

# The Miller Umwelt Assessment Scale: A Tool for Planning Interventions for Children on the Autism Spectrum

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## Abstract

The Miller Umwelt Assessment Scale is a useful tool for obtaining information about the developmental capacities of children on the autism spectrum. The assessment, made up of 19 tasks in the areas of: body organization, contact with surroundings, expressive and receptive communication, representation, and social-emotional development, has been used with much success over the past 40 years. While many assessments are difficult to administer to children on the autism spectrum, the simplicity of the MUAS reveals key strengths and challenges for both low and high functioning children on the spectrum. The results guide parents and clinicians in providing a curriculum and/or home program that moves children up the developmental ladder.

**Keywords:** Autism spectrum disorder; Neurological dysfunction; Cognitive-developmental system

## Introduction

Autism Spectrum Disorder (ASD) is a lifelong disability typified by challenges with communication and reciprocal social interaction along with restricted repetitive patterns of interests and behaviors. The impact of ASD can range from mild to severe, and may improve or change across a person's lifespan. Many individuals with ASD commonly suffer from a number of comorbid problems, including mental handicap, language and learning disabilities, seizures, and neurological dysfunction [1]. Additionally, they are at extremely high risk for comorbid psychiatric disturbances, including anxiety and mood disorders, Attention Deficit Hyperactivity Disorder, and tics [1]. A review of global prevalence estimates of autism spectrum disorders found a median of 62 cases per 10,000 people [2]. The number of children known to have autism has increased dramatically since the 1980's, at least partly due to changes in diagnostic practice, although it is still unclear as to whether prevalence has actually increased.

Most schools boards in the province of Ontario require assessments and evaluations documenting the full range of a child's capacities in order to provide funding for specialized services and support. Typically, standardized measures of intellectual ability and academic achievement are necessary, however using such tests with children on the autism spectrum is controversial because they may not yield accurate results or provide useful information for treatment or educational planning since they are heavily reliant on verbal ability, auditory processing, and the ability to follow sequential directions [3]. These areas are of particular difficulty for children with autism spectrum disorder. Additionally, the testing environment can be problematic (e.g., unfamiliar room and examiner, break in typical routine), and standardized procedures may be near impossible, especially if the child possesses behaviors that interfere with the testing process.

One of the purposes of assessment is to measure a child's cognitive and academic strengths and weaknesses, and/or emotional health. Often, this type of assessment provides the best information for intervention and curriculum planning.

Considering the heterogeneity of characteristics associated with autism spectrum disorders, it is not surprising that questions often arise about how best to evaluate children with this diagnosis. Thorough assessment depends on information gathered through a variety of methods and relies on the collaboration of many individuals including, professionals, family members, and educators. There is not a single test that when used alone can guide effective intervention planning [3]

An assessment should also provide parents and professionals working with the child on the autism spectrum, a range of suggestions and next steps for programming and intervention.

The Miller Umwelt Assessment Scale (MUAS) has been used over the past 40 years with children on the autism spectrum or with those exhibiting a wide array of communication challenges. In order to fully understand the functionality of the scale, it is important to review the theory and clinical work that preceded the development of this tool. The late Dr. Arnold Miller, pioneer of the Miller Method™ and of the MUAS, grounded his work in cognitive-developmental systems theory which assumes that all children are born with the nature to explore, communicate, cope, and make contact with others and their environment [4]. When this natural curiosity is interrupted (i.e. for any number of reasons such as: head injury, anoxia, structural anomalies in the brain), children may become frozen at an earlier stage of development or may approach more advanced stage of development in an incomplete manner. Cognitive-developmental systems theory suggests that children with autism spectrum disorder (ASD) are unable to react to and influence their world. They appear to lack a clear sense of their body and self in relation to the world. As a result, some stimuli may cause them to develop scattered or stereotypic behavioral responses that prevent them from establishing functional relationships. In addition, the theory recognizes that these atypical

sensory responses interfere with normal exploration of the environment.

The MUAS is a crucial component of the overall Miller Method approach because it guides clinicians, therapists, teachers and parents in the development of appropriate interventions in five key areas: Body Organization, Contact with Surroundings, Communication (Expressive and Receptive), Representation, and Social-Emotional Development. Many assessments administered to children with autism spectrum disorder typically require the child to remain seated for long periods of time. The MUAS offers a child-sensitive, holistic approach to assessment that honors the fluctuations in the child's hyper/hypo arousal levels.

