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What is This?
Using a Multicomponent Adapted Power Card Strategy to Decrease Latency During Interactivity Transitions for Three Children With Developmental Disabilities

Maureen E. Angell1, Joanna K. Nicholson1, Emily H. Watts1, and Craig Blum1

Abstract
An adapted Power Card strategy was examined to determine effectiveness in decreasing latency in responding to teacher cues to initiate interactivity transitions in the classroom among three students, aged 10 to 11 years, with developmental disabilities (i.e., one with autism and two with intellectual disability). The Power Card strategy, a form of visually cued instruction, included scripts in which the students’ “heroes” or preferred fictional characters demonstrated targeted interactivity transition behaviors. The strategy decreased response latency for all three students as documented within a single-case withdrawal (A-B-A-B-A-B) design replicated across the three participants. Instructional staff implemented the intervention and, at the end of the study, all remarked about the dramatic effectiveness of the adapted Power Card strategy, said they would use this strategy in the future, and noted that overall classroom functioning had improved. Implications for classroom practice and recommendations for further research on the use of Power Card strategies are discussed.

Keywords
Power Cards, interactivity transitions, visual cues, developmental disabilities, elementary age

One of the barriers that interfere with, and limit, academic learning time is lengthy classroom interactivity transitions. Students with developmental disabilities often have difficulty with interactivity transitions because these transitions represent times that are less structured than instructional sessions and behavioral expectations are not always clear. When interactivity transitions become lengthy, they may not only decrease opportunities for academic engaged time but also result in increased behavior problems (Dettmer, Simpson, Myles, & Ganz, 2000; Martella, Nelson, & Marchand-Martella, 2003; Sterling-Turner & Jordan, 2007).

Students with disabilities may exhibit maladaptive behaviors throughout the course of a school day, and interactivity transitions may be a particularly vulnerable time for them (Scheuermann & Hall, 2012).

Students often have a difficult time transitioning from more-preferred to less-preferred activities (Cote, Thompson, & McKerchar, 2005). For some students, this situation may result in challenging behaviors that take the form of non-compliance, which in turn may negatively affect their performance with respect to areas beyond academics, such as social skills and meeting behavioral expectations at school (Lee, 2005). Although effective classroom management that includes positive reinforcement of behavioral expectations for transitions and the use of activity schedules may help many children with disabilities, some problems with interactivity transitions may persist.

Strategies Using Students’ Interests to Support Positive Behavior
One way to increase compliance is to engage students through their interests. Several strategies have been shown to increase prosocial behavior in students with and without disabilities. For example, Dunlap, Foster-Johnson, Clarke, Kern, and Childs (1995) identified interests of children with autism and behavioral challenges through preference

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assessments and incorporated the children’s interests into a modified curricular activity. This resulted in higher degrees of task completion while maintaining the integrity of the curricular activity. Similarly, preferred or perseverative student interests can function as motivating variables that have the potential to increase students’ desire to perform requested tasks or initiate joint attention (Epstein, Taubman, & Lovaas, 1985; Vismara & Lyons, 2007). For example, a perseverative interest in toy planes could be presented contingently to foster joint attention in conversation.

The motivating role of student perseverative or special interest varies depending on the child, nature of the task, and circumstance. Often, the source of perseverative interest is embedded in an activity (Baker, Koegel, & Koegel, 1998), and at other times it is presented as a contingent reinforcer after a desired behavior has been exhibited (Charlop-Christy & Haymes, 1998). Baker’s (2000) incorporation of ritualistic behaviors into a game dramatically increased social play interaction of elementary school–age children with autism with their siblings. Charlop, Kurtz, and Casey (1990) found that the use of perseverative behaviors as potential positive reinforcement did not result in any increase in perseverative behavior (i.e., with the same object) at other times of the day. Perseverative and ritualistic behaviors can be used to promote desired behavior, but practitioners must be cognizant of the age appropriateness for any use of a student’s special interest.

**The Power Card Strategy**

One approach that incorporates student interest into interventions is the Power Card strategy (Gagnon, 2001), which aims to increase a desired behavior by capitalizing on an individual’s particular interest. Gagnon (2001) developed the Power Card strategy for children with autism to take advantage of their proclivity for visual stimuli and to use their special interests to increase desirable social behaviors. Power Cards involve a combination of pictorial and written cues, based on a child’s area of peak interest, to promote prosocial behavior. The Power Card is a small, personalized card that incorporates text and a visual graphic of a student’s “hero” or special interest. The Power Card has a script that task analyzes the desired behavior in simple steps (i.e., usually two–four sentences). The student may take ownership of the card, carrying it from place to place, or classroom staff may present the card at pertinent times.

