Brenda Smith Myles¹ Barry G. Grossman² Ruth Aspy³ Shawn A. Henry⁴

Planning a Comprehensive Program for Young Children with Autism Spectrum Disorders

Abstract

This article outlines two compatible models for planning and implementing programs for students with autism spectrum disorders (ASD). The Ziggurat Model begins the process with an assessment of individual strengths and concerns related specifically to ASD and identifies interventions across five tiers that are matched to the individual's profile: (a) sensory and biological, (b) reinforcement, (c) structure and visual/tactile supports, (d) task demands, and (e) skills to teach. Content from the Ziggurat Model is then placed with the Comprehensive Autism Planning System (CAPS) to allow the child's day to be operationalized and matched to student goals, state standards, and related benchmarks. This article overviews this process and offers a brief case study as an example.

Keywords: Autism spectrum disorders, the Ziggurat Model, the Comprehensive Autism Planning System (CAPS).

Introduction

Autism spectrum disorders (ASD) are pervasive developmental disorders that have lifelong impact. Research has shown that early intervention is critical to improved long-term outcomes (Dawson & Osterling, 1997; Eikeseth, Smith, Jahr, & Eldevik, 2007; Harris & Handleman 2000; Lord, 1995; McEachin et al. 1993; Rogers, 1998; Smith et al. 2000).

¹Ph.D., (Corresponding author), Autism Society, USA, [brenda_myles@me.com]

²*Ph.D.*, *The Ziggurat Group*, USA

³Ph.D., The Ziggurat Group, USA

⁴*Ph.D., Ohio Center for Autism and Low Incidence (OCALI, USA*

Horner, Carr, Strain et al. (2002) discuss the importance of comprehensive intervention planning and state that comprehensive interventions involve multiple strategies applied across all or most of the individual's day. As educators and parents strive to develop meaningful interventions for young children with autism spectrum disorders, they need a process for pulling together a number of strategies to address complex needs and they need a method for implementing those strategies throughout an individuals' day.

The process of comprehensive intervention planning begins with a thorough understanding of the individual's needs, especially those related to the underlying characteristics of ASD. Next, a comprehensive daily schedule for the child is critical. A schedule should embed the supports needed for success as well as develop individual skills and measure those skills with a vision of how this will affect the child now and in the future (National Research Council, 2001). This is achieved through well-organized planning with clearly defined objectives and goals.

Far-reaching changes have occurred in the educational system in recent years, including the identification of teaching strategies and models that result in positive gains for young children with ASD. The use of Lovaas' (1987) form of applied behavior analysis, the Early Start Denver Model (Dawson et al., 2009) and Project Data (Boulware, Schwartz, Sandall, & McBride, 2006), have all resulted in skill increases for those with ASD. While each approach is unique they share some commonalities: comprehensive planning, use of multiple materials, systematic program implementation, and progress monitoring. Educators and parents using these models often experience challenges in identifying and tracking (a) which materials and supports match student needs and are required for specific activities, (b) which materials and activities lead to positive outcomes, (c) data collection, and so forth. To date, no system or framework has existed that can accomplish these lofty goals and support fidelity of implementation. The purpose of this article is to introduce two linked comprehensive planning models that meet the rigor required by comprehensive planning systems: the Ziggurat Model (Aspy & Grossman, 2008) and the Comprehensive Autism Planning System (CAPS; Henry & Myles, 2007). Together these models link characteristics to evidence-based interventions and present them in an easy-to-use format. The Ziggurat and CAPS are methodology free. That is they can be used with almost any model, including the Early Start Denver, Lovaas' ABA, and TEACCH.

What Is the Ziggurat Model?

The goal of the Ziggurat Model, a comprehensive planning system for those with ASD, is that underlying needs and characteristics of the individual related to the autism spectrum must be addressed. Therefore, the Ziggurat Model is designed to utilize individual strengths to address true needs or underlying deficits that result in social, emotional, and behavioral concerns. The Ziggurat approach centers on a hierarchical system, consisting of five levels that must be addressed for an intervention plan to be comprehensive (see Figure 1).



Figure 1. The five levels of the Intervention Ziggurat.

