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SAISI WEBSITE: www.instsi.co.za
Views contained in articles appearing in this newsletter do not necessarily reflect the opinion of the South African Institute for Sensory Integration.
As the Ubuntu-blood rushes through our veins it is no surprise that it is the South African therapists who are collaborating with therapists all over the world to take ASI® further.

It is therefore fitting for the Madagascar friends to lead us to the end of the year. This edition of the newsletter is filled with exciting developments happening right here in South Africa which again substantiates what we do for our population. There is feedback from the exhilarating 4th European Sensory Integration Congress held in October this year and some relevant revisits to old friends.

I trust you will find this edition reaffirming who we are as occupational therapists.

Amy Rode
COMPUTEDITION

Results of COMPUTEDITION ONE: R100 won by the following therapists with great ideas for community SI ideas:

BRIDGET HARTLEY

Sensory systems involved: great proprioceptive feedback, bilateral upper limb skills, shoulder stability, eye-hand coordination.

Materials required:

- any number of plastic packets (Checkers etc.) - fairly intact
- a source of water - tap, dam, bucket, large basin, river or the ocean!
- a target - something to knock down (cardboard box), a pole, a rock or anything that looks sturdy and can tolerate water all over it.

Structure of game:

Holding the plastic packets by the handles, semi fill them up with water. Then either tie the packets closed or just lift them up still open and carry them as close as you want to the target and FLING your homemade water balloon in that direction! Use on a hot day and expand into a water fight! Remember to pick up all the pieces of plastic when it is over.

JACQUI JORGE

For me music and rhythm and timing is an important 'ingredient' to facilitate sensory integration. I would look at ways to create musical instruments and then create dances to the music. This can be a lovely individual and group activity. This would also be a fantastic way to simulate praxis- ideation by thinking how they can create different sounds using different everyday objects and gives the opportunity to explore the sound of metal on metal vs sticks and stones for example. This is also a good way to incorporate multi-sensory inputs which really afford the opportunity for sensory integration: vestibular input- by including movement; proprioception through the making of the instruments as well as the making of the sounds e.g. repetitive shaking of a heavy shaker can be organizing. Finally music can be used to help explore and facilitate arousal regulation through a program such as the Alert Program.

Instruments:

- Shakers
- Drums
- Percussion
- Bodies
- Voices

Very exciting and can be graded to age, resources, cognitive capacity, etc.

MICHELLE LUYT

My favourite sensory activity for the community is gardening.

Gardening involves all the senses, depending on the intensity of the gardening. There is plenty of tactile input from the soil and feeling the fresh air on your skin, smelling the earth, seeing the surroundings, hearing the birds (or traffic, depending on where you live) and then tasting the lovely produce when the veggies are harvested. Movement is stimulated by bending over, and proprioception is involved in digging. An all-rounder! And gardening is a lifelong skill, so this task is not only purposeful, but meaningful as well!
KATE BAILEY


**Equipment needed:**
- Tennis ball or soccer ball (size of ball graded for age and skill of people involved)
- "Crash" mats – between 2 to 4 double duvet covers filled with foam off cuts or scatter cushions.

**Structure of the Game:**
Between 4 and 8 people stand in a circle with the ‘crash’ mats in the centre. Each person is allocated a number. One person has the ball and shouts out the number of someone in the circle e.g. “Number 3”, and then throws the ball up into the air above the ‘crash’ mat. Number 3 then has to make one turn in a circle and dive to catch the ball, landing on the ‘crash’ mat. That person (number 3), whether he/she catches the ball or not, then takes a turn to call a number and throw the ball into the air e.g. “Number 1”. Number 1 then makes one turn in a circle and dives to catch the ball, landing on the ‘crash’ mat. So the game continues. This game may be competitive i.e. if the ball is caught, the person gains a score. It may be non-competitive i.e. the group cheer when the ball is caught and no scores are counted.

**Grading and variations:**
1. Instead of turning in a circle, the person whose number is called, touches his/her toes and then dives to catch the ball. (variation in vestibular input)
2. The person whose number is called, does a somersault onto the ‘crash’ mat and then attempts to catch the ball. (variation in vestibular input)
3. The person who has the ball can decide what the person whose number is called must do before catching the ball e.g. “Touch your toes, number 5” or “Do a somersault, number 2”. (variation in auditory processing)

**Equipment needed:**
- Tennis ball or soccer ball (size of ball graded for age and skill of people involved)
- “Crash” mats – between 2 to 4 double duvet covers filled with foam off cuts or scatter cushions.

**1ST PRIZE**
Weighted Collar from SpecialU (Yvonne Romyn)

**2ND PRIZE**

Please send photos/descriptions/clip explaining and describing it to Sally Fraser-Mackenzie at sm@cyberperk.co.za. Your deadline for sending in entries is 31 January 2016. As many entries per person as you like.
IDEATION & OBJECT AFFORDANCES: IDEAS FROM THE PENGUINS OF MADAGASCAR

BY Elize Tanse van Rensburg M. OT (UFS)

INTRODUCTION

THE CONCEPT OF IDEATION IN PRAXIS IS ONE OF THE RELATIVELY NEWER DEVELOPMENTS IN THE FIELD OF SENSORY INTEGRATION, WITH FORMAL PUBLICATIONS ON IDEATION ONLY SURFACING FROM AROUND THE YEAR 2000 ONWARDS. ONE OF THE PIONEERING SCHOLARS IN THE FIELD OF IDEATION, DR. THERESA A. MAY-BENSON, VISITED SOUTH AFRICA FOR THE ANNUAL SAISI AGM WORKSHOP AT LA VIIDA LODGE (GAUTENG) IN JUNE THIS YEAR. SHE PRESENTED AN INSPIRING WORKSHOP ON THE ASSESSMENT OF IDEATIONAL PRAXIS, AND INTERVENTION FOR CHILDREN WITH IDEATION DIFFICULTIES.
Conceptually, ideation as part of the praxis process is reliant on (1) a cognitive awareness of a need for goal directed action, and (2) previous knowledge of actions and characteristics of objects, known as object affordances (May-Benson 2001:169). Knowledge of what an object offers in terms of object interaction opportunities is in turn reliant on previous experiences as well as reacting to the sensory characteristics of the object as it is perceived, experienced and explored. Coming up with ideas for object interactions is used as a fundamental indicator in the assessment of ideational praxis by May-Benson in her Test of Ideational Praxis (TIP).

While both ASI® intervention and intervention for ideation as conceptualized by May-Benson will require the child to come up with ideas for object-interactions (i.e. child-led intervention), having a bank of ideas of object affordances is vital for therapists in order to be able to scaffold and optimize the child’s person-object-environment interactions in therapy.

Coming up with novel ways to use and interact with objects is an art that was perfected by the penguins from Madagascar. I decided to invite these creative, monochromatic friends over to the practice to help me come up with ideas to use a slightly unconventional piece of therapy equipment – a ladder from a hardware store. Here are some of the ideas that the masters of ideation came up with that may provide you with some inspiration in your practice.
Climb up to block-able

Climb over to swing-able

Climb up-able

Climb into-able

Jump off-able
SAFETY FIRST!

Whenever utilizing any piece of equipment in therapy, always remember to consider safety. The penguins wish to remind therapists of the following:

- Mattresses should be placed under all equipment at all times.
- Maintain close proximity to the child in order to provide physical support as needed.
- Cover hard surfaces with padded materials (not pictured), such as:
  - Wrapping padded materials around the ladder
  - Covering moving parts of the ladder with removable padding e.g. a piece of ‘pool noodle’ (see picture)
- When altering the setup of the ladder you can ask the child to give suggestions and to assist, but the penguins advised that the therapist should be the one manipulating the locking mechanisms to ensure safety and prevent any pinching of fingers.

REFERENCES

SENSORY INTEGRATION AND CREATIVE ABILITY: TOWARDS A SYMBIOSIS for SELF-ACTUALISATION

BY

Elize Janse van Rensburg, M. OT (UFS)

FOR OCCUPATIONAL THERAPISTS TRAINED AND PRACTICING IN THE FIELD OF SENSORY INTEGRATION, THIS RIGOROUS AND EXTENSIVELY RESEARCHED THEORY1 PROVIDES A POWERFUL LENS THROUGH WHICH WE MAY VIEW OUR CLIENTS, AS WELL AS A POTENT TOOLBOX TO EMPLOY THE SENSORY INTEGRATION GUIDED KNOWLEDGE AND SKILLS TO GUIDE INTERVENTION. SIMILARLY, THE THEORY1 OF MOTIVATION AND ACTION OR “CREATIVE ABILITY” DEPICTED IN THE VONA DU TOIT MODEL OF CREATIVE ABILITY IS ANOTHER POWERFUL CONTRIBUTOR TO THE OCCUPATIONAL THERAPIST’S TOOLBOX – ALTHOUGH BEST KNOWN FOR ITS APPLICATION IN THE FIELD OF MENTAL HEALTH.

In this opinion piece I will reflect on the origins and core assumptions of these two theories that may guide our practice in paediatric occupational therapy. Postulates regarding change, growth and/or development will be considered, and the interactive nature between the two theories will be highlighted from case examples. I will argue that, in combination, these two theories provide a “mix” that not only answers to the call for holistic mind-brain-body consideration (Bundy & Murray 2002:17) in intervention, but is also contextually relevant (Alers 2008:3). Finally, I will reflect on some potential conflicts or challenges that may require special consideration in practice when choosing to work with these two theories simultaneously. The purpose of this opinion piece is to start eliciting discussion on how the theories of sensory integration and creative ability can augment one another in therapeutic practice.

1. HISTORICAL OVERVIEW

Originating in the United States in the 1950s, the theory of sensory integration was developed over the course of more than three decades by occupational therapist A. Jean Ayres who is, to this day, honoured and respected.

1The term “theory” will be used in connection with both sensory integration and creative ability for ease of reading, although due acknowledgement is given to the development of these bodies of knowledge as, among others, theoretical frames of reference and models (Sherwood 2011; Schaaf et al. 2010).
by professionals and families around the world. Ayres’ work, which she did with so much passion and scientific rigour brought answers, insights and solutions not before thought possible (Clark in Ayres 2005:X; Coleman & Mailoux in Ayres 2005:XI).

Some years later, starting in the 1960s and halfway around the world in South Africa, Vona du Toit’s work on volition and action took form. Vona du Toit, an occupational therapist, like Jean Ayres, had an inextinguishable enthusiasm to elucidate meaningful life for humanity and her contributions in this regard earned her national and international renown (SAJOT 1974 in Du Toit 1991:iv; Alers 2008:4).

Both Ayres and Du Toit have been acclaimed as “visionaries” and with thinking “ahead of their time”. These two dynamic occupational therapists have made an invaluable contribution to the profession of occupational therapy and while doing their work in similar times but removed by thousands of kilometres. Today, it is only by virtue of careful synthesis of both these pioneer’s works in practice that we are coming to realise the benefits of the complementary interplay between these great theories when working with children with sensory integrative dysfunction. However, although I have experienced the practical symbiotic relationship between sensory integration and creative ability, it is imperative to investigate this phenomenon from a theoretical stand point – consequently the core assumptions of both these theories need to be further compared.

2. CORE ASSUMPTIONS

I have attempted to delineate five core assumptions that are present in both the theory of sensory integration and the theory of motivation and action. Presented here are my interpretations of various assumptions in literature, and admittedly an over-simplification of theoretically rich concepts. However, the purpose of this section is to illustrate some of the ontological similarities between the two theories, and ultimately argue the compatibility of these theories, when used in combination, poses powerful therapeutic potential (Pierce 2003:294).