Currently, there are only two peer-reviewed published studies using a Power Card strategy. Keeling, Myles, Gagnon, and Simpson (2003) used the Power Card strategy to teach a 10-year-old girl with autism sportsmanship skills across different game settings. Within a multiple-baseline design, Keeling et al. were able to reduce the girl’s “whining” and “screaming” when she lost a game to 0-min duration of these behaviors in all three game settings. Seeking to replicate these findings, Spencer, Simpson, Day, and Buster (2008) used an A-B design to explore the effectiveness of the Power Card strategy to increase the engagement of a 5-year-old child with autism with peers on the playground. The researchers successfully increased the child’s time engaged on the playground from 0 to 1 min during the baseline phase to 9 to 10 min during the maintenance phase. In an unpublished master’s thesis, Devenport (2004) used an A-B-C-A reversal design to demonstrate that a Power Card strategy could assist a student remaining on task.

In the current single-case study, we sought to evaluate the effectiveness of an adapted Power Card strategy for facilitating interactivity transitions of three 10- and 11-year-old students with developmental disabilities. We designed this study with three students to expand understanding of this intervention beyond the existing Power Card studies with only one student. We also expanded previous work by adding differential reinforcement (social praise) contingent on successful task completion (i.e., students’ checking their schedules). Cooper, Heron, and Heward (2007) noted that stimulus control (i.e., a behavior emitted more often in the presence of a discrete, salient stimulus, such as the Power Card, than in its absence) can be attained by providing differential reinforcement contingent on the desired response. A second rationale for adding this component is that differential reinforcement is a natural feature of contemporary special education instructional practices. Devenport (2004) noted that the Power Card intervention effect may have been maintained for her student’s on-task behavior by unprogrammed positively reinforcing consequences. Hence, by adding a differential reinforcement component, our adapted version of the Power Card strategy becomes both naturalistic and multicomponent in nature. The research questions that guided this investigation were the following: (a) How effective will the use of an adapted Power Card strategy be in decreasing latency of students with developmental disabilities in response to teacher cues to initiate classroom interactivity transitions? and (b) What are classroom staff’s perceptions related to the social validity of the adapted Power Card strategy?

**Method**

**Participants**

The Institutional Review Board at Illinois State University approved the study and verified protection of human participants. Three 10- to 11-year-old students, all enrolled in the same special education program in a midwestern public elementary school, participated in this study. Two of the students had moderate intellectual disability and one had been diagnosed with autism by his pediatrician. All students received speech/language and occupational therapy as related services, and one also received physical therapy.
The students’ eligibility for special education was based on criteria defined by the Individuals With Disabilities Education Act (P.L. 105-117). All three students were verbal and ambulatory, without assistive devices. Although they used verbal language as their primary communication modality, visual supports/schedules were components of their curriculum, and these students often supplemented verbal communication with gestures and other forms of nonverbal communication to indicate their desires and needs. Six other peers shared the instructional setting. One teacher, two instructional assistants, and one special education student teacher comprised the instructional staff. In prestudy interviews, each classroom staff member cited lengthy interactivity transitions as an impediment to maximizing instructional time.

**Quincy.** Quincy was an 11-year-old male diagnosed with autism by his pediatrician. He received speech/language services focused on sentence structuring and increasing general vocabulary. He also received occupational therapy to decrease his sensitivity to touch and noise. No standardized assessment data were available regarding Quincy’s IQ or adaptive behavior skills. Instructional staff reported that he typically responded well to positive reinforcement and that computer games, musical toys, and most electronics were his preferred activities. The teaching staff said that Quincy exhibited verbally defiant behaviors and refused to complete transitions, often requiring excessive prompting and/or redirection when asked to complete interactivity transitions.

**Elaine.** Elaine was an 11-year-old female with a moderate intellectual disability who received speech/language therapy for articulation, vocabulary, and social–pragmatic language skills. She received occupational therapy to improve her handwriting and functional daily living skills such as zipping, buttoning, and hair brushing. In addition to an intellectual disability, Elaine had a seizure disorder and had been diagnosed with attention deficit hyperactivity disorder by her pediatrician. At Elaine’s latest reevaluation, her overall IQ was 50 as measured by the *Wechsler Intelligence Scale for Children–Fourth Edition* (WISC-IV; Wechsler, 2003), with her verbal abilities ranging slightly higher than her performance (standard scores of 50 and 43, respectively). Usually, she was helpful in the classroom, often assuming the role of “teacher” for other students. This behavior often interfered with her completion of interactivity transitions because she spent her transition time “looking after” her classmates. Elaine also engaged in maladaptive behaviors such as screaming, hitting, or urinating on herself (purposeful wetting of pants) when the classroom staff required her to stop preferred activities and move to less-preferred activities. Elaine especially liked the color orange, sought any opportunity to engage in activities with orange materials, and talked about this color often during the school day.

