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A Case Report and Review of a Young Adult with Non-Verbal Low-Functioning Autism

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ABSTRACT: *This case report concerns a case of a young man GO, in his early twenties, who was diagnosed with Autistic Disorder (AD) when he was a preschooler. It sets out to look at the numerous therapies GO had undergone in the past, ranging from evidence-based therapies such as speech-language therapy and occupational therapy to unproven complementary and alternative therapies such as hyerbaric oxygen therapy and non-invasive chelation therapy. At the point of this writing, GO is learning life skills at a daycare center for young adults with autism. His parents have requested for a diagnostic evaluation of GO's condition to ascertain his latest status in terms of his capability so as to better understand his current level of functionality. With the information, they want to work on the next course of action as their child enters into the mid-twenties phase of adulthood, hoping that he will be gainfully employed and thus to lead a functionally independent and meaningful life.*

Key words: *Autism, Functionality, Skills.*

1. Introduction

Under the Individual Disability Education Act (IDEA) 2004, autism spectrum disorder (ASD), or autism for short, is defined as a developmentally disability affecting verbal and nonverbal communication and social interaction, usually evident before the age of three, and this, in turn, adversely affects a child's educational performance. Other characteristics that are commonly associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences.

In the current literature review, numerous published papers in journals, professional periodicals and web-blogs have described how different degrees of severity of the autistic symptoms affect the lives of these people, from impaired communication to difficulties in registering information from the surrounding environment. Amongst these, a critical question that has been frequently raised is: "How does a person with autism make up for his condition in such a way that he/she is able to cope well and function well into the later part of his/her life?" Such a question is very relevant to the primary caregivers and the people with ASD as well as the professionals working with them. This is even more crucial, especially for those with low-functioning autistic disorder (LFAD). From basic hygiene practice through social-emotional behaviors to personal safety, people with LFAD need a set of skills for daily living ranging from adaptive skills to mainstream behavioral practices designed specially to meet their needs. Acquiring a set of daily living skills in order to ensure long-term survival is the key to manage their autistic behavioral challenges.

Children with ASD have long-term difficulties in many areas of daily living, such as making a request, keeping oneself clean, looking for directions and many others. These are some examples to show the needs of these children to acquire essential skills that must be functional enough for them to adjust themselves to meet the demands of everyday life. These skills are termed as "adaptive behavior skills" (or living skills) and they

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often have implications of concern affecting activities of daily living (Siegel, 2007). In other words, the adaptive behavior skills refer to an individual's adeptness to adapt to changes in the everyday living, meeting and working with others (familiar or new people), constantly adjusting one's emotions to be in sync with different situations … are just some examples. Sigel (2007) also referred adaptive behavior skills as the same with "functional skills".

According to Bal (2015), adaptive behavior encompasses daily activities important to functional independence, including communication, social, and daily living skills (DLS). As mentioned earlier, some examples of DLS are personal hygiene, meal preparation, and money and time management. These skills are vital for an adult with ASD to leading a functionally independent life and with some form of structured or supported employment. Adaptive behavior which is needed for the proper execution of DLS is often defined by its typical performance, rather than ability (Sparrow et al., 2005). An individual with ASD may possess an average cognitive functioning but manifests low adaptive behavior (Klin et al., 2007). This would imply that although the individual has the means (abilities) to problem-solve, s/he may not be able to function (functionality, see next paragraph below) normally in order to do a good job (occupationality, i.e., the state or quality of being able to do a job).

According to the Oxforddictionaries.com (2019), the term "functionality" is defined as "The quality of being suited to serve a purpose well; practicality" (para.1). In other words, in order to be fully considered as functional, the job done must meet a certain predetermined benchmark set (quality) and also being appropriately suited (suitability) to serve (usability) in order to fulfil a purpose, i.e., to achieve its desirable aim or goal). In short, functionality is practicality in twofold, i.e., (1) to be able to carry out a function with a meaningful purpose; and (2) to achieve its desirable aim or goal for which something was made to fulfill its purpose. The failure to meet this operating definition of functionality suggests that a person is unable to function properly even when s/he has either average or high cognitive abilities. Klin et al. (2007) argued that adaptive skills can be separately addressed (or be trained till functionality is attained) for individuals with ASD.