### **The Miller Method: A Unique Intervention Model Grounded in Cognitive Development Systems Theory**

Although the Miller Method was introduced to the autism research and clinical communities in the 1960's, it has not gained international recognition like some of the other evidence-based treatment approaches used in the field of ASD's, partly due to the fact that the method has infiltrated educational and clinical arenas and has remained largely unexplored in research and academia. The method, although firmly rooted in several theoretical orientations (Piaget, Vygostsky, Werner), and applied in various contexts (clinics, schools, treatment centers), needs to be substantiated by rigorous clinical trials [5] emphasizes the importance of understanding cognitive-developmental systems theory in order to develop programs and activities for a child's current level functioning and capability, with the aim of expanding these functional capacities. In this theory, 'systems' can be defined as organized sequences of behavior that exist when a child can produce a particular activity without assistance or support (i.e. such as locating a crayon and a piece of paper, and then proceeding to draw a picture). In addition, some children with ASD have a good variety of systems in their repertoire; however have difficulty including other people into their activities. As a result, the theory proposes that the type of interventions and remedial techniques that could help children with ASD should relate to people and objects in the environment in order for the children to reach various developmental milestones [6]. The theory also maintains that every child, regardless of how withdrawn or disorganized he/she appears to be, is trying to find a way to cope with his/her world [7].

Infants develop as 'stimulus-dominated organisms' with a range of part systems (i.e. the range of reflexes and rhythmical stereotypies that the child is given hereditarily, such as sucking, grasping, rocking, waving arms, etc.) to children who are competent in representing reality to themselves and others by going through a series of liberations exerted by the pull of their immediate environments [4]. There are three qualitatively distinct stages (sign, symbolic sign and symbolic), which occur during early development and reflect an element of continuity essential to later learning. Each stage is a prerequisite to the next and each also actively contributes to the attainment of later stages [4]. The sign-stage (0-18 months) is particularly vital, since it is during this stage that the abnormalities in development begin to become evident in children with ASD's.

### **Transforming a Theory into Therapy**

Cognitive Developmental Systems Therapy (CDST), is a structured, child sensitive, developmental approach for children with ASD that involves the collaboration of teachers, therapists and parents in

helping a child with ASD integrate sensory experience with body function. In CDST, the child is led into social and communicative exchanges and into activities to help represent their world, using step by step, whole body signals, gestures, pictures, signs, symbolic play, speech, reading, and writing [8]. The goals of CDST are to: a) assess the adaptive relevance of a child's behavior and to transform it into functional activity; b) expand and guide the child from closed ways of being into social and communicative partners; and to, c) work with parents in guiding their children along in their eventual reading, writing, symbolic play, understanding of number concepts and meaningful inclusion in their respective school communities (Miller & Miller, 1996). The goals in CDST are attained by expanding and transforming the child's limited reality systems and by introducing new systems through spheric activity. With the introduction of new systems, a child learns to permit the stretching of his/her reality systems or to accept new ones via repetitive spheres of activity. In addition, he/she learns to make the transition from on activity to the next without distress.

Spheres are therapist-introduced activities presented in a repetitive manner in order to establish them as ritualized systems for the child. The spheres parallel typical development by introducing and guiding those strategies, which occur spontaneously in typically developing infants. The spheres are typically introduced by hand-over-hand guidance and require the child to repetitively perform a certain activity while the therapist uses the gestural signs and words directly related to the activity [4]. The activity may be paced rapidly to enable the child to connect one part of it with another so that they can eventually own the system. Spheres are designed to meet each child's developmental needs and are also developed to establish social interactions for those children who have difficulty interacting with others. Initially, the spheres are completely controlled by the therapist, but through selective interruptions of the activities, the child learns to mutually participate in the spheres.

CDST is made up of mini-spheres, multi-spheres, and integrative spheres. Mini-spheres involve the repetitive guiding of a child's actions around a particular object or event, such as putting cups on hooks. The goal is to expand the position, location, or people involved in this activity. When the activity is interrupted and a child seeks to complete it with all possible expansions, the child has internalized it as a 'system.'

Integrative spheres are the accumulation of a variety of mini-spheres. For example, the integrative system of picking up an object with one hand, opening a cupboard door with another hand, and putting an object inside a cupboard, builds on three previously developed mini-spheres (picking up/dropping objects, opening/closing door, and putting in/taking out objects). Through these integrative spheres, a child with ASD learns to cope with familiar sequences that are naturally linked together such as: climbing stairs to go down a slide, washing and drying dishes, or clearing the table.