**Keith.** Keith was a 10-year-old male with a moderate intellectual disability, microcephaly, and mild cerebral palsy. His full-scale IQ score was 48 as measured by the WISC-IV, and he received speech/language therapy for articulation, vocabulary, and social language (reciprocity with others in social settings, greetings, and appropriate ways to indicate likes/dislikes). Keith also used a picture exchange communication (PECS) book. He received physical therapy services to strengthen gross motor skills and reduce toe walking. Keith’s occupational therapist targeted hypersensitivity to touch, handwriting, dressing skills, and motor endurance. Keith engaged in self-stimulatory and self-injurious behaviors such as hand biting and chin hitting. The classroom staff provided repeated prompting and redirection to guide him to complete interactivity transitions, and he often wandered around the classroom. The teaching staff reported that Keith responded well to clear expectations and verbal encouragement. Keith reportedly liked “high fives” and was particularly interested in the character “Sponge Bob”.

### Classroom Management Practices

General classroom management practices included the use of positive reinforcement (usually in verbal forms such as “good job” or physical form such as a pat on the back). The students were accustomed to the specific behavior management practices that the staff used to facilitate interactivity transitions. Posted picture schedules helped students anticipate upcoming events, and all areas of the classroom were labeled (e.g., reading center, grooming, bathroom). When the teacher or aide announced, “check your schedule,” the students would remain at their current activities or slowly move to their picture schedule location, remove the Velcro®-backed icon depicting the next activity or designated area, then move slowly to the next activity. Frequently, the students received verbal positive reinforcement (i.e., social praise) when they arrived at their target activity locations, regardless of transition duration. Students were often reminded to “hurry up” or “get going,” or reminded that “you need to be . . . . ,” but there was no specific plan to differentially reinforce shorter transitions or reprimand students for lengthy ones.

### Power Card Development and Materials

We followed a procedure similar to that described by Gagnon (2001) to develop individualized Power Cards for our student participants. We interviewed the classroom staff and family members to identify socially valid heroes or sources of high interest to incorporate into the adapted Power Cards. For the purpose of this study, we defined “high interest” as any source of special interest—person, character, or object. As noted in the participant descriptions, these children talked frequently about their interests, sometimes perseverating on them. We made the adapted Power Cards using graphics and
features in Microsoft Office PowerPoint™ and presented them to each child first on an 8.5 × 11-in. piece of paper to confirm that the child found the hero on the adapted Power Card interesting. Each student verbally acknowledged, pointed to the card, or had a facial expression (i.e., a smile) consistent with a positive response. The teacher, who was familiar with the students’ behavior repertoires, verified that each student responded positively.

Having confirmed their special interests with the larger version, we made a smaller version of the adapted Power Card (5.25 × 6.5 in. with 0.25-in. lamination) for everyday use and durability. Quincy’s adapted Power Card had a picture of his dad on it, Elaine’s had a picture (with an orange background) of a doll dressed in orange that was similar to a popular doll enjoyed by her same-age peers, and Keith’s had a graphic cartoon of the Sponge Bob™ character. As depicted in the sample shown in Figure 1, each adapted Power Card included a directive sentence stating that the student should check his or her schedule, thus initiating an interactivity transition in response to a teacher’s or staff member’s cue. Using Writing With Symbols 2000 software (Widget Software Ltd., 2005), we selected two symbols to embed in the directive sentence for the words “check” and “schedule.” This visual component was incorporated into the card to support the participants’ understanding of the written word component of Power Cards (Downing, 2006).

**Research Design**

We employed a single-subject A-B-A-B-A-B withdrawal design (Hersen & Barlow, 1976) replicated across three students to measure the effectiveness of an adapted Power Card strategy in reducing students’ latency in complying with cues to begin classroom interactivity transitions. During prestudy interviews, staff members indicated that the most prevalent cause of problematic interactivity transitions for all three students was the time it took the students to initiate interactivity transitions after adults’ cues. Classroom staff also noted a high frequency of disruptive behaviors during interactivity transitions and reported that the students would not only not check their schedules but also drift off task and not complete the required transitions. Because of the disruptive nature of this behavior, the classroom teacher saw this as one of her main classroom management challenges and noted that it interfered with her students’ learning. Baseline data confirmed that student difficulties occurred during the latency period following adults’ directives.