When designing a comprehensive program, it is essential to consider the *context of the underlying autism spectrum disorder*. This is overlooked all too often. Targeting underlying needs leads to interventions that are proactive and fundamental. In comparison, interventions that are solely designed to address surface behavior without consideration of the underlying ASD are potentially less effective and less likely to result in sustained behavior change.

As mentioned earlier, the process of intervention design should begin with an assessment of the presenting characteristics of ASD. A thorough assessment of underlying characteristics helps parents and professionals plan a program that takes into account individual strengths and needs. Further, assessment of underlying characteristics provides insight into which skills should be taught and how to design instruction that facilitates learning and brings about meaningful, long-lasting change. The Underlying Characteristics Checklist – Early Intervention (UCC) offers a comprehensive perspective as a basis for program planning for young children with ASD.

The Underlying Characteristics Checklist

The UCC is an informal assessment designed to identify ASD characteristics for the purpose of intervention. There are three versions of the UCC: (a) one intended for use with individuals who are high functioning (UCC-HF), including those with Asperger Syndrome (AS); (b) one for use with those with a more classic presentation (UCC-CL) in cognition and speech-language skills; and (c) one for young children (UCC-Early Intervention [EI]). The UCC is comprised of eight areas. The first three represent the autism spectrum triad: social, restricted patterns of behavior interests and activities, and communication. Characteristics often associated with ASD are addressed in the next four areas: sensory differences, cognitive differences, motor differences, and emotional vulnerability. The eighth underlying area is known medical and other biological factors.

Based on the results of completing the UCC, a comprehensive intervention plan is developed that targets ASD characteristics by incorporating each of the five levels of the Ziggurat. The UCC may be completed by parents, teachers, or other service providers, individually or as a team.

The Individual Strengths and Skills Inventory

The Individual Strengths and Skills Inventory (ISSI) was designed to accompany the UCC. The ISSI parallels the first seven areas of the UCC. The purpose of this tool is to ensure that underlying strengths and skills are incorporated in the intervention design process. For example, one child may have a strength in imitation whereas another has an intense interest in and knowledge of animals. These assets can easily become keys to addressing underlying skill deficits. An example of a completed ISSI is provided in the case example of Maria.

Global Intervention Plan

The Global Intervention Plans helps the multidisciplinary team address quality of life, including long- and short-term goals for the individual with ASD. The team uses this information to prioritize items from the Underlying Characteristics Checklist that will be matched to interventions using the Ziggurat Worksheet.

The Intervention Ziggurat

The Intervention Ziggurat (IZ), the cornerstone of the Ziggurat Model, is the framework on which comprehensive interventions are built. The IZ is comprised of five critical levels structured into a hierarchy: Sensory Differences and Biological Needs, Reinforcement, Structure and Visual/Tactile Supports, Task Demands, and Skills to Teach (see Figure 1). The first level, Sensory Differences and Biological Needs, addresses basic internal factors that impact functioning. The second level addresses reinforcement – meeting the motivational needs prerequisite to skill development. The third level, structure and visual/tactile supports, draws on individuals' visual processing strengths and addresses their fundamental need for order and routine. The final two levels of the IZ emphasize the importance of expectations and skill development relative to the characteristics of individuals with ASD.

The IZ helps parents and educators avoid overlooking critical areas that impact the effectiveness of any intervention plan. Each of the levels is essential and contributes to the effectiveness of the others. Thus, if needs on all levels are not addressed, the intervention will not be as effective and skills will not develop. The following is a brief discussion of the five levels of the Intervention Ziggurat.

Sensory differences and biological needs

The first level of the IZ represents what is, in one sense, the basis of all behavior—biology. Consideration of biological factors is especially important in the case of ASD due to the strong genetic and neurological underpinnings of this disorder. Unmet sensory and biological needs will result in changes in behavior, highlighting the importance of including strategies to address these needs.

While sensory differences and biological needs are not included as symptoms of ASD in the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association [APA], 2000), they often present some of the greatest challenges for individuals on the spectrum. For example, anxiety, distractibility, overactivity, impulsivity, perseveration, delayed receptive and expressive language skills, poor social skill development, and poor eye contact have all been related to sensory challenges (cf., Pfeiffer & Kinnealey, 2003; Stackhouse, Graham, & Laschober, 2002).