Multi-spheres involve the capacity to shift engagement between one activity or object to another unrelated object or activity, and then return to the first having kept its continued existence in mind. This milestone occurs in typically developing children at approximately 7-8 months of age. Since many children with ASD lack this essential capacity, and the therapy is designed to help them resolve their difficulty in relating one object or event to another. The activities introduced closely resemble the composition of 'real life' situations such as when a child interrupts a game to eat dinner and then returns to the game later on without difficulty. The use of multi-spheres

involves the therapist interrupting the child's engagement at the point of 'maximal tension' with the first activity/object by taking him/her to the second, and then after the child is engaged with the second activity/object, interrupting the child yet again and returning him/her to the first [6]. The rationale behind these intentional interruptions is that they create a tension state whereby the child needs to complete the first sphere. By maintaining this state of tension while the child becomes engaged in the second completely different sphere, the first sphere will remain alive in the child's psychological economy [4]. When a child is able to cope with interrupted activities that are broadly separated, he/she becomes closer to developing a more solid reality.

### **The Miller Umwelt Assessment Scale (MUAS)**

The word Umwelt means 'world around one,' which is the unique reality experienced by each child. The MUAS is an effort to understand the nature of the child's reality in order to provide interventions that would be most helpful to resolve the child's reality challenges. The MUAS was developed for the following reasons:

Conventional tests fail to guide therapists, clinicians and teachers toward useful interventions; Conventional tests underestimate the capacities of children on the autism spectrum;

The MUAS elicits the child's capacities and near capacities in 5 domains often overlooked in other assessments. These domains include: body organization/body schema development, contact and coping with surroundings, social contact communication and representation.

The MUAS provides specific interventions in these five areas, which guide the work with a particular child on the spectrum.

The tasks used in the MUAS examine earlier and later stages of development and involve situations that are relatively familiar to the child. Some examples of Umwelt tasks and the information they can elicit include: a swinging ball (which assesses body organization and social contact), a primary board (which assesses body organization and contact with the environment), and a step/slide system (which assesses body organization, contact with the environment as well as the child's ability to form and expand new systems).

When presenting the 15 tasks on the Umwelt assessment, there are two types of responses that may be elicited. In the first response, a child becomes so involved with an object or event that he/she is unresponsive to what is happening around him/her. This is characteristic of a child presenting with a 'closed system disorder.' Another characteristic of this disorder is the child's apparent inability to switch his/her attention from an object or event to another, or to spontaneously expand the nature of the interaction with an object or event to include another person [6]. An important prognostic indication for children who present with this type of profile is whether or not the child learns to coordinate body activity with a particular object or event. Children who can learn to do this within the assessment usually respond better and more rapidly to intervention than those who cannot [4]. In the second type of response, a child is so hyperactive to salient objects or events, tending to orient in a scattered fashion to various aspects in the surroundings that he/she is constantly being pulled from one object or event to another. A child presenting with this profile is described as having a 'system forming disorder' because he/she has difficulty engaging with objects and forming systems, therefore impeding their learning.

When administering the MUAS, it is assumed that all children with ASD's are trying to find a way to cope with the multisensory world around them. The emphasis of the assessment is placed on the child's experience and how he/she copes with and comprehends reality. The findings from the different tasks involved in the assessment are brought together to give a more in-depth understanding of the child's profile in the areas of body organization/schema development, contact with the environment, social contact, representation, and communication [6]. There are a variety of intervention strategies/tasks that are used as a follow up to the assessment to move the child up the developmental ladder in the five aforementioned domains. The 15 tasks of the MUAS are provided in Table 1. The tasks provide information about the child's current capacity across the five domains discussed in the next section.

### **Developing Body Organization/Schema**

Children with ASD's appear to have significant difficulty both directing their body activity towards their immediate environment and making the transition from body action to more symbolic experiences. The children seem to become so captivated by one event that they are oblivious to other events going on outside their immediate environment. Miller and [9] propose that it is this single-track involvement with only one object or event within a sphere that impedes a child from deliberately disengaging from the object so that he/she could relate his/her body to a larger or new situation in a more functional manner. These body schema problems often become apparent when a child is required to use his/her body in a new way. Another common body schema problem among this population is the lack of awareness of how one side of the body differs from the other or how the hands, legs, and arms work together to solve particular problems [4]. Without awareness that the body is a separate entity connected to external goals, a child with ASD cannot engage in self-directed activity nor is he/she able to discriminate between where the body ends and where the world begins, thus impeding purposeful action [10]

The activities within CDST for developing body organization and contact with surroundings are based on the assumption that language and cognition develop in a regular progression in which children first learn to direct their body actions, then their distal senses (vision and hearing), and ultimately their language and thought toward objects and events that are beyond their immediate reach [10]. In his early work, [11] also noted that a child that who is able to direct his/her body towards the surrounding environment and make a transition from large body activity to contact with the environment using the senses, is able to gain more symbolic modes of communication and experience [8]. Discusses three principles regarding the importance of developing body organization. These include:

1. If you do not know where parts of your body are, you cannot feel pain those parts.
2. If you do not know where your body is in relation to an object, you cannot associate with that object.
3. If you cannot physically address the object, you cannot label it.