The students were expected to follow an established classroom routine for interactivity transitions (e.g., movement from the computer to the reading corner or from individual desks to a horseshoe-shaped table for small-group instruction). The routine consisted of (a) discriminative stimulus/cue (S0) announced by a classroom adult, “Check your schedule”; (b) stopping the current activity and traveling to the schedule chart’s location; (c) removing the laminated picture symbol (attached by Velcro®) representing the next activity; and (d) moving to the location of the next activity represented on the symbol. For this study, we considered the time period between the initial cue (i.e., “Check your schedule”) and a student’s checking his or her schedule as the latency period prior to an interactivity transition (Alberto & Troutman, 2008).

**Data Collection**

We collected data only on interactivity transitions that occurred within the classroom, and we counterbalanced 2-hr observations across mornings and afternoons. Prior to initiation of the project, the four authors developed systematic intervention procedures and engaged in simulated data collection to ensure reliability of performance data. Latency data were recorded using stopwatches to record latency periods to the nearest second prior to each student’s initiation of an interactivity transition in response to classroom staff’s cues. An undergraduate preservice teacher also was trained in data collection procedures and helped with data collection as part of an honors project.

All five data collectors took turns recording data when role-playing mock transitions while other members recorded latency periods on a data recording form specifically designed for this study. Our data recording form included student performance data and classroom staff procedural reliability data. Observations of role-playing scenarios between all members of the research team were used to determine training efficacy prior to initiating data collection. Training activities continued until all five data collectors demonstrated 100% data recording accuracy based on a checklist of training components.
During study observations, all data collectors refrained from interacting with any of the students with an emphasis on ensuring that the classroom presence of data collectors was minimally intrusive. Observers typically remained in the classroom for 2-hr blocks, varied across the school day, and these blocks typically included three or four transitions.

**Interobserver Reliability for Performance Data Collection**

Interobserver (performance) reliability data were collected during at least 47% of all sessions across all phases for the three participants. All six data collectors recorded interobserver reliability data. For each interactivity transition observed by two data collectors, the percentage of performance reliability was calculated using the following formula: shorter latency ÷ longer latency × 100%.

Mean interobserver agreement on student performance during the baseline conditions was 96.8% (range = 89%–100%). Mean interobserver reliability during intervention conditions was measured at 95.7% (range = 86%–100%). We collected performance reliability data for Quincy during 48% of his observed transitions across all phases of the study. The mean interobserver agreement rate for Quincy’s performance was 96.9% (range = 89%–99.1%). Reliability data collection for 49.5% of Elaine’s observed transitions yielded a mean interobserver reliability rate of 97.2% (range = 91%–98.7%). We gathered performance reliability data for Keith during 47.2% of his sessions for a mean interobserver rate of 97.4% (range = 90.6%–98.8%).

Although each data collector observed and collected “practice” performance data for several days in the classroom after training, there was some interobserver disagreement at the beginning of the study. We attributed this disagreement to slight discrepancies in observers’ understanding of response definitions (i.e., exactly when to start and stop their stopwatches to record latency periods). This discrepancy was quickly corrected with team discussion of the operational definition of the latency period to be recorded. Minor discrepancies that occurred after this retraining were because of observer drift where one observer missed the first or last 1 or 2 sec of the latency period.

**Procedures**

Following the establishment of interrater reliability under simulated conditions and the collection of initial baseline data (Condition A1), the first author trained the classroom staff in the intervention protocol. Each staff member was given a written, step-by-step protocol, and the first author modeled the desired staff behavior (SB) to ensure consistency in stimulus-cue delivery. Intervention (Condition B1) data collection did not begin until all staff members demonstrated accuracy and proficiency in implementing the intervention. Staff members were instructed to use the adapted Power Card strategy only for target behaviors and only with target students. We also instructed staff members to refrain from implementing any other interactivity transition interventions throughout the course of study.