Research exists on sensory and biological interventions for individuals with ASD. For example in 2009, Case-Smith and Arbesman identified 49 studies conducted on sensory and motor interventions. Much of the research on biological interventions has centered on the use of medications, including antidepressants (cf., Namerow, Thomas, Bostic, Prince, & Monuteaux, 2003); antipsychotics (cf., Erickson, Stigler, Posey, & McDougle, 2005); and stimulants (cf., Di Martino, Melis, Cianchetti, & Zuddas, 2004).

Reinforcement

Because of its fundamental nature, reinforcement is included as the second level of the Intervention Ziggurat. All intervention plans ultimately target the development or increase of a behavior or skill. This goal can only be accomplished by incorporating reinforcement into the comprehensive plan. Without reinforcement, there is no intervention. Indeed, effective intervention programs deliver reinforcement for positive behaviors (cf., Horner, Carr, Strain, Todd, & Reed, 2002).

In seeking to identify effective reinforcers – often a challenging task – it is often helpful to consider the individual's interests or preoccupations (Winter-Messiers, 2007; Winter-Messiers et al., 2007). Indeed, research has found that activities or objects related to interests may be most effective for individuals on the autism spectrum (cf., Charlop-Christy, Kurtz, & Casey, 1990).

Structure and visual/tactile supports

Individuals with ASD function best when the school day is predictable. Supports such as pictures, schedules, learning strategies, and task strips may be used as tools to clarify activity structure and increase academic/social performance (cf., Betz, Higbee, & Reagon, 2008; Ganz, Kaylor, Bourgeois, & Hadden, 2008; Songlee, Miller, Tincani, Sileo, & Perkins, 2008). Tactile supports are an alternative to verbal communication and should be considered, especially for individuals with a visual impairment. Thus, the third level of the IZ is a direct response to these core characteristics of ASD.

Task demands

The term *task demand* can be thought of as obstacle removal (E Blackwell, personal communication, 2007). In designing quality interventions, obstacles that could prevent an individual from succeeding either independently or with assistance should be taken away. For example, a team may recognize that because a child lacks the skills to negotiate peer conflict, he will be provided a trained peer "buddy" during group activities until he is able to master strategies for compromise. The obstacle: lacking the skills to negotiate peer

conflict; how it is removed: a trained peer buddy who can help the child in situations that require compromise. Numerous interventions reduce demands. For example, peer networks (cf., Kamps, Dugan, Potucek, & Collins, 1999), circle of friends (cf., Frederickson, Warren, & Turner, 2005), and peer buddies (cf., Laushey & Heflin, 2000) have been found to be beneficial in promoting social skills.

Skills to teach

The first four levels of the Ziggurat set the stage for skill acquisition. It is possible to resolve many concerns using strategies on the first four levels without ever teaching skills. Indeed, many improvements may be seen as a direct result of attending to an individual's biological needs, providing meaningful reinforcers, addressing the need for structure and predictability, and carefully matching demands to ability. Comfortable with behavior gain, intervention teams may overlook this crucial last level. However, such a "partial" approach to intervention will have negative long-term outcomes because it does not allow for independence or promote generalization or growth. It is for this reason that Skills to Teach is the ultimate goal of any intervention plan. Several approaches to teaching skills to individuals with ASD have been supported in the literature, including priming (cf., Zanolli, Daggett, & Adams, 1996); formal social skills group instruction (cf., Lopata, Thomeer, Volker, Nida, & Lee, 2008); and pivotal response training (PRT; cf., Harper, Symon, & Frea, 2008).

Ziggurat Worksheet

The Ziggurat Worksheet guides the team through the development of a comprehensive intervention plan. With a new understanding of the child's needs based on completion of the UCC and the information on strengths and current skill level provided through completion of the ISSI, the team is now prepared to design an intervention plan that is targeted to the individual. Areas of the UCC are prioritized and specific UCC items are selected. All interventions incorporated into the plan must address underlying needs from the UCC. This provides a safeguard from developing a plan that addresses only surface concerns or from recycling interventions that have been used with others with ASD without careful consideration of the specific child. Further, the Ziggurat Worksheet promotes collaboration by helping parents and professionals to understand their part in the larger intervention picture.

