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Gradual Guidance and Independent Activity Schedules for Children with Autism

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Abstract

The goal of this intervention was to increase on-task and on-schedule behavior in a child with autism through the use of gradual guidance and an independent activity schedule. The participant was a three year-old boy who exhibited noncompliant problem behavior. He was at mastery level for the tasks that were included in the independent activity schedule and had no prior learning experience with an independent activity schedule. Gradual guidance was used to decrease the time it took for him to learn the complex behavior that is involved with an independent activity schedule and to keep the participant on-task and on-schedule in order to promote independence. The study was an AB design. This study will contribute to the quality of life of the participant by decreasing his noncompliant and problem behavior while increasing his on-task and on-schedule behavior. It also allows time for the participant's tutors, teachers and aids to prepare other materials and mark data while the child independently completes complex behaviors. On-task and on-schedule behavior in the participant steadily increased with on-task and on-schedule behavior both at 0% during baseline and averaged out to 74.3% and 79.2% respectively by the 52nd session. Independent task completion steadily increased as problem behavior decreased. It has been observed that the use of gradual guidance and an Independent Activity Schedule do increase on-task and on-schedule behavior for autistic children with noncompliant problem behavior.

Studies have shown that independent play skills of children with autism can drastically increase and improve with the addition of an independent activity schedule. (Betz et al., 2008) There are studies that have looked at increasing the interaction of two children with autism by the use of an independent activity schedule, as well as using an independent activity schedule (IAS) to increase on-task and on-schedule behavior. (MacDuff, Krantz, & McClannahan, 1993). With the help of studies like these, independent activity schedules have had a great impact on the way that children with autism are taught in a classroom, as well as how children with autism do everyday activities including playing with toys and games. Many of the studies that have looked at the relationship of an independent activity schedule and a child with autism have used high functioning children that have mastered the skills that the experimenters were asking them to complete in the intervention. MacDuff et al. used an intervention that consisted of using a two-component teaching package that used gradual guidance and a picture activity schedule (1993). The picture activity schedule had three specific toys for the participant to play with as well as three other activities that were, snack, puzzle and TV (MacDuff et al., 1993). The gradual guidance consisted of manual prompts that were defined as; "Orienting a youth's head towards materials, hand-over-hand prompts, and light touches such as those that occur when manual guidance is faded" (MacDuff et al., 1993, p. 91).

During an intervention, gradual guidance helps the participant correctly execute the desired response and stay on-schedule by receiving help to elicit the correct behavior. Gradual guidance also helps to create an example of correct on-schedule behavior that includes a long chain of behaviors, for example, finding the toy, playing with the toy, picking up the pieces once finished with the toy and then putting the toy away. For this reason, there is

no room for error when using gradual guidance because the guider physically prompts the child and shortens the time it might take for a child to learn a complex behavior. “Graduated guidance, delivered from behind the youth, was used to help him complete the sequence of activities pictured in his activity schedule, in the order in which photographs were presented” (MacDuff et al., 2008, p. 92).

Increasing on-task and on-schedule behavior in a child with autism is very useful to the child as well as the adults that regularly work with the child. It increases the child’s independence and skills within the classroom and at home, and it helps relieve the responsibilities of being the caretaker of that child. Increasing on-schedule and on-task behavior for the child allows them to actively use their time and independently from their aids. At a school setting this would allow teachers, staff and tutors time to gather supplies, take notes and prepare for the next task while the child uses their down time appropriately and doesn’t create an interruption within the classroom. The child that was chosen for this study emits noncompliance and problem behavior on a regular basis. Baseline data was taken on the first day but was not valid to use in this study, but the participant was observed with noncompliant behavior, crying, flopping on the floor, and aggressive behavior towards his tutor. Noncompliance includes an incorrect response to the procedural demand or task that is at hand, and problem behavior including: flopping on the ground, which includes any behavior where the child is not holding up their own body weight and is loosely falling to the ground or into someone or something, eloping or running away from the materials and work space, screaming, throwing materials, aggression and self-injurious behavior. Aggression is defined as hostile or violent behavior or attitudes towards another. Given his mastered skills, including, matching simple, and complex pictures, completing a simple puzzle and playing

