Does Performance on the ABLA Test Predict Receptive Name Recognition in Children with Autism?

by

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Abstract

Researchers have hypothesized that for people with autism, the deficits in learning certain tasks may be a function of deficits in learning the prerequisite auditory, visual and motor discriminations. The Assessment of Basic Learning Abilities (ABLA) Test is a useful tool by which these discriminations are assessed. This study investigated whether performance on ABLA Level 6, an auditory-visual discrimination, predicts performance on a receptive language task with children with autism. Participants included five children who passed ABLA Level 6, four children who passed ABLA Level 4 but failed ABLA Level 6, and one child who passed ABLA Level 3 but failed ABLA Level 4. Standardized prompting and reinforcement procedures were used to attempt to teach each participant to respond correctly on ten name-recognition tasks. During a task pictures of two objects were placed in randomly alternated left-right positions, and a child was required to point to the picture that was named. Training on a task continued until either a pass or a fail criterion was met, whichever came first. Three of the Level 4 participants passed all ten of the picture name recognition tasks, and one passed eight of the ten tasks. The Level 3 participant passed two of the ten tasks. All five of the Level 6 participants passed all picture name recognition tasks. The difference in performance between children at ABLA Level 4 and Level 6 was not significant at the .05 level. These results suggest that children with autism at ABLA Level 4 or 6 are approximately equally capable of learning receptive name recognition tasks.

Does Performance on the ABLA Test Predict Receptive Name Recognition in Children with Autism?

Autistic disorder is a pervasive developmental disorder that is typically diagnosed between the ages of 18 to 36 months. Over the last twenty years, the prevalence of autism has increased. The current prevalence of autism is estimated to be as high as 1 in 166 in Canada, as opposed to the estimated prevalence 20 years ago of 1 in 2,500 (Standing Senate Committee on Social Affairs, Science and Technology, 2007). Children with autism have deficits in reciprocal social interactions, as well as verbal and nonverbal communication. They also show repetitive and stereotypic patterns of behaviour and restricted interests and activities. Communication impairment in individuals with autism is characterized by a delay or total lack of development of spoken language (with no alternative modes of communication), impairment in the ability to initiate or sustain a conversation, stereotyped and repetitive use of language, and lack of spontaneous make-believe or social imitative play appropriate to developmental level (American Psychiatric Association, 2000). Early intensive behavioural intervention has been shown to be effective in teaching the skills mentioned above (e.g., Lovaas, 1987; Matson & Smith, 2008; McEachin, Smith, & Lovaas, 1993). However, the effectiveness of treatment varies across individuals.

Researchers have hypothesized that for people with autism, the deficits in learning certain tasks may be a function of deficits in learning the prerequisite auditory, visual and motor discriminations. The Assessment of Basic Learning Abilities (ABLA) Test is a useful tool by which these discriminations are assessed. The ABLA Test is a dynamic assessment during which a tester, using standardized prompting and reinforcement

procedures, attempts to teach a testee to learn a simple imitation and five two-choice discriminations, called levels (Kerr, Meyerson, & Flora, 1977). The ABLA Test assesses the ease or difficulty with which a client can learn to reliably perform each level. These tasks were selected by Kerr et al. because one or more of them appeared to be required for a client to readily learn a large number of self-care, academic, prevocational, and vocational tasks in training programs. The ABLA Test has proven to be a valuable tool for teachers and other workers for selecting and sequencing training and work tasks appropriate for the learning ability of persons with developmental disabilities (Vause, Yu, & Martin, 2007). As will be discussed later, some research suggests that the ABLA Test is also useful for children with autism.

When testing Level 6, an auditory-visual discrimination, a participant is required to place a piece of foam into a red box or a yellow can when the tester says "red box" or "yellow can." The left/right position of the containers, as well as the words spoken by the tester, are randomly alternated from trial to trial. A correct response requires an appropriate discrimination between the two spoken requests and between the two visually presented alternatives. In this study I investigated whether performance on this auditory-visual discrimination predicts performance on receptive name recognition tasks for children with autism.