An intervention plan is truly comprehensive when interventions address each of the five levels of the Intervention Ziggurat, three points of intervention—antecedent, behavior, and consequence—and when each intervention strategy addresses underlying characteristics from the UCC. The Ziggurat Worksheet provides a structure for verifying that the intervention plan is indeed comprehensive. Interventions that are not comprehensive leave unnecessary "holes" where difficulties may occur and begin to undermine the effectiveness of the intervention techniques that are put into place. After completion of the Ziggurat Worksheet, the team is ready to complete the CAPS. While the Ziggurat Worksheet allows a team to know that the intervention plan is thorough and targeted, the CAPS provides a structure for implementation.

What Is the Comprehensive Autism Planning System (CAPS)?

CAPS provides an overview of a individual's daily schedule by time and activity and specifies of supports that he needs during each period. Thus, the CAPS enables professionals and parents to answer the fundamental question: What supports does the child need for each activity?

Once a multidisciplinary team, including the parents, has identified the child's needs through completion of the UCC (HF, CL, EI) and ISSI and has developed interventions across the five areas of the Ziggurat that match the child's UCC- and ISSI-identified strengths and concerns, the team is ready to complete the CAPS. That is, based on information developed using the Ziggurat Model, the CAPS is a list of a child's tasks and activities, the times they occur, along with a delineation of the supports needed for success. In addition, the CAPS includes a place for recording the results of ongoing data collection and consideration of how skills are to be generalized to others settings.

Components of CAPS

The CAPS contains the following components:

- 1. *Time*. This section indicates the clock time of each activity that the child engages in throughout the day.
- 2. *Activity*. Activities include *all* tasks and activities throughout the day in which the individual requires support. Academic periods (e.g., preliteracy), nonacademic times (e.g., circle time, lunch) as well as transitions are all be considered activities.
- 3. *Targeted Skills to Teach*. This may include IEP goals, state standards, and/or skills that lead to school success for a given child.
- 4. *Structure/Modifications*. Structures/modifications can consist of a wide variety of supports, including placement in the classroom, visual supports, peer networks and instructional strategies (e.g., priming, self-monitoring).
- 5. *Reinforcement.* Student access to specific types of reinforcement as well as reinforcement schedules are listed here.
- 6. *Sensory Strategies.* Sensory supports and strategies identified by an occupational therapist or others are listed in this CAPS area.
- 7. *Communication/Social Skills*. Specific communication goals or activities as well as supports are delineated in this section. Goals or activities may include (a) requesting help, (b) taking turns, or (c) protesting appropriately. Supports may encompass language boards or augmentative communication systems.
- 8. *Data Collection*. This space is for recording the type of data as well as the behavior to be documented during a specific activity. Typically, this section relates directly to IEP goals and objectives.
- 9. *Generalization Plan.* Because individuals with ASD often have problems generalizing information across settings, this section of the CAPS was developed to ensure that generalization of skills is built into the child's program.

Figure 2 depicts which Ziggurat areas the CAPS items are drawn.



Figure 2. Depiction of where CAPS items are drawn from the Ziggurat.

Case Study for Michael: From Ziggurat to CAPS

Maria is a three-year old child attending an early childhood program in a public school. She is identified with ASD and speech impairment. Parents report that Maria experienced a language delay. Currently, Maria can label objects and make one-word requests when prompted. She does not initiate communication or social interaction with adults or peers. Eye contact is fleeting and she seems to display limited interest in others. Maria withdraws from group activities and spends extended periods of time engaged in repetitive behaviors such as jumping and wiggling her fingers in her peripheral vision. Maria requires prompting in order to engage in play and extended social interactions. Parents and teachers believe that if Maria could stay on-task longer, she would make more progress at home and in school. They also express concern with apparent sensory differences. Maria frequently smells and mouths objects and toys, is bothered by loud or unexpected noises, startles when there is unexpected movement, and has difficulty participating in groups in a loud environment. She becomes distressed when her teeth are brushed. Maria seeks movement. She frequently shakes objects in her peripheral vision, rocks, and jumps. Maria appears to be visually distracted and captivated by straight lines such as mini-blinds and corners of shelves, books, frames, etc.

