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The ^{m a g a z i n e} ^{TAP INTO IT.} AUTISM

perspective



Strange Son
By Portia Iversen

Advocate for
Autism Awareness
in honor of her
brother David

Crowned Miss Oregon
Donilee McGinnis

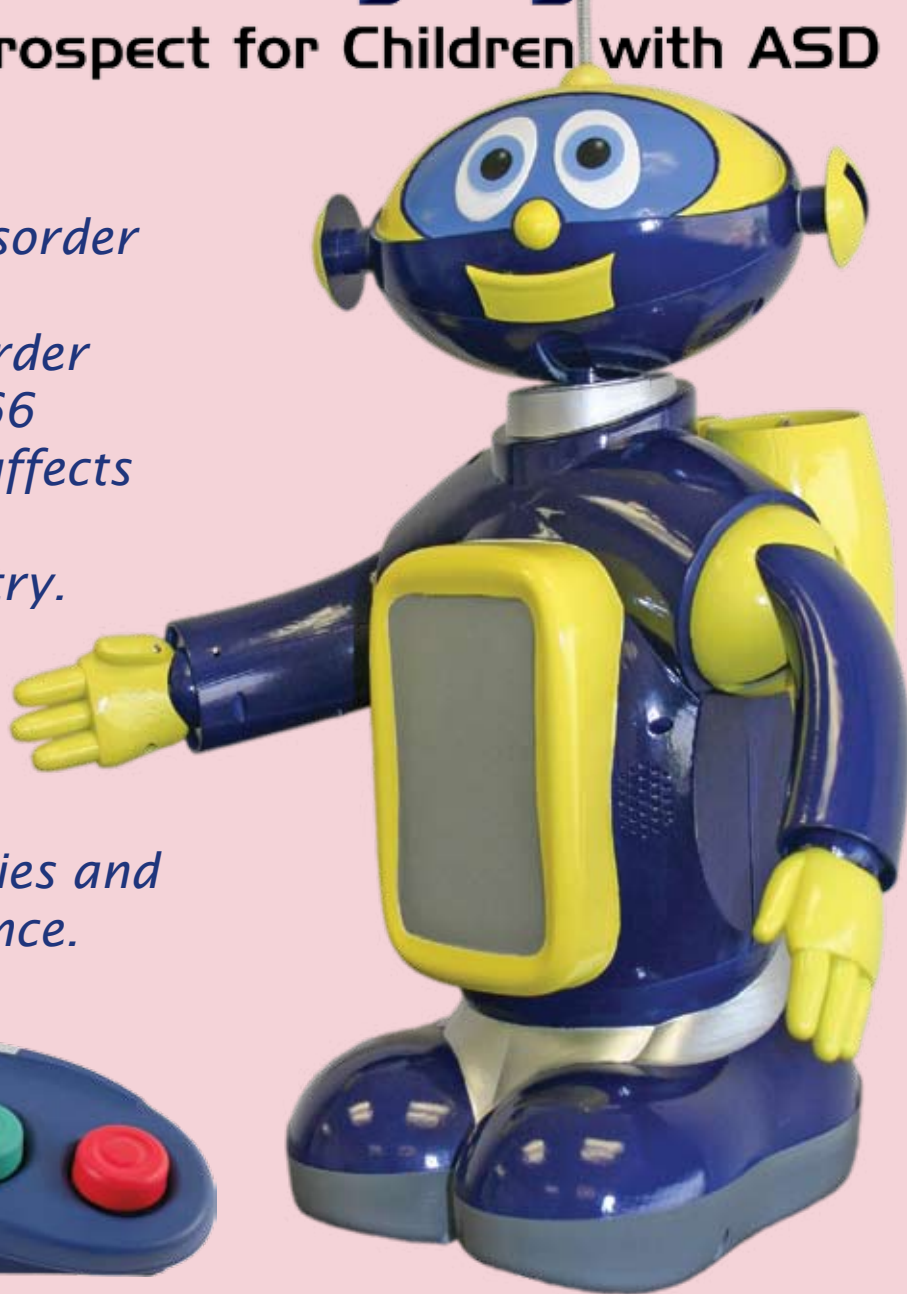
Autism Spectrum Disorder, Developmental Dyspraxia and Assistive Technology

Cosmo's Learning Systems:

A Tantalizing Prospect for Children with ASD

By Dr. Carole Samango-Sprouse

Autism Spectrum Disorder (ASD) is a common neurobiological disorder which occurs in 1:166 children and today affects more than 500,000 children in the country. It is a disorder of extremes with great variability in behavior, intellectual capabilities and individual performance.



Every child with ASD must have three defining characteristics (Table 1) in order to meet the diagnostic criteria; however, each child's learning style is unique and presents a complex and intriguing puzzle for clinicians and neuroscientists.

These fragmented pieces of development are present in each child but configured in a unique manner, such that every day can be a challenge for the child and the family. For some children, every sound is heard as distracting and, in some cases, painfully disturbing. For other children, sounds are largely ignored and deafness initially may be suspected. These variances in development challenge everyone, since the extremes, whether markedly above or below normal, must be identified in order to facilitate continued developmental growth with eventual self-sufficiency, optimum functionality and improved communications skills.

Learning in children with ASD is affected by various factors, and many children with ASD have some degree of motor-planning deficits or developmental dyspraxia (DD) (see Table 2).