The ABLA Test

The ABLA Test consists of six levels: Level 1, a simple imitation; Level 2, a two-choice position discrimination; Level 3, a two-choice visual discrimination; Level 4, a two-choice visual quasi-identity match-to-sample discrimination; Level 5, a two-choice auditory discrimination; and Level 6, a two-choice auditory-visual combined

discrimination (see Table 1). The ABLA Test assesses an individual's ability to learn the six discriminations described in Table 1. Prior to testing a particular ABLA level, a demonstration, a guided trial, and an opportunity for an independent response at that level occurs. Following a correct independent response, testing of that level begins. Correct responses during testing are reinforced with praise and an edible, and incorrect responses are followed by an error correction procedure which consists of a demonstration, a guided trial, and an opportunity for an independent response. Testing of a level continues until the participant meets the pass criterion (eight consecutive correct responses), or meets the fail criterion of eight cumulative errors. Correct responses or errors on assisted trials (e.g., demonstration, guided trial) do not count towards the pass or fail criteria. The pass criterion of eight cumulative correct responses was chosen because the probability that eight consecutive correct responses will occur by chance in a two-choice discrimination, in which successive responses are independent, is quite low (i.e., approximately 0.03).

Research on the ABLA Test with Persons with Developmental Disabilities

Research has shown that the levels of the ABLA Test are hierarchical in terms of difficulty (Kerr et al., 1977; Martin, Yu, Quinn & Patterson, 1983; Wacker, Steil & Greenebaum, 1983). Failed ABLA levels are difficult to teach using standard prompting and reinforcement and may require hundreds of trials before the discrimination is learned, if it is learned at all (Meyerson, 1977; Stubbings & Martin, 1995, 1998; Witt & Wacker, 1981; Yu & Martin, 1986). If a task is chosen above a client's ability level, the client may not be able to learn the task even following several hundred trials of reinforced practice. If a task is chosen below a client's ABLA level, he or she is typically able to learn the task very quickly. Therefore, a client's ABLA level has been found to

Table 1

A Description of the ABLA Levels and the Types of Discriminations Required

ABLA Level	**Type of Discrimination**
1) Imitation: A tester puts an object into a container and asks the client to do likewise	A simple imitation
2) Position Discrimination: When a red box and a yellow can are presented in a fixed position, a client is required to consistently place a piece of beige foam in the container on the left when the tester says. "Put it in."	A simultaneous visual discrimination with position, color, shape and size as relevant cues
3) Visual Discrimination: When a red box and a yellow can are randomly presented in left-right positions, a client is required to consistently place a piece of beige foam in the yellow can when the tester says, "Put it in."	A simultaneous visual discrimination with color, shape and size as relevant cues
4) Match-to-Sample Discrimination: A client demonstrates level 4, if when allowed to view a yellow can and a red box in randomly alternating left-right positions, and is presented randomly with a yellow cylinder and a red cube, he/she consistently places a yellow cylinder in the yellow can and a red cube in the red box.	A conditional visual-visual identity discrimination with color, shape and size as relevant cues.
5) Auditory Discrimination: When presented with a yellow can and a red boxed (in fixed positions), a client is required to consistently place a piece of foam in the appropriate container when the tester randomly says, "red box: (in a high-pitched rapid fashion) or "yellow can."	A conditional auditory- auditory nonidentity discrimination with pitch, pronunciation, and duration as relevant auditory cues and with position, color, shape and size as relevant visual cues
6) Auditory-Visual Discrimination: The same as Level 5, except that the right-left positions of the containers is randomly alternated.	A conditional auditory-visual nonidentity discrimination, with the same auditory cues as level 5, and with only color, shape and size as relevant visual cues.

Note: From "Overview of Research on the Assessment of Basic Learning Abilities Test," by Martin, G. L., & Yu, D. C. T. 2000. *Journal on Developmental Disabilities, 7,* 14-15. Reprinted with Permission.

be predictive of the type of tasks that he or she is likely to readily learn, for example simple imitation tasks, or match to sample tasks.

Martin, Thorsteinsson, Yu, Martin, and Vause (2008) reviewed studies that examined performance of participants with developmental disabilities (DD) on the ABLA Test in order to predict (a) performance on a variety of simple imitations and two-choice discriminations, (b) performance on three-choice and four-choice discriminations, (c) the relative efficacy of three presentation modes for assessing preferences, (d) compliance of adults with DD and children with and without DD, and (e) participants' ability to learn to respond to the spoken names of pictures of common objects. These studies demonstrated that the predictive validity of the ABLA Test has been very high. Therefore, tasks can be analyzed according to the discriminations necessary for their completion. Matching tasks with a client's current ABLA level is important for both clients and staff in that training tasks matched to a client's ABLA level results in fewer aberrant behaviors than tasks that are mismatched to that client's ABLA level (DeWiele & Martin, 1996; Vause et al., 2000).

Finally, the ABLA test has been shown to be a better indicator of a client's ability level than experienced staff assessment. Stubbings and Martin (1998) asked staff to judge which tasks a particular client would easily master. These judgments were compared thereafter with predictions based on a client's ABLA level. Results indicated that even though each staff member had been working with the client for at least 8 months, the ABLA Test performance was significantly more accurate in predicting which tasks clients would learn quickly. These results were replicated by Thorsteinsson et al. (2007).