**Experimental Conditions**

**Baseline conditions (A1, A2, A3).** During the baseline conditions within the context of the A-B-A-B-A-B withdrawal design, we recorded baseline data under typical classroom routines, void of any intervention. We began recording latency data immediately following a staff member’s directive to “Check your schedule.” Recording ceased when a student physically engaged with his or her schedule’s picture symbol. We documented latency periods prior to interactivity transitions throughout and across school days to ensure that we observed and recorded latency periods prior to all types of interactivity transitions. During baseline conditions, staff members typically were within 1 to 2 feet of the target students when “Check your schedule” was announced. We continued baseline data collection until the baseline performance data were stable or when five observation periods had been documented.

**Intervention conditions (B1, B2, B3).** Immediately preceding the first intervention condition, the classroom teacher introduced each student to his or her 8.5 × 11-in adapted Power Card and slowly read aloud the Power Card script. Students were then shown the large and small cards side by side, and the teacher reread the scripts. Prior to giving the verbal directive to check their schedules, the teacher gave a gestural indicator to staff members who presented the adapted Power Cards to individual students and read aloud the corresponding script. Because the intervention was designed to be applied under naturally occurring classroom conditions, it included multiple components. These components were (a) presentation of the adapted Power Card with script encouraging the student to check his or her schedule, (b) an initial $S^1_{b}$ from the teacher to “Check your schedule,” and (c) verbal praise when the student checked the schedule as directed (e.g., “Good job checking your schedule, Elaine”). To ensure that latency periods prior to interactivity transitions during the intervention condition were equal comparisons with those in baseline conditions, latency recording did not begin until the staff finished reading the script and the teacher gave the verbal cue “Check your schedule” and stopped when the student physically engaged with his or her picture schedule. During baseline and intervention conditions, the staff’s proximity to the student was held constant (i.e., within 1–2 feet).

**Treatment Integrity**

Treatment integrity involves the comparison of results obtained from two or more independent observers to determine the
interventionist’s procedural adherence during intervention (Billingsley, White, & Munson, 1980) and was considered critical to this study. Treatment integrity data were collected using direct observation during 100% of the intervention sessions across all participants and interactivity transitions. The treatment integrity/performance data recording sheet included a checklist of three planned SBs/actions for all conditions. These behaviors included (a) showing the adapted Power Card to the target student, (b) reading the adapted Power Card script with the student before delivery of the S0 (i.e., “Check your schedule, [name]”), and (c) delivering positive social consequence for starting the interactivity transition by physically engaging with the picture schedule. The number of SBs observed was marked on the data sheet. The formula used to calculate the percentage of treatment integrity was \( \frac{\text{SB}}{\text{total planned staff behaviors (TPSBs)}} \times 100\% \), resulting in a percentage of the TPSBs completed for each intervention session observed.

Treatment integrity results for all observed intervention sessions ranged from 66.6% to 100% with an acceptable mean procedural reliability rate of 95.6%. A component analysis of the treatment integrity data revealed that departures from the planned protocol in a total of seven sessions were due to staff members’ failure to deliver positive social consequence to target students on their completion of interactivity transitions. Staff members attributed their failure to follow through to their moving on to attend to another or other student(s) as soon as the target student headed toward his or her schedule chart. When an intervention procedural error occurred, the first author reviewed the correct behavior and asked that staff member to demonstrate his or her understanding of that part of the intervention protocol. Treatment integrity increased as the study progressed.

**Results**

In this study, the use of an adapted Power Card strategy decreased the latency of three students with developmental disabilities in response to teacher cues prior to classroom interactivity transitions. Although success rates varied across participants, all three students’ mean transition latency decreased with the implementation of the adapted Power Card strategy. Experimental control was demonstrated within a single-subject withdrawal (A-B-A-B-A-B) design. All participants demonstrated a significant decrease in transition latency only when the intervention was applied within the A-B-A-B-A-B design. Each student’s mean transition latency during baseline (A), intervention (B), withdrawal (A2 and A3), and reintroduction (B2 and B3) conditions are provided in the next section. Graphic displays of student performance data during each condition (see Figures 2, 3, and 4) represent mean latency data rather than latency data for each transition that occurred throughout the observation periods. Each 2-hr observation period included two to three (but typically three) interactivity transitions. The 44 or 46 observation periods shown in the graphic displays represent the means of 102, 103, and 106 actual transitions for Quincy, Elaine, and Keith, respectively.
Quincy’s Performance Data

