on x-axis indicates two-week holiday.
of adult outcome areas and opportunities among transition-aged students with significant cognitive disabilities. A multiple probe across participants design demonstrated a functional relationship between MMSS intervention and students’ knowledge of adult outcome areas and opportunities. In addition, after intervention, participants demonstrated improved ability to express preferences for adult life and participate in transition planning activities in comparison to (a) pre-intervention assessments and (b) students who did not receive the intervention. Finally, various stakeholders indicated that the intervention was both a feasible and valuable instructional method that resulted in a socially significant improvement in a participant’s transition knowledge.

Findings indicated a functional relationship between MMSSs and students’ knowledge of outcomes and opportunities. All students demonstrated an immediate increase in knowledge level. Two of three participants also exhibited an immediate change in trend from descending during baseline phase to ascending upon receiving the MMSS intervention. One participant, Donna, reached mastery after viewing all six MMSSs. One participant, Eric, reached mastery after viewing all six MMSSs and two additional presentations related to the vocational opportunities in the first Skill Builder phase. Finally, one participant, Alex, did not reach mastery criteria after viewing the six MMSS and participating in three Skill Builder Phases. Alex frequently selected responses based on placement in the response array provided by the researcher. For example, when the response array was presented vertically, Alex frequently selected responses that were at the bottom of the array. Further, when the response array was presented horizontally, Alex frequently selected responses that were on the right of the array. Finally, regardless of vertical or horizontal response array presentation, Alex rarely selected a response in the middle of the array.

Overall, the results of this study support previous research related to social stories. The social story literature provides several examples of studies conducted to improve skills and knowledge among individuals with disabilities. However, this study extended the use of social stories in several ways. First, the current study extended the literature related to social story interventions by including participants who were older (i.e., 17–21 years old). Second, this study included only students with significant cognitive disabilities, including not only students with a primary diagnosis of autism, but also students labeled with a intellectual disability or multiple disabilities.

Third, while most social stories research has been conducted using a social story on paper, the results of this study extend the use of a multimedia social story (Hagiwara & Myles, 1999; Ozdemir, 2008) to teach knowledge of adult outcomes and opportunities.

Fourth, the current study extends the use of social stories to teach students self-determination skills through social story interventions (Barry & Burlew, 2004; Thiemann & Goldstein, 2001). Results of the current study suggest that students with significant disabilities can increase knowledge necessary for both participating in transition planning and expressing preference, two skills related to self-determination.

Fifth, the generalization data measure extend the body of literature related to social stories and student participation in educational planning by demonstrating that students increased their ability to respond to questions related to adult outcomes and opportunities within the context of an informal transition planning meeting after viewing the MMSSs. These findings are promising and contribute the first anecdotal evidence that MMSSs can improve IEP participation among students with disabilities. Additionally, this contribution is unique as IEP participation is a unique dependent variable in the body of social story literature and social stories, including multimedia social stories, are unique.

### Table 2

<table>
<thead>
<tr>
<th>Participant</th>
<th>Informal Transition Planning Meeting</th>
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<tbody>
<tr>
<td></td>
<td>Pre</td>
</tr>
<tr>
<td>Alex</td>
<td>6/16</td>
</tr>
<tr>
<td>Donna</td>
<td>6/16</td>
</tr>
<tr>
<td>Eric</td>
<td>12/16</td>
</tr>
</tbody>
</table>

TABLE 2

Pre- and Post-Intervention Situation Generalization Scores
independent variables in the body of educational planning literature.

Further, results indicated that students’ pre-intervention setting generalization scores were higher in comparison to baseline measures of the primary dependent variable. Similarly, for post-intervention setting generalization, scores were higher in comparison to the maintenance measures of the primary dependent variable. One possible explanation for the elevated scores in setting generalization is the order in which questions were posed in these measures. In the primary dependent variable probes, the researcher used a random sequence generator to order the items included in the 16-item probe. However, in the setting generalization measure, the 16 questions were posed in five groups, including questions related to (a) adult outcome areas (i.e., four questions), (b) educational opportunities (i.e., three questions), (c) vocational opportunities (i.e., three questions), (d) residential opportunities (i.e., three questions), and (e) recreational opportunities (i.e., three questions). Posing the questions in the order they typically occur within the context of a formal transition planning meeting may have provided students with realistic experience, but this may have allowed students to use the process of elimination within the five groups of questions.