Research on the ABLA Test and Language

Research has demonstrated that performance on the ABLA Test correlates with language assessments. A study by Casey and Kerr (1977) indicated that 42 typically developing children who were able to pass the two auditory discriminations (Levels 5 and 6) of the ABLA Test had significantly higher scores on mean length of utterance, as well as vocabulary sample, than age-matched children who failed those two auditory tasks. Barker-Collo, Jamieson, and Boo (1995) conducted a study with individuals with developmental disabilities, during which they found that ABLA Test performance was significantly and positively correlated with the receptive and expressive communication subscale scores on the Vineland Adaptive Behavioral Scales (Sparrow, Balla, & Cicchetti, 1984) and with the Communication Status Survey (Barker-Collo, 1996). In another study, Marion et al. (2003) assessed persons with developmental disabilities on the ABLA and on tests of echoics, tacts, and mands. Only 2% of the verbal assessments were passed by participants who failed Level 6; however 36% of the verbal assessments were passed by the individuals who passed ABLA Level 6. Verbeke, G. L. Martin, Yu, and T. L. Martin (2007) examined whether performance on ABLA Level 6 might predict the ability of persons with a severe developmental disability to recognize the spoken names of pictures of common objects. The participants were divided into two groups: A visual group (passed Levels 3 and 4 and failed Levels 5 and 6), and an auditory group (passed Levels 5 and 6). They found that four of the five participants in the visual group failed all of the name recognition tasks, and the fifth participant passed all the name recognition tasks. All five participants in the auditory group passed all of the name

recognition tasks. Therefore, ABLA Level 6 performance predicted receptive name recognition performance.

Research on the ABLA Test with Persons with Autism

There is a limited amount of research regarding individuals with autism and the ABLA Test. One study conducted by Ward and Yu (2000) analyzed the auditory discrimination tasks used in the ABLA Test, and identified 4 component skills that may be prerequisites for speech discriminations: delayed visual-visual identity matching; visual-visual nonidentity matching; auditory-visual matching involving object sounds; and auditory-visual matching involving speech and object sounds. Of the 32 children (aged 3-9 yrs; 20 with autistic spectrum disorder) tested on the ABLA , all but 1 child displayed pass-fail patterns on the ABLA Test consistent with that reported in previous research. Of 17 children (13 with autistic spectrum disorder) tested on the 4 component skills, all but 1 child showed the 4 component skills to be hierarchically ordered between ABLA Level 4 visual matching and Level 5 auditory discrimination. These results demonstrate that children with autistic spectrum disorders follow the same progression as typical children and children with developmental disabilities on the ABLA Test. As well, Ward and Yu identified that individuals with autistic spectrum disorders who passed ABLA Levels 5 and 6 communicated using two or more words, while individuals who failed Levels 5 and 6 communicated using simple words or signs. In another study, Schwartzman et al. (2009) assessed the predictive validity of the ABLA Test with 16 children with autism spectrum disorder, eight who performed at Level 4 and eight who performed at Level 6. Twenty criterion tasks were selected, and predictions on whether a child would learn each of the criterion tasks were based on ABLA Test

performance and by parents. Results demonstrated that 94% of predictions based on ABLA performance were confirmed, and the ABLA Test was significantly more accurate for predicting a child's performance than were the parents. As the majority of research on the ABLA test has been with persons with developmental disabilities, the current study focused on the use of this learning assessment tool with children with autism.

Statement of Problem

The purpose of this study was to investigate whether performance on Level 6 predicts performance on receptive name recognition tasks for children with autism. Five participants who passed ABLA Levels 3 or 4 but failed Level 6 and five participants who passed Level 6 were assessed to determine their ability to point to pictures of familiar, as well as unfamiliar objects after hearing their names. It was predicted that those participants who were classified at ABLA Level 6 would pass the receptive name recognition tasks whereas participants classified at ABLA Level 4 would not pass the receptive name recognition tasks. As well, it was predicted that across the two groups of participants, better performance would be demonstrated with the pictures of familiar objects.

Method

Participants and Setting

Ten children between four and twelve years of age diagnosed with an autism spectrum disorder were recruited from the St. Amant ABA Preschool and School-Age Programs for Children with Autism, as well as the ABA Program's wait lists. Four of the participants passed the ABLA (Kerr et al., 1977) visual discrimination levels (Levels 3 and 4) and failed the ABLA auditory discrimination levels (Levels 5 and 6). One

participant passed the ABLA visual discrimination (Level 3) but failed the match-to-sample discrimination (Level 4). Four of the other five participants passed Level 6 but failed the Auditory-Auditory Identity-Matching (AAIM) assessment. Participant 4 passed Level 6 but was not tested on the AAIM. Consent for participants to take part in this study was obtained from the participant's legal guardians.