2. A Brief Background Information about the Case

In this case report, it features a Chinese young adult, GO[1], aged 24 years 2 months. GO was diagnosed with autistic disorder (AD) and associated comorbidities when he was a young child at the Behavior Intervention Center for Children (BICC), Singapore.

Currently, GO is learning life skills at a learning center for adults with special needs run by a voluntary welfare organization. GO's mother had requested for a case review of their son's autistic condition. According to the mother, GO is the eldest son in the family and he has a younger sister with typical development. From the age of three, GO had gone through a series of conventional intervention sessions as well as complementary and alternative medicine or therapies (CAM/T). He received speech-language therapy, educational therapy, art and music therapies, traditional Chinese medicine including acupuncture, biomedical treatment, homeopathic treatment, non-intrusive chelation therapy, gluten-free diet, dolphin-assisted therapy, and many other alternative medicine and therapies. Like many other Singaporeans, GO's mother continues to seek CAM/T in spite of inconclusive or conflicting findings of research studies on the efficacy of the treatment. According to Chia and Kee (2013), "[A]pparently, those who go for CAM/T make them their choices based on the qualities of the provider, desire for individualized treatments, and their perception of overall effectiveness rather than efficacy (Boon et al., 2003). Other reasons why many people prefer to seek CAM/T include a positive valuation of CAM/T, the ineffectiveness of conventional or orthodox treatment for their complaint and dissatisfaction with care and communication with professionals providing the treatment (Vincent & Furnham, 1996)" (p.38). GO's mother has been very proactive in seeking and trying all kinds of treatment for him with the hope that GO will get better in future.

According to his mother and sister, GO is able to perform several daily chores, such as making his bed, folding, keeping and hanging clothes, going to toilet, bathing, combing and drying hair with a dryer (but he seldom does it). Besides, he is able to wash utensils, cut with knife or a pair of scissors, refreeze food of his choice (including untying rubber band, pouring food into a plate of appropriate size, keeping the food in the chiller, tying the packaging with rubber band), operating air fryer, stove, slow cooker, electric kettle and other

[1] The parents of GO have kindly given their signed consent for the case report to be published.

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electrical appliances, and make beverages using 3-in-1 mixed coffee or tea sachets that involves several steps as follows: (1) filling up a kettle with water from the tap, (2) boiling the water, (3) opening a sachet of coffee or tea powder, (4) pouring appropriate amounts of hot water, (5) stirring the hot coffee with a spoon, (6) adding cold water/ice to make it cool enough to drink, and (7) pouring the drink from a big mug into a smaller cup or bottle.

However, GO still needs guidance in brushing his teeth, shaving his mustache with an electric shaver, using a lighter (as GO is afraid of the heat), and knowing the exact amount of money to pay (though he is able to count money). In addition, he is still unable to travel independently using the public transport and it is still something his family is working hard to train him.

Currently, GO is picking up several practical life skills taught at his daycare activity center. His parents have expressed their wish to have a formal review of GO's abilities and skills to help them better understand his profile of weaknesses and strengths in order to work on those skills that need further training or drop those that are far too difficult for him to master.

3. Set of Instruments used in this Case

Several standardized measures were administered in order to review GO's case at the request of his parents. Below is a brief description of each of the assessment tools:

3.1. Autism Assessment

3.1.1. Autism Diagnostic Observation Schedule-Generic

The Autism Diagnostic Observation Schedule-Generic (ADOS-G; Di Lavore et al, 1995) is a semi-structured, standardized assessment of four domains, i.e., social interaction, communication, play, and imaginative use of materials, for individuals suspected of having ASD. Its observational schedule consists of four 30-minute modules. Each module is designed to be administered to an individual according to his/her level of expressive language.

3.1.2. Autism Diagnostic Interview™

The Autism Diagnostic Interview™-Revised (ADI™-R; Rutter, LeCouteur, & Lord, 1994) was also used. This test is the 2003 revision of the ADI™. It involves interviewing the client's parents or primary caretakers with the knowledge about the individual's current behavior and developmental history. The questions in ADI-R address the triad of symptoms related to ASD: (1) Language/Communication; (2) Reciprocal Social Interactions; and (3) Restricted, Repetitive, and Stereotyped Behaviors and Interests. The measure consists of 93 yes/no questions followed by probe questions that are scored on a scale of 0-2. The scores are then converted into diagnostic criteria based on the International Classification of Diseases-10th Revision (ICD-10; World Health Organization, 1993).