Thus, interventions for the development of body organization and contact with the surroundings have been developed using elevated structures (also known as an elevated square). In the early 1970's, Dr. Miller, in his clinical work, discovered that children with ASD's who were unresponsive to directions on the ground became more aware of

their surroundings when they were placed on elevated boards. Moreover, when these children were placed on the elevated structures, eye contact was improved and mannerisms (such as hand flapping and toe walking) suddenly stopped. It has been hypothesized that some children with ASD's may be able to follow directions better when elevated because it removes any distractions and capitalizes on the alertness that typically comes with being placed in a somewhat unstable position [8]. During intervention, strategies used to develop body organization include: teaching expanded sets of gross motor movements on the elevated structures, tickling or rough and tumble play, guided collisions on the elevated structures, exploiting reality systems, establishing body-object differentiation, and establishing body efficacy [8].

### Developing Contact with the Environment

A major challenge often for parents and teachers is coping with frequent tantruming. CDST addresses tantrums and outbursts by trying to understand the meaning behind them or the need the child is trying to express. With this approach, the adult intervenes during tantrums by indicating transitions from one activity to the next more clearly and by using repetitive rituals to help the child reorganize [7]. In addition, the intervention strategy used is also dependent upon the child's particular profile. For example, for the child presenting with closed-system disorder, the introduction of rituals is often effective since the tantrum is usually precipitated by new circumstances or situations that are incompatible to the child's exiting systems [4].

The best method for helping children with ASD's develop a concept of space and how one object relates to another involves the use of spheres that help them to acquire knowledge of objects in a controlled space [4]. The use of an elevated square in which there are four different stations at each corner where various tasks are performed is also important for placing structure on a child's actions. Once specific spaces are brought into relation with each other, they begin to become familiar to the child as spaces within which he/she can perform intentional actions with objects [4].

### Developing Social Contact/Interaction

Children with ASD often lack both affective expression and preverbal communicative gestures such as pointing or reaching to be picked up, and as a result, they remain isolated emotionally and appear to prefer objects rather than people. In order to develop social contact, CDST draws on the response to contagion, which is common to both children with and without ASD. The method involves a variety of spheric, contagious strategies (i.e. rough and tumble play and including people in object systems) that were developed to encourage contact with others and to move the child towards more appropriate exchanges with others [4]. For example, a child who rocks on his own can be enticed to join the adult in a rocking activity with an accompanying song (i.e. row, row your boat). The adult builds the rocking motion up to a high level of excitement, interrupts the action, and then observes the child for any indication of anticipation. If the child responds to the interruption with an attempt to continue the rocking (often shown by eye contact, verbalizations or beginning rocking motions), the child demonstrates that he/she has successfully internalized the rocking sphere with another person [4]. In addition, the activity can be expanded upon by, introducing new songs, actions, and people. The role of language in acquiring more complex social systems begins to become more and more important as the child's awareness of others increases through the use of these methods [4].

### Developing Communication and Representation

Communication can be defined as the ability to both send and receive messages about objects and events. The ability to send messages follows the ability to receive and be guided by messages [4]. In order to develop the ability to communicate effectively, a child must: a) be aware of him/herself and others as separate beings; b) understand the distinction between him/herself and the meaning of the sign, picture, or word being sent; c) understand that signs or words carry meaning in multiple contexts (generalization); d) understand that pictures, signs, and words can be used reciprocally; and e) understand that pictures, signs, or words can communicate complex purposes, such as two or three step requests [4]. Children with ASD's must understand that it is possible for utterances to carry meanings before they can understand the intent of a spoken word. CDST suggests that before children can begin to develop language, they must gain awareness of their own bodies in relation to objects and events so that they can intentionally initiate directed action. In summary, the children need to gain a way of relating their directed body actions to spoken language.

Children with ASD are placed on the elevated structures to enable them to become more aware of their bodies, more focused, and to improve their ability to cope with obstacles or demands that may be confronting them [7]. Communication is taught by: pairing spoken words and signs with actions, using object relations, using interruptions to induce compensatory verbal expression, and contagion (Miller, 1996). One of the most important ways to develop communication is to first have children with ASD become sign and word guided. Subsequently, many of the children learn to use both signs and spoken words to communicate their intentions and wants [4]. Using signs adapted from American Sign Language in conjunction with spoken language is based on the premise that sign language is a transitional phase that facilitates spoken language and, therefore, may be more available to many nonverbal children with ASD because they act as a bridge between a spoken word and its referent. Spoken words often fail to develop in children with ASD unless they have been paired with signs and unless the signs have been used functionally [4]. Until a child is able to transfer the signs to spoken words, the signs could provide a way for the child to communicate and understand others [9].