with a geo board, the addition of an independent activity schedule may help to reduce problem behavior and noncompliance as well as increase on-task and on-schedule time. Gradual guidance would also decrease the probability of the event of noncompliance in the participant. The problem behavior can lead to injuries to the participant as well as to the instructors and must be handled and controlled in a way that decreases the noncompliant behavior and increases appropriate behavior. This experiment has the capability to strengthen the relationship between independent activity schedules increasing on-task and on-schedule behavior as well as decrease noncompliant behavior. The relationship between independent activity schedules and on-task and on-schedule behavior has been studied and we want to expand the knowledge on how independent activity schedules impact noncompliant and compliant behavior.

Method

Participants

This study had one participant, who was a three-year-old boy who was enrolled in an early childhood special education classroom. This child was chosen for this intervention because he exhibited knowledge of the tasks and trials that said he was ready to move onto the next classroom setting, but his behavior showed otherwise. The participant was dependent on the tutor and this study was to help promote classroom independence and generalize it to other settings and that is what the participant needed in order to progress through the curriculum. The participant also elicited noncompliant behavior, which allowed us to track the occurrence of it and how it related to the intervention. He also was at mastery level for multiple tasks and through his prior learning, could easily perform them during intervention. Mastery level, according to the early childhood special education classroom, meant that the skills were in his

repertoire and he was able to independently complete all the tasks before intervention commenced.

Design

An AB design was used for this study. We did not want to return back to baseline because self-injurious behaviors were observed at this time. We did not want to leave the participant in a no-intervention phase.

The study started with the collection of baseline data. All materials were placed inside of the participant's discrete trial booth and the independent activity schedule was placed on the child-sized table. The tutor then verbally prompted the participant, "Insert name, Get your book." From there the participant was observed and data was recorded for on-task behavior and on-schedule behavior. Implementation of the intervention consisted of the same steps in baseline and after the participant was prompted to get his book, there was a researcher who used gradual guidance to walk him through the steps of the intervention. Data was recorded for on-task and on-schedule behavior using whole interval time sampling every 15 seconds. Data was also recorded on the participants skill acquisition by marking a plus sign if a correct and independent behavior in the complex behavior was made, and a minus sign with an indication of full or partial prompting from the researcher if the participant did not elicit the behavior individually. There were eleven behaviors in the behavior chain and they were as follows: open book, point, match to icon, obtain, complete, put away, come back, turn page, tap/grab "all done", close book, sign/say/hand "all done". A percentage was then taken of the amount of behaviors that were completed independently.

Phase two of the study began when three sessions were completed with 80% or higher successful completion of the task or two sessions of 90% or higher were correctly completed.

Phase two consisted of completing two complex behaviors/tasks before obtaining a reinforcer. The initial part of phase two was to complete a preference assessment of the tasks. We followed the Premack Principle so in order to find the highest preferred task in order to assess what the most reinforcing task was for the child, we performed a paired stimulus preference assessment. We presented two tasks at the same time and allowed the participant to chose the most desired task. We paired all tasks with one another and presented the same two tasks three times in order to make a list that truly corresponded to his most preferred tasks and then ranked them accordingly. Then, when it came time to implement phase two, we made sure to arrange the independent activity schedule so his most preferred task was after the first task in order to reinforce his first complex behavior. When the same criterion from phase one was met for phase two, we prepared to begin phase three. Phase three was set up exactly like phase two, with the exception that the participant needed to successfully complete three tasks before receiving the reinforcer.

The independent variable for this study was the independent activity schedule. The dependent variable is the measure of on-task and on-schedule behavior throughout the session. We measured the effectiveness of the independent variable through independent performance and compliant behavior.

