

## Increasing Task Engagement and Decreasing Challenging Behavior via a Work-Reinforcement Contingency

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This study was a single-case study of a verbal and pictorial-plus-verbal work-reinforcement contingency prompt with a three year-old child with autism/ASD who engaged in challenging behaviors and task avoidance when faced with task demand. In baseline, he received no prompt regarding any reinforcement contingency and was simply presented with task demand. For the verbal-only prompt, he was given a gestural and verbal prompt indicating that he would receive access to a preferred item after working. For the pictorial-plus-verbal prompt, he was given the same verbal and gestural prompt but was also shown a “first-then” card with pictures representing both ‘work’ and his preferred reinforcer. Results showed a notable decline in challenging behavior and increase in task engagement over the course of the study; however, there also appears to be notable bleed across the different conditions. There is also some limited support for the superiority of a pictorial-plus-verbal contingency prompt.

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Keywords: autism, reinforcement contingency, challenge behavior, task engagement behavior, pictorial-plus-verbal prompt

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## **The Effectiveness of Work-Reinforcement Contingency on Increasing Task Engagement and Decreasing Challenging Behaviors of a Child with ASD**

Work or other demands often act as an aversive stimulus; they may evoke challenging behavior in order to escape the demand or gain access to a preferred item or activity (Reese, Richman, Belmont, & Morse, 2005). This may be particularly true for children with autism spectrum disorders (ASD) or other developmental disabilities, given the difficulties with communication and social skills that often characterize these disabilities (American Psychiatric Association [APA], 2013). When faced with a work demand, a child with ASD may engage in challenging behavior instead of engaging in the work task, potentially interfering with the delivery of instruction or treatment.

The use of a potent, desired reinforcer to increase future engagement in given behavior and behaviors is a key principal of operant conditioning. The establishment of a contingency between completion of non-preferred task and subsequent access to a preferred item or activity should make the learner more willing to engage in the non-preferred task in order to gain access to the reinforcer (DeLeon et al., 2014). Indeed, positive reinforcement (i.e., access to a reinforcer) has been shown to be perhaps the most effective means for decreasing escape behavior (DeLeon et al., 2001).

### 1. Visual Prompts and Schedules for Children with ASD

Many children with autism are highly visual learners (Mesibov & Shea, 2008; Simpson, Myles, & Ganz, 2008) and thus may benefit from visually or pictorially-loaded interventions. For example, the Picture Exchange Communication System (PECS; Frost & Bondy, 2002) is a picture-based communication system that has been found to be very effective in increasing communication in children with ASD (Ganz et al., 2012; Ganz, Simpson, & Lund, 2012). Indeed, Ganz, Simpson, and Lund (2012) hypothesize that its visual nature may contribute to its accessibility for individuals with ASD. Furthermore, because PECS provides an accessible, functional means of communication for children with ASD, it has the potential to decrease challenging behavior (Ganz et al., 2012).

Similarly, visual schedules are a common and recommended component of classroom and home environments for children with ASD (Ganz, 2007) and have sometimes been shown to have positive effects on task engagement and challenging behavior. In her practitioner-focused article, Ganz

(2007) discusses six studies in which visual schedules were found to have positive behavioral effects for children with ASD. Three of these studies involved preschool-aged (i.e., three or four year old) children. For example, Massey and Wheeler (2000) found that teaching a four year-old child with ASD to use a visual schedule resulted in relatively fast acquisition of ability to use the schedule independently to transition between activities in a school setting. Furthermore, they found that the student was able to generalize use of the visual activity schedule to new activities and settings in school relatively easily and that task engagement increased and challenging behavior decreased when the visual schedule was implemented.

Additionally, Machalicek and colleagues (2009) investigated the use of visual activity schedules and combined pictorial-verbal task correspondence prompting to decrease challenging behavior and increase appropriate behavior during recess. The participants in Machalicek et al.'s (2009) study were three kindergarten students with ASD. The authors found that use of the visual schedules and combined pictorial-verbal task correspondence prompting decreased challenging behavior in two participants; the third participant displayed low levels of challenging behavior throughout both the baseline and intervention phases of the study. Furthermore, the participants' engagement in appropriate play behavior during recess increased when the visual and verbal prompts were introduced. Similarly, Dettmer, Simpson, Myles, and Ganz (2000) found that using visual prompts for transition between activities decreased latency time for two elementary school-aged boys with ASD. Notably, in one participant, the visual prompts also decreased the need for physical and verbal prompts from the teacher. This suggests that visual supports may be more effective than verbal prompts for some children with ASD.