Both of the abovementioned measures were administered to ascertain accurately GO's condition: autistic disorder (AD). According to the records provided by GO's mother, he was delivered by elective Caesarean section at 38 weeks gestation. However, speech-language delay was noted at 18 months of age and a speech-language assessment was conducted, followed by the administration of ADOS-G and ADI-R.

3.2. Test of Nonverbal Intelligence, Third Edition (TONI-3)

The Test of Nonverbal Intelligence-3rd Edition (TONI-3; Brown, Sherbenou, & Johnsen, 1997) is a norm-referenced nonlinguistic problem-solving ability assessment tool used. It is suitable with individuals who have severe spoken language disorders, deaf or hearing impaired, non-English speakers, or English-language learners. It is used to assess the cognitive, language, or motor impairments due to neurological conditions. It also helps to identify individuals suspected of intellectual impairment. Since GO has severe speech impairment, TONI-3 was the choice of IQ testing and it was administered to better understand his cognitive ability.

3.3. Sensory Profile-Caregiver Questionnaire (SP-CQ)

The Sensory Profile-Caregiver Questionnaire (SP-CQ; Dunn, 1999) measures the sensory processing on an individual's daily performance patterns by providing information about his/her tendencies to respond to

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stimuli and which sensory systems are likely contributing or creating barriers to functional performance. The SP-CQ contains some 125 items that are organized into three main sections (Dunn, 1997):

(1) Sensory Processing: It contains six item categories that measure an individual's responses to possessing of sensory inputs via auditory, visual, vestibular, tactile and oral processes;

(2) Modulation: It contains five item categories that measure the individual's ability to monitor and regulate information to generate an appropriate response to the situation; and

(3) Behavioral and Emotional Responses: It contains three item categories that measure children's emotional and behavioral responses to sensory experiences.

In the SP-CQ administration, the primary caregivers are asked to record the frequency with which their charge displays each itemized behavior on a 5-point Likert scale: 1-always, 2-frequently, 3-occasionally, 4-seldom, or 5-never.

The SP-CQ administration provides a means to understand GO's sensory processing patterns and their effects on his ability to perform daily activities like handling relationships, performing tasks as required by his school, responding to every day challenges and many other every day activities. This caregiver questionnaire was completed by proxy involving his mother (the main caregiver) and sister (who has also been helping her mother to care for GO). With the SP-CQ results, GO's SP profile based on threshold level to sensory-related processing, sensory modulation, and emotional-behavioral issues was obtained. The SP-CQ information is useful for designing an appropriate intervention/remediation plan for GO, taking into consideration his sensory needs.

3.4. Adaptive Behavior Diagnostic Scale (ABDS)

The Adaptive Behavior Diagnostic Scale (ABDS; Pearson, Patton, & Mruzek, 2016) is "an interview-based rating scale that is used to assess adaptive behavior of individuals for ages 2 through 21 years … [Its] function … is to establish the presence and magnitude of adaptive behavior deficits" (Pearson, Patton, & Mruzek, 2016, p.1). The results of the ABDS administration provides both the therapist working with the client and the cleint's parents a better understanding of the client's daily functionality, especially relating to the practical tasks under the category of Daily Living Skills (Bal, 2015).

The ABDS provides information on the following three domains (see Pearson, Patton, & Mruzek, 2016, p.23):

(1) Conceptual Domain: It measures skills in language, reading, writing, mathematics, reasoning, knowledge, and memory.
(2) Social Domain: It measures empathy, social judgment, gullibility, communication skills, the ability to make and retain friendships, and similar interpersonal capabilities.
(3) Practical Domain: It measures self-management personal care, home living, community use, job responsibilities, money management, recreation, and organizing school and work tasks.

Raw scores obtained in the ABDS administration are converted into domain index scores, percentile ranks and age equivalents. An adaptive behavior composite (ABC) index score is computed from the sum of the scores obtained from the three domains. The descriptive terms that correspond to domain and composite scores are shown in Table 1 below:

Table-1. Descriptive Terms that correspond to Domains and Composite Scores

Domain & Composite Scores	Descriptive Terms
>109	Above average
90-109	Average
80-89	Low average
70-79	Low
55-69	Very low
<55	Extremely low