Assumptions about development

Ayres described sensory integration as a developmental process that occurs when the brain processes information from the environment (received through the senses) and organises this information for use to interact meaningfully with the environment (Schaaf, Schoen, Smith Roley, Lane, Koomar & May-Benson 2010:100). Ayres described and acknowledged the sequential nature of development, and the effects of environmental (experiential) influences on the developmental process. Aligned with this assumption, sensory integration-based therapy will meet the child at their current developmental level while working towards increasingly complex abilities (Schaaf et al. 2010:106).

Similarly, within the theory of creative ability, acknowledgement of the sequential, predictable, orderly nature of human development throughout life is emphasised (Du Toit 1991:51; De Witt 2005:9), and the development of motivation and action is described along linear hierarchical levels in the Vona du Toit Model of Creative Ability (Alers 2008:4). In the application of the theory, Du Toit (1991:50) pointed out that there is a distinction between restoring creative ability in an adult where pathology has influenced the person’s creative ability, and encouraging the development of creative ability in children. She theorised in the context of children with cerebral palsy that there is a dynamic interaction between the child’s physical expression of himself, and the development of the child’s “being” and creative ability. Du Toit (1991:51) argued that, where the child is perpetually confronted with his or her inabilities, that the child will also be hampered emotionally, behaviourally, and in creative ability.

The importance of meeting the child at their ‘current level of functioning’ in order to scaffold from there to increasingly adaptive levels of occupational performance is further emphasised in both theories (Shaaf et al. 2010:133; De Witt 2005:4). Both theories’ perspective on development recognises the complexity of mind-brain-body-environment interactions that contribute to human development (despite emphasising different aspects of these interactions) while maintaining the sequential view on development.
Assumptions regarding person-environment interactions
Ayres identified successful interactions with the environment (referred to as “adaptive responses”) as an essential contributor to enhanced sensory integration and consequently improved occupational performance (Ayres 2005:14). The role of the environment and the child’s ability to adapt to changes in the environment is highlighted, and Ayres emphasised the importance of structuring environments in the therapy setting that will provide enhanced opportunities for successful interactions with the environment (“adaptive responses”) (Reeves & Cermak 2002:88).

Along very similar lines of argumentation, creative ability theory suggests that where the child’s response to changes in environmental demands is successful and pleasurable, this will enhance self-satisfaction and facilitate future success in responding to the environment (Du Toit 1991:52; De Witt 2005:9-10). Creative ability theory however also postulated that where the child is unable to respond successfully to environmental demands, stagnation or regression along the developmental continuum and dysfunction in occupational performance may occur as a result of anxiety elicited by the unattainable environmental demands (De Witt 2005:9). Gleaning from these inherent ontological positions, both theories seem to argue the importance of success and pleasure in attaining effective adaptive responses.

Assumptions regarding the “just-right challenge”
Building upon assumptions regarding person-environment interactions, the notion of the “just-right challenge” is described in both theories. In order for the environment to support optimal development, the child must be afforded with opportunities for adaptive responses and mastery (Reeves & Cermak 2002:88) or success (Du Toit 1991:52). The “just-right challenge” will elicit active participation and optimal engagement from the child (Schaaf et al. 2010:106-107) right at the edge of the child’s current ability in order to exert what Du Toit called “maximum effort” (Du Toit 1991:23) which is the essential ingredient for growth from one level to the next. Both sensory integration and creative ability theories therefore emphasise the therapist’s responsibility to facilitate growth opportunities through creating “just-right challenges” (activities that have the potential to promote development through learning new skills) while still ensuring success in its execution (i.e. meeting the child at the child’s current level of functioning).

Assumptions regarding inner drive
From her earliest work, Ayres described the child’s “inner drive” to interact with the environment and to develop sensory integration (Schaaf et al. 2010:107; Ayres 2005:15). She also reiterated the importance of the child engaging from this “will to act” (i.e. active, self-directed involvement) with activities in order for activities to hold maximal therapeutic power to enhance adaptive responses and the sensory integrative process (Alers 2008:4).

The theory of creative ability, consisting primarily of two components namely motivation and action, predict the quality of the child’s “will to act” at different stages of development, and offers guidelines on how to optimally engage with this inner drive. Based on the predominant characteristics of the child’s motivation and action, strategies for activity selection, presentation and handling of the child are identified and can be used in intervention planning and implementation.

Assumptions regarding change, growth and self-actualisation
Recognising the need for an occupational focus in sensory integration theory, Fisher and Murray (1991 in Bundy & Murray 2002:14-15) developed the spiral process of sensory integration and self-actualisation in which the dynamic spiral process of sensory integration was merged with a spiral process of self-actualisation based on volition theory derived from the Model of Human Occupation (see Figure 1). This model is discussed extensively in Bundy and Murray (2002:14-16) and will not be discussed in detail here. Based on the assumptions of sequential hierarchical development, person-environment interactions (‘sensory intake’) and adaptive responses (‘adaptive behaviour’) the process of sensory integration in close relation with the volitional state of the self-directed motivated child is depicted as a spiral towards adaptive occupational behaviour and ultimately self-actualisation.
Alers (2008:4) suggests that this spiral process closely resembles the traditionally linear hierarchical levels suggested in the Vona du Toit Model of Creative Ability. She superimposed the progression along the levels of motivation and action onto the spiral process of sensory integration and self-actualisation model as depicted in Figure 1. Despite popular notions regarding the linear nature of progression of the Vona du Toit Model of Creative Ability, Du Toit herself in early writings remarked: “creative ability progresses in a spiral fashion embracing those creative responses which went before, and moving on to those ahead. The spiral also increases in the depth or vertical dimension in its upward progression” (Du Toit 1991:28). Du Toit explained that while progressing through the stages of creative ability, the child will have access to the motivation and action from two to three levels simultaneously, oscillating subtly between the stages depending on internal and external factors (Du Toit 1991:38,52).

The notion of development along an upward moving spiral, toward self-actualisation, seems to be the most striking resemblance and also the inspiration behind the title of this piece. Albeit not unique to these two theories, the facilitation of human potential towards actualising his or her potential (self-actualisation as depicted in Figure 1, or creative capacity as described by Du Toit (1991:22)) is striking as it stands at the centre of the character of both these theories. Therefore the combination of the two theories in practice seem to hold much promise as both have the same end-goal in mind.

This section has attempted to give an overview of key overlapping assumptions between the theories of sensory integration and creative ability with the aim to highlight the compatibility but also the complementary nature of these theories. In the following section, I will consider the symbiotic relationship of these two theories from a practice perspective.
3. POSTULATES FOR DISCUSSION

Based on these five core assumptions, I will put forward three postulates about the use of the theory of sensory integration and the theory of creative ability in symbiosis while working with children with sensory integrative dysfunction:

• Sensory integrative dysfunction may restrict development of motivation and action.
• Creating the just-right challenge and connecting with the child’s inner drive while working towards self-actualisation requires careful consideration of both sensory integrative functions and creative ability.
• Targeting certain sensory integrative functions may be more suited to certain levels of creative ability.

Each postulate will be discussed in more detail and illustrated by means of case studies or examples from practice.

Postulate 1: Sensory integrative dysfunction may restrict development of motivation and action.

Registration, modulation, discrimination and organisation of incoming sensory inputs are what constitute the sensory integrative process. When this process occurs naturally and mostly adaptively in order for a child to respond successfully to environmental demands, a continuous flow of adaptive responses and building of new neuronal models occur, leading to an ever-increasing sense of mastery, success, confidence, meaning and satisfaction, ultimately leading to optimal occupational performance and self-actualisation.

However, when difficulties occur in the sensory integrative process, i.e. in the presence of sensory integrative dysfunction, responses to the environment are typically less successful and adaptive, resulting in experiences of failure (Ayres 2003). The child forms less neuronal models based on successful action and thus becomes increasingly less able to cope with the demands of the environment (as these demands typically increase with the child’s age). As argued by Du Toit (1991:51) experiences of inadequacy are detrimental to the development of a child’s motivation and action, i.e. his or her creative ability, which may result in “immaturity” and behavioural and/or developmental difficulties frequently observed in children with sensory integrative dysfunction.

Alternatively, when viewed from a creative ability perspective, lower levels of creative ability are typified by a lack of adequate sensory integrative functions. For example, on the level of self-differentiation it is commonly described that the person is developing sensory identification, self-awareness, body concept, and refined motor functions (Du Toit 1991:25; De Witt 2005:20) – all functions related to the sensory integrative process. It stands to reason that, where a lack of sensory integration occurs, development along the continuum of motivation and action may be hampered by the child’s inability to attain the basic functions of this level of creative ability. Therefore, for children with sensory integration difficulties, the development of their creative ability and consequently attainment of their creative potential and self-actualisation, may be impaired. Due acknowledgement is also given to the fact that the influences of sensory integration and creative ability are or can be reciprocal, i.e. that lack of development of creative ability may also hamper development of sensory integrative functions. However, case examples will be presented primarily from the stance of the initial explanation.

Case Study: Stephen2 is a seven-year old boy and in Grade 2. He prefers sedentary activities and takes part in chess. He avoids sport, especially contact and team sports, and becomes very distressed when water splashes in his face during swimming lessons that his parents have enrolled him in order for him to learn about basic water safety. Stephen’s parents are concerned that he often engages impulsively and “immaturely” in situations, such as shouting out answers in class or “clowning” when he is with his peers (often resulting in social rejection). Assessment of Stephen’s sensory integrative functions revealed both modulation and discrimination difficulties in the tactile system. Assessment of his level of creative

2 Pseudonym
ability revealed motivation and action predominantly characteristic of the level of self-presentation (i.e. motivated to ‘present the self’ and action directed toward ‘exploration’).

Based on the postulate that sensory integrative dysfunction may restrict development of motivation and action, it is argued that as a result of early unpleasant (modulation difficulties) or unsuccessful (discrimination difficulties) experiences in interactions with the environment that challenged the tactile sense, Stephen became increasingly less “self-driven” to experience or succeed at these interactions (e.g. choosing sedentary play activities and avoiding sports). This not only results in decreased opportunities to develop sensory integration, but also restricts the development of creative ability. While Stephen would be expected to fluctuate between different levels of creative ability, predominance of the participation levels (passive, imitative, active) would typically be expected at his age (Crouch & Alers 2005:276; Du Toit 1991:28).

However, Stephen seems to function predominantly within the level of self-presentation, characterised by explorative handling of materials and tools as well as explorative engagement with others (e.g. testing reactions in an effort to establish social boundaries) and very short duration of maximal effort in activity participation (Du Toit 1991:68-69), contributing to his parents’ interpretation of his behaviour as “immature”.

**Postulate 2: Creating the just-right challenge and connecting with the child’s inner drive while working towards self-actualisation requires careful consideration of both sensory integrative functions and creative ability.**

Understanding the “just-right challenge” requires the therapist to understand and be able to identify cues for the presence or absence of “optimal engagement”. Creek (2003:52) defines engagement as “attention or commitment to an undertaking; fascination or involvement with an activity or interest so that the attention is held fast.” We know that an activity is “just-right” when the child “engages” – we know that the child “engages” if the child’s attention to the activity is maintained, the child is actively involved in the activity and fascinated by what he/she is doing. Pierce (2003:118), when writing about designing occupations for appeal, adds that engagement of the child in the activity is noted when the child is comfortable and relaxed in the activity.