Given the evidence supporting the effectiveness of pictorial schedules and communication systems for children with ASD, it is possible that pictorial prompts, alone or combined with verbal prompts, may be more effective than verbal prompts alone in communicating with children with ASD (Earles-Vollrath, Cook & Ganz, 2006; Hodgdon, 1995). This may also hold true for the teaching and prompting of a work-reinforcement contingency.

## 2. Purpose of the Current Study

The purpose of this case study is to assess the teaching and maintenance of a work-reinforcement contingency across multiple activities. Levels of task engagement and challenging behavior were assessed. Additionally, this study examined the degree to which demand could be increased and access to the reinforcer decreased while maintaining an effective contingency system that might promote task engagement while decreasing challenging behavior.

There are three main research questions in this study: (1) Does a learned work-reinforcement contingency decrease challenging behavior and increase task engagement in a preschool age child with ASD?; (2) Can this contingency be taught and maintained across multiple activities?; and (3) Does a pictorial prompt paired with the verbal prompt increase effectiveness of the learned work-reinforcement contingency over a verbal prompt alone?

## I . Methods

### 1. Participant

The participant in this study, “Jonah,” was a three year-old male child diagnosed with ASD. He lacked functional verbal communication in the form of words, although he sometimes used the Picture Exchange Communication System (PECS; Frost & Bondy, 2002) to communicate at home and in the clinic. Jonah frequently engaged in challenging behavior when faced with task demands. These include eloping (i.e., running away from a task), vocal protest (i.e., screaming or crying), hitting objects or people, or throwing objects. Typical work demands in the clinic included discrete trial training (DTT) matching, reading books with a therapist, lining up letters on a magnetic board, and completing art projects. The client’s overwhelmingly preferred reinforcer was access to an iPod or iPad for viewing videos.

The iPad was frequently used as a reinforcer or calming stimulus, but delineated, explicit work-reinforcement contingencies were not often used by Jonah’s therapists. Specifically, pictorial work-reinforcement contingencies had not yet been established, and verbal work-reinforcement contingencies were rarely used and their use lacked consistency or regularity. Thus, although Jonah

had some limited exposure to work-reinforcement contingencies, they were not regularly or systematically used and pictorial contingency prompts had not been introduced.

## 2. Setting

At the time of the study, Jonah attended a half-day, intensive, early intervention preschool program specifically for young children with ASD. The clinic uses primarily a naturalistic teaching approach combined with applied behavior analytic principles, such as discrete trial training (DTT). The children who attend the clinic participate in semi-structured, naturalistic activities, such as art, block/train center, and book center and also receive one-on-one behavioral intervention for a variety of skills, such as matching colours and shapes and putting together puzzles.

The study took place immediately after the end of clinic two days per week. A private therapy room in the clinic was used, and the principle investigator of the study (who also served as the primary data collector) and the intervention therapist (who also served as the secondary data collector) were present for all sessions. Except for the final session when a substitute therapist had to be used due to scheduling conflicts, the intervention therapist remained the same throughout the course of the study.

### 1) Clinic therapist

Under the clinic's standard therapist rotation schedule Jonah's primary therapist rotated twice over the course of the study. The first such change corresponded to data points three and four in the books and letters conditions and data points one and two for the matching condition were collected. The second therapist change occurred on the day before data points 13 and 14 for letters and matching and data points 14 and 15 for books. Because the external events of therapist change tended to coincide with phase change within lag -1 or +1, it was decided that cross-correlation would likely be confounded by the effects of phase change. Thus, cross-correlations were not run for the data.

## 3. Study Design

This study employed a multiple baseline across activities design, with changing treatment. The

multiple treatments will be B (verbal “first work then iPad” prompt) and B1(verbal plus pictorial “work first then iPad” prompt). The activities used for the multiple activity/setting component were rearranging magnetic letters, matching discrete trial training, and reading books with a therapist. Some phases were longer due to the staggered start for each intervention phase in a multiple baseline design. In the matching condition, the pictorial-plus-verbal contingency prompts (phase B1) were implemented before the verbally contingency prompts only (phase B) in order to see if the removal of pictorial prompts or the ordering of the intervention sequences impacts the effectiveness of the contingency prompts.