As shown in Figure 2, Quincy’s mean interactivity transition latency during the initial baseline condition (A₁) was 29 sec (range = 26–32). His mean interactivity transition latency decreased to 11 sec (range = 5–18) during the initial intervention condition (B₁). During the first return to baseline (i.e., withdrawal) condition (A₂), Quincy’s mean transition latency increased to 24 sec (range = 18–31). Subsequent reintroduction (B₂), withdrawal (A₃), and final reintroduction (B₃) conditions yielded mean transition latency periods of 10 sec (range = 7–12), 27 sec (range = 23–31), and 12 sec (range = 9–14), respectively. As shown within the A-B-A-B-A-B design, Quincy’s latency decreased abruptly each time the adapted Power Card strategy was introduced or reintroduced and increased abruptly when the Power Card strategy was withdrawn. Mean level changes also indicate the effects of the Power Card strategy on latency behavior.
Elaine’s Performance Data

Figure 3 includes a visual representation of Elaine’s mean transition latency periods across experimental conditions. During the initial baseline condition (A₁), Elaine’s mean interactivity transition latency was 26 sec (range = 24–30). Her mean interactivity transition latency decreased abruptly to 10 sec (range = 3–19) during the initial intervention condition (B₁). During the first withdrawal condition (A₂), her mean transition latency increased to 25 sec (range = 18–34). Subsequent reintroduction (B₂), withdrawal (A₃), and final reintroduction (B₃) conditions yielded mean transition latency periods of 14 sec (range = 6–24), 23 sec (range = 12–28), and 12 sec (range = 7–20), respectively. As with Elaine’s performance, dramatic mean level changes in latency across conditions also indicate the positive effects of the Power Card strategy on her latency behavior during interactivity transitions.

Keith’s Performance Data

As depicted in Figure 4, during the first two conditions of this study, baseline (A₁) and initial adapted Power Card strategy implementation (B₁), Keith’s decrease in interactivity transition latency periods was the most noticeable of the three participants. During the initial baseline condition, Keith’s mean interactivity transition duration was 29 sec (range = 23–36). When the adapted Power Card intervention was first introduced (B₁), Keith’s mean transition latency decreased by 21 sec with a mean transition latency of 8 sec (range = 5–10). During the withdrawal condition (A₂), reintroduction of the intervention (B₂), a subsequent return to baseline (A₃), and final reintroduction of the intervention (B₃), Keith’s mean transition latency periods were 25 sec (range = 15–34), 10 sec (range = 5–15), 19 sec (range = 16–21), and 11 sec (range = 5–15), respectively.

Intervention Acceptability Data: Classroom Staff Perspectives

The acceptability of the adapted Power Cards intervention was demonstrated by pre- and poststudy interviews with the classroom staff (i.e., the classroom teacher, two full-time instructional assistants, and a special education student teacher). A member of the research team conducted interviews in 1:1 face-to-face sessions both pre- and poststudy and wrote the interviewees’ responses. The classroom staff’s prestudy comments related to interactivity transition latency, frequency and topography of problematic behaviors during transitions, how staff responded to inappropriate interactivity transition behaviors, and the effect of those behaviors on classroom functioning.

When asked how often the target behaviors occurred, the classroom teacher indicated “five out of five transitions.” One of the assistants indicated that Quincy’s behavior often disrupted the classroom routine: “It sometimes startles the other students; he makes a scene and they stare.” When asked how Keith’s behavior personally affected her, the teacher said, “It just gets on my nerves.” She said she and her staff were frustrated by the target students’ other behaviors, so when their maladaptive transition behaviors occurred, they were often the “last straw.” Staff looked forward to consistently and systematically addressing problematic interactivity transition behaviors.

Poststudy interview probes for classroom staff were similar to the prestudy ones but also included questions about the perceived effectiveness of the adapted Power Card strategy in decreasing target students’ interactivity transition latency periods. During the poststudy interviews, staff members noted the decrease in target students’ interactivity transition latency periods, a decrease in the frequency and level of intrusiveness of staff prompts needed during those transitions, and a decrease in maladaptive behaviors exhibited by target students during their interactivity transitions. Interviewees indicated that the use of the adapted Power Card strategy served as an effective visual strategy to assist students make successful interactivity transitions. They noted students’ excitement about their adapted Power Cards, and the staff appreciated the clear behavioral expectations, structure, direction, and focus that the use of the adapted Power Cards strategy provided. All staff members remarked about the dramatic effectiveness of the adapted Power Card strategy, said that they would use this strategy in the future, and noted that overall classroom functioning had improved.