Sessions were conducted in the participants' homes. Participants sat at a table directly across from the experimenter. The first language of participants 9 and 10 was French, and they were taught in French. The first language of all the other participants was English, and they were taught in English. When inter-observer reliability and procedural reliability assessments were conducted (as described later), an observer sat next to the experimenter.

Materials

The ABLA Test materials included a large yellow can (approximately 15 cm in diameter and 17 cm in height), a red box with black diagonal stripes (approximately 14 cm x 14 cm x 10 cm), a white colored irregularly shaped piece of foam (approximately 5 cm in diameter), a yellow wooden cylinder (approximately 9 cm long and 4 cm in diameter), and a red wooden cube with black diagonal stripes (approximately 5 cm x 5 cm x 5 cm).

The pictures used during the receptive naming assessment were 20.32 cm x 27.94 cm photographs of 10 familiar and 10 unfamiliar objects. Family members were asked to select 10 items whose spoken names were rarely encountered by the participants (unfamiliar) and 10 items whose spoken names were encountered once a day or more by the participants (familiar) (see Appendix A). For instance, a participant may hear "plate,"

"cup," "ball," "chair," and "table" seven or more times a day, and rarely hear "car," "hair band," "tape," or "cloth." The selection of item names provided to each family was obtained from Sundberg and Partington's First 240 Words List (1998). Each item was then photographed on a white, solid background, and printed in color on 20 cm by 28 cm paper and laminated.

Procedure

Prior to testing, family members for each participant identified six preferred edibles and/or activities (for participants with diet restrictions or uninterested in food), and these were used as reinforcers. At the start of each session, participants were given a choice of two edibles or activities (chosen from the six). The choice of two reinforcers varied across sessions, and this procedure was replicated across all the participants. The reinforcer chosen at the beginning of a session was used during that session.

I randomly paired the ten familiar photos into five predictive task pairs, and the ten unfamiliar photos into another five predictive task pairs for each participant (see Appendix B). The testing procedure for each pair of photographs followed the ABLA procedures for testing Level 6. I randomly selected a task pair from one of the groups, and placed this pair on the table in front of a participant. The participant was then given a demonstration, a guided trial, and the opportunity for an independent response with each of the two pictures. A demonstration consisted of me stating the name of one of the pictures. I then pointed to the correct photo. Following the demonstration a guided trial was given. Again, I stated the name of one of the photos, guided the participant's hand to point to the correct picture, and then praised the child. Finally, the participant was given an opportunity for an independent response, during which the participant had to point to

the correct photo named by me. If the participant responded correctly, the chosen reinforcer was given. If the response was incorrect, another demonstration, guided trial and independent response would occur until there had been a successful independent response. Following a correct independent response to each picture, testing of that pair would begin. During a test trial, I would state the name of one of the photos of the pair. For instance, if the pair of pictures consisted of a knife and a fork, I would say either "knife" or "fork" and the correct independent response would be for the child to point to the named picture. The location of the pictures on the table (e.g., left or right side) and the words spoken (e.g., "knife" or "fork") were randomly alternated across trials (see Appendix C).

Following a correct response a participant was given an edible and praise. After an incorrect response I would look away for a few seconds, and then proceed with a demonstration, a guided trial, and an opportunity for an independent response. If the independent response was correct, it did not count towards the pass criterion. However, if the independent response was incorrect, it counted towards the fail criterion (as an additional incorrect response).

Testing continued until the participant met the pass criterion of eight consecutive correct responses or the fail criterion of eight cumulative errors. The predictive task pairs were presented in random order, however testing for a particular task pair continued until the pass or fail criterion was met for that task pair.

Reliability Assessments

Inter-observer reliability (IOR). IOR checks were conducted for approximately 85% of the sessions. During an IOR check, an observer and I independently recorded the

participant's response on each trial. A trial was defined as an agreement if both of us recorded the same response; otherwise, the trial was defined as a disagreement. Percent agreement per session was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100% (Martin & Pear, 2007). IOR scores ranged from 92-100% across all participants with a mean of 96%.