### Application of the MUAS to a Young Child with Autism Spectrum Disorder

Ricky began attending a specialized, full day, self-contained program for students with Autism Spectrum Disorder at the age of seven. The MUAS took place over three days (for approximately 1 hour per day), although the majority of the assessment was completed on the first two days. There are 15 tasks involved in the assessment which tap into the sign, symbolic-sign, and symbol stages of functioning and involve relatively familiar situations that require him to: cope with an object (i.e. a swinging ball moving toward him) climb up steps, and walk over, across, or around various obstacles such as holes in a long board that resemble a piece of Swiss cheese (notably called the Swiss Cheese Board). The tasks also entail dealing with a step-slide arrangement, stacking blocks; using rakes to retrieve objects (both with and without the interference of obstacles) and stacking cups and bowls in a variety of ways. Other tasks involve symbolic play, reciprocal interaction, picture recognition, reading and number capacity, and awareness of people. The following tasks or "bits of reality" were used to assess Ricky, gain understanding from his responses and to ultimately guide his teachers and parents toward



interventions that will be effective in moving him along the developmental ladder. Ricky has challenges in the areas of social and emotional contact with others, in his ability to cope effectively with the physical surroundings, and in his ability to communicate his experience to himself and others. The Umwelt Assessment reveals the strengths he possesses and how the weaknesses prevent him from adaptive contact with his surroundings. It also permits the planning of interventions most likely to help him develop and expand on his already established repertoires. Table 2 is a brief summary that breaks down the tasks and reveals what Ricky accomplished while performing the tasks.

### **Body Organization/Contact with Surroundings**

Ricky demonstrated an awareness of and interest in his surroundings. His curiosity and exploratory drive was evident throughout the assessment. Ricky had a strong emotional bond with his parents -- particularly mother. Ricky could orient toward an object moving toward him (suspended ball task) and anticipate its trajectory as it moved towards him. He could also climb over a fence-like obstacle to get to his father on the other side. On the first several attempts on the anticipation board, it appeared as though he had greater difficulty using the left side of his body, but with repetition he was able to put his left leg over and use his hand on the board to assist him with this task. He coped extremely well with the elevated Swiss cheese board and was able to step over the variously shaped holes while still attending to his father who was calling him on the opposite side of the plank.

On the step-slide task Ricky would not respond to his father saying "sit down," but instead would attempt to hug him with outstretched arms. Ricky made several attempts to run away from dad as the demand was placed on him to complete the sequence of events. It is possible that Ricky was frustrated with this task because it did not provide enough stimulation and interest. It took Ricky some time to combine this four step system (climbing stairs, sitting down, and making a turn at the bottom of the slide) which entailed getting to his father who was calling him at the steps positioned at a right angle to the slide. Ricky was also able to incorporate an expansion into the step slide system. He had minimal difficulty accepting blocks to throw down the slide before he went down. He seemed to follow the blocks going down the slide and began to anticipate receiving the next block. Ricky demonstrated good body organization and adapted to the new tasks he was presented with. Although coordinated, he has a somewhat driven quality which is evident in his constant need to keep moving or doing. He is, somewhat unresponsive to spoken words, tending to ignore them in favor of visually stimulating objects/events.

Ricky's small body problem solving was assessed by introducing a variety of tasks that entailed eye-hand coordination, cognitive flexibility and tool use. Ricky showed minimal interest in stacking blocks. He was able to begin stacking them in a rather hurried, driven manner, and the pacing had to be quick in order to keep him attended to the task at hand. He did pay attention to how they were balanced but did not push the assessor's hand away when she threatened to break the tower. Once the tower was broken, Ricky began a new system of aligning the blocks horizontally rather than vertically. Ricky had great difficulty throwing the blocks into the box and required extensive hand over hand support. However, with repetition, he began to complete this task independently. Ricky did demonstrate difficulty waiting for the assessor to throw the blocks in the box. Turn taking is a skill that needs to be further developed.

Cognitive flexibility was assessed by providing Ricky with a set of cups and bowls requiring him to stack them in a variety of ways. He demonstrated that he could put cups and bowls in their proper stacks even when the cup was presented upside down over the bowl stack and the bowl was presented right side up over the cup stack. He easily broke his vertical stacking by shifting to a pattern whereby he would put a cup in each of six bowls spread out in front of him.