During the poststudy interviews, we also asked the classroom staff about variables they thought might affect the success of the adapted Power Card strategy. They reported that the intensity of a particular student’s interest in a given hero was instrumental in ensuring success. They also indicated that their own enthusiasm and consistency when reading the adapted Power Card scripts prior to each transition played a vital role in student outcomes. Although all interviewees attributed a decrease in interactivity transition latency to the use of the adapted Power Cards, they indicated that latency decreases were inconsistent. They cited the “kind of day” a student was having and the difference between transitioning to more or less student-preferred activities as influences on interactivity transition behavior for each student, sometimes regardless of the use of the adapted Power Card strategy. Review of anecdotal notes indicates a link between students’ behaviorally challenging days and longer latency days.

Discussion

Prior to the adapted Power Card intervention, all three students in this study had difficulty transitioning between classroom activities. Classroom staff cited lengthy
transitions as a major impediment to maximizing instructional time. The use of an adapted Power Card strategy (i.e., combining symbol-based visual prompts, a brief narrative that included behavioral expectations, and a pictorial representation of the students’ heroes or special interests) radically decreased interactivity transition latency periods for all students in this study. Prior to the implementation of the adapted Power Card strategy, staff members described student behavior during transitions as “aimless” and “lengthy.” Students often avoided upcoming tasks, did not expediently attend to staff requests to stop current activities, and displayed avoidant, and often refusal, behaviors during transitions. Following the implementation of the adapted Power Card strategy, staff reported that students “benefited from clear and motivating expectations,” “students were excited to check [their] schedules,” and “it took less of our [staff’s] time to get them [students] to switch activities.” An interesting finding revealed that both Elaine’s and Quincy’s longer latency periods occurred during the afternoon observation periods. Elaine exhibited an increase in mean latency from the previous (morning) observation period in 15 of 16 afternoon observation periods, and Quincy demonstrated longer latency performance in 13 of 17 afternoon observation periods. Future research is needed to investigate the implications of these findings for classroom practice.

The A-B-A-B-A-B withdrawal design employed in this study documents experimental control of the independent variable by demonstrating with three introductions and two withdrawals of the adapted Power Card strategy across three students that, despite within-condition performance variability, each participant’s mean latency prior to interactivity transition behavior was decreased using a strategy that incorporates visual prompts, verbal cues, and students’ special interests as an antecedent-based approach combined with positive social consequence once students have successfully completed the desired transition behaviors. Demonstration of a functional relation between the intervention and the dependent variable (Horner et al., 2005) is evident in the large mean changes in latency across conditions for all three students. One quality indicator of internal validity is having multiple demonstrations of experimental effect at different times. In this study, there are more than three demonstrations of experimental effect over time for each of the participants. Furthermore, external validity of this study is enhanced through within-subject and intersubject replication of the intervention effects (Horner et al., 2005).

**Implications for Classroom Practice**

Although the results of this study cannot be generalized, it is possible that an adapted Power Card strategy may be a viable and user-friendly means of decreasing students’ latency prior to interactivity transitions. Student interactivity transitional behavior continues to be a concern in classrooms, as lengthy transitions waste valuable instructional time and make it more difficult for students to become engaged in subsequent activities. For at least three decades, research on student learning outcomes has consistently linked student academic engagement and academic learning time with student achievement (e.g., Berliner, 1978; Fisher, 1981; Stallings, 1980), and teachers have been encouraged to use school hours efficiently and effectively to improve student learning outcomes (Hollowood, Salisbury, Rainforth, & Palombaro, 1995; Mastropieri & Scruggs, 2000; Oliver & Reschly, 2007). Many variables play a role in determining the effectiveness of a given intervention, such as one aimed at decreasing students’ latency in initiating interactivity transitions in response to classroom staff cues.

Use of a Power Card strategy is not a substitute for solid classroom management. Most students need structure, organization, established routines, behavioral expectations that are taught and reinforced, and consistent classroom procedures (McIntosh & Sanford, 2004). These are all important elements of classroom-based positive behavior support that ensure students learn what is expected of them in classroom environments with maximized learning time (Scheuermann & Hall, 2012). Without these practices in place, teachers may erroneously conclude that a Power Card strategy is the solution. However, if a student fails to respond to effective evidence-based classroom behavior support efforts, the teacher’s next step is a more intensive support strategy (Fairbanks, Sugai, Guarding, & Lathrop, 2007). The Power Card strategy is one intervention option for a student who has special interests and who will likely respond to visual supports. Although it could not be used as a broad-based targeted intervention, it could be used as a personalized intervention strategy that precedes a behavior intervention plan (BIP). For students with more complex needs, it could be used as one of several supports in a BIP.