Knowing what engagement looks like is a good platform to work from. From a sensory-motor perspective the skilled sensory-integration trained occupational therapist will be able to structure “just-right challenges” artfully, however at times despite all efforts to ensure “just-rightness” from a sensory-motor perspective, something appears to be amiss and the child just does not engage on the level anticipated by the therapist, resulting in less-than-optimal success and learning. I would argue that this will happen where, despite being on a “just-right” sensory-motor level, the innate characteristics of the activity is not pitched at the correct level to connect with the child’s “inner drive” as manifested in the child’s creative ability (Du Toit 1991:23).

Sensory integration theory provides limited guidance on how to connect with the child’s inner drive, or how to facilitate this drive where it is lacking. In a section titled “Striving to find inner drive”, Bundy and Koomar (2002:250) explain that where the child does not seem to engage optimally, it may be attributed to any of the following reasons: the activity is too difficult, or the child perceives the activity as too difficult, the child’s level of arousal is not optimal, the activity is too “childish” or the activity lacks meaning for the child. Using these pointers may guide the therapist to adapting the activity on any of these parameters, however even this does not always seem to be effective and it still does not really give an answer to how to connect with the child’s “inner drive”. I would argue that it is here that a merger between the ontologically similar yet practically distinct theories of sensory integration and creative ability can serve the therapist and child most beneficially.

Table 1 presents a very concise summary of the characteristics of the levels of creative ability – simply to serve as a reminder as you continue reading.
### TABLE 1

**ABBREVIATED CHARACTERISTICS OF THE RESPECTIVE LEVELS OF CREATIVE ABILITY**

(adapted from Van der Reyden (in De Witt 2005:58-60) and Du Toit (1991))

<table>
<thead>
<tr>
<th>Tone</th>
<th>Self-differentiation</th>
<th>Self-presentation</th>
<th>Passive participation</th>
<th>Imitative participation</th>
<th>Active participation</th>
<th>Competitive participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volition</td>
<td>Maintenance existence</td>
<td>Differentiate the self (egocentric)</td>
<td>Present the self</td>
<td>Skill acquisition (robust)</td>
<td>Directed to product</td>
<td>Improvement of product</td>
</tr>
<tr>
<td>Action</td>
<td>Pre-destructive / Undirected</td>
<td>Destructive / incidentally constructive</td>
<td>Explorative</td>
<td>Product-centred (experimental)</td>
<td>Product-centred (imitative)</td>
<td>Product-centred (original)</td>
</tr>
<tr>
<td>Steps</td>
<td>None</td>
<td>1-2 steps</td>
<td>3-4 steps</td>
<td>5-7 steps</td>
<td>7-10 steps</td>
<td>-</td>
</tr>
<tr>
<td>Product</td>
<td>None</td>
<td>Coincidental - result of destructive action</td>
<td>Simple, poor quality, coincidental – result of exploration with tools/ materials</td>
<td>Fair quality (aware of expectations), end-product important</td>
<td>Reproduction of example, good quality product (according to expectations)</td>
<td>High standard influenced by interests and aptitudes</td>
</tr>
<tr>
<td>Tool &amp; Material handling</td>
<td>None</td>
<td>Simple everyday tools – handling ‘by chance’</td>
<td>Basic tools for activity participation – poor handling</td>
<td>Appropriate skill</td>
<td>Good</td>
<td>With initiative</td>
</tr>
<tr>
<td>Relation to people</td>
<td>No effort to make contact</td>
<td>Recipientivity, fleeting awareness, response not maintained</td>
<td>Makes contact, explores reactions, superficial</td>
<td>Maintains contact, communicate, more predictable</td>
<td>Interacts, maintains relationships, lacks intimacy</td>
<td>Close interpersonal relationship, intimacy, considers others</td>
</tr>
<tr>
<td>Handling situations</td>
<td>No relation to situation</td>
<td>Undifferentiated, behaviour – unable</td>
<td>Stereotypical handling, makes effort (unsure)</td>
<td>Follower, variety of situations (prefers familiar), passive participation</td>
<td>Appropriate behaviour in most situations</td>
<td>Can adjust, enjoys new situations</td>
</tr>
<tr>
<td>Task concept</td>
<td>No task concept, basic concepts</td>
<td>No task concept; basic and elementary concepts</td>
<td>Partial, compound concepts</td>
<td>Total task concept, abstract element concepts</td>
<td>Comprehensive task concept, integrated abstract concepts</td>
<td>Abstract reasoning</td>
</tr>
<tr>
<td>Assistance / supervision</td>
<td>Total assistance</td>
<td>Physical assistance, constant supervision</td>
<td>Constant supervision</td>
<td>Regular supervision</td>
<td>Guidance, occasional supervision (familiar), regular supervision (unfamiliar)</td>
<td>Guidance / training, responsibility for self, helps to supervise others</td>
</tr>
<tr>
<td>Behaviour</td>
<td>Bizarre / disoriented</td>
<td>Bizarre, little reaction, disorientation</td>
<td>Strange, hesitant, unsure, willing to try</td>
<td>Follower, more predictable (occasionally strange)</td>
<td>Acceptable, controlled</td>
<td>Acceptable, shows originality</td>
</tr>
<tr>
<td>Norm awareness</td>
<td>None</td>
<td>None</td>
<td>Starts to be aware (no compliance)</td>
<td>Aware of expectations</td>
<td>Norm compliance</td>
<td>Norm transcendence</td>
</tr>
<tr>
<td>Anxiety and emotional responses</td>
<td>Undifferentiated</td>
<td>Limited uncontrolled basic emotions, low self-esteem</td>
<td>Full range of emotions, mostly controlled, anxiety experienced as anger or fear</td>
<td>Full range of emotions, mostly controlled, high anxiety (cannot handle failure)</td>
<td>Anxiety where required to be different</td>
<td>Controls anxiety, extended range</td>
</tr>
<tr>
<td>Initiative effort</td>
<td>None</td>
<td>Fleeting</td>
<td>Inconsistent effort, low frustration tolerance</td>
<td>Varies (familiar situations)</td>
<td>As expected, sustained</td>
<td>Consistent and original</td>
</tr>
</tbody>
</table>

**TABLE 1**

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When designing activities (with the child in therapy), adjusting the characteristics of the activity, and perhaps more importantly, the presentation of the activity and your handling of the child at the correct level of motivation and action (creative ability) gives the therapist great therapeutic power to connect with the child’s “inner drive” and to construct the “just-right challenge” on more than just a sensory-motor level. This principle is elucidated by the following example.

Case study: Meeting Stephen at “his level” would require the therapist to facilitate an optimal state of arousal through opportunities for enhanced ability to modulate tactile input, as well as targeting Stephen’s ability to discriminate tactile input more effectively, while simultaneously engaging with his motivation to “present” himself and “explore”. It would, for example, require the therapist to carefully consider the norms set for participation in activities targeting tactile discrimination, as norm compliance is not yet a feature of this level of creative ability. But more about that in the following postulate.

**Postulate 3: Targeting certain sensory integrative functions may be more suited to certain levels of creative ability.**

I need to emphasise from the onset that this postulate is based purely on my own experiences in practice, and does not necessarily imply that this is the case for all therapists. I have experienced that, where I use the sensory integration and creative ability theories simultaneously I am often challenged in the way I offer or make available activities, as many of the activities that would “typically” be used to address certain sensory integrative difficulties fail to engage the child optimally through a connection with their “inner drive”. As argued in the first postulate, I also experience that (dare I say the majority of) children with sensory integration difficulties seen in practice, regardless of age, tend to present initially on the lower levels of creative ability (self-differentiation and self-presentation), that typically also pose the greatest challenges in activity selection, presentation and scaffolding in order to connect with the child’s intrinsic motivation.

I will use a variation on the hierarchical clinical reasoning model proposed by Van Jaarsveld (2011:7) to structure the discussion of my reasoning in this regard in Table 2. For each “level” of sensory integration I will provide an example of a “dysfunction” or “difficulty” in order to provide examples of activities that are typically used in such instances (i.e. a generalisation for the sake of illustration), from which a discussion of the considerations pertaining to creative ability will follow. Last-mentioned discussion will focus on the three levels in my perception most frequently observed in paediatric occupational therapy, namely self-differentiation, self-presentation and passive participation, with occasional reference to higher levels. I will primarily pose challenges or questions in this section and not necessarily provide answers or solutions. My suggestion would be to approach the table from the bottom upward, as this is the way in which the sensory integration functions are hierarchically discussed by Van Jaarsveld (2011:8-11).
### Level of sensory integration

<table>
<thead>
<tr>
<th>Praxis</th>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person</td>
<td>Moving/Stable</td>
</tr>
<tr>
<td>Stable</td>
<td>(e.g. somatodyspraxia – targeting projected action sequences, stable person and moving target)</td>
</tr>
</tbody>
</table>

#### Examples of "typical" activities

- In the case of somatodyspraxia both feedback and feedforward dependent actions would be important. For simplicity sake the example will focus on projected action sequences that are more feedforward dependent.
- Projected action sequences are commonly graded based on the spatial-temporal characteristics of the person and the environment.

#### Examples of considerations pertaining to creative ability activities

- An activity such as the one provided in the example requires purposeful directed actions, are at the very least product-centred and directed to the attainment of skill. It requires the child to act predictably and planned and also requires total task-concept. However, depending on the characteristics of the projected-action sequences targeted in terms of the person and the environment, the steps in the activity, the requirements on task concept and skill as well as the nature of the "product" can be graded effectively. Activities such as the one in the example are most naturally suited to children on a level of passive participation and higher. However, projected action sequences performed by a stable child with a stable / stationary target or environment (e.g. hitting a ball off a stand while standing still) or a moving child with a stationary target (e.g. swinging with a trapeze into a tower of blocks) may be fairly easily adapted for lower levels of creative ability. I would urge therapists to carefully consider the activity requirements when working on projected action sequences, and tailor them to the child’s level of creative ability. As argued earlier, facilitation of higher levels of creative ability may be beneficial before attempting to target more complex projected action sequences that require (as mentioned) total task concept and the ability to consciously plan actions.

<table>
<thead>
<tr>
<th>Ideation</th>
<th>Bilateral integration &amp; sequencing</th>
</tr>
</thead>
<tbody>
<tr>
<td>(e.g. difficulty with ideation – targeting enhanced perception and application of object affordances)</td>
<td>(e.g. bilateral integration and sequencing dysfunction – targeting asymmetrical bilateral coordination)</td>
</tr>
</tbody>
</table>

#### Examples of considerations pertaining to creative ability activities

- The therapist encourages the child to explore with the possibilities of objects in the environment and increasingly find ways of purposefully engaging with these objects. The child may initially be asked to identify what they have done, and later be asked to plan what they are going to do. Examples of typical activities: ask the child to come up with as many ideas as possible of what he/she can do with a hula-hoop or a certain swing (and execute these) (Koomar & Bundy 2002:286-287).

- By nature activities presented to encourage ideation require an aspect of abstract thought – evident or accessible only from a level of passive participation upwards. However, this does not mean that ideation cannot be promoted in children on lower levels of creative ability (although again I would argue that this would not be the only explicit aim of intervention on these levels). Exploration with objects will come naturally to children on a level of self-presentation and even asking them to reflect on what they have done with objects may be accessible and engaging to them as it will make their exploration more concrete. However, asking a child on self-presentation to come up with “as many ideas as possible” or to indicate what they “plan” to do can be detrimental to their engagement in the activity as their actions are still largely stereotypical and unplanned and may elicit anxiety due to their norm-awareness but inability to comply with the set norm.

- Therapist facilitates activities that require coordinated use of two sides of the body (in the example simultaneous symmetrical use). Examples of typical activities: swinging on a platform swing by (a) standing in prone and pushing downward to propel swing, (b) sitting on the swing and pulling on a stick held by the therapist and letting go or (c) alternately, rhythmically pulling on a rope suspended from a nearby suspension point to keep swing going. (Koomar & Bundy 2002:287-288).