Procedural Integrity (PI) and Reliability (PR). PI and PR assessments were calculated for approximately 85% of the sessions. During these sessions, an observer and I independently monitored all parts of the procedure to ensure that they were carried out correctly, using a checklist of steps to be followed (see Appendix D). A step was scored as delivered correctly if there were no errors made by me. The percentage of trials delivered correctly per session as recorded by the observer provided a PI score. The PR score was calculated in the same manner as the IOR score. Both PI and PR scores were 100% across all participants.

Results

Three of the four Level 4 participants passed all of the name recognition tasks, and one Level 4 participant passed eight tasks and failed two unfamiliar tasks. The Level 3 participant passed two familiar tasks and failed eight tasks. The performance of the Level 6 participants was consistent across all tasks, with all five of the participants passing all of the tasks (see Table 2). A two-tailed independent samples *t*-test was used to evaluate the difference between the number of recognition tasks passed by the ABLA Level 4 (and the Level 3) participants and the number of recognition tasks passed by the ABLA Level 6 participants. Results from a two-tailed *t*-test demonstrated that there was not a significant difference between the passing of ABLA Levels 4 and 6, and

performance on receptive name recognition tasks ($t[8] = 1.29$, $p > .05$). Finally, a two-tailed *t*-test was used to examine whether there was a difference in performance with familiar versus unfamiliar pictures of objects. Results revealed that there was not a significant difference in performance on receptive name recognition tasks between familiar and unfamiliar pictures of objects ($t[8] = 2.30$, $p > .05$).

Discussion

This study examined the predictive validity of the ABLA Test for performance on name recognition tasks with children with autism. The procedure used replicated Verbeke et al., 2007, however with children with autism. Also, ten items whose spoken names were never or rarely encountered by the participants, and ten items whose spoken names were encountered five or more times a day by the participants were selected for the predictive task pairs, to determine if familiarity of names of objects was a factor when testing the participant's performance on the receptive name recognition tasks.

Based on Verbeke et al.'s findings, it was hypothesized that the ability to pass ABLA Level 6, an auditory-visual discrimination, would be a good predictor of receptive name recognition. In other words, children at ABLA Level 6 would pass significantly more name recognition tasks than children at ABLA Level 3 or Level 4. In addition, I predicted that children would pass significantly more name recognition tasks with familiar names than unfamiliar names. However, ABLA Level 6 was not a better predictor of receptive name recognition than Level 4 for children with autism. Three of four participants at ABLA Level 4 also passed all the task pairs, and one Level 4 participant passed eight of the ten tasks. Therefore, children with autism who have passed

Table 2

The Pass (P)/Fail (F) Performance of Participants on the Picture Name Recognition Tasks

P01*	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P10**
Level 6	Level 6	Level 6	Level 6	Level 6	Level 4	Level 4	Level 4	Level 4	Level 3
Familiar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar
P	P	P	P	P	P	P	P	P	**F**
P	P	P	P	P	P	P	P	P	P
P	P	P	P	P	P	P	P	P	**F**
P	P	P	P	P	P	P	P	P	**F**
P	P	P	P	P	P	P	P	P	P
Unfamiliar	Unfamiliar	Unfamiliar	Unfamiliar	Unfamiliar	Unfamiliar	Unfamiliar	Unfamiliar	Unfamiliar	Unfamiliar
P	P	P	P	P	P	P	P	P	**F**
P	P	P	P	P	**F**	P	P	P	**F**
P	P	P	P	P	**F**	P	P	P	**F**
P	P	P	P	P	P	P	P	P	**F**
P	P	P	P	P	P	P	P	P	**F**
100%	100%	100%	100%	100%	80%	100%	100%	100%	20%

* P01 refers to Participant 1.

ABLA Levels 4 or 6 are likely to pass a receptive picture name recognition task. Finally, children at ABLA Level 4 and Level 6 passed all familiar and unfamiliar tasks, with the exception of the Level 4 participant (mentioned above) who failed two unfamiliar tasks. In other words, children's familiarity with the names of objects was not a significant factor when testing their performance.

There are a few possible reasons why the results found are different from Verbeke et al.'s study. First, the diagnoses for severe mental retardation and autism are different. Second, Verbeke et al.'s participants were adults as opposed to children, and the ability to learn language tasks might vary according to age. Third, all but two of the ten participants are currently in ABA language training programs, in which they are practicing and learning various language tasks every day.

One participant at ABLA Level 3 passed two familiar tasks, and failed the remaining tasks. This child was on the borderline between ABLA Levels 3 and 4, and almost passed ABLA Level 4. As ABLA Levels 3 and 4 are both visual discrimination levels, this child was recruited as a participant in the ABLA Level 4 group. However, results clearly demonstrate that this child's receptive name recognition skills did not match the skills of the ABLA Level 4 participants. Further discussions with staff that work with this child revealed that he has not been able to master receptive labeling of objects in his programs. Therefore, it may be that these picture name recognition tasks required prerequisite receptive labeling skills that the child lacked. Additionally, as he failed almost all familiar tasks, and all of the unfamiliar tasks, familiarity of the names of objects did not seem to be a relevant factor in his performance.