After the MMSS intervention, all students were better able to indicate rationale for their post-secondary preferences. The preference assessments used in this study included suggestions by Bambara, Cole, and Koger (1998), who recommended that researchers conduct studies to identify successful strategies to assess preference among abstract options. Additionally, the preference assessment also responded to recommendations made by Storey (2005), who indicated that in order to provide individuals with significant cognitive disabilities with the skills and knowledge to make decisions to improve their lives, special educators must shift from activities related to choice making to activities that support informed choice. For example, Bambara et al. suggested presenting abstract concepts in symbols that were accessible to the individuals and providing opportunities to gain information about a variety of life experiences, as MMSS intervention did.

These findings also contribute to the preference assessment literature related to post-secondary plans. Research indicates that many studies have assessed preferences related to specific areas of adult life, including vocational preferences (e.g., Lattimore, Parsons, & Reid, 2003), residential preferences (e.g., Faw, Davis, & Peck, 1996), and recreational preferences (e.g., Browder, Cooper, & Lim, 1998). However, no studies have investigated post-secondary educational preferences among individuals with disabilities, nor have any studies been conducted to assess preferences across all four adult outcome areas. This study did both.

Finally, procedures used to assess post-secondary preferences over time in the current study also add to the preference assessment literature. Assessing changes in preference among abstract experiences in experimental research poses challenges to researchers because preferences can reasonably be expected to change over time, thereby posing a threat to internal validity. In the current study, the researcher used an innovative preference assessment measure to quantify changes in preference by evaluating both preferences and rationale provided in support of identified preferences. To date, no studies in the literature have attempted to assess preference over time by assessing preferences and supporting rationale. Results of this study are promising because procedures used allowed changes in preference to be captured quantitatively.

In terms of social validity, students’ acceptance of the procedures, paired with results of the intervention on students’ knowledge of adult outcomes and post-secondary opportunities, suggest that the MMSS intervention was both effective and enjoyable. In addition, the researcher anecdotally noted that students seemed especially interested in watching the MMSS presentations, participating in the informal transition planning meetings, and creating the video about post-secondary plans. Teachers and parents indicated that they would suggest using MMSS intervention with other students. Feedback from special education teachers is especially important because an instructional program will only be effective if teachers are willing to implement it (Gersten, Vaughn, Deshler, & Schiller, 1997). Additionally, both groups of respondents indi-
<table>
<thead>
<tr>
<th>Student</th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preferences</td>
<td>Rationale</td>
</tr>
<tr>
<td>Alex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ed</td>
<td>4/4</td>
<td>Community College</td>
</tr>
<tr>
<td></td>
<td>0/12</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Learn about hobbies like art and music</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Learn to paint, sew, play an instrument, or cook meals</td>
<td></td>
</tr>
<tr>
<td>Voc</td>
<td>Working with a Job Coach</td>
<td>None</td>
</tr>
<tr>
<td>Res</td>
<td>Living in a Supported Apartment</td>
<td>None</td>
</tr>
<tr>
<td>Rec</td>
<td>Joining a Group or Team</td>
<td>None</td>
</tr>
<tr>
<td>Donna</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ed</td>
<td>3/4</td>
<td>Community College</td>
</tr>
<tr>
<td>Voc</td>
<td>Working in a Mobile Work Crew</td>
<td>None</td>
</tr>
<tr>
<td>Res</td>
<td>Living in a Supported Apartment</td>
<td>None</td>
</tr>
<tr>
<td>Rec</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>1. Staff visit the apartment every day to help with some chores like buying groceries and paying bills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Staff visit the apartment every day to help with some chores like buying groceries</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. See a sports game in Charlotte</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. See a movie in the theater with my friends or family</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. See a band play music at a concert</td>
<td></td>
</tr>
</tbody>
</table>

*(continued on next page)*
cated that they believed students learned about adult opportunities from the MMSS intervention and that students are likely to use the information gained as they plan for adult life.

Finally, to measure the importance of outcomes of this study, researchers asked prospective special education teachers who were uninformed regarding this study to evaluate readiness for transition planning among three intervention participants and three other students. Overall, respondents indicated that students who received the MMSS were better able to indicate and support a plan for learning, working, living, and having fun in post-secondary life in comparison to students who did not receive the intervention.

Of the three students who received the intervention, the student who did not reach mastery following intervention and three Skill Builders received the lowest scores in the social validity of outcomes analysis. This finding suggests that students' mastery of knowledge of adult outcomes and opportunities may be critical to their ability to make informed educational, vocational, residential, and recreational plans for adult life.