Due to experimenter error, the implementation order of the B and B1 phases in the matching DTT condition were altered from the original model. Two data points were collected for an initial B1 phase, the B phase was accidentally started a session early, resulting in the B1 not being of adequate length (i.e., having less than four data points). A decision was made to implement a second, full B1 phase following a full (i.e., four data point) B phase. Although this somewhat obscured our ability to observe order effects, it did ensure that an adequate amount of data was collected for each phase and each condition and allowed all conditions to end in the verbal-plus-pictorial prompt condition.

Start and end dates for each phase are noted on the graphs in <Figure 1>.

#### 4. Intervention

In baseline, Jonah was asked to engage in three “work” tasks—specifically, matching, arranging magnetic letters, and reading books with a therapist—that were anecdotally observed to be associated with challenging behavior on the part of the client. During the baseline period, he did not receive any kind of verbal or pictorial prompt regarding a work-reinforcement contingency. In all phases, challenging behavior was ignored except when intervention was required to maintain client safety or when behavior represents continued elopement requiring re-direction. After 150 seconds of task demand, Jonah received access to the iPad for 60 seconds. Jonah was required to sit at the table before receiving the iPad in order to avoid reinforcing challenging behavior that had occurred during the task demand.

In the verbal-only intervention condition (B), Jonah was verbally prompted with “first work, then iPad” when asked to complete the task. The therapist could repeat the prompt whenever necessary

as a form of redirection. When Jonah was given access to the iPad after 150 seconds of task demand, the therapist told him “Good working! Now, iPad” in order to further emphasize the contingency.

In the verbal-plus-pictorial intervention (B1) condition, a pictorial prompt card depicting “first [one-on-one work], then [iPad]” was added to the verbal prompt. The therapist could repeat the verbal and pictorial prompts when ever necessary during the 150 seconds of task demand. When Jonah was given access to the reinforcer following task demand, he was told, “Good working! Now, iPad” simultaneously with the verbal and pictorial prompts in order to further reinforce the contingency.

## 5. Measures

The main outcome measures for this study were task engagement and challenging behavior. Data was collected in sessions comprised of the 15, 10 seconds intervals. Challenging behavior included hitting people or objects, throwing objects, or verbal protest (screaming or crying) and was recorded on a partial interval basis. Task engagement involved actively participating in the task demanded and is measured on a whole interval basis. If Jonah failed to engage in the task for the entire interval (e.g., eloped, was not engaged in matching during DTT) but did not engage in challenging behavior, neither category was endorsed. The percent of 10 seconds intervals in which Jonah engaged in challenging behavior and task engagement were calculated for each 150 seconds session.

## 6. Data collection

Data was collected for 30-60 minutes after clinic two days a week if Jonah was present and able to participate that day. The interventionist therapist and the principal investigator were always present during data collection sessions; for the last session (i.e., the last two data points in each condition), a substitute therapist was used due to scheduling conflicts. During the week of Spring Break, when clinic was not session, data was collected for approximately 30 minutes in the same setting as the other sessions. The study took place over approximately nine weeks, including Spring Break.

Data points (i.e., 150 seconds intervals) were typically collected in pairs. Thus, one 150 task

demand interval followed by 60 seconds of iPad access was usually immediately followed by second, identical trial. However, for one point in the books phase, only one interval of data was collected due to time restraints. In total, 58 data points were collected. A total of 20 were in books, 18 were in letters, and 20 were in matching.

## 7. Data Analysis

### 1) Tau-U

In addition to visual analysis of the results, effect sizes were also calculated. The main effect size used in this study is Tau-U, with correction for baseline trend (Parker et al., 2011). Tau-U is an effect size designed specifically for single case research; it compares nonoverlap between phases while controlling for improvement in the baseline (Parker et al., 2011). Given the visually apparent baseline trends in the letters and matching conditions, the ability of Tau-U to control for baseline trend and to be sensitive to the amount of baseline trend controlled for is particularly desirable (Parker et al., 2011). Tau-U can be calculated by dividing the number of data points that show improvement from phase A to phase B (S) by the number of pairs. Phase A or baseline trend can be controlled for by subtracting (S of phase A only) from the total S before dividing by the number of pairs (Parker et al., 2011). Additionally, an omnibus Tau-U effect size across phases can be calculated through weighted averaging in which each effect size is divided by its variance. Tau-U and weighted average Tau-U were calculated via Vannest, Parker, and Gonen's (2011) online calculator. An effect size of roughly  $Tau\ U = .6$  or higher is generally considered to be meaningful (Richard Parker, personal communication, April 25, 2012).