A limitation of the present study is that only one ABLA Level 3 participant was tested on the picture name recognition tasks. Given the results mentioned above, testing of additional Level 3 participants would provide more information regarding differences in performance between children at ABLA Level 3 versus Level 4.

Another limitation of the study is that the participants were not matched on a language scale. For those who are clients in the ABA Program, language scores were obtained (see Appendix E). Different language assessments were used (according to their age), and therefore their scores varied as well. Overall, scores ranged from no score (the assessment could not be administered) to a score that meets average language performance. Further research should take this into consideration and attempt to match participants on a language scale, to control for this factor and therefore improve interpretation and validity of results.

As previously mentioned, the procedure used for the task pairs followed the procedure used for ABLA Level 6, where an individual must make a discrimination between two words that are spoken by the researcher, and two objects in front of him/her. The results of this study indicate that children with autism at ABLA Level 4 are capable of making this auditory-visual discrimination. Performance of the Level 3 participant demonstrates that without the ability to perform at least at ABLA Level 4, success at tasks involving receptive language may be unlikely. Further research is needed to assess the generality of the results with other Level 3 participants.

These results have important implications for staff teaching communication skills to children with autism. If staff can correctly identify their clients' ABLA levels, they

will be able to teach the most appropriate tasks, and in turn the children will learn more effectively and in fewer trials.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Barker-Collo, S., Jamieson, J., & Boo, S. (1995). Assessment of Basic Learning Abilities Test: Prediction of communication ability in persons with developmental disabilities. *International Journal of Practical Approaches to Disability, 19,* 23-28.

Barker-Collo, S. (1996). Live-to-live auditory matching: An extension of the Assessment of Basic Learning Abilities test? *Developmental Disabilities Bulletin, 23,* 72-81.

Casey, L., & Kerr, N. (1977). Auditory-visual discrimination and language prediction [Monograph]. *Rehabilitation Psychology, 24,* 137-155.

DeWiele, L., & Martin, G. L. (1996). Can the ABLA test help staff match training tasks to the abilities of developmentally disabled trainees? *International Journal of Practical Approaches to Disability, 20,* 7-11.

Kerr, N., Meyerson, L., & Flora, J.A. (1977). The measurement of motor, visual, and auditory discrimination skills [Monograph]. *Rehabilitation Psychology, 24,* 95-112.

Lovaas, O. I. (1987). Behavioral treatment and normal educational and intellectual functioning in young autistic children. *Journal of Consulting and Clinical Psychology, 55,* 3-9.

Marion, C., Vause, T., Harapiak, S., Martin, G. L., Sakko, G., & Walters, K. (2003). The hierarchical relationship between several visual and auditory discriminations

and three verbal operants among individuals with developmental disabilities. *The Analysis of Verbal Behavior, 19*, 91-105.

Martin, G. L., & Pear, J. J. (2007). *Behavior Modification: What it is and how to do it.* (8th ed.). Upper Saddle River, NJ: Prentice-Hall

Martin, G. L., Thorsteinsson, J. R., Yu, C. T., Martin, T. L., & Vause, T. (2008). The assessment of basic learning abilities test for predicting learning of persons with developmental disabilities. *Behavior Modification, 32,* 228-247.

Martin, G. L., Yu, D., Quinn, G., & Patterson, S. (1983). Measurement and training of AVC discrimination skills: Independent confirmation and extension. *Rehabilitation Psychology, 28,* 231-237.

Matson, J. L., & Smith, K. R. M. (2008). Current status of intensive behavioral interventions for young children with autism and PDD-NOS. *Resarch in Autism Spectrum Disorder, 2,* 60-74.

McEachin, J. J., Smith, T., & Lovaas, O. I. (1993). Long-term outcome for children with autism who received early intensive behavioral treatment. *American Journal on Mental Retardation, 97,* 359-372.

Meyerson, L. (1977). AVC behavior and attempts to modify it [Monograph]. *Rehabilitation Psychology, 24,* 119-122.

Schwartzman, L. J. V., Vause, T., Martin, G. L., Yu, C. T., Campbell, L., Danbrook, M., et al. (2009). Predicting the learning ability of children with autism: The assessment of basic learning abilities test versus parents' predictions. *Education and Training on Developmental Disabilities, 44*, 271-279.