Procedure

The intervention was run one to two times a day five days (Monday-Friday) a week dependent on the child's attendance. The materials were located in the child's work area. The researcher would quietly place all available tasks inside of his area and place the individual activity schedule on his child-sized table. Prior to the session, the participant's tutor would continue with mands, a verbal operant that is under control of a motivating operation and

reinforced by characteristic consequence, and extra learning opportunities and appropriate play until the area was set for the intervention. This would take approximately 20 seconds. At this time, the tutor would step out of the booth and verbally prompt the participant saying, "Insert name, get your book." The tutor was then responsible for keeping track of skill acquisition and marked all steps as completed independently or with full or partial physical prompting, provided by Markowitz. An independent observer recorded data on on-task and on-schedule behavior. Once the task was finished and the participant completed the terminal behavior, he was given access to reinforcers. During this time, the materials were quickly taken out of his work area and he continued with his daily schedule.

As previously explained, in order to move to the next phase of the intervention, we required three sessions of at least 80% of the task completed independently. We took note of the specific steps in the task that did not meet criteria as an independent and on-task and on-schedule behavior to ensure that it wasn't an issue with unlearned behavior, but rather a skipped or mistaken step in the schedule.

A plus sign was used in all of our data to signify when a response was correctly completed. If the participant completed a session of the intervention he was reinforced with a preferred toy chosen earlier that day during a preference procedure. Once gradual guidance decreased and an incorrect response was elicited it was marked as a negative sign in our data and taken into account for the percent of the session with correct responding. If the student did not make the correct response for the current step in the session gradual guidance was applied again, full physical and then partial physical prompting from behind the student.

There were two different data sheets that were used simultaneously. The first of the two was a sheet that recorded on-task and on-schedule behavior in 15-second increments

(Appendix A). If on-task behavior was emitted for the whole 15-second interval then a plus sign would have been used and same for on-schedule behavior. If off-schedule behavior was observed at any point during the interval, a minus sign would be marked for that interval and respectively for off-task behavior. After the session was complete, two percentages were figured for the amount of on-task and on-schedule behavior the student responded with. The second data sheet recorded the type of task that was chosen for the session and if the steps of that task were completed independently or with prompting through gradual guidance (Appendix B). The percent of the task performed correctly was then figured after completion of the session.

Setting and Materials

The setting for this study is at WoodsEdge Learning Center in the Early Childhood Special Education classroom, which was the child's typical classroom. Each child within the classroom is assigned a booth that creates the child's individual work area, and inside the booth is a child-scale table and chair.

The materials used during intervention included five small Tupperware bins that each held a different task. There were two sets of pictures of all of the tasks and one set was adhered to the lid of the bin that held that task and the other picture of the task was Velcro'd into the independent activity schedule. The schedule consisted of four laminated pages in a one-inch three-ring binder and the tasks were interchanged depending on the session for generalization purposes.

Results

This experiment had the capability to strengthen the relationship between independent activity schedules increasing on-task and on-schedule behavior and in doing so, decrease

noncompliant behavior. During baseline on-schedule and on-task behavior were at 0%. The participant was showing no signs of cooperation or understanding of the independent activity schedule that he was supposed to attend to. He did not attend to the book, manipulate any of the materials and his behavior, in regards to completing any activity, did not change. Baseline demonstrated that the participant had no prior training with IAS. With the phase change into intervention and gradual guidance, the participant's on-schedule behavior was at 100%. It took five sessions of intervention before the majority of gradual guidance was faded out and the participant began completing the procedural steps independently. On-task behavior also increased when intervention began and skill acquisition showed a steady increase in behavior. Appendix C1 was used to observe the participants learning curve and keep track of phase changes. The participant's skill acquisition was a percentage of the behavior sequence that was completed correctly. During phase one the data sheet was edited to better fit the behavioral steps and a new component, "match to icon", was added. This required the participant to match the icon in the book to the icon on the lid of the Tupperware bin. With the addition of this step, required a phase change because the original intervention and data collection was compromised. This phase change took place between session 26 and session 27 and is considered to be the second part of phase one. The mean scores for on-schedule behavior, on-task behavior and skill acquisition for phase one were: on-schedule 81.1%, on-task 75%, and skill acquisition 58%.