### 2) Auto-correlation

In addition to Tau-U, autocorrelation was calculated for all phases. Autocorrelation tests the independence or inter-dependency of data during a phase. Positive auto-correlation may indicate violation of the assumption of independence of data; this assumption is held for both parametric and non-parametric data (Busk & Marascuilo, 1988). SISA's (2012) calculator was used for auto-correlation calculation.



### 3) Inter-observer Agreement and Treatment Fidelity

Inter-observer agreement was collected for 12 data points, or 21% of the total data points. These sessions were predominantly during the baseline phase of treatment. This occurred in part because as Jonah became more engaged in the activities, the interventionist therapist was malleable to interact with him during the activities and thus was less able to take inter-observer reliability data. Similarly, most of the inter-observer reliability data was collected during the books and letters conditions, as it was more difficult for the intervention therapist to collect data during the DTT process.

Overall, inter-observer agreement was relatively high. When calculated on an interval-by-interval basis inter-observer agreement for both challenging behavior and task engagement ranged from 73% to 100%. The mean inter-observer agreement for challenging behavior was 91%, with a standard deviation of 11%. The mean inter-observer agreement for task engagement was 94%, with standard deviation of 9%.

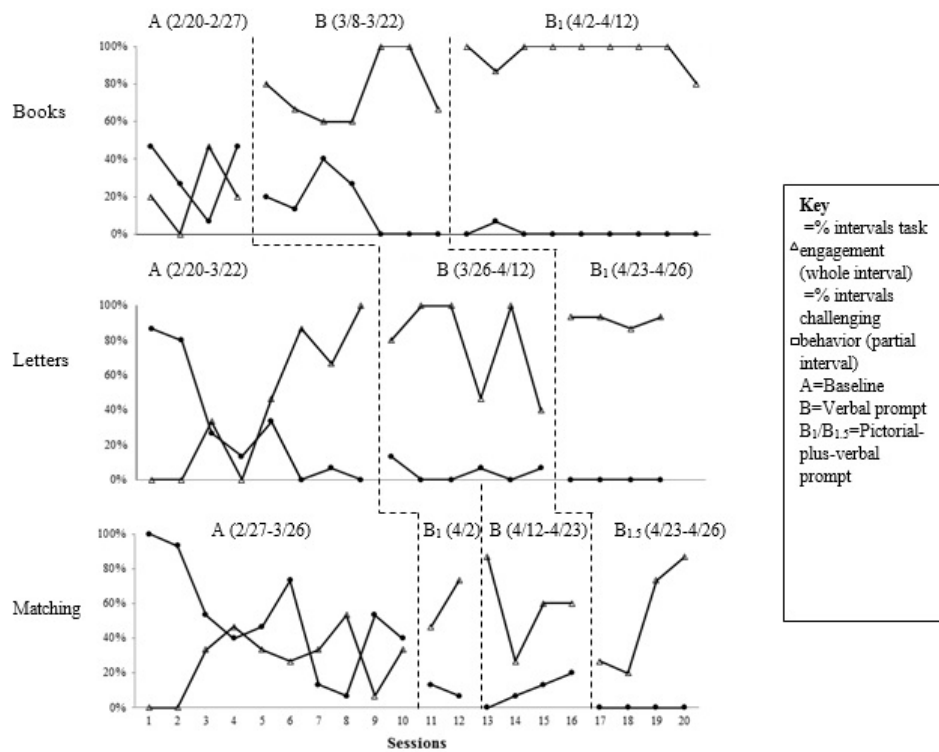
Treatment fidelity was collected for 25 sessions. Because data points were typically collected in pairs as described previously, treatment fidelity was collected once for a single pair. For the one trial in books where only one data point was collected, treatment fidelity was collected for that one data point. Treatment fidelity was collected 80% of the time by the primary data collector and principal investigator only and 20% of the time by the interventionist therapist only. Both observers recorded treatment fidelity information for one session.