Sparrow, S., Balla, D., & Cicchetti, D. (1984). *Vineland, Adaptive Behavioral Scales.* Circle Pines, MN: American Guidance Service.

Standing Senate Committee on Social Affairs, Science and Technology. (2007). *Pay now or pay later: Autism families in crisis*. Ottawa, Canada: Author.

Stubbings, V., & Martin, G. L. (1998). Matching training tasks to abilities of people with mental retardation: A learning test versus experienced staff. *American Journal on Mental Retardation, 102,* 473-484.

Stubbings, V., & Martin, G. L. (1995). The ABLA test for predicting performance of developmentally disabled persons on prevocational training tasks. *International Journal of Practical Approaches to Disability, 19,* 12-17.

Sundberg, M. L., & Partington, J. W. (1998). *Teaching language to children with autism or other developmental disabilities*. Pleasant Hill, CA: Behavior Analysts.

Thorsteinsson, J. R., Martin, G. L., Yu, C. T., Spevack, S., Martin, T. L., & Lee, M. S. (2007). Predicting learning ability of people with intellectual disabilities: Assessment of basic learning abilities test versus caregivers' predictions. *American Journal on Mental Retardation, 112,* 130-139.

Vause, T., Martin, G. L., Cornick, A., Harapiak, S., Chong, I., Yu, D. C. T., et al. (2000). Training task assignments and aberrant behavior of persons with developmental disabilities. *Journal of Developmental Disabilities, 7,* 37-53.

Vause, T., Yu, C. T., & Martin, G. L. (2007). The assessment of basic learning abilities test for persons with intellectual disability: A valuable clinical tool. *Journal of Applied Research in Intellectual Disabilities, 20,* 483-489.

Verbeke, A. K., Martin, G. L., Yu, C. T., & Martin, T. L. (2007). Does ABLA test performance on the ABLA test predict picture receptive name recognition with persons with severe developmental disabilities? *The Analysis of Verbal Behavior, 23,* 35-39.

Wacker, D. P., Steil, D. A., & Greenbaum, F. T. (1983). Assessment of discrimination skills of multiple handicapped preschoolers and prediction of classroom task performance. *Journal of the Association for the Severely Handicapped, 8,* 65-78.

Ward, R., & Yu, D. (2000). Bridging the gap between visual and auditory discrimination learning in children with autism and severe developmental disabilities. *Journal on Developmental Disabilities, 7*, 142-155.

Witt, J. C., & Wacker, D. P. (1981). Teaching children to respond to auditory directives. An evolution of two procedures. *Behavior Research of Severe Developmental Disabilities, 2,* 175-189.

Yu, D., & Martin, G. L. (1986). Comparison of two procedures to teach visual discriminations to severely mentally handicapped persons. *Journal of Practical Approaches to Developmental Handicap, 10,* 7-12.

Appendix A

Item Rating Questionnaire

How often does your child hear the name of these items?

Familiar: Hears the name of the item approximately *once a day* or more
Unfamiliar: Hears the name of the item approximately *once a week* or less
Neither/ Don't know

Please check in the appropriate column

Items	**Familiar** Approx. Once a day or more	**Unfamiliar** Approx. Once a week or less	**Neither/ Don't know**
e.g., Table	√		
1. Juice			
2. Milk			
3. Sandwich			
4. Candy			
5. Cookies			
6. Computer			
7. Playdough			
8. Umbrella			
9. Shirt			
10. Shoes			
11. Socks			

Items	**Familiar** Approx. Once a day or more	**Unfamiliar** Approx. Once a week or less	**Neither/ Don't know**
e.g., Table	√		
12. Dog			
13. Cat			
14. Bed			
15. Chair			
16. Mouth			
17. Nose			
18. Spoon			
19. Fork			
20. Toilet/Potty			
21. TV			
22. Hairbrush			
23. Keys			
24. Candle			
25. Pencil			