Praxis is the distinctive ability to produce a specific motor action on command and when necessary. Children with DD may perform an action in play spontaneously, but cannot repeat the same action on demand. Actions may be easy in simple motor schemes, such as protruding their tongue or licking an ice cream cone. Other motor actions are quite complex, such as skipping or riding a bicycle. Regardless of

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the level of complexity of the motor task for the child with ASD/DD, motor planning is extremely challenging. Learning then becomes very complicated because motor planning is necessary for even the simplest activities of everyday life. Without good motor-planning skills, the world becomes perpetually frustrating, with overwhelming hurdles to overcome in order to move, to speak and to interact. This is the life of the child with ASD and DD. Every task demands thought and deliberation. It is sometimes easier to sit quietly and appear to do nothing because planning can be difficult, demanding and exhausting.

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Enter Cosmo's Learning Systems

Cosmo's Learning Systems is a unique family of learning tools created by AnthroTronix and manufactured by AT KidSystems (www.atkidsystems.com), a subsidiary of AnthroTronix. Cosmo's Learning Systems combines the appeal of a toy with the versatility of a computer. Children can interact with Cosmo's Learning Systems through Mission Control, a computer interface device, voice commands or

Table 1
Characteristics of Autism

- Impaired social interaction
- Problems with verbal and nonverbal communication
- Unusual, repetitive or severely limited activities and interests

Source: www.cureautismnow.org

Table 2
Key Characteristics of Developmental Dyspraxia

- Limited repertoire of vowels; variability of errors in speech.
- More difficulty with volitional, self-initiated utterances or movements as compared to over-learned, automatic or modeled utterances or movements.
- Impaired rate/accuracy on diadochokinetic tasks.
- Groping or observable physical struggle for articulatory position may be observed.
- May also demonstrate impaired volitional nonspeech movements (oral apraxia).
- Postural instability and motor discoordination.
- Difficulty acquiring complex movements like hopping and jumping.

Source: <http://www.apraxia-kids.org>



the more traditional method of mouse and keyboard. It is this flexibility that provides the opportunity to program simultaneously both interactive and therapeutic tasks. Cosmo's Learning Systems features Cosmo's Play and Learn software that is innovative and engaging, so children are motivated to explore and play with it. Cosmo's Learning Systems offers the unique circumstance for the clinician to interact with the child in a way that is equally nonintrusive and directed. The opportunity is available for clinicians to facilitate joint attention, motor-planning sequences and imitation both motorically and verbally, while the child is having fun and learning.

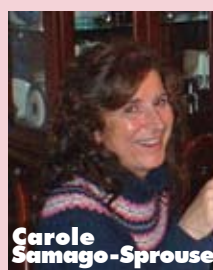
As Director/CEO of the Neurodevelopmental Diagnostic Center for Young Children (NDC), I have collaborated with AnthroTronix previously on scientific projects. Evaluating Cosmo's Learning Systems and its efficacy for children with ASD/DD or DD seemed a natural extension for both entities.

The NDC is a unique facility for children with neurogenetic disorders, such as ASD, DD and Sex Chromosome Disorders. At the NDC, a neurodevelopmental evaluation assesses the integrity of the child's central nervous system and the relationship between brain and behavior. Therapeutic services are then determined and configured in light of the child's disorder, learning style and behavioral manifesta-

tions. For the child with ASD and DD, the influence and the impact of the motor-planning challenges are of utmost importance, since dyspraxia affects every aspect of the child's life and learning.

Cure Autism Now, a parent advocacy group started to improve the care of children with ASD, gave funding to AnthroTronix for a small pilot study using a robotic device, CosmoBot, with a group of young children with ASD/DD in order to assess its usefulness as a tool for learning, developing social interaction and enhancing motor-planning skills. The children used Cosmo's Learning Systems and CosmoBot during this small pilot study. All children were preschoolers and the mean developmental age was 3 years 7 months. The usefulness was evident within minutes of interacting with Cosmo's Learning Systems, since all the children began engaging, playing and attempting new and challenging tasks. They were highly attentive for at least fifteen minutes with pretend and interactive play with Cosmo's Learning Systems. The children appeared to perceive Cosmo's Learning Systems as a toy and wanted to touch, play and feel it. Although Cosmo's Learning Systems, as a toy and a therapeutic device, was quite successful, further design improvements were made as a result of this small pilot study. Cosmo's Learning Systems presents an intriguing vehicle for clinicians, parents and mental health personnel to interact with, teach and treat children with ASD and DD. Cosmo's Learning Systems, in conjunction with the development of targeted and syndrome-specific goals, is a creative mechanism to address the needs of the young child with ASD.

Findings with Cosmo's Learning Systems are captivating and suggest that motor-planning skills could be enhanced using this unique modality. Cosmo's Learning Systems offers a distinctive and tantalizing prospect for children with ASD to promote neurodevelopmental progress, as well as increase our understanding of the relationship between brain and behavior. Cosmo's Learning Systems potentially offers the opportunity to increase our understanding of the child with ASD and the motor-planning deficits associated with it. Collaboration between neuroscientists and clinicians using innovative technology could provide a window to understand another facet of the "giftedness and unique abilities" of the young child with ASD/DD. **TAP**



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