3.5. Learning, Executive and Attention Functioning Scale (LEAF)

The Learning, Executive and Attention Functioning Scale (LEAF; Kronenberger, Castellanos & Pisoni, 2016) is an assessment tool that measures the neuropsychological abilities related to executive functioning and learning. The LEAF consists of 3 major areas used to assess the overall functioning of the child. The first part

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is the Cognitive Learning where it looks into the conceptual and factual learning. The second part refers to the Cognitive-Executive Functioning where processing speed of the child, ability to solve novel problems and memory are assessed. The last part deals mainly with Academics like reading, writing and math skills. Depending on the scores given, they are categorized under as no problem, borderline problem range to problem range. These descriptions give information with regard to the delays and disturbances (Kronenberger, Castellanos & Pisoni, 2016) in the executive functioning and learning of a child.

4. Results and Discussion from Assessments for Psycho-Educational Evaluation and Profiling

In this section, the results based on the abovementioned assessment tools will be discussed in detail in order to evaluate and establish GO's psycho-educational profile.

4.1. Discussion of Results based on the Administered Tests

4.1.1. Results of ADOS-G and ADI-R

When GO was six years old, he was diagnosed with autistic disorder with scores above the cut-off range of the autistic population in the areas of communication, social relations and restricted, repetitive behaviors on both the Autism Diagnostic Interview Schedule-Revised (Lord et al., 1994) and the Autism Diagnostic Observation Schedule-Module G (ADOS-G) (Di Lavore et al., 1995) by a clinical psychologist at the Behavioral Intervention Center for Children (BICC) managed by the Autism Research Center in the National University of Singapore. His behavioral problems also included short attention span. He underwent the Integrated Playgroup Program offered at the BICC run by trainee psychologists doing their final year project. Table 2 below shows GO's ADOS and ADI-R results.

Table-2. ADOS and ADI-R Results when GO was 6 Years Old

ADOS: Results

Category	Cut-off Scores	GO's Scores
Social Interaction	7	20
Communication	4	10

ADI-R: Results

Category	Cut-off Scores	GO's Scores
Social Interaction	10	26
Communication	8	15
Repetitive Behavior	3	6

In an attempt to review GO's case, the writer of this paper has to review several past psycho-educational assessments and also conducted several additional assessments in order to provide an updated status on this young adult. In this section, these tests are briefly discussed and their respective results are discussed.

4.1.2. Results of TONI-3

The TONI-3 was administered as it has been found to be most suitable for GO since he is non-verbal. The test was administered when GO was 24 years 2 months and the results are shown in Table 3 below.

Table-3. TONI-3 Results

	Scores
Age Equivalence:	7:00
Deviant Quotient:	73
Percentile Rank:	4%ile

The TONI-3 score for GO showed an NVIQ of 73, suggesting that he displays some form of neurological challenge (Exkorn, 2005). This puts him far below the average IQ range of 90-110. With greater than one standard deviation (-1 SD) below the mean, the challenging intellectual condition is known as cognitive deficit (McGill et al, 2015) or two (-2 SD) below the mean, it will be in the category of cognitive disability. This result implies that GO has intellectual or cognitive challenges involving problem-solving skills, attention,

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memory, mathematics, visual comprehension, reading, linguistic skills, and verbal comprehension. With an NVIQ of 73, a relevant question to ask at this juncture would be "what other skills can GO learn to function as independently as he can?"

According to Cooijams (2005), the borderline retardation is in the IQ range between 70 and 79. A person whose IQ is found within this range has limited trainability and difficulty with daily demands (e.g., using a telephone directory, reading bus or train schedules, banking, filling out forms, using appliances, etc.) unless being taught to mastery and therefore require assistance from other people (e.g., community care and service workers, job coaches and other people in management of the individual's affairs. The person concerned can still be employed to do simple tasks but will require constant supervision.

4.1.3. SP-CQ

As explained earlier, the aim of administrating the SP-CQ is to find out GO's sensory-related processing problems that are affecting his thinking and learning processes. GO's mother and his sister helped to complete the SP-CG. The results of the SP-CQ are shown in Table 4 below:

Table-4. SP-CQ Results

Sensory Processing	**Score**	**Max**	**Range**	**Descriptor**
A. Auditory Processing	13	40	8-25	Definite
B. Visual Processing	13	45	9-26	Definite
C. Vestibular Processing	12	55	11-44	Definite
D. Touch/Haptic Processing	26	90	18-64	Definite
E. Multisensory Processing	9	35	7-23	Definite
F. Oral Processing	12	60	12-39	Definite
Sensory Modulation				
G. Sensory Processing Related to Endurance Tone	11	45	9-35	Definite
H. Modulation Related to Body Position Movement	10	50	10-35	Definite
I. Modulation of Movement Affecting Activity Level	12	35	7-18	Definite
J. Modulation of Sensory Input Affecting Emotional Responses	8	20	4-13	Definite
K. Modulation of Visual Input Affecting Emotional Responses & Activity	6	20	4-11	Definite
Sensory Behavior and Emotional Responses				
L. Emotional/Social Reponses	23	85	17-54	Definite
M. Behavioral Outcomes of Sensory Processing	6	30	6-18	Definite
N. Items Indicating Thresholds for Response	3	15	3-9	Definite

The above SP-CQ results provide a clear case of GO as a person with complete sensory processing disorder in all the sensory domains: auditory, visual, vestibular, touch/haptic, multisensory and oral. In other words, GO has sensory processing challenges that affect his ability to detect, process, and utilize external information and internal information to support adaptive behavior. As a result, GO struggles to modulate the sensory inputs from both the environment (external senses, i.e., those that detect information from the physical surroundings: vision, hearing, taste and smell) and his body (internal senses, i.e., those that detect information about the body: touch, proprioception, e.g., the position of the limbs in space, vestibular sense, e.g., the position of the head in relation to the body, and interoception, e.g., hunger, thirst, bladder distention) (Vincuilia, 2018). The central nervous system processes this information, determining if the information requires attention, if the world around GO is safe or risky, and then his brain responds accordingly. As such, the sensory processing system is closely associated with the emotional response system. In GO's case, his borderline retardation limits his brain to respond efficiently and appropriately and with poor sensory modulation, he struggles to cope with sensory overload (e.g., loud noise, rowdiness and crowded places). When feeling too bored without appropriate sensory input, GO may end up manifesting self-stimulatory behavior (e.g., vocal and/or motoric stimming).

Moreover, GO also displays definite challenges in his sensory modulation or regulation. In addition, based on his SP results, he has problems in his sensory behavior and emotional responsivity to the environment as well as the people around him.

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4.1.4. Results of ABDS

In Tables 5A and 5B below, GO's ABDS results are shown for each of the abovementioned three domains.

Table-5A. ABDS Results: Domain Index Scores

Subscales	Raw Score	Index Score	SEM	Percentile Rank	Descriptive Term	Age Equivalent
Conceptual Domain	78	<4< 400	(4)	< 1	Extremely Low	4 – 5 years
Social Domain	73	40	(4)	< 1	Extremely Low	2 – 8 years
Practical Domain	94	48	(4)	< 1	Extremely Low	8 – 9 years

Table-5B. ABDS Results: Adaptive Behavior Composite Index Score

	Sum of Index Scores	Composite Index Score	SEM	Percentile Rank	Descriptive Term
Adaptive Behavior Composite (ABC)	128	35	< 1	Extremely Low	NA

GO's adaptive behavior composite is categorized under the percentile ranking as extremely low with an adaptive behavior composite (ABC) score of 35. The low composite score implies that GO is experiencing severe challenges in communicating effectively with his surroundings, and he needs close guidance and monitoring if he is to live on his own and/or to socialize appropriately with others around him.

4.1.4. Results of LEAF

The aim of the LEAF administration is to determine GO's neuropsychological abilities related to executive functioning and learning. The results of the test are tabulated in Table 6 below.

Table-6. The LEAF Scale Results

No.	Subscales	Scores	Interpretation
	A. Cognitive Learning		
1	Comprehension & Conceptual Learning	10	Problem Range
2	Factual Learning	10	Problem Range
	B. Cognitive-Executive Functioning		
3	Attention	9	Borderline Problem Range
4	Processing Speed	10	Problem Range
5	Visual-Spatial Organization	2	No Problem Range
6	Sustained Sequential Processing	6	Borderline Problem Range
7	Working Memory	7	Borderline Problem Range
8	Novel Problem Solving	10	Problem Range
	C. Academic		
9	Mathematics Skills	5	Borderline Problem Range
10	Basic Reading Skills	11	Problem Range
11	Written Expression Skills	14	Problem Range

The Table 6 above showed that GO is in the problem range for areas like comprehension and conceptual learning, factual learning, processing speed, novel problem solving, basic reading and written expression skills. The problematic areas that will pose challenges for GO are, for example: processing and reasoning of information. Weaknesses in basic reading and written expression skills have indicated GO's literacy challenges in terms of expressing his emotions for others to understand him as well as able to put his ideas across to others so that they can comprehend him. There is a high probability that GO is experiencing the condition of alexithymia, which "is a personality construct characterized by the subclinical inability to identify and describe emotions in the self" (Sifneos, 1973, p.255). An additional test is required to confirm this condition.