Limitations

Several limitations must be considered when analyzing study results. First, the small number of participants limits the generalizability of findings. Second, only three people (i.e., researcher, student, and teacher) attended the informal transition planning meetings, therefore, these meetings may not accurately repres-
sent a student’s ability to express knowledge of outcomes and opportunities and preferences at a typical transition planning meeting.

Third, when the researcher posed questions to participants related to the dependent variable, the field of responses included picture symbols that depicted one correct response (e.g., family home) and two incorrect responses (e.g., group home, supported apartment). Therefore, students without the knowledge necessary to make the correct response had a 33% chance of randomly selecting a correct response.

Fourth, some of the rationale statements used during preference assessment activities included picture symbols that were also included in the picture symbols that represented the adult opportunities. For example, for the post-secondary residential opportunity, family home, both the opportunity and one of three potential rationale statements (i.e., live with my family) included the picture symbol that represented family.

Finally, although teachers reported the procedures seemed reasonable, teachers were not responsible for implementing this intervention. Therefore, teachers’ report that procedures and goals were acceptable may be more meaningful if they implemented the intervention.

Suggestions for Future Research

The results of the current study provide several areas for future research. First, the researcher identified several inclusion criteria for participants in this study including age range, experience with transition planning, and acceptable attendance. However, after reviewing Alex’s response patterns and results, it is recommended that future studies also limit participation to students who can select requested items from an array despite placement in the array (e.g., top, bottom, middle, right, left). Further, to avoid the impact of chance on students’ selection of responses from a field of three, future researchers may consider posing questions in a manner that requires students to describe the salient characteristics of the adult opportunities (e.g., “What is a supported apartment?”) or provide a response array that includes additional distracters.

Next, through anecdotal data recorded during intervention sessions, the researcher noted that Donna, who met mastery criteria without entering the Skill Builder phase, interacted regularly with MMSSs and pictures of outcomes and opportunities during her MMSSs viewing sessions without guidance from the researcher. Future studies may improve efficiency of similar interventions by including active student response opportunities within the MMSSs (e.g., “Touch the group home.”)

Additionally, in this study, preference assessment was conducted only twice, during baseline and maintenance phases. By investigating the impact of the MMSSs intervention on preference and preference rationale as a primary dependent variable, researchers may better determine if assessing rationale is an appropriate strategy for measuring changes in preferences related to plans for adult life.

Finally, researchers may find promising results by adapting the procedures of the MMSS intervention. First, researchers may use photographs of the post-secondary opportunities in each adult outcome area. For example, a photograph of a student on a team or outside their family home may be an effective addition to the MMSS intervention. Second, pairing sampling activities in the community (e.g., visit to a supported apartment) with MMSSs that describe post-secondary opportunities (e.g., information about a supported apartment) may be an effective strategy that may assist students in gaining knowledge of transition knowledge.

Implications for Practice

There are a number of implications for special education teachers based on the findings of this study. Baseline data from this study indicate that transition-aged students with disabilities were not aware of the post-secondary opportunities available to them as adults. Additionally, students’ positive reports of the MMSS and their active participation in informal transition planning meetings aligns with NLTS-2 reports that youth with disabilities value involvement in IEP decisions (SRI, n.d.b) and suggest that transition-aged students with significant cognitive disabilities value opportunities to plan for adult life with their teachers and families. As educators support the spirit of the Individuals with Disabilities Educational Improvement Act (IDEA;
2004) to include students meaningfully in transition planning, strategies similar to those used in designing and implementing this study may be valuable in aligning students’ plans for adult life with their goals and values.

Additionally, the researcher used community mapping to identify the post-secondary educational, vocational, residential, and recreational opportunities available to students with significant cognitive disabilities in the local community. Teachers are encouraged to conduct similar investigations to ensure that transition-aged students are provided with accurate information about the options available in their local community.

Next, as practitioners educate students with disabilities about transition planning and experiences of adult life, assessing students’ knowledge is an important first step in facilitating their participation in transition planning. With the assessment results, practitioners can provide instruction that responds to students’ needs for specific transition knowledge, as the MMSS intervention did. Additionally, as special education teachers assess students’ preferences for various experiences of adult life as part of the transition planning process, they may also want to assess students’ ability to express rationale for the preferences identified to ensure that students with disabilities understand the implications of their plans.

Finally, as special education teachers design instruction to teach students about adult outcomes and opportunities, the MMSS intervention shows promise as an effective instructional method. Additionally, special education teachers rated the intervention as a feasible, cost-effective, and efficient strategy to teach knowledge of adult outcomes and opportunities.

References
Individuals with Disabilities Education Improvement Act of 2004, 20 U. S. C.


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