Interventions tried in the past include interactive metronome, therapeutic listening, and cremation. Parents reported that these interventions have resulted no in change in Maria's behaviors and skill acquisition. The school provides the following sensory interventions: a

weighted vest, a weighted lap pad, picture schedules, and use of a color-coded square for positioning during circle time. Currently, Maria receives speech therapy at school and participates in outpatient occupational therapy sessions three times per week.

Maria's multidisciplinary team, including his parents, met to develop his program. They completed an ISSI (see Figure 3), UCC-EI, Global Planning Guide (see Figure 4 for the guide that also include UCC-EI items) and using information from these activities, Maria's team completed the Ziggurat Worksheet (see partial copy in Figure 5). Finally, they created a CAPS for her school program (see partial copy in Figure 6).

Figure 3. Maria's ISSI

Individual Strengths and Skills Inventory-ISSI Ruth Aspy, Ph.D., and Barry G. Grossman, Ph.D.

When designing an effective intervention plan, it is important to consider individual strengths. Please describe strengths in the following areas:

Social		Motor			
• Kind child		•	Enjoys jumping, running, and climbing		
• Engages be	est during predictable, repetitive activities	•	Strong		
• Engages in	parallel play in quite settings	•	Plays best during activities involving movement		
• Plays with	sister at home				
Responds v	well to parent praise				
Behavior, Inte	rests, and Activities	En	notional		
• Does very	well with structure	٠	Happy child		
• Prefers acti	ivities that are routine/predictable				
Communication		Biological			
• Able to rep	eat words	٠	Strong		
• Able to lab prompting	el objects and make simple requests with	•	Healthy		
		•	Sleeps well		
Sensory		Co	gnitive		
 Enjoys san 	d play	•	Good memory		
• Eats a rang	e of textures	•	Maintains skills		

Figure 4. Maria's Global Planning Guide (partial view only).

Global Intervention Plan: Guide to Establishing Priorities

Ruth Aspy, Ph.D., and Barry G. Grossman, Ph.D.

Directions: Following completion of the UCC and ISSI, the next step is to identify UCC **areas** and **items** that will result in a *meaningful* Global Intervention Plan. Consideration of priorities and strengths for an individual facilitates selection of UCC areas and items. The following questions are provided as a guide.

	Vision	"Begin with the end in mind" – Stephen R. Covey				
	• What is the short and l Note that "short-term" and	ng-term vision of/for the individual? "long-term" may be defined differently in order to be meaningful.				
	<u>Snort term:</u>					
reas	 Pretend play 	rentry requires prompting)				
	 Increase communication skills – follow two-part directions; use four-word sentences; communicate with same-age peers Long term (3 years); 					
	• Tell us about an event that occurred at school					
	• Make a friend					
	• Which UCC areas wo	ld have the greatest impact on achieving this vision?				
	Social, Communication, Sensory Differences					
	Settings					
	• In what settings does the individual participate?					
СА	School, home, family, church, OT					
ng UC	• Which UCC areas have the greatest impact on the individual's ability to function in multiple settings?					
lecti	Communication, Sensory D	ifferences				
Sel	Ouality of Life					
	• What is most important to the individual? What provides a sense of well-being?					
	Consider independence, re	ttionships, play/leisure activities, safety, health, etc.				
	Jumping, watching television	n, dog, structure and predictability				
	• Which UCC areas hav	the greatest impact on the individual's quality of life?				
	Restricted Patterns of Behavior Interests and Activities					
	Key UCC Areas					
	Based on your answers to the questions above, place a check X next to the key UCC areas .					
	Transfer to the Areas of Co	ncern section of the Ziggurat Worksheet.				
	Social Restricted Patterns of	Lehavior Interests O Motor Differences				
	and Activities	Emotional Vulnerability				
	Communication	Known Medical or Other Biological Factors				
	Sensory Differences					

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Key UCC Items

Selecting UCC Items

Select key UCC **items** for *each* of the UCC **areas** listed above. Choose items that are essential (necessary for progress) and developmentally appropriate. Emphasize items that are more pivotal (building blocks for additional skills). Avoid selecting redundant items.

Write key item numbers and descriptions below. These items will be used to develop interventions keeping strengths and skills (identified on the ISSI) in mind.