Treatment fidelity ranged from 80% to 100%, with 24 of 25 sessions being rated as having 100% treatment fidelity. It should be noted that the only treatment session where 100% treatment fidelity was not reached was when a substitute interventionist therapist was conducting the intervention during the final session.

## II. Results

### 1. Visual Analysis

For a visual representation of the main outcome measures (challenging behavior and task engagement), please see Figure 1. In general, visual analysis of the results suggests a strong decline in challenging behavior and increase in task engagement over the course of the study. However, the



〈Figure 1〉 Results for Multiple Baseline Design

results also appear to indicate a strong decline in challenging behavior and increase in task engagement during the baseline phase of the letters condition. Because this improvement accelerated at roughly the same time intervention began in the books condition, this may be an instance of “bleed” between conditions (i.e., the generalization of the contingency from one condition to another). Alternatively, this may have been a result of the task becoming less aversive and more well-liked by Jonah over time. It is also could have been due to him adapting to task demand in general as a result of ongoing therapy, both within and supplemental to the clinic.

The matching condition shows a possible improvement trend in baseline, although it is not as consistent or noticeable as that seen in the letters conditions. In particular, levels of challenging behavior appear noticeably lower in the intervention phases compared to baseline. There does appear to be a slight deteriorating (increasing) trend in challenging behavior in the B phase, although that appears to reverse in the second B1 phase (hence referred to as B1.5 to reduce confusion). Levels of challenging behavior in the B1.5 phase are consistently at 0%. In terms of task engagement, the

reappears to be as light increase in the intervention phases; however, the phase contrast does not appear as noticeable as that seen with challenging behavior. This may indicate that Jonah engages in relatively high levels of passive resistance or elopement during the matching task. The initial drop-off in task engagement during the B1.5 phase may be explained by the fact that the additional trial came at the end of the research session after Jonah had already complete done trial (i.e., two data collection intervals) in each condition. Thus, he may have been particularly tired and less prone to task engagement at that time. However, it is not able that, despite the higher task demand placed on Jonah, he still did not demonstrate any challenging behavior during the entire trial.

## 2. Effect Size Analyses

For each of the three conditions, separate effect sizes were calculated for challenging behavior and task engagement. For the books and letters conditions, Tau-U was calculated for A v. B, B v. B1, and A v. B1. For the matching condition, Tau-U was calculated for A v. B, B v. B1.5, and A v. B1.5. Additionally, an omnibus effect size was calculated for both challenging behavior and task engagement in each of the three conditions. Individual phase contrast Tau-U effect sizes for books, letters, and matching can be found in Tables 1, 2, and 3, respectively. Because the B1 phase for the matching condition contained only two data points, individual Tau-U contrasts using this phase are not reported here; however, A v. B1, B v. B1, and B1 v. B1.5 phase contrasts were included in the calculation of the omnibus effect size for the matching condition. Because of the strong tendency of the data toward baseline improvement, all Tau-U values were calculated with controlled baseline trend. Because Tau-U is sensitive to the amount of baseline trend (Parker et al., 2011), over correction is unlikely to be a concern.

### 1) Books

With baseline trend corrected for in all phase contrasts, the omnibus weighted Tau-U for challenging behavior in the books condition is  $-.6112$  with a variance of  $.2007$ . The corrected weighted omnibus Tau-U for task engagement is  $.8293$  with a variance of  $.2007$ . Both of these values exceed the suggested Tau-U value of  $.6$ . This indicates that there are considerable differences in task engagement and challenging behavior between phases; namely, that level of challenging behavior notably decreases while level of task engagement notably increases. These results support the

main hypothesis that teaching and prompting a work reinforcement contingency may increase engagement and decreasing escape-maintained challenging behaviors during task demand.