The participant hit phase change criteria by completing sessions 41, 42, and 43 with a skill acquisition of 80% or higher. None of the missed steps in the behavioral sequence were the same one consecutively so the intervention began phase 2 with session 44.

Before moving on to phase two of the intervention a paired stimulus preference assessment took place. In order to apply the laws of the Premack Principle, there had to be data on the participants most desired task to his least desired task and each of the five tasks having a ranked number in between. This data was collected over three days and each task was randomly presented with another and the participant had a forced choice in which task he wanted to complete. No other data was taken at this time. The task with the highest preference was ranked as the most preferred task and the task with the second highest preference was ranked as his second favorite, etc.

Independent task completion steadily increased with the use of the independent activity schedule and problem behavior decreased. Analysis of the data for Appendix C1 shows that the intervention has significance on the behavior sequence the participant followed. Appendix C2 shows on-schedule behavior through baseline and intervention. Appendix C3 shows the percentage of on-task behavior for baseline and intervention. Data indicate that an independent activity schedule decreases off-schedule and off-task behavior.

Discussion

This study does show significance in the data. There was an increase in on-schedule and on-task behavior, which decreased noncompliant and problem behavior. These results were obtained through the use of the independent activity schedule and gradual guidance as the means of teaching the tasks. Graduated guidance reduces the number of mistakes made during acquisition and this drastically decreased the amount of time spent learning. MacDuff et al. (2008) explains the benefit of using the independent activity schedule, how they enabled the participants to independently start and finish previously mastered tasks, which prior to the

intervention the child did not have the entire chain of complex behavior in his repertoire. Our study showed the same results to a varying degree, that the participant was compliant when prompted with the discriminative stimulus, "Name, get your book", and emitted on-schedule and on-task behavior throughout the task.

The participant demonstrated difficulty matching the picture icon in the independent activity schedule to the task and because of this, the "match" step was added to the complex chain of behaviors in session 27. The "match" step immediately increased the participant's success at matching the correct task to the icon. To most children, it would most likely be beneficial to begin with this step and phase it out if the participant reached phase change criteria with this step completed with a 100% success rate.

Also, on the first day of intervention and data collection for phase two, there was not a time limit for each individual task and subsequently, the first session ran for longer than five minutes per task, which is what was decided upon after session one of phase two. A five-minute time limit per task was added when a second task was introduced in phase two to prevent lengthy sessions when noncompliant behavior was observed.

Variability in data could be attributed to confounding variables including a change in medication, absences from school, breaks in school and extended breaks from the intervention. There was a change in medication and it was during session 14, 15, and 16. The amount of missed days due to absences, school closings and scheduled breaks also played a role in the success of the intervention. This intervention demonstrated the effects of an independent activity schedule and increasing on-schedule and on-task behavior while consequently decreasing noncompliant behavior. With the success of this intervention, the participant will be able to move onto higher learning and has stopped disruption within the

classroom. This intervention can be retested and used on other noncompliant children with autism in order to increase on-task and on-schedule behavior.

Possible future research might use this intervention on a participant that is stable with their medication and unscheduled school closings are less likely to occur as they did interrupt the intervention. Future research might study the effect of an independent activity schedule with a small child with noncompliance and practicing hygienic activities such as brushing teeth and washing hands.