- The success of the activities described is primarily dependent on the child and as such have a higher risk for failure. Assuming that the therapist carefully created the just-right sensory-motor challenge, the child on passive participation will most likely enjoy the activity and e.g. the opportunity for experimenting with making the swing go faster or slower (“I wonder if I can make it go faster?” – directed toward attainment of skill). The initial possibility of failure may deter the child on self-presentation from active engagement in this activity, especially if his/her first attempt at propelling the swing is unsuccessful. While careful encouragement and possible resultant success may eventually entice engagement, the window of opportunity may be small, and the connection with the child’s “inner drive” with the activity may be lost. An important aspect of the approach to a child on self-presentation would be not to set any norms for participation (e.g. do not tell the child to “make the swing go”) but rather to continue with encouraging exploration (e.g. “I wonder what will happen if you sit on the swing and pull on the rope?”). With upwards progression on the “hierarchy” of sensory integrative functioning, it becomes increasingly challenging to adapt activities to the level of self-differentiation. The principle of incidental eliciting of actions and responses as explained under postural-ocular control and engaging with destructive action may provide incidental opportunities to facilitate more complex sensory integrative functions. However, the therapist will need to refrain from purposeful facilitation (e.g. by giving instructions such as “we must use two hands to do this”) as this is most likely to elicit differentiating behaviour from the child. From this point onward, it is my argument that it would greatly serve the therapist to target the facilitation of higher levels of creative ability (i.e. self-presentation, and preferably passive participation and upward) before actively targeting higher levels of sensory integrative functions. I argue that this also aligns well with the implicit process depicted in the merger between the spiral process of sensory integration and creative ability (Figure 1).

### TABLE 2

CONSIDERATIONS PERTAINING TO CREATIVE ABILITY ON VARIOUS LEVELS OF SENSORY INTEGRATIVE FUNCTION

(based on the Clinical Reasoning Model of Van Jaarsveld (2011:7))

<table>
<thead>
<tr>
<th>Level of sensory integration</th>
<th>Examples of &quot;typical&quot; activities</th>
<th>Examples of considerations pertaining to creative ability activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Praxis</td>
<td>In the case of somatodyspraxia both feedback and feedforward dependent actions would be important. For simplicity sake the example will focus on projected action sequences that are more feedforward dependent. Projected action sequences are commonly graded based on the spatial-temporal characteristics of the person and the environment. An example of a typical activity requiring a stable person and a moving target would be a child positioned in prone over a barrel tossing bean bags at a moving target such as a suspended toy.</td>
<td>An activity such as the one provided in the example requires purposeful directed actions, are at the very least product-centred and directed to the attainment of skill. It requires the child to act predictably and planned and also requires total task-concept. However, depending on the characteristics of the projected-action sequences targeted in terms of the person and the environment, the steps in the activity, the requirements on task concept and skill as well as the nature of the “product” can be graded effectively. Activities such as the one in the example are most naturally suited to children on a level of passive participation and higher. However, projected action sequences performed by a stable child with a stable / stationary target or environment (e.g. hitting a ball off a stand while standing still) or a moving child with a stationary target (e.g. swinging with a trapeze into a tower of blocks) may be fairly easily adapted for lower levels of creative ability. I would urge therapists to carefully consider the activity requirements when working on projected action sequences, and tailor them to the child’s level of creative ability. As argued earlier, facilitation of higher levels of creative ability may be beneficial before attempting to target more complex projected action sequences that require (as mentioned) total task concept and the ability to consciously plan actions.</td>
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<td>Environment</td>
<td>The therapist encourages the child to explore with the possibilities of objects in the environment and increasingly find ways of purposefully engaging with these objects. The child may initially be asked to identify what they have done, and later be asked to plan what they are going to do. Examples of typical activities: ask the child to come up with as many ideas as possible of what he/she can do with a hula-hoop or a certain swing (and execute these) (Koomar &amp; Bundy 2002:286-287).</td>
<td>By nature activities presented to encourage ideation require an aspect of abstract thought – evident or accessible only from a level of passive participation upwards. However, this does not mean that ideation cannot be promoted in children on lower levels of creative ability (although again I would argue that this would not be the only explicit aim of intervention on these levels). Exploration with objects will come naturally to children on a level of self-presentation and even asking them to reflect on what they have done with objects may be accessible and engaging to them as it will make their exploration more concrete. However, asking a child on self-presentation to come up with “as many ideas as possible” or to indicate what they “plan” to do can be detrimental to their engagement in the activity as their actions are still largely stereotypical and unplanned and may elicit anxiety due to their norm-awareness but inability to comply with the set norm.</td>
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<td>(e.g. somatodyspraxia – targeting projected action sequences, stable person and moving target)</td>
<td>The therapist facilitates activities that require coordinated use of two sides of the body (in the example simultaneous symmetrical use). Examples of typical activities: swinging on a platform swing by (a) standing in prone and pushing downward to propel swing, (b) sitting on the swing and pulling on a stick held by the therapist and letting go or (c) alternately, rhythmically pulling on a rope suspended from a nearby suspension point to keep swing going. (Koomar &amp; Bundy 2002:287-288).</td>
<td>The success of the activities described is primarily dependent on the child and as such have a higher risk for failure. Assuming that the therapist carefully created the just-right sensory-motor challenge, the child on passive participation will most likely enjoy the activity and e.g. the opportunity for experimenting with making the swing go faster or slower (“I wonder if I can make it go faster?” – directed toward attainment of skill). The initial possibility of failure may deter the child on self-presentation from active engagement in this activity, especially if his/her first attempt at propelling the swing is unsuccessful. While careful encouragement and possible resultant success may eventually entice engagement, the window of opportunity may be small, and the connection with the child’s “inner drive” with the activity may be lost. An important aspect of the approach to a child on self-presentation would be not to set any norms for participation (e.g. do not tell the child to “make the swing go”) but rather to continue with encouraging exploration (e.g. “I wonder what will happen if you sit on the swing and pull on the rope?”). With upwards progression on the “hierarchy” of sensory integrative functioning, it becomes increasingly challenging to adapt activities to the level of self-differentiation. The principle of incidental eliciting of actions and responses as explained under postural-ocular control and engaging with destructive action may provide incidental opportunities to facilitate more complex sensory integrative functions. However, the therapist will need to refrain from purposeful facilitation (e.g. by giving instructions such as “we must use two hands to do this”) as this is most likely to elicit differentiating behaviour from the child. From this point onward, it is my argument that it would greatly serve the therapist to target the facilitation of higher levels of creative ability (i.e. self-presentation, and preferably passive participation and upward) before actively targeting higher levels of sensory integrative functions. I argue that this also aligns well with the implicit process depicted in the merger between the spiral process of sensory integration and creative ability (Figure 1).</td>
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</tbody>
</table>
### Level of sensory integration

<table>
<thead>
<tr>
<th>Postural-ocular control (e.g. postural-ocular control difficulties – targeting tonic postural extension and eye movements)</th>
<th>Examples of “typical” activities</th>
<th>Examples of considerations pertaining to creative ability activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapist facilitates activities that require extension against gravity with linear vestibular inputs and resistance. Example of activity typically used: bouncing / swinging in prone in a frog swing, fetching objects or throwing objects at a target (Koomar &amp; Bundy 2002:281).</td>
<td>Once again, the way in which the activity is presented will greatly influence the child’s engagement depending on his/her level of creative ability. By nature, the goal-directedness and product-centeredness of the activity as described here (e.g. throwing at a target) would be most suited to a child on a level of passive participation. Careful adaptation of the innate characteristics of the activity would be necessary to grade it down to lower levels. For the child on self-presentation for example, removing the objective of fetching or throwing objects may elicit explorative responses while still attaining the objective of anti-gravity extension and linear vestibular input. The challenge will be not to set expectations nor measurements of norm-compliance (e.g. the child will be able to “measure” his/her own success by observing whether the target was reached regardless of the therapist’s encouragement or reassurance that success is not required). One might opt to set “exploratory” challenges, such as asking the child to throw “hard” and “soft” and “high” and “low” but not putting an observable target in place that the child should throw at. On self-differentiation the challenge will be similar to that described under discrimination. The child’s “inner drive” will not be toward constructive or even explorative action, and here a possibility may be to engage with the child’s natural inclination toward “destructive” action – for example the child may be asked to knock over a tower of foam blocks while jumping in the frog swing (note that “knocking over” the tower should be an incidental part of the activity and not require excessive effort from the child as this will cause the child to disengage from the activity).</td>
<td></td>
</tr>
</tbody>
</table>

### Discrimination & Perception

(e.g. poor tactile discrimination – targeting increasing adaptive responses to tactile stimuli)

| Therapist provides activities rich in temporal and spatial tactile characteristics while including opportunities for deep pressure experiences. Examples of activities typically used: searching for objects in a ball pit or a tub of rice, identifying objects based on tactile characteristics (Koomar & Bundy 2002:279). | The way in which the activity is presented will have a big influenced on how it is perceived by the child. Presenting it in an exploratory way (e.g. “I wonder if we will find any animals in the shark-tank (ball-pit)?”) will elicit the explorative action of the child on self-presentation. Challenging the child on passive participation with a goal (e.g. “Let’s see if we can find ten coins in the “treasure chest” (tub of rice)?”) may engage with the child’s inclination toward product-centred action. However, I would argue that this kind of activity when working with discriminative functions with a child on self-differentiation will be particularly difficult, as the child likely still has difficulty distinguishing himself as separate from the environment, therefore asking him to distinguish between other things in the environment will not be engaging or meaningful. My suggestion would be to elicit discriminative responses “incidentally” – i.e. that discrimination will be a “by-product” of the activity but not the (expressed) purpose of the activity (such as activities typically used with modulation difficulties) where the experience (and sometimes even seemingly passive receiving) of the sensory stimulus is the focus of the activity. |

### Arousal & Modulation

(e.g. gravitational insecurity – targeting enhanced tolerance to movement)

| Therapist provides experiences in the vestibular system (and proprioceptive system), with varying characteristics (focusing on otolith organs – linear movement) and intensity while facilitating the child’s active involvement and appropriate adaptive responses. Examples of activities typically used: walking up and down a ramp, riding on a scooter board (could include ramp), bouncing on a trampoline or therapy ball, suspended equipment (suspended from 2 points) (Koomar & Bundy 2002:272-273). | My argument would be that by nature, these activities lend themselves primarily to “exploration” as the child is encouraged to explore (and comment on their experiences of) the different apparatus, and may, in the way they are typically used, be most suited to children on the level of self-presentation. You may be challenged with a child on self-differentiation who, due to the inclination to “differentiate the self” refuse your suggestions for the sake of being “different”. These children will benefit from a coincidental approach to facilitating activity participation, with sufficient structure provided by the therapist in order not to endanger their low self-esteem by setting unattainable targets. Very basic equipment, physical assistance during participation and allowance for destructive actions are important. For children on passive participation the challenge may be to make these activities more product-centred, as exploration with apparatus may very soon be perceived as “boring” or elicit responses such as “so what are we going to do?”. |

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4. CLOSING REMARKS

In our strive toward promoting self-actualisation in the children that we work with, a symbiosis between the theories of sensory integration and creative ability have great therapeutic potential – potential I believe many therapists are utilising to the benefit of the clients in their practices on a daily basis. However, the need for evidence regarding this therapeutic power is evident in the lack of published material on this topic. It is my hope that this piece will elicit renewed consideration of the possibilities of consciously combining these two theories in practice and that we may continuously challenge one another as therapists to become scientifically and theoretically deeper embedded, and increasingly more artful in our approaches as we practice the “art and science” of occupational therapy.