2) Letters

With regards to letters, the weighted average omnibus Tau-U for challenging behavior is -.2013, with a variance of .2088. Weighted average omnibus Tau-U for task engagement is .1097, with a variance of .2088. The low values for both of these omnibus effect sizes are likely due to the heavy correction for baseline improvement trend, especially in phase A. Although it does not reach the .6

〈Table 1〉 Tau-U values for Books Condition

Outcome variable	Phase contrast	Tau-U (with Phase A trend control)	SEtau
CB	A v. B	-.5714	.3780
CB	B v. B <sub>1</sub>	-.3651	.2999
CB	A v. B <sub>1</sub>	-.9444	.3600
TE	A v. B	.9643	.3780
TE	B v. B <sub>1</sub>	.6032	.2999
TE	A v. B <sub>1</sub>	.9722	.3600

Note. CB=challenging behavior; TE=task engagement. A=baseline; B=verbal prompt; B<sub>1</sub>=pictorial-plus-verbal prompt

〈Table 2〉 Tau-U values for Letters Condition

Outcome variable	Phase contrast	Tau-U (with Phase A trend control)	SEtau
CB	A v. B	-.0833	.3227
CB	B v. B <sub>1</sub>	-.4583	.3909
CB	A v. B <sub>1</sub>	-.0938	.3680
TE	A v. B	.1032	.3227
TE	B v. B <sub>1</sub>	.1667	.3909
TE	A v. B <sub>1</sub>	.0625	.3680.

Note. CB=challenging behavior; TE=task engagement. A=baseline; B=verbal prompt; B<sub>1</sub>=pictorial-plus-verbal prompt

cut-off suggestion of a meaningful Tau-U, the effect size of  $-.4583$  for challenging behavior between phases B and B1 is not ably higher than the other corrected phase contrasts for letters. Specifically, the decrease in challenging behavior between the verbal prompt-only and the pictorial-plus-verbal prompt phase lends some support to the hypothesized superiority of a pictorial-plus-verbal prompt. However, given that the Tau-U is still relatively low, it should be interpreted with caution and in the context of the rest of the study.

### 3) Matching

For challenging behavior, matching has a weighted average omnibus Tau-U of  $-.3672$ , with a variance of  $.1854$ . For task engagement, the weighted omnibus effect size is  $.0600$ , with a variance of  $.1854$ . The maximum Tau-U of  $-1$  between phases B and B1.5 is worth noting, as it may suggest that a return to pictorial-plus-verbal prompt instead of a verbal prompt alone may have led to a decrease in challenging behavior. The omnibus Tau-U for challenging behavior in the matching condition is not particularly high; however, the individual phase contrast tentative supports the hypothesis that the addition of a pictorial component to the work-reinforcement contingency prompt may increase its effectiveness.

〈Table 3〉 Tau-U Values for Matching Condition

Outcome variable	Phase contrast	Tau-U (with Phase A trend control)	SEtau
CB	A v. B	$-.2250$	$.3536$
CB	B v. B <sub>1.5</sub>	$-1$	$.4330$
CB	A v. B <sub>1.5</sub>	$-.4250$	$.3536$
TE	A v. B	$.3750$	$.3536$
TE	B v. B <sub>1.5</sub>	$-.0625$	$.4330$
TE	A v. B <sub>1.5</sub>	$.0250$	$.3536$

*Note.* CB=challenging behavior; TE=task engagement. A=baseline; B=verbal prompt; B1.5=pictorial-plus-verbal prompt.

### 3. Autocorrelation

No phases were found to be significantly autocorrelated, suggesting that the data meets the assumption of independence.

## III. Discussion

This study examined the effect of teaching a work-reinforcement contingency to a preschool-age child, “Jonah,” with an autism spectrum disorder as a means to increase task engagement and decrease challenging behavior during task demand. Three task demand conditions (books, letters, and DTT colour matching) and two treatment conditions (verbal contingency prompt and pictorial-plus-verbal contingency prompt) were used in the study.

Overall, this study provides some support for the use of work-reinforcement contingencies with young children with ASD. Although the likely bleed in the form of improving baseline trend may have obscured some intervention effects for the second and third conditions, it is worth noting that challenging behavior reached and maintained zero levels in all three conditions by the end of the study. This represents a sharp decline from the levels seen in the beginning of the study. Furthermore, in the matching condition, challenging behavior appeared to increase when the pictorial version of the prompt was removed. This suggests that there was at least some intervention effect, and reduces the likelihood that the decrease seen in all three conditions was not simply the product of global improvement unrelated to the intervention.