References

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Appendices

Appendix A: Skill acquisition data sheet

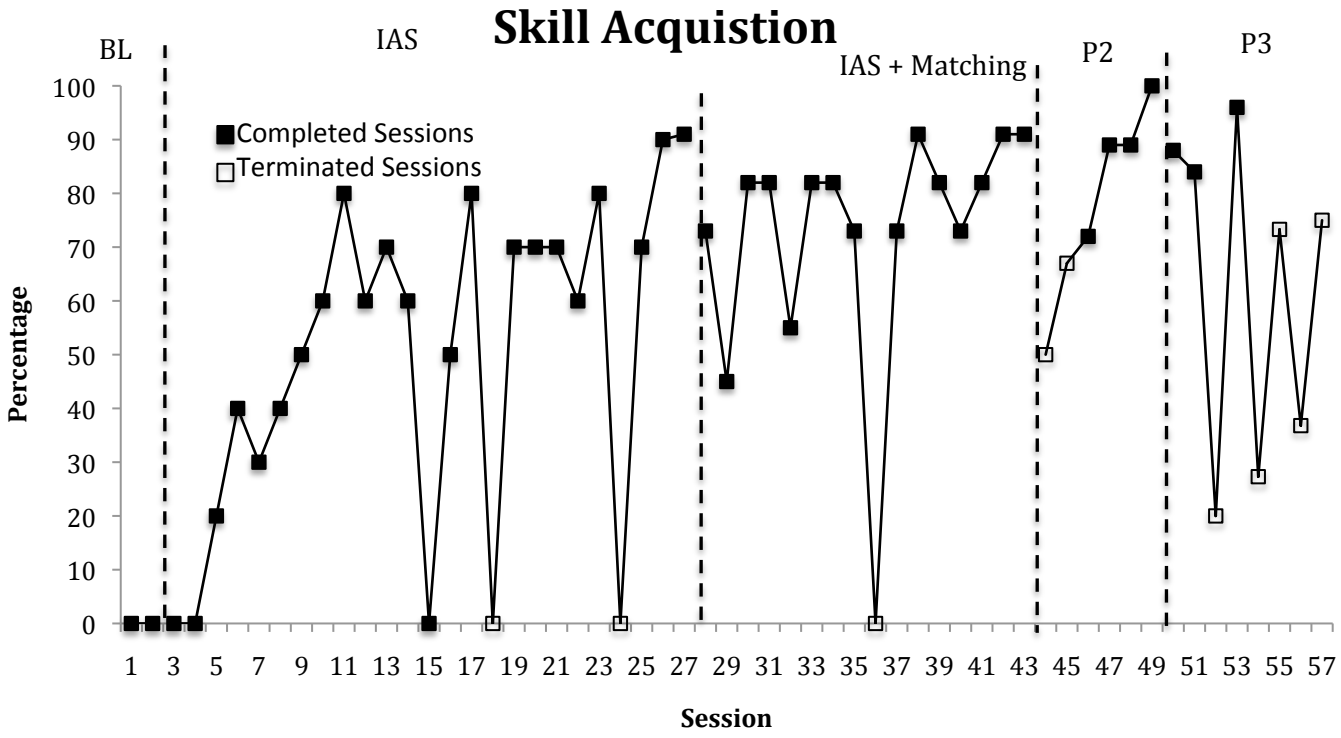
		Completes Activities and Consumes Reinforcer								Data				
Initials Date	Task	Open book	Point	Match icon to bin	Obtain	Complete	Put away	Come Back	Turn Page	Tap/ grabs "all done"	Close book	Sign/say/hands "all done"	Total steps	%