Tool use was assessed by providing Ricky with a string attached to a toy dog. In addition, he was given a variety of rakes to retrieve a desired object (cereal) that was presented in various contexts (behind an obstacle). Although he did not demonstrate a pattern of alternating hands while pulling the string (to bring the dog closer), he did respond with eye contact to the assessor saying "woof, woof" and then proceeded with one strong pull to bring the dog within arm's reach. He demonstrated a much greater range of understanding with the rake. Here, he was able to vary the rake position to bring the desired cereal towards him when it was presented either to the right, left or behind the rake. His best performance was in turning the rake to its narrow side so it would fit between two parallel barriers in order to retrieve the cereal. He also showed excellent ability in retrieving the cereal when it was placed within a horseshoe shaped structure behind a barrier. In spite of Ricky's language delays, he showed an active, adaptive intelligence as he tried to cope with a variety of problem solving situations. His eye-hand coordination seemed adequate while his cognitive flexibility permitted him to use tools to solve a range of problems.

### **Social Contact**

Ricky displayed affection towards his father during the assessment and spontaneously approached him for hugs and cuddles, however when children were introduced, there was minimal contact. He needs to further develop social skills of reciprocity, waiting, and appropriate greetings/protests. Once caught up by the exciting, repetitive aspects of a situation, he may more readily accept other adults (and eventually children) in his play. The key will be to use rough and tumble play so that he forms a strong physical connection with the play partner. Furthermore, using highly motivating and salient objects (i.e. trains, balls, marbles, coins, beads) in systems may allow for easier expansions from solitary play to interactive play. Ricky protested when the assessor interrupted his solitary ball swinging and refused to include her in the game. When the assessor intervened by pushing the ball, Ricky tried to escape the activity. When high demands were placed on him throughout the assessment, Ricky either aggressed towards his parents or would hit himself on the head. With continued growth in the area of expressive/receptive language, Ricky will be able to use his words to express negation.

### **Communication**

Ricky understood a variety of spoken directions (i.e. come, get up, sit down, up, down, etc). He approached his father when he heard the command, "come." He was guided by the words, get up, come, up, sit down, on, in, and push. Expressively, Ricky used an array of words intermingled with babbling, ga, ga, ga, why, down the slide, and go home, to name a few. Ricky is beginning to identify the relationship between what he says and what the word means. Ricky did ask for help and various objects (i.e. juice) during the assessment. During the assessment there was strong evidence of his ability to respond to spoken words when he was asked to give the assessor a cup, dog, and cat. More compelling was his response to gesture. On one occasion,

when the assessor introduced the words sit down in a strong tone, Ricky immediately sat down. Although he is not using his gestures expressively (uses words instead), the gestures helped him retrieve spoken words and to receptively follow various one-step commands.

## Representation

Although clearly more engaged by objects than pictures, Ricky demonstrates an interest in picture books. He produced some scribbling, but much more impressive was his ability to imitate lines and circles. His fine motor abilities were sophisticated enough to begin printing. When the assessor presented Ricky with a large circle with one eye, he was able to draw in a second eye along with a happy face. On the second attempt, Ricky watched the assessor draw a happy face. She then offered him the circle once again. This time Ricky's eyes and happy face were much more accurate representations than the first. This reveals that Ricky learns very well through modeling and imitation. When Ricky was asked to locate his own eyes and mouth, he buried his head in his arms. At this point he seemed fatigued and therefore the assessor was unable to determine whether he could locate his own facial parts. During the reading and writing task, Ricky was able to write a multitude of sounds that were presented to him auditorily (f, c, m, sh, b) and a variety of sight words (cat, cup, rat). He was able to accurately match the 3-D object to the accompanying word (cat, cup, rat). Ricky also demonstrated some good symbolic play skills. He was able to imitate the doll-feeding task by placing the bottle in the doll's mouth, putting her to bed, and continuing to feed her. He refused to put the blanket on her because he was enthralled with holding the bottle to her mouth and feeding her. Perhaps he believed that the blanket signified going to bed and a termination of the bottle-feeding. During the counting task Ricky was able to count a series of bolts (ten were displayed). However, when asked to give 2, 6,...etc. he could not complete the task with accuracy. Ricky can seriate numbers but does not yet have an understanding of number concepts.