Appendix B

Participants' Task Pairs

Participant	ABLA Level	Familiar Task Pairs	Unfamiliar Task Pairs
1	6	Computer-Bananas, Mouth-Socks, Candy-Pencil, Candle-Sandwich, Cookies-Play dough	Fire truck-Umbrella, Sink-Broom, Horn-Watch, Pudding-Ankle, Hairbrush-Washcloth
2	6	Sandwich-Cookies, Fork-Keys, Cat-Juice, Hairbrush-Computer, Mouth-Candy	Shirt-Spoon, Toilet-Pencil, Pudding-Candle, Sink-TV, Play dough-Umbrella
3	6	Fire truck-Hairbrush, Juice-Shirt, Umbrella-Computer, Play dough-Cookies, Socks-Candy	Minnie Mouse-Washcloth, Mickie Mouse-Donald Duck, Clown-Ankle, Pudding-Bagels, Drum-Comb
4	6	Dog-Fork, Potty-Hairbrush, Spoon-Cat, Candy-TV, Cookies-Sandwich	Comb-Sink, Play dough-Candle, Pencil-Ankle, Broom-Shirt, Pudding-Washcloth
5	6	Pencil-Cookies, Toilet-Candle, Computer-Umbrella, Dog-Juice, Play dough-Candy	Clown-Ankle, Pudding-Squirrel, Button-Elbow, Keys-Horn, Fire truck-Donald Duck

6	4	Pencil-Hairbrush, TV-Candy, Play dough-Cookies, Fork-Juice, Dog-Toilet	Sandwich-Ladder, Drum-Candle, Big Bird-Chicken, Horn-Leaf, Button-Squirrel
7	4	TV-Computer, Toilet-Keys, Dog-Fork, Hairbrush-Candy, Play dough-Cookies	Pencil-Washcloth, Paper-Candle, Book-Clown, Broom-Ankle, Umbrella-Pudding
8	4	Cookies-Play dough, Keys-Fork, Umbrella-Computer, Socks-Dog, Hairbrush-Pencil	Sandwich-Candle, Horn-Shirt, Broom-Ankle, Pudding-Candy, Washcloth-Squirrel
9	4	*Sandwich-Bonbon, Télé-Bouton, Fourchette-Chemise, Chandelle-Toilette, Ordinateur-Parapluie	Big Bird-Épaule, Clown-Lavette, Minnie Mouse-Klaxon, Mickey Mouse-Cheville, Pudding-Évier
10	3	*Jus-Bas, Biscuit-Télé, Nez-Chien, Chemise-Toilette, Pate à Modeler-Ordinateur	Brosse-Clefs, Pudding-Chandelle, Sandwich-Crayon, Clown-Balai, Écureuil-Parapluie

*Participant 9 and 10 were French and taught in French. Words are presented in French because they were matched on number of syllables.

Appendix C

Object Name Recognition

Date: Tester:
Participant: IOR:
K = “Knife” Task:
F = “Fork”

TESTER:	**F**	**K**	**K**	**F**	**K**	**F**	**K**	**K**	**F**	**K**
LEFT:	F	F	K	F	F	K	K	F	K	K
RIGHT:	K	K	F	K	K	F	F	K	F	F
	1	2	3	4	5	6	7	8	9	10
	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-

TESTER:	**K**	**F**	**F**	**F**	**K**	**F**	**K**	**F**	**F**	**F**
LEFT:	K	F	K	F	K	K	K	F	K	K
RIGHT:	F	K	F	K	F	F	F	K	F	F
	11	12	13	14	15	16	17	18	19	20
	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-

Tester: The cue given by the experimenter
Left: The position of one picture in front of the participant
Right: The position of the other picture in front of the participant

Appendix D

Procedural Reliability

Date: Participant: Experimenter: PR: Reinforcer:

	Demo 1	Demo2	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6
New Session:								
Demonstration								
Guided Trial								
Independent Response								
Steps of task:								
Photos in correct location								
correct verbal cue from experimenter								
prompt if no response in 5s								
everyone praises correct response								
experimenter gives reinforcer								
For Errors:								
Look away for 2 s								
Demonstration								
Guided Trial								
Independent Response								

	Trial 7	Trial 8	Trial 9	Trial 10	Trial 11	Trial 12	Trial 13	Trial 14
Steps of task:								
Photos in correct location								
Correct verbal cue from experimenter								
Prompt if no response in 5s								
Everyone praises correct response								
Experimenter gives reinforcer								
Error Correction:								
Look away for 2 s								
Demonstration								
Guided Trial								
Independent Response								

Appendix E

Language Scores

Participant	ABLA Level	Assessment	Language Score
1	6	PLS- total language standard score (mean=100)	65/150
2	6	CELF- concepts and following directions & recalling sentences scaled scores (mean=10)	1/19 & 1/19
3*	6		
4	6	PLS- total language standard score (mean=100)	59/150
5	6	PLS- total language standard score (mean=100)	100/150
6	4	CELF & WNV	Could not be administered
7	4	PLS- total language standard score (mean=100)	57/150
8*	4		
9	4	PLS- total language standard score (mean=100)	54/150
10	3	EVIP (Peabody)	Could not be administered

*Participants 3 and 8 are not clients in the ABA Program.