All competent special education teachers’ target goals relate to student independence and students’ generalization of learned skills. It would seem plausible that the effectiveness of increasing student independence is based not only on teacher commitment, but also on the nature of classroom interactions and interventions that foster lasting change. Connell, Carta, and Baker (1993) contended that increasing student independence and appropriate classroom behaviors may increase positive teacher and peer perceptions of students with disabilities, adding to the social validity of intervention strategies. Interventions have no behavior-altering change agent or pragmatic utility if the skills educators hope that students learn cannot be generalized or if they do not increase self-sufficiency. Teaching students how to transition effectively and efficiently requires commitment and time, but the initial investments result in lasting behavioral affect (Todd, Haugen, Anderson, & Spriggs, 2002). Crucial to the utility of this strategy is the
motivating potential and magnitude of the idealization associated with a student’s hero or special interest. It may be informative to the research community to base participant selection for an adapted Power Card study on the intensity and topography of participants’ special interests or heroes, rather than on specific classroom behaviors. Further investigation may warrant the use of assistive technology to support various school transition behaviors. Davies, Stock, and Wehmeyer (2000, 2002, 2003) used assistive technology devices in teaching individuals with disabilities work tasks, time management, and independent decision making. Assistive technology in the form of personal digital assistants with audio instructions programmed to match a digital, graphic version of Power Cards may possibly lead to more independence on the part of students to transition successfully, while decreasing the need for direct staff involvement (Mechling, 2007).

When selecting interventions viable for students and classrooms, it is imperative that consideration be given to the interventions’ likelihood of teaching students to manage their behavior without intensive educator support (Connell et al., 1993). The goal of a Power Card strategy is to increase independence and generalization with less and less student reliance on teacher prompting and cueing to perform desired behaviors.

Limitations

We have demonstrated the effective use of an adapted Power Cards strategy for three elementary-school-aged students with developmental disabilities. The purpose of this study did not include analysis of the underlying individual components of Power Cards. Conducting that type of investigation would require a functional behavioral assessment, manipulation of differential reinforcement, and overt measurement of the particular kinds of activities that prompt transition difficulties. Therefore, our findings should be considered with caution, due to some limitations of the study.

First, generalization of the findings is limited to students with similar characteristics participating in a special education program. Keeling et al. (2003) conducted a study using Power Cards in a general education setting, and other researchers have discussed uses of similar visual strategies with children in general education or naturalistic settings, suggesting that they may be viable. There is no current research on the use of a Power Card strategy with populations other than students with autism or developmental disabilities.

Second, progress of some of the students in the current study was extremely variable. Generally speaking, there were desirable trends in decreased latency; however, future researchers need to address applications of the adapted Power Card strategy combined with positive reinforcement that may reduce performance variability. It is possible that a variety of unknown setting events influenced these students’ behavior. Careful documentation of setting events in the future may enhance our understanding of the effectiveness of various forms of the Power Card strategy.

Finally, we conducted an experimental evaluation of an adapted Power Card strategy, so this cannot be considered an exact replication of the Power Card method. Especially notable was our addition of a positive social consequence for students’ completion of interactive transitions within defined parameters for behavioral expectations. It is possible that this may have served as a positive reinforcer of the target behavior and the outcome may be attributed to a contingent presentation of positive stimuli. Determination of this effect was beyond our scope in this study. However, it is not unusual for antecedent interventions and positive reinforcement (i.e., consequent) interventions to be used together when implementing positive behavior supports in classrooms (Crone & Horner, 2003). Still, a component analysis to determine which parts of the adapted Power Card strategy are the most critical and under what conditions would clarify our findings.

Conclusion

We have shown an adapted Power Card strategy to be an effective intervention for decreasing the latency of three elementary school–aged students with developmental disabilities prior to interactivity transitions in response to classroom staff’s verbal cues. These students’ interactivity transition latency decreased significantly while the adapted Power Card strategy was implemented and increased when the strategy was withdrawn. Although students in this study decreased their latency prior to transitioning between classroom activities due to the use of an adapted Power Card strategy, further research on this strategy is needed. To promote replication, generalization, and pragmatic utility, the use of Power Card strategies must be replicated across behaviors, learner characteristics, and ages. Although further research is suggested to validate this study’s findings, the likelihood that Power Card strategies can be an effective behavior change mechanism is promising.

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References


Mechling, L. C. (2007). Assistive technology as a self-management tool for prompting students with intellectual...


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