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RESEARCH ARTICLE OPEN ACCESS

INTEROCEPTION: SENSORY INTEGRATION-BASED INTERVENTION - POLI METHOD

***Thais Caroline Pereira**

MSc –Researcher and Occupational Therapist at Neurosense, Curitiba, Paraná, Brazil

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****Corresponding author:***
Thais Caroline Pereira

ABSTRACT

Objective: The aim of this study is to describe the efficacy of the Poli Method in the treatment of interoceptive sensory processing, through evidence-based practice.

Method: This is a qualitative, exploratory and prospective research, involving field research and experience reports. It consists of experience reports from five patients aged between 6 years and 10 months and 11 years, diagnosed with Autism Spectrum Disorder (ASD), Restrictive and Avoidant Eating Disorder (RAED), Overactive Bladder, and Atopic Dermatitis, all with clinical evidence of interoceptive sensory processing dysfunction. The evaluation was performed in three stages: 1) definition of the items that compose the Sensory Profile 2 which refer to interoceptive sensory processing dysfunction; 2) identification of patients who have interoceptive sensory processing dysfunction based on the Sensory Profile 2, and 3) application of the Poli Method. The patients were followed up for 6 months to 1 year, depending on the case.

Results: It was observed that the Poli Method, when applied in the treatment of the five evaluated patients, resulted in exceptional improvements regarding: a) identification of visceral needs such as hunger and thirst; b) development of communicative intention, contributing to orality; c) broadening of the food repertoire (awakening the taste buds); d) better crisis management (emotional outbursts); e) improvement of self-perception; f) improvement of self-control; g) improvement of body awareness; h) better personal, temporal and spatial organization; i) better management of emotions and emotional intelligence. Thus, the Poli Method proved to be an effective resource to be adopted in difficulties involving interoceptive sensory processing dysfunction.

Conclusion: Evidence-based practice brings to light a powerful and undeniable vision of the efficacy of the Poli Method in improving the processing of interoceptive sensory stimuli, which can have input through the brain, viscera and emotions. There is a need for the development of multicenter research in order to determine a greater range of clinical cases and the scope of the Poli Method.

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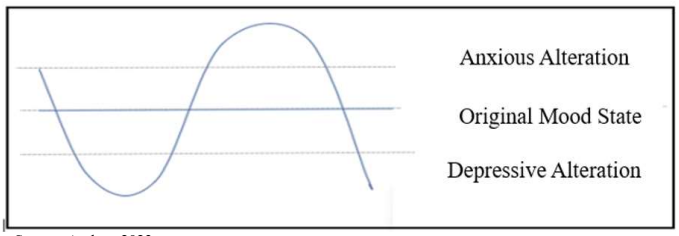
INTRODUCTION

When considering stimuli sensors or sensory systems, it is necessary to revisit the theory of sensory integration developed by Dr. Anna Jean Ayres, which cites sensory processing as the basis for human development, learning, and behavior. The theory states that all our actions result from the brain's interpretation of the stimuli received both from outside the body (through the visual, tactile, olfactory, gustatory, and auditory systems) and from within the body through proprioceptive, vestibular, and interoceptive systems).[1] The theory of sensory integration considers that processing happens on the central nervous system. Interoception was previously associated with the viscera, had its concept linked to the autonomic nervous system. This may have been one reason why this sensory system was given little consideration within this theory until now (LANE & BUNDY, 2020). Until 2015, interoception was attributed to the perceptions of the viscera, which were felt when there was pain present (CRAIG, 2015).[2] Interoception was established as the eighth sense from the research of Dr. Craig (2015), an American neuroscientist. He showed the path through which neurons with very small fibers send their signals from the spinal cord to a specific area in the thalamus (traditionally related to "pain and temperature"); according to him, this is the main sensory pathway to the autonomic nervous system, followedby from the thalamus to the insular cortex (MAHLER, 2015). Craig (2015) emphasizes that this pathway appears to be unique to primates, and humans. The anterior insula integrates signals from the entire body, where the relationship between interoception and the other sensory systems is established. According to him, that is why humans have a much more refined sense of their body and emotions than other species.