GO is in the borderline problem range in areas like sequential processing, working memory and mathematics skills. This is not surprising since GO has been identified or diagnosed as a non-verbal autistic

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with a low NVIQ of 73. In a literature review study done by Kercood, Grskovic, Banda, and Begeske (2014), individuals "with autism have been found to score lower on measures of working memory than do typical controls especially on tasks that require cognitive flexibility, planning, greater working memory load, and spatial working memory, and with increasing task complexity and in dual task conditions" (p.1316). In addition, Kercood et al. (2014) also reported "lower scores in verbal working memory were associated with greater problems in adaptive behavior and more restrictive and repetitive behavior" (p.1316). With extremely low adaptive behavior composite score based on the ABDS administration and observable stereotypal behavior, it can be inferred that GO's verbal working memory is in the descriptive range of poor to very poor. As a result, GO has limited trainability in these areas: recall things, follow schedules and able to compute simple numerical operations with supervision. These findings are also confirmed by his mother and his sister.

As for his visual-spatial organization skills, GO has no problems and is able to locate his things and assemble things. According to Costandi (2011), people with autism process visual information differently from those without autism. Though they are known to have difficulty recognizing familiar faces and correctly interpreting facial expressions, their non-social visual-spatial processing skills are found to be superior to those of healthy people.

4.2. Discussion based on the Hierarchy of Building Blocks of Skills and Abilities

GO's mother has been thinking what are some of the possible venues GO may go for further intervention in the light that this young adult will be in his middle adulthood in the next five years and also his parents will not always be in the best healthy state to take care of him in the future. His sister has her own personal life to lead, too, especially once she is married and has a family of her own.

In the best interest of GO, his case has been reviewed through a series of information gathering cum meet-up sessions as well as emails, all provided by GO's mother and his sister. In addition, there were also several psycho-educational assessment reports provided by the family members. Furthermore, additional tests were also conducted by this writer and the results were used in alignment with the existing information in order to draw up accurate updates on GO's current condition.

The issue regarding where GO will go on for his intervention in the subsequent phase of development is discussed in this paper using the Hierarchy of Building Blocks of Skills & Abilities (Chia, 2008) as shown in the Figure 1 below:

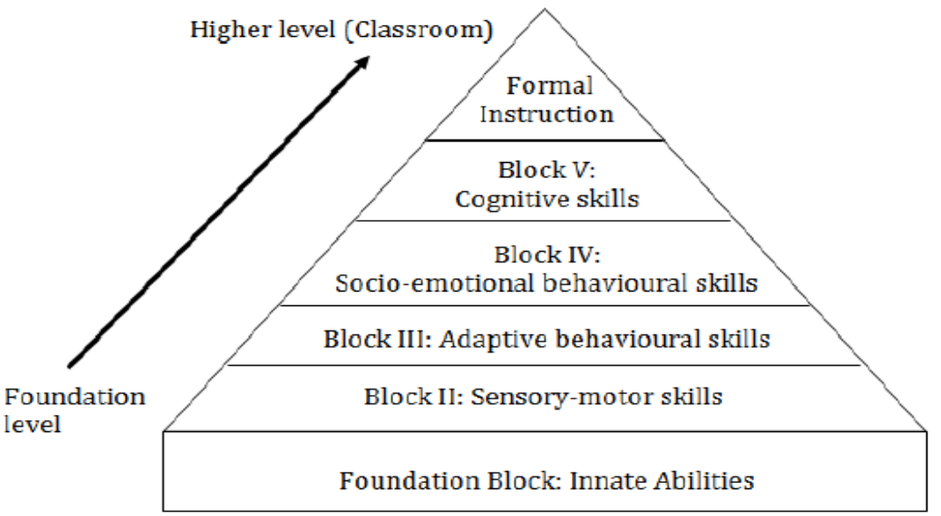


Figure-1. Hierarchy of Building Blocks of Skills & Abilities (Chia, 2008)