Transfer items to the **Selected UCC Item** section of the Ziggurat Worksheet. Develop interventions.

- Does not respond to the emotional expressions of familiar others
- Does not use sustained and purposeful eye contact or watch faces intently
 - Isolates self from others or chooses solitary play consistently and across settings
 - Becomes upset easily with interruption to routines or unanticipated changes in events
 - Uses objects in repetitive, atypical manner

- Fails to initiate or respond to either verbal or nonverbal gestures and greetings
- Does not spontaneously comment or share experiences may speak only when asked a direct question
- Responds in an unusual manner to sounds
- Responds in an unusual manner to visual input (angles/lines)
- Shows an unusual strong desire to do activities that provide movement

Figure 5. Maria's Ziggurat Worksheet (partial view only).

BEHAVIOR/AREA	FOR SPECIFIC	SELECTED UCC ITEMS	CHECK ALL THAT APPLY		
s of CONCERN Social Restricted Patterns Communication Sensory Differences	INTERVENTION PLAN Operationalized Behaviors	 Does not respond to the emotional expressions of familiar others Does not use sustained and Fails to initiate or respond to either verbal or nonverbal gestures and greetings 	A	В	C
		 purposeful eye contact or watch faces intently Isolates self from others or chooses solitary play consistently and across settings Becomes upset easily with interruption to routines or unanticipated changes in events Uses objects in repetitive, atypical manner Does not spontaneously comment or share experiences – may speak only when asked a direct question Responds in an unusual manner to sounds Responds in an unusual manner to visual input (angles/lines) Shows an unusual strong desire to do activities that provide movement 			
Structure & Visual/Tactile Supports	Structure & Visual/Tactile Supports Intervention:	X	X	X	
	Underlying Characteristics Addressed:	 Does not respond to the emotional expressions of familiar others Isolates self from others or chooses solitary play consistently and across settings Does not use sustained and purposeful eye contact or watch faces intently Fails to initiate or respond to either verbal or nonverbal gestures and greetings Does not spontaneously comment or share experiences – may speak only when asked a direct question Responds in an unusual manner to sounds 			

ZIGGURAT WORKSHEET (PARTIAL) Ruth Aspy, Ph.D., and Barry G. Grossman, Ph.D.

Figure 6. Maria's CAPS (partial view only).

COMPREHENSIVE AUTISM PLANNING SYSTEM

Time	Activity	Targeted Skills to Teach	Structure/ Modifications	Reinforcement	Sensory Strategies	Communication/ Social Skills	Data Collection	Generalization
9:00	Arrival	Complete arrival steps independently Greetings Emotion check	Task strip of arrival steps Emotion check-in poster	Reinforcement menu (after arrival steps)	Fidget	Language board Prompt to greet (fade)	D: # steps, greetings I, P Emotion (y/n)	Task strip at home for bedtime routine
9:10	Priming	Use language board to initiate, respond, comment	Visual schedule	Verbal reinforcement	Fidget or hold dog Carpet square	Language board Labeled area with icons to match schedule	M: # (5 min) initiations, responses, comments; 5 min	Language board at home Fidget at home
9:20	Sensory Break	Follow task strip Orientation to speaker	Visual schedule/task strip	Sensory activity is reinforcing Verbal reinforcement	Trampoline Dancing/ movement activity	Language board Labeled area with icons to match schedule	T: # steps, I, P # Orientation	Trampoline or fluffy pillows to jump on
9:30	Literacy/ Language Group	Use language board to initiate, respond, comment State standards Recognize emotion Independent transition to activity	Task strip of activities Visual schedule	Interacting with peers Verbal reinforcement	Fidget Carpet square	Language board Labeled area with icons to match schedule Transporters My Feelings book	T # (5 min) initiations, responses, comments; Grade book T # steps, I, P	Read books at home

Note: D=daily, M=Monday, T=Tuesday, I=Independent, P=Prompt.

Summary

The Ziggurat Model and CAPS provide a unique way to develop and implement a meaningful program and comprehensive for a student with ASD. The structure fosters consistent use of supports to ensure student success as well as data collection to measure that success. Compatible with current trends in education of young children with ASD, the Ziggurat Model and CAPS are also easy to use.

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