In recent years, researchers from various fields have recognized the influence of interoception in their areas of interest, such as trauma, emotion, using the bathroom, hunger and thirst, mental health, self-experience, decision-making, and time perception. As awareness of interoception's role grows, the relevance of this theme for participation in daily life and occupational performance gains importance in the future direction of clinical and research fields. Hence, the need arises for the development of an intervention method that assists in the clinical practice of these professionals, the Poli Method. The Poli Method is named for its proximity to the Polyvagal Theory. This theory focuses on feelings of safety, considering the involved neurophysiological substrate. It provides a scientific perspective which considers that these feelings originate from physiological states regulated by the autonomic nervous system. The central idea is to consider that when humans feel safe, they are better able to perceive homeostasis, restoration, and growth while becoming more socially accessible. This has repercussions on health, education, socialization, creativity, productivity, and the feeling of well-being. In the Poli Method, the focus is on self-confidence, understanding that this psychosocial aspect contributes to human action in the same proportion as motor coordination and its psychosocial implications.

The starting point of the Polyvagal Method lies in the understanding that the neural center of interoception - the insula - when more activated on the left side, there is the predominance of: a) parasympathetic activity, b) positive affect, c) calm behavior, d) energy nourishment. And, when there is greater activation on the right side, there is the predominance of: a) sympathetic activity, b) negative affect, c) challenging behavior, d) energy expenditure (CRAIG, 2015). With this in mind, there are parameters to understand that people with greater activation on the left side of the insula (remembering that there is genetic and environmental influence) tend to be more positive, optimistic, more receptive to sensory stimuli, people, food, places, clothing, learning, tending towards greater homeostatic and emotional balance, with greater ease in spending energy only on what is necessary, being able to consider which stimuli are worth paying attention to, those that are relevant (referring to salience). On the other hand, people with greater activation on the right side of the insula tend to be more negative, pessimistic, generally showing a heightened alertness, easily bothered by the stimuli received, a situation that makes it difficult to consider which stimuli they should spend their energy on. Understanding the "two-way" relationship between the brain, viscera, and emotions, the Polyvagal Method considers that stimuli can originate in the brain, viscera, or emotions, with collateral repercussions. For example: 1) entry through the brain: when there is greater activation on the left side of the insula, there is a tendency to receive sensory stimuli better, without great discomfort or irritation. The opposite is true in relation to greater activation on the right side; 2) entry through the viscera: when there is visceral pain, the mood state changes, leading to irritation and elevating alertness.Consequently, it elevates sensory reactivity (mainly tactile, but also auditory and olfactory), resulting in discomfort and annoyance; 3) entry through emotions: when there is a feeling of joy, humans are more available, able to overlook sensory stimuli that can cause discomfort when sad. The Poli Method favors interoceptive sensory processing, enabling the individual to connect with his/her feelings and emotions (with their essence), in order to strengthen the self, promoting self-confidence. This in turn, elicits the sense of security sought by the Polyvagal Theory. Being connected to one's essence allows for sensory self-knowledge, understanding and respect for personal limits; the ability to assertively express likes and dislikes; decision-making; emotional management; personal and temporal organization; Promotes motivation, attention, and arousal; enables perspective-taking, self-awareness, and self-care; facilitates social touch; enables imitation, the ability to interpret facial expressions and body language, the understanding of metaphors and irony, and favors communication and self-expression in the first person, while also arousing a feeling of vigor, as it "bridges" the internal and external, allowing for the expression of one's innermost desires. An important aspect of the Poli Method, which is related to self-confidence, is aggression. It is understood that its lack or excess promotes not only emotional but also endocrine imbalance. For example, experiencing mood-altering situations such as during the pandemic period, where anxiety increased without mood swings, or having difficulty becoming anxious and calming down, or becoming sad and being able to return to the original mood state (Figure 1), can affect the endocrine system, resulting in hormonal imbalances. Under such aspects, the Poli Method promotes balance between endocrine, visceral, and somatic functions, with a focus on organic, cognitive, behavioral, and psychosocial aspects.



Source: Author, 2023

Figrue 1. Mood state oscillation

Although conceptually close to the Polyvagal Theory, the Poli Method differs from it in several ways. Due to the existing gap in the literature regarding treatment of interoceptive processing, this study aims to contribute by describing the experience of five cases that presented limitations related to interoceptive processing and after treatment with the Poli Method, showed effective improvement.