According to Chia (2008), the Hierarchy of Building Blocks of Skills & Abilities has 6 levels and each level serves a particular purpose. They are briefly explained below:

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Level #1: It concerns with the core block of skills that relate to the innate abilities of a person. These innate abilities deal with the use of language to communicate, abstract thoughts and reasoning skills, memory retention as well as problem solving skills.
Level #2: It concerns mainly with balance/motion of the body (vestibular) and position of body (proprioception).
Level #3: It concerns with the adaptive behavior and it consists of home living, social, self-help and independent skills.
Level # 4: It concerns adaptive, internalizing and externalizing skills.
Level #5: It concerns higher levels of cognition which involves knowing vocabularies, having worldly knowledge, able to do and manipulate numbers and possess the ability to carry out activities using reasoning skills.
Level # 6: It concerns with the ability to listen, carry out or give instructions.

The emphasis on using this hierarchy of building blocks of skills and abilities highlights the use of information from multiple test batteries in guiding the diagnostic decision to gain a fuller picture of an individual's cognitive abilities than can be ascertained through the use of single-battery assessments (Flanagan & McGrew, 1997). This approach is known as cross-battery assessment. Moreover, it is essential for an individual to have a balanced development in all the six levels of skills and abilities in order to function reasonably well to cope with the activities of daily living. This model is used to align with GO's current level of skills and abilities to obtain a better and clearer understanding of his functionality as well as occupational readiness for employability (if applicable).

Below is a brief description of GO's skills and abilities based on the assessment results and according to the hierarchy of skills and abilities.

4.2.1. Level #1: Innate Abilities

GO's NVIQ of 73 (based on the TONI-3 administration) with a 4 percentile places him in the category of cognitive disability. This implies that GO will continue to face daily challenges when it comes to planning, decision-making and understanding and using information. GO will also have difficulties in both spoken and written language. Although GO's has intellectually low level of innate abilities, GO can still develop practical life skills to manage his daily activities (Edgerton, 2001).

4.2.2. Level #2: Sensory and Motor Skills and Abilities

GO's problems in all the three sensory areas of concern involve sensory processing, sensory modulation/regulation, and sensory emotional-behavioral responses. In other words, GO has sensory processing disorder (SPD). The sensory dysfunctions may occur in each of the six sensory processing systems: auditory, visual, vestibular-proprioceptive (interoceptive), touch (tactile/haptic), multisensory, oral (olfactory/smell and gustatory/taste) (Dunn, 1999), and their symptoms may vary depending on the different sensory subtypes. Hence, it is often difficult to understand and diagnose an individual with SPD. GO may have one, two or up to eight sensory processing systems involved and one, two or up to six different subtypes. In other words, 6^6 or >46,656 different patterns of expression of SPD. Hence, GO's condition of SPD has to be assessed or evaluated individually and a sensory diet plan has to be customized to meet his sensory needs.

Having the condition of SPD means GO often misinterprets daily sensory information, such as touch, sound, and movement. He is bombarded by information: may crave intense sensory experiences, or may be unaware of sensations that others feel (Miller et al., 2017). GO may also exhibit sensory-based motor symptoms such as a weak posture, clumsiness or awkwardness or developmental delays in sensory-based motor skills. As a result, GO will need an inclusive environment that has to be universally designed to meet his sensory behavioral challenges.

With the condition of SPD, GO will also experience emotional, behavioral, social, attentional, or motoric problems and these are secondary problems that can take many forms (Cheng & Boggett-Carsjens, 2005) and are different depending on an individual and his/her family context.

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4.2.3. Level #3: Adaptive Behavioral Skills and Abilities

According to Sparrow, Cicchetti and Balla (2005), typically developing individuals have adaptive behavior skills that commensurate with their intellectual ability. However, for those with ASD and intellectual disability, their adaptive behavior has been found to commensurate with, or greater than, intellectual ability (Perry et al., 2009; Kanne et al., 2011). However, in GO's case, his NVIQ of 73 places him in the category of borderline intellectual functioning. There is a significantly wide gap between his IQ and his extremely low adaptive behavior composite of 35, with his rating of adaptive behavior falling about four standard deviations below his NVIQ and more than five standard deviations below the population mean, despite his borderline intelligence.