5. REFERENCES


CONTINUED RESEARCH WITHIN A FIELD OF EXPERTISE OFTEN CHANGES A LANDSCAPE OF KNOWLEDGE TO A LESSER OR GREATER DEGREE AND THAT IS ALSO TRUE FOR THE PATTERNS OF SENSORY INTEGRATION DYSFUNCTIONS. UP TO 2013 SAISI HAS TAUGHT THE PATTERNS OF SI DYSFUNCTIONS ACCORDING TO THE SIPT MANUAL ON THEIR TRAINING COURSES. RECENT PUBLICATIONS ON RESEARCH DONE ON PATTERNS OF DYSFUNCTION ON CHILDREN FROM THE UNITED STATES AND CHILDREN FROM SOUTH AFRICA AS WELL AS SUSANNE SMITH-ROLEY PRESENTING THE SAISI INTERPRETATION COURSE IN DURBAN IN 2013, HAS LED TO THE UPDATE OF HOW WE VIEW, REASON AND INTERPRET SI FUNCTION, SI DIFFICULTIES AND DYSFUNCTIONS.

The SIPT remains to be the best evidence set of tests to identify SI difficulties and dysfunctions. It exhibits an incomparable ability to discriminate between children with known learning disorders or children with sensory integration problems and typically developing children. Using the SIPT to identify SI dysfunctions remains the golden standard and also provides us with the necessary knowledge and reasoning skills for use when for some or other reason we are not able to use the SIPT.

A research study done on the use of the SIPT on a selected sample of typically developing South African children indicated children (aged 6 years 0 months to 8 years 11 months) performed moderately to significantly better on five of the seventeen tests of the SIPT than the United States (US) sample on which the test was standardised. These tests were Standing and Walking Balance, Bilateral Motor Coordination, Oral Praxis, Design Copying and Motor Accuracy. From this study it was concluded that it would be fair to use the SIPT to identify SI dysfunctions in children from South Africa (SA) if the five mentioned tests scores of the relevant age groups are adapted with 0.5 Standard Deviation to the negative side before the test results are interpreted. This research confirmed that the SIPT (with the adapted scores on
the relevant five items of the older age intervals) can be administered and interpreted on children from SA. Numerous, previous factor analytic- and cluster analyses studies revealed the existence of consistent patterns of sensory integration dysfunction. These include Visuopraxis, Somatopraxis, Vestibular Bilateral Integration, Somatosensory perception and Tactile Defensiveness/Attention patterns as the most consistent patterns across multiple studies.

Most of the research on SI patterns of dysfunction has been done on children in the US. The question remained as to whether South African children identified with sensory integration problems would reveal similar or different patterns of dysfunction to those found in previous studies?

A study done on the patterns of SI dysfunction in children from SA utilised both exploratory and confirmatory factor analysis to reveal patterns of dysfunction. This research confirmed that similar patterns of sensory integration dysfunction (Visuopraxis, Bilateral Integration and Sequencing, and Multiple Sensory Perception) identified in previous research were present in a sample of children from SA. It can be stated with confidence that children in SA do experience similar sensory integration difficulties as those that were revealed in previous studies done in the US. We thus have proof that children growing up in SA also experience difficulties with SI functions that require discriminatory and perceptual abilities, such as the spatial and temporal aspects of navigating oneself in three dimensional space, as well as more refined sensory-motor functions such as motor skills and praxis.

For the purpose of this article and to reflect the knowledge gained by current SAISI Interpretation Course participant an abbreviated summary will be provided on the different SI difficulties and dysfunctions that children can experience. The dysfunctions discussed are dysfunctions that were identified by research and factor analytical studies using the SIPT, whilst milder forms of SI problems seen in children and also described in literature are also presented and referred to as “difficulties” and not per se dysfunctions. When a child was assessed with the SIPT and the scores are a fit with one of the identified patterns of dysfunction a “SI diagnosis” can be made with confidence. When the child does not fit one of the patterns of dysfunction then the challenges the child experience can be matched to the “clusters” of difficulties that is well described within SI literature and are summarised below. Once the child is “matched” to either a dysfunction or a difficulty, through the use of test results and clinical reasoning, a treatment plan can be developed as the type of difficulty or dysfunction will reveal which sensory systems are involved in the functional problems the child experiences.

A summary of SI difficulties will be presented first and when applicable the relevant SI dysfunctions together with the SIPT test items involved will be provided.

### 1. VISUAL PERCEPTION DIFFICULTIES

**Form and Space difficulties:**
Child will perform poorly on tests of Space Visualization and Figure Ground and other visual perception tests that assesses form and space.

**Visual Praxis difficulties:**
Poor performance will be evident on Design Copying test (2D Construction).

Constructional Praxis (3D Construction) will also be poor.

Motor Accuracy scores will be poor and components of poor postural mechanism can be present.

**Haptic Form & Space difficulties:**
Child will perform poorly on tests of Manual Form Perception and Graphesthesia.

When a child experience severe difficulties with all of the above the chances are that he/she will test with a pattern of dysfunction namely, Visuodyspyaxia. The tests that will be the highest loaders (meaning that they fit the statistical patterns as identified by research) will be in order of priority as follow:
PATTERN OF VISUODYSPRAxia:
Constructional Praxis, Manual Form Perception, Design Copying, Motor Accuracy, Space Visualization and Figure Ground.

GRAVITATIONAL INSECURITY DYSFUNCTION:
Child present with an abnormal fear as soon as pull of gravity comes into play and feet are lifted from ground or body needs to move through 3D space without child feeling gravitationally secured.
Observations and history will reveal anxiety related to moving in space as well as fear and apprehension related to movement. Fear of heights are common.
The Sensory Profile/Sensory Processing Measure will confirm sensitivities within the vestibular system.

INTOLERANCE TO MOVEMENT
The child does not like moving through 3D space and prefers sedentary play (gravitational pull is not the problem here but the moving through 3D space are).
The Sensory Profile/Sensory Processing Measure will confirm sensitivities within the vestibular system.

2. VESTIBULAR PROCESSING DIFFICULTIES

Difficulties with Vestibular Ocular Responses:
A reduced Post Rotary Nystagmus score will be present and the child will experience difficulties with stabilizing the head during eye movements as well as keeping the eyes stable during head movements.
Coordinating head and eye movements together with neck and body stability will be a challenge.

Postural Control difficulties:
Vertical head righting response will be poor.
Protective and Equilibrium reactions will be poor.
Child will perform poorly on the test for Standing and Walking Balance.
Postural sway and tilt may be present.
Anticipatory and reactive postural responses will be poor.

Muscle Tone difficulties:
Maintaining extension postures against gravity will be a challenge for the child.
Extension- and flexion postures/patterns will both be poor.
Co-contraction difficulties will be present.

Aversive response to movement:
Child will demonstrate inhibited/delayed response to movement.
A seeking of movement activities will be present.
Extremely high tolerance for rotation will be evident.

Autonomic reactions to movement:
Nausea and vertigo will be present.
Vestibular processing difficulties underlies the dysfunctions of Gravitational Insecurity and Intolerance to Movement.

3. LATERALITY ISSUES

Crossing Midline difficulties:
The child will have a poor Space Visualization Contralateral Hand Use score.
Poor spontaneous crossing of midline during postural adjustments.
Clinical Observation during the completion of the Motor Accuracy test will confirm difficulties with midline crossing.

Spontaneous Hand Use difficulties:
The child will have a low Preferred Hand Use score.

Difficulties with R/L Differences:
On the Motor Accuracy Test either hands will have equally poor scores or the non-preferred hand’s score will be markedly better.

Ambiguous Handedness:
Inconsistent hand use on similar activities will be prominent.
4. BILATERAL INTEGRATION AND SEQUENCING DEFICITS

**Bilateral Integration and Sequencing (BIS) difficulties:**
The child will have low to below average scores on Bilateral Motor Coordination, Sequencing Praxis, Oral Praxis, Graphesthesia, Manual Form Perception, Motor Accuracy and possibly Postural Praxis.

**Inadequate Vestibular processing:**
See Vestibular Processing.

**Inadequate Lateralization:**
See Laterality issues.

**Behaviour that can often be associated with BIS difficulties and dysfunction include:**
Poor performance in bilateral activities.
Seems to be capable in performing bilateral activities but the quality is poor.
Often experience difficulties with reading and mathematics.
Delayed spontaneous speech is present or evident in history.
Experience difficulties with sitting/holding still for longer periods of time.

When a child experience severe difficulties with all of the above the chances are that he/she will test within a pattern of dysfunction namely a Vestibular Proprioceptive BIS (VBiS) dysfunction. The tests that will be the highest loaders (meaning that they fit the statistical patterns as identified by research) will be in order of priority as follow:

**PATTERN OF VESTIBULAR PROPROCEPTIVE BIS (VBiS) DYSFUNCTION:**
Bilateral Motor Coordination, Standing Walking Balance, Sequencing Praxis, Oral Praxis, Graphesthesia, Manual Form Perception, Motor Accuracy and Kinesthesia. (Post Rotary Nystagmus have also loaded with this pattern in the 2011 study of Mailloux, et al.)

5. SOMATOSENSORY DIFFICULTIES

**Tactile Discrimination difficulties:**
Low to below average scores will be present on tests for Localization of Tactile Stimulation, Graphesthesia, Finger Identification and Manual Form Perception.

**Proprioceptive Processing Difficulties:**
Child will have low scores on Kinesthesia and Standing Walking Balance.
Supportive sensory history.
Supportive evidence on the Clinical Observations of poor diadokokinesia, poor RAMP movements, poor finger/nose touching as well as evidence of other cerebellar difficulties.
Poor modulated force of movements.
Seeks/avoids proprioceptive sensations.
Parent report will be in support of above.

**TACTILE DEFENSIVENESS DYSFUNCTION:**
A child can have significantly high or low scores on Localization of Tactile Stimulation.
A history supportive of tactile sensitivities and defensiveness will be present.
Supportive observation of tactile defensive behaviour during administration of Clinical Observations
Parent/teacher Observations will be confirming.
The Sensory Profile/Sensory Processing Measure will confirm sensitivities within the tactile system.
Associated behaviour will include distractibility, hyperactivity, and inattention (due to tactile sensitivities).

6. SOMATOPRAXIS DIFFICULTIES

**Motor planning difficulties on visual demonstration:**
Child will have low to below average scores on Postural Praxis and Oral Praxis.
Visual system not supporting praxis process.
Motor planning difficulties on verbal instruction:  
Praxis on Verbal Command score will be low to below average. History of experiencing difficulties with tasks where verbal instructions are involved.

Somatosensory Processing difficulties:  
Also see Somatosensory Difficulties.  
Poor performance on Graphesthesia test will be a strong indicator.  
Poor exploratory play is evident.  
Poor ideation of novel activities, limited imagination  
Initiation of play in terms of people and objects are problematic.  
Poor problem solving on new tasks.  
Sequencing difficulties with approach of complex tasks.  
Using of body during interaction can be awkward.  
Poor imitation of objects and people.

Parent Report: Behaviour and Independence:  
Problems with sequencing of new tasks.  
Experiences challenges in accomplishment of new tasks.  
Transitions are problematic.  
Turn taking is problematic.  
Chunking actions together is a challenge in terms of doing all the steps e.g. dressing and having all materials together.