Appendix B: Whole interval time sampling data sheet

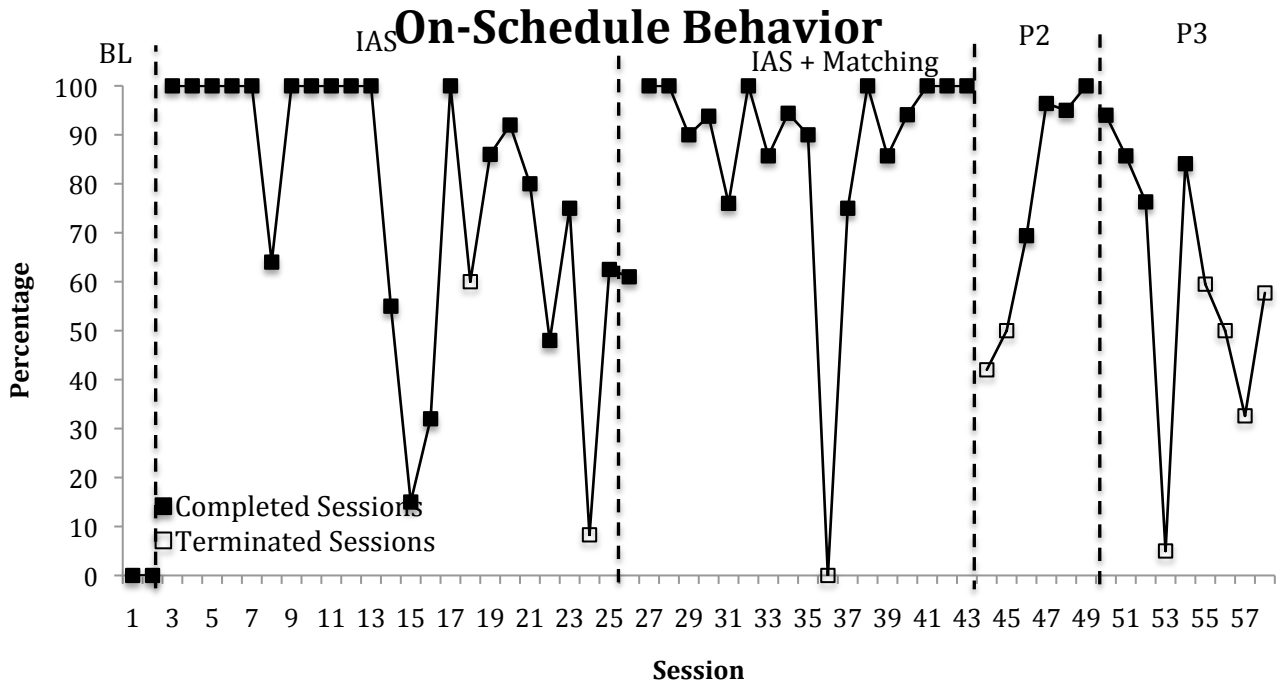
On-task behavior will be defined as the student attending to the book or the materials, the student engaging in the activity, the student transitioning between activities. Off-task behavior will be defined as not attending to the book or materials, engaging in other behaviors such as tantrums including throwing or hitting materials against environment, putting materials in mouth, flopping on the floor, eloping from work area, or aggressive behaviors including biting, hitting and self-injurious behavior in the form of hitting head against the ground or the walls as well as not engaging in the scheduled activity. On-schedule behavior is defined as engaging in the activity that corresponds to the picture on the page. Off-schedule behavior is defined as not engaging in the activity corresponding to the picture on the page.

Date		**0:00-0:15**	**0:16-0:30**	**0:31-0:45**	**0:46-1:00**	**1:01-1:15**	**1:16-1:30**	**1:31-1:45**	**1:46-2:00**	**2:01-2:15**	**2:16-2:30**	**2:31-2:45**	**2:46-3:00**
	On-schedule												
	On-task												
Date		**0:00-0:15**	**0:16-0:30**	**0:31-0:45**	**0:46-1:00**	**1:01-1:15**	**1:16-1:30**	**1:31-1:45**	**1:46-2:00**	**2:01-2:15**	**2:16-2:30**	**2:31-2:45**	**2:46-3:00**
	On-schedule												
	On-task												
Date		**0:00-0:15**	**0:16-0:30**	**0:31-0:45**	**0:46-1:00**	**1:01-1:15**	**1:16-1:30**	**1:31-1:45**	**1:46-2:00**	**2:01-2:15**	**2:16-2:30**	**2:31-2:45**	**2:46-3:00**
	On-schedule												
	On-task												
Date		**0:00-0:15**	**0:16-0:30**	**0:31-0:45**	**0:46-1:00**	**1:01-1:15**	**1:16-1:30**	**1:31-1:45**	**1:46-2:00**	**2:01-2:15**	**2:16-2:30**	**2:31-2:45**	**2:46-3:00**
	On-schedule												
	On-task												