Although GO has low intellectual functioning, it does not mean that he will always be low in his adaptive behavior skills (Arc, 1999). Studies (e.g., Farley et al., 2009; Kanne et al., 2011) have suggested that adaptive behavior is more closely related to social functioning and independent living than intellectual ability or autism symptomatology (see Pugliese et al., 2015, for detail). In other words, GO can still be trained in order to adapt to the surrounding challenges. People with cognitive disability can still learn provided that they are given the right education, formal education and /or support so as to succeed with the tasks given to them (Tymchuk, Lakin, & Luckasson, 2001).

4.2.4. Level # 4 – Social-Emotional Behavioral Skills with LEAF; and
4.2.5. Level #5 – Cognitive Skills with LEAF

These last two levels are put together for a brief discussion here as the results for both levels are based on the same LEAF administration. GO's LEAF scores are mainly in the borderline problem ranges. These results agree with the TONI-3 results which categorized GO's non-verbal intelligence quotient in the borderline retardation range, i.e., the standard scores ranging from 70 to 79 (Cooijams, 2005). For such an individual like GO, he can still function but with limited trainability and will continue to experience difficulty with daily demands unless being trained to attain skill mastery level or receive assistance from other people such as community care and service workers and job coaches (see Cooijams, 2005, for detail). GO can still be trained until he is ready for partial or supported employment to do simple tasks with consistent supervision.

As mentioned earlier, GO will have issues with intellectual tasks (as confirmed by his TONI-3 score). In view of this weakness, GO may run into a series of challenging social issues, such as being a potential victim of sexual abuse (Lumley et al., 1999) and a subject of violence (Carlson, 1998). In addition, GO also lacks the much-needed social skills required for interaction with others. As he grows older, GO may run the risk of having depression, loneliness or anxiety (Tymchuk, Lakin, & Luckasson, 2001). This will affect GO's socio-mental health greatly.

5. Conclusion

Using the model of the hierarchy of building blocks of skills & abilities, GO faces challenges in all the levels of skills and abilities. To sum up his current status, GO can be categorized under the nonverbal borderline cognitive disability (NVIQ=73) with extremely poor adaptive behavior (ABC=35). This would mean that GO would need constant supervision and help in order to lead an independent lifestyle. At the present, GO is going to daycare center for adults with autism. The center provides special services which encompass education, vocational and life skills training and residential care for people with autism in Singapore. As a result, the family caregivers of these people with ASD can have a moment of daily respite. Apart from such residential daycare center where GO goes during the weekdays, there is also another almost similar residential care center, where it houses adults with special needs in the least restrictive possible setting.

Known as a community or community care home for people with the special needs, it provides therapeutic community living in a residential care center, involving allied health professionals (e.g., occupational therapists, physiotherapists, speech-language therapists, rehabilitation therapists, counselors and social workers) (Lim & Chia, 2017). If needed, it may also include the additional services of nurses and doctors, especially more so for those residents with medical conditions.

In the community home, depending on a person with special needs' level of social interaction, s/he may meet a lot of other people with special needs staying there together with the professionals who are helping these residents to interact among themselves. Community homes are also staffed with counselors and other community care service workers (including job coaches) who facilitate the daily living activities to help these

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residents live as functionally independent as possible. In some instances, the residents can even live quite independently without professional or para-professional assistance. Besides, some people with special needs, especially the older or elderly individuals, may require some form of additional assisted living facilities. It means that the "more independent" residents can cook their own food as well as for others and/or eat together in a communal dining hall. It is beyond the scope of this paper to delve into details on living in a community home.

As mentioned earlier, functionality within the context of a community home – also known as communal functionality – is practicality that refers to the quality of being suited to serve a communal purpose well. In GO's case, his current level of skills and abilities in terms of communal functionality should qualify him to stay in a community home. It is where he can acquire relevant daily living skills (taught and/or supervised by the care and service workers), not only for the purpose of leading his functionally independent life, but also to serve others (e.g., cooking meals for them) staying there, too. In other words, GO's level of occupationality or his state or quality of his being able to do a job (e.g., cooking meals and washing dishes) will become an asset to the services of a community home. What is needed to be done for GO as a follow-up action is to have him further evaluated to ensure that living in a community home is beneficial to him and his personal growth. The writer can only recommend to GO's parents to give such an option a thought. The details of such homes will be described in depth in a separate paper entailing communal living for adults with special needs.

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