When a child experience severe difficulties with all of the above the chances that he/she will test with a pattern of dysfunction namely Somatodyspraxia. The tests that will be the highest loaders (meaning that they fit the statistical patterns as identified by research) will be in order of priority as follow:

SOMATODYSPRAXIA PATTERN  
Postural Praxis, Oral Praxis, Sequencing Praxis, Bilateral Motor Coordination, and Graphesthesia tests will have the highest loadings  
Praxis on Verbal Command, Finger Identification, Constructional Praxis and Standing Walking Balance will have lower loadings

7. GENERALISED DYSFUNCTION
Child scores far below average on almost all of the SIPT tests. Bilateral Integration and Sequencing scores are consistently low.  
Visuo- & Somatodyspraxia scores are consistently low.  
Score relatively better on tests of tactile localization and postural praxis (but still low).  
Low mean score on Oral Praxis indicates that oral praxis is part of a generalized dysfunction.  
Deficits are present in all practic areas tested by the SIPT and are accompanied by somatosensory deficits.

Although Dyspraxia on Verbal Command is not a dysfunction that is per se a SI dysfunction it is a dysfunction that are identified by the SIPT. It is also often seen in combination with a SI dysfunction and therefore it is included in the overview of the patterns of difficulties- and dysfunctions.

8. DYSPRAXIA ON VERBAL COMMAND DIFFICULTIES

Poor Auditory Language Function:  
A low score on Praxis on Verbal Command will be present.  
Supporting information on school report.  
Low verbal IQ, bit higher performance are evident.  
Prolonged (or average) Post Rotary Nystagmus score.  
Inadequate sequencing difficulties with lower scores on Design Copying, Oral Praxis, Sequencing Praxis, Bilateral Motor Coordination and Standing Walking Balance. These lower scores are present without supporting evidence of a SI dysfunction.  
These children also experience difficulties with following instructions and sequencing of actions.

When a child experience severe difficulties with all of the above the chances that he/she will test with a pattern of dysfunction namely Dyspraxia on Verbal Command. The tests that will be the highest loaders (meaning that they fit the statistical patterns as identified by research) will be in order of priority as follow:
PRAXIS ON VERBAL COMMAND PATTERN OF DYSFUNCTION:
Low Praxis on Verbal Command, normal to high Post-rotary Nystagmus May have 1 or 2 lower loadings on Design Copy, Oral Praxis, Sequencing Praxis, Bilateral Motor Coordination, Standing Walking Balance without evidence of sensory system dysfunction.

Sensory modulation difficulties and dysfunctions in children are not “diagnosed” by the SIPT but by sensory processing questionnaires completed by caregiver/parent/educator, such as the Sensory Profile (SP) or the Sensory Processing Measure (SPM). Disorders in sensory modulation are reflected in behaviour. Modulation disorders can be present in one or more of the sensory systems and responses from internal-(interoception) or external sensations can be involved.

SENSORY MODULATION DYSFUNCTIONS:
GRAVITATIONAL INSECURITY: See under vestibular processing
INTOLERANCE TO MOVEMENT: See under vestibular processing
TACTILE DEFENSIVENESS DYSFUNCTION: See under somatosensory processing

Currently there is a debate on sensory seeking versus sensory craving, where sensory seeking is seen as part of typical behaviour, where the child with high levels of need for certain sensory experiences will exhibit seeking behaviour in an effort to fulfil a sensory need and to keep him-/herself modulated. Sensory craving is then seen as atypical seeking for certain sensory experiences and often these seeking behaviour will not be acceptable. The other latest discussion regarding terminology is on the use of sensory reactivity versus sensory modulation. This discussion is talked on in the article on the overview of presentations of the ESIC 2015 congress. Please refer to that article.

Conclusive remarks:
This article provides a summary of the latest research and theories on sensory integration difficulties. It remains a challenge to stay updated with all the literature and to apply the knowledge to practice. In order to remain relevant and deliver best evidence practice, practitioners has the ethical obligation to remain lifelong learners and it is the authors hope that this article has assisted in updating practitioners on SI difficulties and dysfunctions. The invitation and recommendation of SAISI that practitioners must do refresher courses will always stand, so if this article was difficult to understand or are very different form the readers understanding of SI difficulties or dysfunctions, the author will strongly recommend that a SAISI Interpretation course must be done as an update or refresher. Remember you will not have to redo a protocol!

References
Model for Clinical Reasoning on Possible Sensory Integration Difficulties and Dysfunctions. Volume 21, No 3 p:7-21
FEEDBACK FROM THE 4TH EUROPEAN SENSORY INTEGRATION CONGRESS 2015

BY Elize Janse van Rensburg  
M.O.T (UFS)

THE 4TH EUROPEAN SENSORY INTEGRATION CONGRESS WAS HOSTED BY THE SENSORY INTEGRATION NETWORK IN BIRMINGHAM, UK FROM 9-10 SEPTEMBER 2015. AMONG THE MORE THAN FOUR HUNDRED DELEGATES FROM ALL OVER THE WORLD, EIGHT SOUTH AFRICAN OCCUPATIONAL THERAPISTS (AND A FEW MORE EX-SOUTH AFRICANS NOW PRACTICING IN THE UK) ATTENDED AND DELIVERED CONTRIBUTIONS AT THIS INTERNATIONAL SENSORY INTEGRATION EVENT.

BY Annamarie van Jaarsveld  
M.O.T (UFS)

The theme for the congress was “Sensory Integration across the Lifespan: the Art and Science” and featured presentations from world-renowned experts in the field of sensory integration, including key note addresses by Prof Roseann Schaaf (USA), Dr Susanne Smith-Roley (USA), Dr Zoe Mailloux (USA), Dr Diane Parham (USA), Prof Batya Engel-Yeger (Israel), Eynet Gal (Israel), Eadaoin Bhreatnach (UK) and Annamarie van Jaarsveld (South Africa). Four pre-course workshops were also presented.

This article will feature a summary from one of the workshops, highlights from selected key-note addresses and highlights from the South African presenters. Visit www.esic2015.eu for the complete programme, more information on the presenters as well as post-conference resources.
Workshop summary: An Introduction to a Clinician’s Guide for Implementing Ayres Sensory Integration® for Children with Autism (Roseann Schaaf and Zoe Mailloux)

The primary objectives of the workshop were to understand systematic, evidence-based application of Ayres Sensory Integration (ASI®) for children with Autism Spectrum Disorder (ASD), to increase the appropriate use of ASI® for children with ASD, to apply data driven decision making using ASI® and lastly to introduce the newly published clinical guidebook: “Clinician’s Guide for Implementing Ayres Sensory Integration® for children with Autism (Promoting Participation for Children with Autism)”. Background information was provided on ASI® and specifically the sensory integrative processes involved in ASI®. This was linked to the latest DSM-5 criteria for ASD. From this the recommendation stemmed that we should start using the term sensory reactivity, as the DSM-5 criteria refers to hyper- or hypo-reactivity to sensory input. This will also lead to consistency in terms of use of terminology.

An overview was presented on the patterns of sensory integrative function which included sensory reactivity (modulation), sensory perception, vestibular bilateral integration, somatopraxis and visuopraxis. The dysfunctions that were addressed were difficulties with sensory reactivity, poor sensory perception problems (in terms of tactile perception, proprioceptive discrimination, vestibular discrimination and visual discrimination), and problems in vestibular bilateral integration, somatodypraxia and visuodypraxia.

The workshop assisted participants in understanding Data Driven Decision Making (DDDM) and the use thereof in ASI®. According to Schaaf (2015) DDDM provides a framework on how to use assessment data to guide intervention as well as an outcome measure within the OT process. It provide us with a “tool” to help us articulate “why we are doing what we are doing”! (Schaaf, 2015). The process includes the following:

• Identification of strengths and challenges
• Generating hypotheses
• Identifying outcomes
• Developing and scaling goals using the Goal Attainment Scale (GAS) as a tool
• Planning and implementing ASI® intervention

Evidence of the effectiveness of ASI® intervention on children with ASD was discussed and research has provided proof that ASI® therapy has had a statistically significant effect on children with ASD, which is very exciting. This was only possible because of the systematic data collection procedures that were used during research. One of the take home messages was that we have to become better at collecting data about what we do!

ASI® intervention was the focus of the last part of the workshop. How to set the stage for intervention and ASI® intervention with children with ASD was then presented and discussed using clinical examples.

This workshop was incredibly valuable and the Clinician’s Guide for Implementing Ayres Sensory Integration® for children with Autism (Promoting Participation for...
Children with Autism (Schaaf & Mailloux, 2015) is highly recommended. This is not only for OT’s working with children with ASD but for everyone using ASI® assessment and intervention as it provides an overview of the theoretical framework as well as a guide to providing ASI®. The book also has a flash drive that provides the following items which can be printed:

- Data-driven decision making table
- Occupational profile
- ASI® Assessment Interpretation Tool©
- Sample Parent Interview Questions for Setting Goals
- Parent Response Form for Goal Attainment Scaling
- Goal Attainment Scaling Checklist for Technical Quality of Goals

Highlights from the key-note addresses

The power of Vision (and ALL the senses!): Looking Toward the Future for Ayres Sensory Integration® (Dr Zoe Mailloux)

Dr Mailloux presented an update on the ASI® 2020 Vision, a project aimed at celebrating and promoting the work of Jean Ayres in the year that she would have turned 100 years old through the following vision:

*Ayres Sensory Integration® will have a strong, international presence with demonstrated scholarship, means for valid, comprehensive assessment and pathways for training to ensure ongoing development, standards of excellence and effective implementation of this important work.* (www.ASI2020vision.org)

Three goals have been set for 2020, namely:

1. Scholarship: 100 papers will be published in peer reviewed journals (start date January 2013) referencing or consistent with Ayres Sensory Integration®.
2. International test: The Evaluation in Ayres Sensory Integration (EASI) – the purpose of the EASI is to provide a valid and reliable tool for assessing sensory integration functions free of charge.
3. International training: Clearly designed pathways for demonstrating competency in ASI® will be developed and available in a 100 countries ( overseen by the International Coalition for Education in Ayres Sensory Integration®)


Evidence for Ayres Sensory Integration® (Prof Roseann Schaaf)

This was perhaps the most telling presentation for the ‘bigger picture’ of Ayres Sensory Integration®. Prof Schaaf presented the compelling evidence that ASI® intervention complies with the criteria for an evidence-based practice according to three different sources (The National Professional Development Center on Autism Spectrum Disorders, the Council for Exceptional Children-Guidelines for identifying evidence-based Practices in Special Education and the U.S. Preventative Services Task Force Guidelines for Evidence Reviews). This means that occupational therapists practicing in ASI® in South Africa can proceed with confidence that there is sound scientific evidence that it is an effective intervention.

Sensory Attachment Intervention: A Neurosequential Approach to Developmental Trauma (Éadaoin Bhreathnach)

Éadaoin Bhreathnach presented an intriguing theoretical model depicting the dynamic interplay between emotional processing, the autonomic nervous system and sensory processing. She shared her experiences of using this model in addressing developmental trauma in children.

During her treatment sessions the parents are facilitated to become the child’s regulator rather than the therapist, while the therapist unobtrusively organises the environment to facilitate regulation and co-regulation. The photographs of her outdoor treatment spaces were magnificent – from a ‘float in womb space’ dam where parents and children spend time together drifting in a canoe and a secret garden, to mazes to help with spatial-temporal organisation. She cited Van der Kolk, as follows, as foundation for the creation of her treatment spaces:

*Complexly traumatized children need to be helped to*
FEEDBACK: 4TH ESIC 2015

engage their attention in pursuits that do not remind them of trauma-related triggers and give them a sense of pleasure and mastery. Safety, predictability and “fun” is essential for the establishment of the capacity to observe what is going on, put it into a larger context and initiate physiological and motoric self-regulation (Van der Kolk 2005:407)

Éadaoin records all of her therapy sessions with a video camera, and children wear heart rate monitors to monitor their autonomic nervous system responses. She has developed an assessment tool called ‘The Sensory, Attachment & Autonomic Regulation Questionnaire’ which she is currently using in her research. She is also in the process of determining the validity and reliability thereof.