## Summary and Recommendations

Ricky is a child who is driven by external stimuli. He is capable of further growth and development, however will require continued intense intervention to help him integrate his skills so that he could achieve a more spontaneous use of language. Ricky learns best through movement. With a stronger communication system (both expressive and receptive), Ricky's reciprocal skills will improve over time. To heighten Ricky's awareness of his own body, a range of activities are required for his program which include: rough and tumble activities, gymnastics, trampoline work, swimming, horseback riding, climbing, massage (deep pressure), physio ball, as well as the elevated board work and adaptive physical education. Ricky also needs continued opportunities to lift, push, pull and carry relatively heavy objects to gain a better sense of his body's efficacy. Essentially, work in the area of body-object relations will increase his understanding of how things work (i.e. how spring loaded clothes pins hold things and release them; how nuts fit on bolts). Ricky would also benefit from woodshop time, including using a hammer, spoke shave, saw and screwdriver. Ricky seems best able to learn tasks involving several steps (multispheres and integrative spheres)--when introduced by others. These tasks need to be presented in a rapidly paced manner so that he is guided from one part of the task to another. With rapid pacing, he soon learned to stack the blocks. He was also able to tolerate an expansion of this system by throwing the blocks in a box.

Ricky continues to require extensive work in the area of reciprocal social contact with and without objects. He needs to engage in chasing games that involve being the chaser and being chased. He enjoyed being chased and would often seek out a potential runner. A range of turn taking games such as patty cake and competition games (i.e. competition cup) as well as ring toss, bean bag and similar games would prove beneficial. Since Ricky is often echolalic (often repeats words without a sense of their meaning), it is important that all words addressed to him be accompanied by signs which resemble the word meaning. Initial signs should relate to actions and should include terms such as push, pull, jump, open, pick up, drop, run, walk, etc. Ricky is beginning to understand how spoken words relate to actions and objects through narration. It is important that all individuals working with him continue to narrate what he is doing. In this way, Ricky will learn that the word he hears is directly related to what his body is doing. The Miller Symbol Accentuation reading program will help him establish a functional speaking vocabulary and will contribute to the development of spoken syntax.

## Implications for Practice

The Miller Umwelt Assessment Scale gives parents and practitioners a starting point from which they can design effective home programs and interventions for children with Autism Spectrum Disorder. In addition, the assessment provides a snapshot of the developmental capacities, strengths and challenges experienced by children on the autism spectrum whom are often difficult to assess using traditional testing methods and approaches. In summary, the MUAS is an easy-to-administer assessment tool that requires minimal training and yields maximum benefits (Tables 1 and 2).

Sl. No	Task
1	Unstructured Period
2	Swinging Ball
3	Primary Board
4	Swiss Cheese Board
5	Slide Sphere
6	Blocks
7	Stacking Cups & Bowls
8	Reciprocal Pull Toy
9	Croupier Rake
10	Graphic Expression
11	Unstructured Period
12	Number Relations
13	Symbolic Play
14	Object/Picture Designation
15	Reading and Writing

Table 1: The 15 Tasks of the MUAS

Swinging Ball	<p>was able to coordinate his pushing with the ball's arrival</p> <p>-had difficulty integrating pushing ball activity with awareness of the examiner (me) who was pushing the ball</p>
Primary Board	<p>-good gross motor coordination (attempted to jump off several times...landed on both feet)</p> <p>-demonstrated body awareness, problem solving capabilities (i.e. split board task), and awareness of dad (who was calling him)</p> <p>-difficult to establish the system due to protest</p> <p>-alternated feet when climbing steps, required less physical support as the sequence was repeated</p> <p>-has achieved a differentiated awareness of both sides of the body (i.e. seen during straddling the gap, anticipation board task)</p> <p>-able to successfully integrate two disparate but related events--getting over the fence and getting to dad (often children with ASD can only address one task)</p>
Swiss Cheese Board	<p>did well on this task which tests Ricky's ability to cope with events that impinge directly on his body</p> <p>-was able to shift attention from holes to parent dad calling without mishap</p> <p>-this high demand task revealed Ricky's adaptive behaviour (changed body movement, eye gaze) according to changes in his physical environment</p>
Slide Sphere	<p>-had difficulty transforming this sequence of physical events into an integrative system (i.e. would not sit down with dad, would not respond to me at the base of the stairs calling him to come)--Required a change in the positions of the adults</p> <p>-was able to accept expansions of the newly formed system (i.e. giving him blocks to throw down slide)--this is vital in assessing the teachability of a child with ASD</p> <p>-Ricky was able to complete some of the sphere with little support</p> <p>-demonstrated flexibility since he could readily accept the expansion of the system</p>
Blocks	<p>-could accept blocks handed to him from a variety of orientations</p> <p>-could stack blocks with hand over hand assistance</p> <p>-eventually began stacking independently</p> <p>-did not anticipate me threatening to destroy the stack</p> <p>-did not push assessor's hand away when she threatened to destroy the stack</p> <p>-created a new system (aligned horizontally) when stack was destroyed</p> <p>-became involved in the contagious activity of throwing blocks in a box with repetition; has not grasped the social notion of taking turns, as was evident in his reluctance to alternate with the assessor in throwing the blocks</p>
Stacking Cups And Bowls	<p>-was able to cope with surroundings by adjusting his approach to changing circumstances</p> <p>-handled all stacking with no difficulties</p> <p>-Ricky was firmly guided with one step commands, "in"</p> <p>-expressed the word "in"</p>
Reciprocal Pull Toy	<p>-tests child's ability to cope both with the care giver and with an object at the same time</p> <p>-he grasped the string and tried to pull the dog closer at one point but did not seem to demonstrate a means-ends understanding of the causal relation between pulling on the string and the dog's movement (was focused solely on the dog)</p> <p>-Ricky showed limited awareness of the assessor's role (there was some eye contact), and did not participate in a meaningful game of unexpectedly pulling the dog away from the assessor</p>
Symbolic Play	<p>-the capacity to engage in symbolic play provides the earliest indication that the child is close to moving from sign stage to symbolic sign stage functioning</p> <p>-Ricky demonstrated the sequence by feeding the baby and putting her in the basket</p> <p>-Ricky is often seen engaging in symbolic play (taking figurines and putting them to bed in dollhouse..etc).</p> <p>-since he was able to mimic the symbolic play that I demonstrated he has a great deal of symbolic play capacity'</p>
Croupier Sequences (Rake-Obstacle)	<p>-tests child's ability to cope both with the care giver and with an object at the same time</p> <p>-he grasped the string and tried to pull the dog closer at one point but did not seem to demonstrate a means-ends understanding of the causal relation between pulling on the string and the dog's movement (was focused solely on the dog)</p> <p>-Ricky showed limited awareness of the assessor's role (there was some eye contact), and did not participate in a meaningful game of unexpectedly pulling the dog away from the assessor</p>
Graphic Expression	<p>-Ricky has a sense that the movement of the crayon on the paper produces marks that vary with movements of the hand</p> <p>-Ricky possesses a sense of self as a source of intentional activity related to making marks</p> <p>-Ricky was able to tolerate the various changes (scribbles, horizontal, and vertical lines)</p> <p>-demonstrates the capacity to begin representing people/objects in his environment as seen in his drawing of the happy face</p>