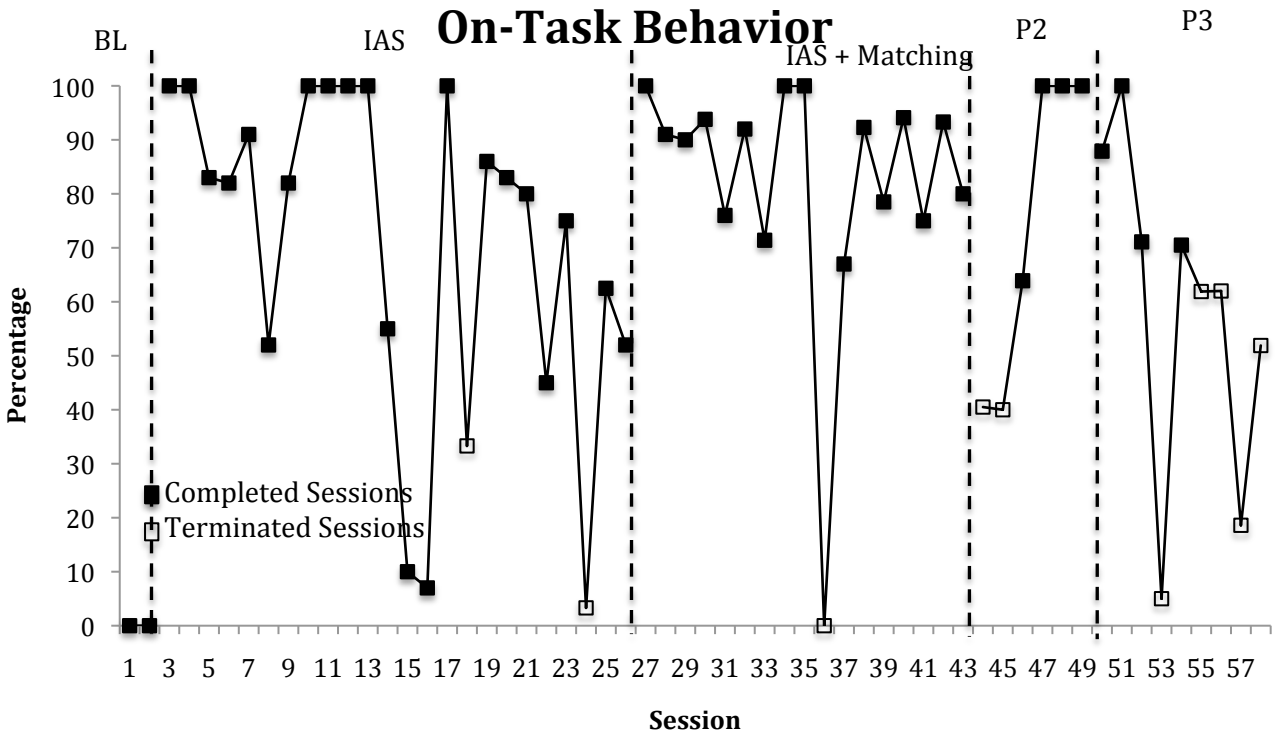
Appendix C1: Skill acquisition graph



Appendix C2: On-schedule behavior graph



Appendix C3: On-task behavior graph



Appendix D: Paired stimulus assessment

Stimulus Items	Overall rank (largest % first)
1	
2	
3	
4	
5	

Record item with corresponding item number			Circle item selected	
1	2		1 2 3 4 5 N	
5	4		1 2 3 4 5 N	
3	1		1 2 3 4 5 N	
2	4		1 2 3 4 5 N	
4	5		1 2 3 4 5 N	
3	2		1 2 3 4 5 N	
1	5		1 2 3 4 5 N	
3	4		1 2 3 4 5 N	
2	5		1 2 3 4 5 N	
1	4		1 2 3 4 5 N	
5	3		1 2 3 4 5 N	

Total Time Selected:

1	/	X100	%
2	/	X100	%
3	/	X100	%
4	/	X100	%
5	/	X100	%