The realities of SI assessment and intervention in third world settings (Annamarie van Jaarsveld)

This presentation was notably the highlight of the congress. Not only was it the closing keynote address delivered by South African sensory integration icon Annamarie van Jaarsveld, but it was also the only presentation at the congress to receive a standing ovation.

Annamarie shared her vast experiences of the realities of sensory integration assessment and intervention in third world settings. She drew on work she had done over many years, among others looking at sensory integration difficulties of children in low socio-economic settings, the effectiveness of a sensory integration-based intervention program for children in low socio-economic settings, the use of the SIPT on South African children and patterns of sensory integrative dysfunction among South African children.

Annamarie started off her presentation with directives from UNICEF’s ‘The State of the World’s Children 2015’ report which highlights what we as occupational therapists and sensory integration practitioners know and see every day, linking this with human capital, poverty eradication, health and the reduction of violence and crime:

Children are the foundation of sustainable development. The early years of life are crucial not only for individual health and physical development, but also for cognitive and social-emotional development. Events in the first few years of life are formative and play a vital role in building human capital, breaking the cycle of poverty, promoting economic productivity, and eliminating social disparities and inequities.

Science has demonstrated that early childhood interventions, early in life, are important because they help mitigate the impact of adverse early experiences which if not addressed lead to poor health (e.g., non-communicable diseases such as obesity, cardiovascular disease and diabetes), poor educational attainment, economic dependency, increased violence and crime, greater substance abuse and depression – all of which add to the cost and burden in society.

She then presented some statistics that sketch the realities of South African children, such as:

- In South Africa, nearly 60% of children live in poverty.
- The minority (about 20 %) of the population have access to private healthcare and thus to "gold standard" assessment and intervention in sensory integration such as the SIPT and ASI® intervention.
- Majority of occupational therapists (>70%) that have completed SAISI’s SIPT training courses are from the private sector whilst only 12% are from the public sector (SAISI, 2014).
- Costs involved in the assessment of a child with an instrument like the SIPT, narrows sensory integration to the private sector as very few public health institutions can afford the use of the SIPT.

Annamarie further reflected that the focus of the South African government in terms of health care is on factors such as life expectancy, maternal mortality rate and communicable diseases (in line with the Millennium Development Goals). However, although early childhood development receives attention, the focus is on providing basic health care services, basic nutrition, basic education
and social services. She further stated that occupational therapists trained in sensory integration in South Africa realize and acknowledge the impact of sensory integration difficulties and dysfunction on childhood development and childhood occupations, but unfortunately the public health sector does not recognize, invest and give attention to services that includes sensory integration.

To demonstrate just how necessary investment in services that include sensory integration is in the South African context, Annamarie presented findings from South African research studies. One study among children from low socio-economic settings indicated that they may be more prone to sensory integration difficulties (Van Jaarsveld, 2010) and thus present a group of children who are particularly in need of sensory integration-based services. Improvement in development and sensory integrative functions have been demonstrated when children from low socio-economic settings are exposed to sensory integration orientated stimulation programs especially in terms of postural control and bilateral integration (Van Jaarsveld, Van Vuuren & Venter, 2006).

Annamarie then continued to report on the following developments that are currently taking place in the area of assessment in sensory integration that may make it more accessible to more South African children:

- Currently the Ayres Clinical Observations and Clinical Observations of Gross Motor Items developed by SAISI are the two instruments used most often in low SES communities in SA (the Clinical Observations is currently under review by SAISI to ensure its continued, reliable use).

- The development of a screening instrument for children from low socio-economic areas at risk of having sensory integration difficulties by Janine van der Linde is an exciting development that will contribute significantly to making sensory integration assessment more accessible to children from low socio-economic settings (see the section on highlights from the South African presentations).

- The development of the EASI (The Evaluation in Ayres Sensory Integration) within the Ayres 2020 Vision project that will be an internationally standardised assessment tool that will be provided free of charge.

In the area of intervention, Annamarie commented that it remains a challenge to make sensory integration intervention accessible, but that there are also efforts such as the inclusion of basic sensory integration theory in some undergraduate training curriculums in South Africa to equip community service therapists with some knowledge in this field that is making a difference. A stimulation program promoting sensory integration functions was also developed by Annamarie at the University of the Free State that is currently used for children in low socio-economic settings in some communities to enhance sensory integration functions.

However, the latest, and most exciting, is the development of Annamarie and other colleagues’ latest project called “Back-to-Urth Playgrounds©” which uses sustainable building techniques and sensory integration theory to construct playgrounds that have the potential to enhance sensory integrative functions across all income groups in South Africa. Projects by occupational therapy students in collaboration with non-profit organisation Qala Phelang Thala have empowered communities to construct their own playgrounds which poetically address directives that UNICEF (2015) has put forward for sustainable development, such as:

Ventures that spring from the initiative of community members and proceed with their participation are more likely to address their needs in ways that are acceptable and sensitive to local social, cultural and political factors. Innovators around the world are closing gaps and crafting solutions tailored to local needs. How effective, acceptable and sustainable an innovation will be hinges on how well it fits into the lives and environments of the children and communities who use it. Using available resources creatively to produce practical solutions that deliver higher quality or greater impact at lower cost.

Participatory – engaging children, young people and their communities as agents of change.
With such a powerful message of hope, it was absolutely no wonder that Annamarie received a standing ovation.

**Highlights from the parallel sessions**

The parallel sessions showcased work done on ASI® across the lifespan including premature infants, adolescents and adults. Diverse populations including developmental coordination disorder, autism spectrum disorders and attachment disorders were featured, while diverse settings such as home-based, community-based, mental health and forensic programmes were also represented.

One presentation that was of particular interest was delivered by Elisabeth Söchting, an occupational therapist and PhD candidate from the Vienna (where ESIC 2017 will be hosted). The title of her presentation based on her PhD study was ‘The role of proprioceptive processing for praxis and participation in children with autism spectrum disorder’. While the study is still a work in progress, Elisabeth presented her work thus far including the development of sophisticated objective measures of proprioception and praxis, summarised in Table 1.
TABLE 1
SUMMARY OF OBJECTIVE MEASURES OF PROPRIOCEPTION AND PRAXIS DEVELOPED AND/OR USED BY ELISABETH SÖCHTING IN HER STUDY TITLED ‘THE ROLE OF PROPRIOCEPTIVE PROCESSING FOR PRAXIS AND PARTICIPATION IN CHILDREN WITH AUTISM SPECTRUM DISORDER’

<table>
<thead>
<tr>
<th>Measures of proprioception</th>
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<tr>
<td><strong>Intramodal discrimination (proprioception)</strong></td>
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<tr>
<td>Grading of Force Test</td>
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<td>Finger-to-Finger Test</td>
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<td>Grading of Movement Passive Source – Kinesthesia Test (SIPT)</td>
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<td>Grading of Movement Test – Active Source</td>
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<td><strong>Crossmodal integration (visual-proprioceptive)</strong></td>
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<td>Postural Adjustment Test</td>
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<tr>
<th>Measures of praxis</th>
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<tr>
<td>Proprioception-based postural praxis, imitation free: Arm Matching Test</td>
</tr>
<tr>
<td>Postural praxis, imitation dependent: Postural Praxis Test (SIPT)</td>
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</table>

What made this presentation so intriguing is that it really highlighted the deficiencies in the available measures of proprioception that we currently have at our disposal, and demonstrated innovative ways in which technology can be used to overcome these challenges.

**Highlights from the South African presenters**
In addition to the keynote address by Annamarie van Jaarsveld, six South Africans who currently reside in South Africa delivered oral presentations at the congress (there were also many more presentations by ex-patriots). Table 2 provides the title and a summary extracted from the abstracts of each of the South African presentations.
<table>
<thead>
<tr>
<th>Presentation title and presenter</th>
<th>Summary</th>
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<tbody>
<tr>
<td>Phase 2 in the development of a screening instrument to identify children at risk of SI</td>
<td>Janine reported on the progress of her PhD study which aims to develop a screening instrument to identify children at risk of sensory integration difficulties from low socio-economic areas. In Phase 1 of the study she developed items for inclusion in the proposed instrument, while Phase 2 involved the field testing of the instrument on 200 children from urban and rural areas to determine validity and reliability. The statistical analysis indicated that most items had high positive correlations and that the scores and observations obtained were valid in measuring sensory integration constructs. Further analysis is in process to determine items that can be deleted, as well as to look at comparisons in results between different the ages, languages and areas (urban and rural areas). This will result in the further refinement of the instrument. The field testing confirmed the fact that children from low socio economic areas are having difficulties with sensory integration. It also highlighted the diversity of the population, especially in terms of language and the difficulty in ensuring that the instrument is usable for the different languages and cultures. Future plans include refinement of the instrument and Phase 3 of the study will focus on comparing findings on the screening instrument with findings from the SIPT in children from the same population. This phase will further investigate the validity and reliability of the instrument.</td>
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<td>Sensory processing and performance of adults in the workplace</td>
<td>Dr Lombard presented results from her PhD study in which she investigated correlations between sensory processing and performance among call centre agents. She utilised a quantitative, non-experimental and correlational study design to measure and compare demographic, sensory processing and performance data from 459 call centre staff within four fully operational call centres, which varied in type of operation, employer and geographical area in South Africa. Results showed strong, consistent and significant correlations between agents' sensory processing, performance and absenteeism. Dr Lombard concluded that sensory processing has the potential to be used for recruitment and performance management. Together with improved sensory environmental considerations and adaptations it can create a healthier agent-job-environment fit. Findings support knowledge transfer into other workplace industries, education and training, occupational health management and occupational therapy practices.</td>
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<tr>
<td>Ayres Sensory Integration Intervention and the development of the ELBW and VLBW Infant</td>
<td>Elise presented results from the study she conducted for her master’s degree which she obtained from the University of the Free State in 2014. In this study she investigated the effect of Ayres Sensory Integration® (ASI) intervention on the development of premature infants, within the first 12 months of their lives. A quantitative research approach was utilized. Through a pre-test/post-test experimental design, 24 premature infants from low socio-economic settings in the Free State, South Africa were divided into an experimental and control group and matched according to corrected ages and gender. The developmental status of both groups was determined with the Bayley III Scales of Infant and Toddler Development, Test of Sensory Functions in Infants (TSFI) and the Infant/Toddler Sensory Profile. The experimental group received a 10 week Ayers Sensory Integration® intervention period which comprised of one individual 45-minute therapy session and one to two home activities given to the mother to do with the infant at home. Results indicated that a short period of weekly ASI® intervention sessions had a significant positive effect on participants’ sensory processing in terms of registration, modulation and discrimination of the sensory input for use, therefore contributing to their ability to develop adequate skills for better general developmental progress.</td>
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<tr>
<td>Presentation title and presenter</td>
<td>Summary</td>
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<tr>
<td>Ayres Sensory Integration® and the experiences of a child with cochlear implants and sensory over-responsiveness (Stefanie Kruger)</td>
<td>Stefanie presented a single-subject case study of a 3-year old girl with cochlear implants displaying inappropriate behaviour related to sensory defensiveness. This 3 year old girl could only wear her cochlear apparatus for 45-60 min at a time; she would then remove the apparatus and hide them away. She changed her clothes between 6 - 8 times per day and had avoidance behaviours such as hiding under the table during speech therapy. The girl had difficulty tolerating the tactile sensation of wearing her cochlear apparatus, as well as coping with auditory input – a “new” sense to her. Sensory over-responsiveness interfered with her ability to learn language and to cope with everyday experiences. Intervention included weekly individual occupational therapy sessions for 45-60min focusing on Ayres Sensory Integration®. Her parents and team members were informed of her sensory preferences. Regulation strategies were suggested for home and speech therapy. Adaptations to reduce external noise had to be made by e.g. seeing her alone in a carpeted treatment room (her mother was present but no other therapists/children), equipment was “muted” by e.g. covering wooden ramp, tying metal chains and closing windows. Changes were observed in adaptive behaviour in ADL (e.g. dressing, eating), participation in play activities, how long she could wear her cochlear implants (up to 8 hours a day) as well as verbalisations/words used.</td>
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<tr>
<td>The prevalence of sensory integration problems in individuals with disorders characterised by symptoms of psychosis (Tharina Annandale)</td>
<td>Tharina delivered two presentations from her master’s degree study which she obtained in 2014 from the University of the Free State. The first presentation reported on the findings of a quantitative study used to investigate the prevalence of sensory integration problems of the person with symptoms of psychosis. The study population consisted of 99 adults who have been admitted to a mental health institution in South Africa. Sensory integration functions were assessed using the “Schroeder, Block and Campbell Adult Psychiatric Sensory Integration Evaluation” (SBC) while the “Therapeutic Functional Level Assessment” (TFLA) was used to assess occupational performance. The results indicated that the individual with psychosis experiences sensory integration problems and this has an impact on their occupational performance.</td>
</tr>
<tr>
<td>The short-term influence of sensory integration intervention on the individual with disorders characterised by symptoms of psychosis (Tharina Annandale)</td>
<td>Tharina investigated the short term influence of sensory integration intervention on individuals with disorders characterized by symptoms of psychosis by using a quantitative, randomized, controlled single blind clinical trial. Ninety-nine adult mental health care users with symptoms of psychosis admitted to acute wards of a psychiatric institution in South Africa participated in the study. The mental health care users were randomized according to age, functional level, pathology and gender. A pre-post testing was done before and after both groups were exposed to the regular occupational therapy groups in the wards, and the experimental group was exposed to sensory integration intervention for a two-week period (8 sessions). Although limited statistically significant differences were found, both groups showed clinical improvements. The experimental group showed statistically significant differences in the improvement of self-care, social behaviour (logical speech and communication), appearance and the occurrence of delusions and hallucinations. Improvements were noted in the experimental group in functions supported by the vestibular-proprioceptive system, the somatosensory system and the visual-vestibular system.</td>
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</table>
Conclusion
ESIC 2015 was an inspiring experience – one that reaffirmed the value of Ayres Sensory Integration® intervention in the lives of diverse people, and that showcased the scientific evidence that we need in order to proceed with confidence when we practice the art and science of Ayres Sensory Integration®.