### 1. Social Validity

From a social validity and practicality standpoint, there are a few points that should be noted. First of all, although bleed is not a positive phenomenon from an experimental control standpoint, it may actually be positive from a clinical standpoint, provided that the client is indeed able to transfer the idea of a work-reinforcement contingency from one condition to another. Future research should investigate if a similar bleed pattern occurs in other, similar participants. The intervention itself is very low-cost, requiring only a laminated “first-then” card, appropriate pictures for work and the

preferred reinforcer(s), and access to the client's preferred reinforcer(s). Because visual schedules, prompts, and communication systems are commonly used with children with ASD (Ganz, 2007), many schools and clinics may already have these materials available or could make them at very low cost. Thus, the study is easily generalizable to other locations and participants, thereby enhancing its replicability.

Furthermore, during the last week of the study, Jonah's current therapist began using a verbal-plus-pictorial "work first, then iPad" contingency prompt during Jonah's matching DTT. The therapist was not aware of the present study and anecdotally reported the "work first, then iPad" pictorial-plus-verbal prompt to be very effective in increasing compliance during DTT. It may be that Jonah was able to transfer the contingency outside of the experimental setting and into similar tasks in the clinic; this again may indicate the transferability of the intervention skill to different settings and conditions. That the therapist found the contingency prompt to be intuitive and helpful further supports the social validity of this intervention.

## 2. Limitations and Future Research

Despite its strengths in terms of generalizability, social validity, and possibly transfer of skills, this study does have some weaknesses that should be addressed. First, the experimental rigor of the study would have been improved by the use of a fourth condition to act as a concurrent baseline for the matching condition. Although a fourth condition was originally planned, finding a condition that provoked similar levels of challenging behavior and that could easily be completed within the limited time and space available for this study proved to be prohibitively difficult. Researchers without these time and space limitations may consider replicating the study with a fourth condition in order to improve experimental control and further track bleed or lack thereof across conditions.

Second, the study would have been benefitted from the implementation of a full B1 phase prior to the B phase in at least one condition. This would allow for a more thorough control of potential order effects and a better understanding of the additive benefit, if any, of a pictorial prompt in addition to the verb alone. Similarly, the study may have benefitted from more and more thorough reversals between the A, B, and B1 phases within conditions in order to better demonstrate the effects of having or not having a verbal or pictorial prompt on challenging behavior and task engagement in a given trial.

Third, due to time and space limitations, trials occurred immediately in rapid succession. This may have enhanced bleed across conditions. For example, a trial of letters in the baseline phase may have come only a few minutes after a trial of books in the verbal prompt-only (B) phase. Because little time had passed between the use of the work-reinforcement contingency and the next task demand, the work-reinforcement contingency may have still been cognitively accessible to Jonah, thus leading to stronger transfer for the contingency from the books condition to the letters condition. Further research in this area may benefit from increasing the length of time between trials in different conditions. This may be especially important when conditions are in different phases.

Finally, most of the inter-rater reliability data were collected during the baseline phase and the letters and books conditions, which provides an unrepresentative sample of the sessions. This was due to practical issues (i.e., only two therapists were available to run the study). Ideally, another researcher should be available to collect data during all treatment phases and conditions.

Future research should address these limitations and further examine the effectiveness of pictorial and verbal-plus-pictorial contingency prompts in children with disabilities. Such replications and expansions may strengthen the preliminary support provided by this study and also answer questions about the transferability of these skills across settings and the maintenance of the contingency following the conclusion of intensive intervention.

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요 약

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## 조건적 강화를 사용한 문제 행동 감소와 과제 관련 행동 증가

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본 연구는 단일 대상 연구 설계인 중다 기초선 설계와 교대-처치 설계를 사용하여 언어적 촉진만 사용했을 때와 언어적 촉진과 시각적 촉진(그림)을 함께 사용하였을 때에 아동의 문제 행동과 과제 참여 행동에 미치는 효과를 비교하고자 설계 되었다. 연구 대상으로 만 3세의 자폐아동이 참여하였다. 이 아동은 과제가 주어졌을 때 언어적인 공격 행동과 신체적인 공격 행동을 보였다. 연구 결과 아동의 과제 참여 행동은 증가하였고, 아동의 문제행동은 감소되었다. 제언에서는 연구 결과를 바탕으로 이 연구의 제한점과 연구 방향 등에 대하여 논의되었다.

〈주제어〉 자폐, 조건적 강화, 문제 행동, 과제 행동, 언어적 촉진, 시각적 촉진

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