	-was able to add in the missing features (eye, mouth) through imitation
Object And Picture Designation	-Ricky has a sense that the movement of the crayon on the paper produces marks that vary with movements of the hand -Ricky possesses a sense of self as a source of intentional activity related to making marks -Ricky was able to tolerate the various changes (scribbles, horizontal, and vertical lines) -demonstrates the capacity to begin representing people/objects in his environment as seen in his drawing of the happy face -was able to add in the missing features (eye, mouth) through imitation
Reading And Writing	-able to sight read many common words -is not yet demonstrating the ability to relate certain letters to sounds in a phonetic way--still by sight -not yet demonstrating the ability to blend letter sounds into sound forms -was able to translate heard sounds into letters and printed words (ie. dictation)
Number Relations	-assessed certain aspect of his ability to grasp numbers--including seriation, number concepts and number conservation -could accurately count objects--this demonstrates knowledge of one to one correspondence between number and referent--and that with each additional object the number must change -could not give 3, 5, 7 bolts when I requested them--no understanding of number concepts yet

Table 2: Summary of Ricky’s Results

**References**

1. [http://www.health.gov.bc.ca/library/publications/year/2003/asd\\_standards\\_0318.pdf](http://www.health.gov.bc.ca/library/publications/year/2003/asd_standards_0318.pdf)
2. Elsabbagh M, Divan G, Koh YJ, Kim YS, Kauchali S, et al. (2012) Global prevalence of autism and other pervasive developmental disorders. *Autism Research*. 5:160–179.
3. Henry S L (1998) Developing your own Miller Method Program. Geneva Center for Autism, Toronto.
4. <http://www.iidc.indiana.edu/?pageId=365>
5. Miller A, Miller E (1973) Cognitive-Developmental training with elevated boards and sign language. *Journal of Autism and Childhood Schizophrenia* 3:65-85.
6. Miller A, Miller E (1989) From ritual to repertoire: A cognitive-developmental systems approach with behavior-disordered children. New York: Wiley.
7. Miller A (1991) Cognitive-developmental systems theory in pervasive developmental disorder. *Saunders Press*, Vol 14, No 1, 141-161.
8. Miller A, Miller E (1993) A new way with children with autism and pervasive developmental Disorder. Boston: Language & Cognitive Development Center Inc.
9. Miller, A. & Chretien, K. (2007). *The Miller Method: Developing the Capacities of Children on the Autism Spectrum*. New York, Jessica Kingsley.
10. Piaget J (1954) *Intelligence and affectivity: Their relationship during child development*. Palo Alto, CA.