References
Ayres Sensory Integration 2020 Vision. Available at: www.ASI2020vision.org
MADAGASCAR: BREAKING OUT OF THE BOX...

BY

Tharina Annandale

M. OT (UFS)
<table>
<thead>
<tr>
<th>Character</th>
<th>Sensory integration processing problems</th>
<th>Possible psychiatric diagnosis</th>
<th>Creative ability analysis</th>
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</thead>
<tbody>
<tr>
<td>Alex</td>
<td>Alex has a very high sensory threshold. He is a dreamer and can sleep through any noise. Although he likes to “move it”, he takes a while to charge his batteries and really get into it…</td>
<td>Alex presents with narcissistic personality traits and has an unrealistic self-image at times. He has grandiose tendencies and often finds himself in the middle of something that he cannot master.</td>
<td>Although Alex takes initiative, he finds it hard to start an activity. He can complete a 3-4 step activity (getting up, seeing food and eating it). He has abstract thinking, but these thoughts never reveal themselves in his actions, but only in his dreams. He is very egocentric. Level of creative ability: Self-presentation (transitional phase)</td>
</tr>
<tr>
<td>Marty</td>
<td>Marty presents with sensory sensitivity disorder. He presents as nervous and even speaks at a fast pace. He over responds to sensory inputs and often overreacts in certain situations.</td>
<td>Marty definitely has fluctuating moods and presents as labile. At times he even presents with symptoms of bipolar disorder and experiences emotions of a high intensity.</td>
<td>Marty is the actual mastermind behind a lot of initiatives, but he lacks the volition to put it into action. He is egocentric and externally driven. His anxiety levels still fluctuate and his judgment is not always accurate. He often finds himself in unfamiliar situations. Level of creative ability: Self-presentation (friends driven)</td>
</tr>
<tr>
<td>Marvin</td>
<td>Marvin presents with somatodyspraxia with a strong vestibular-proproprioceptive component. He has very low muscle tone, often loses his balance and increases his base of support to help keep his balance. He fixates his neck and shoulder girdle in order to keep his posture aligned.</td>
<td>Marvin presents with psychotic symptoms at times and he has a definite identity disorder. He has very high levels of anxiety and can even possibly present with a general anxiety disorder.</td>
<td>Marvin has very limited awareness of himself and finds it difficult to differentiate himself from the environment. He has poor emotional control and hardly ever initiates any activity. He is incidentally constructive. Level of creative ability: Self-differentiation (transitional phase)</td>
</tr>
<tr>
<td>Gloria</td>
<td>Gloria presents with a typical sensory profile and manages to balance herself within her environment. She has very good postural abilities and her gross motor abilities are very well developed.</td>
<td>Gloria has a very good self-image and manages to control her emotions and anxiety levels very well.</td>
<td>Gloria is goal directed and product driven. She communicates well and controls her anxiety levels well. Level of creative ability: Passive participation (Gloria driven)</td>
</tr>
</tbody>
</table>
WE WORK WITH MENTALLY INTELLECTUALLY DISABLED ZOO ANIMALS THAT ATTEND THERAPY IN GROUP SESSIONS. THIS MAKES IT CHALLENGING AS YOU WILL FIND ALL THE DIFFERENT PROFILES IN FRONT OF YOU AT THE SAME TIME. THE PARACHUTE IS A GREAT ACTIVITY TO USE IN A GROUP AND GETS EVEN THE VERY LOW REGISTRATION ANIMAL INVOLVED IN ACTIVE PARTICIPATION. WITH THE PARACHUTE’S MOVEMENT DOING A LOT OF THE WORK FOR THEM, THESE ANIMALS ONLY HAVE TO HOLD ON AND EXPERIENCE THE FUN.
All the animals stand around the open parachute. They pick up the parachute and then move it up and down with their arms. You can change the speed of movement for more or less input. This action causes the parachute to make waves, which is great for proprioceptive input. The Therapist can then throw two balls onto this parachute and the participants must keep it inside the parachute while making waves. The activity usually creates a lot of positive emotions and group interaction. Replace the balls with two animals walking bare feet inside the parachute while the other animals make waves. This is a good activity to improve proprioception, visual stimulation and concentration. It is unbelievable to see how many of them struggle to “walk on” the waves, BUT it is also incredible to see how quick they adapt to walk on this moving parachute.

Still standing in a circle, the Therapist counts to three and then all the animals must lift up the parachute and keep it in the air. Make sure they are bent at the waist and then go into a standing position with their arms raised in the air. Great idea for vestibular input and proprioception. Their arms must go straight up in the air so as to ensure that the parachute makes a dome in the air, i.e. fill with air. We usually practice this a few times as the dome only stays for about 2-4 seconds. The Therapist then calls the names of two animals standing opposite each other. As soon as the parachute make a dome these two animals have to exchange places, running past each other underneath the air-filled parachute. Repeat this to ensure all the animals have a turn. Again this keeps all the animals actively involved and is great for socialization and attention.

You can also hang the parachute from the roof inside your Sensory Integration room. It looks like a tent and works wonderful to create the womb effect. This "womb" can be made bigger or smaller as the need arises, as the parachute is big and easy to change.

These activities help a lot with strengthening shoulder and arm muscles as well as handgrip and bilateral integration. It also stimulates vestibular, proprioceptive and tactile integration. Motor planning is not excluded, especially where they have to exchange places. Caution: When the parachute is moving up and down, the sunlight reflecting on the parachute, may cause an animal with visual modulation problems to become nauseous or develop a headache.
This is a true story of a boy named Jacob Barnett who is likely to change the world one day. Starting out with full blown autism, he doesn’t manage preschool and doesn’t talk much. His mother, who is a preschool teacher, believes that growing the strengths and talents of a child is the only way forward. At the age of 3, Jacob went to a lecture about astronomy and was the only person in the room who was able to explain why the moons of Mars are ellipsoid. This was the first full sentence his mother had ever heard him speak. He was reintroduced to School in Grade 1, and managed for 2 years, but began retreating into himself again due to intense boredom and putting on a “normal” front. He was withdrawn from school and began attending college lectures.

Jacob has a photographic memory and was able to take what he learnt on all subjects, at all times and on all levels and integrate it. He then began coming up with his own theories and thoughts. At the age of 8, he developed a theory of relativity akin to Einstein. He blew the charts higher than anyone in history on IQ assessments and is now thriving in all aspects of life within a fulfilling academic environment. He is currently 13 years old and is doing post-graduate studies developing theories in maths and astrophysics.

There are many other hardships along the way, not least of all the health of his other family members, the recession and friendships. This is an incredible story to follow in the years to come, as he is determined to make changes for the better in the world.

The overriding message from this book is that we should believe and nurture the strengths and talents of our children and through engagement and social interaction, they will achieve their own success.

Google Jacob Barnett for more information, and watch him on Ted Talks for inspiration!
SI AND CREATIVE ABILITY – TOWARDS A SYMBIOSIS OF SELF-ACTUALIZATION

1. The Vona du Toit model of Creative Ability is best known as a model used in paediatric occupational therapy practices.

2. Jean Ayres described sensory integration as a developmental process that occurs when the brain processes information from the environment and organises this information for use to interact meaningfully with the environment.

3. The model of Creative Ability emphasised that when the child is unsuccessful to environmental demands and thus interaction with the environment, it will motivate them to try harder the next time.

4. The model of Creative Ability consists primarily of two components, namely motivation and action.

5. Registration, modulation and organisation of incoming sensory inputs are what constitute the sensory integrative process.

6. The “just-right-challenge” is obtained when a child is observed to engage with the activity.

7. Exploration with objects will come naturally for children on the level of self-presentation of the Model of Creative Ability.

8. With the upwards progression on the “hierarchy” of sensory integrative functioning, it becomes increasingly more challenging to adapt activities to the level of self-differentiation (which involves incidental actions).

9. Activities for arousal and modulation provides ample opportunity for exploration mostly suitable for children on the level of passive participation creative ability.

10. When working with discriminatory functions with a child on self-differentiation will be particularly difficult, as the child likely still has difficulty distinguishing himself as separate from his environment.
VISION
To provide training and education in Ayres Sensory Integration® of an internationally accepted standard in order to provide a service of excellence to the ultimate benefit of the client.

MISSION
To equip Occupational Therapists with basic as well as advanced up to date Sensory Integration interpretation principles and treatment techniques.
To promote awareness within the multi-disciplinary framework in order to play a leading role in the application of Sensory Integration theory and practice in South Africa and in the rest of the world.
To make Sensory Integration accessible to the network of individuals (including caregivers, parents and teachers) involved in the context of the client.