MATERIALS AND METHODS

This is a qualitative, exploratory, and retrospective research study based on experiential reports. Data were collected from patients' records. For this study, five patients treated at the Occupational Therapy Service of Neurosense LTDA were selected. The eligibility criteria included: a) being a patient of the author at Neurosense LTDA, b) being between 4 years and 0 months and 14 years and 11 months old, c) presenting dysfunction of interoceptive processing based on the Sensory Profile 2, and d) obtaining authorization from parents or guardians for the use of data through an informed consent form. This work was in accordance with the principles of the Helsinki Convention and its subsequent amendments, as well as the Brazilian guidelines provided for in resolution 466/2012, with the data given in writing after approval. Patients were evaluated with instruments according to their underlying conditions and reasons for referral. The selection of instruments was determined by factors such as: in case 1, involving a child with dyspraxia who had difficulty responding to verbal commands, directed assessments were discarded. To evaluate praxis, free observations of play and clinical observations were adopted (described below). In case 2, involving TARE, the Scale of Assessment of Eating Behavior in Autism Spectrum Disorder was applied. The same resource was adopted in case 3, which involved selective eating and ASD. Additionally, in cases 1, 2, 3, 4, and 5, the Sensory Processing Measure (SPM), which is considered an instrument for sensory integration assessment, was applied in a quantitative manner, providing a graph that facilitates visual comparison of the case's progress. Thus, similar assessment components were observed across cases (Table 1). Among the similar assessment components were: 1) the list of behaviors that caught the parents' attention, 2) clinical observations, and 3) the Sensory Profile 2. The list of behaviors that draw parents' attention, idealized by the author, consists of reports by parents related to how the patient reacts to certain stimuli and situations. Through these reports, the therapist formulates hypotheses about the sensory basis of the reported behaviors, which are confirmed and/or discarded by the other instruments that compose the assessment. Therefore, it is a qualitative assessment of how the sensory profile is influencing the child's daily behavior. Clinical observations include observation, standardized evaluation, and information reported by caregivers regarding occupational performance, making it possible to identify difficulties related to motor planning, motor coordination, vestibular and proprioceptive sensory processing, and vestibular-proprioceptive integration (BLANCHE and REINOSO, 2008).

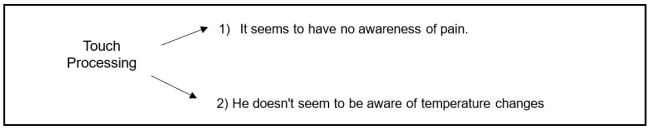
Table 1. Clinical Dat

CLINICAL DATA					
	Patient 1	**Patient 2**	**Patient 3**	**Patient 4**	**Patient 5**
Age	6 years and 10 months	7 years and 7 months	9 years and 5 months	8 years and 3 months	8 years and 1 month
Diagnosis	ASD (non-verbal)	ADHD and Generalized Anxiety Disorder	ASD	Overactive bladder	Atopic dermatitis
Complaint	"to improve the senses and reduce psychomotor agitation" (sic-mom).	Food selectivity.	Food selectivity, cognitive rigidity and broad and fine motor coordination deficits.	Dealing better with their difficulties (sic-mother).	Improve your emotional intelligence (sic-father).
Items scored in sensory profile 2 that refer to interoception					
Touch Processing	1 e 2	1 e 2		1 e 2	2
Socio-emotional responses associated with sensory processing	3, 4, 5, 6 e 7	1, 2, 3, 5, 7, 9, 11, 12, 13 e 14	1, 2, 3, 4, 5, 7, 9, 11, 12 e 13	2, 3, 4, 9, 11 e 13	1, 2, 3, 5, 7, 9 e 12
Attention responses associated with sensory processing	1 e 2	1, 2, 3, 4, 5 e 7	6	2, 3, 5 e 7	3 e 5
Therapy history	5 years of ABA psychotherapy	No history of therapy.	3 years and 10 months of psychotherapy	1 year of pelvic physiotherapy with electrostimulation for urinary control	1 year of psychotherapy
	1 year of speech therapy				
	1 year of hydrotherapy				
Frequency of therapy	Weekly	Weekly	Weekly	Weekly	Weekly
Evidence from the Poly Method	Communicative intent.	Identifying their physiological needs, such as hunger and thirst.	He began to calm down more quickly after crisis epidotes (emotional outbursts).	He began to control his urinary sphincter better during the day.	Reduction in dermatitis episodes, from monthly to quarterly, as well as attenuation of the condition when present.
	Better connection with you.	Anxiety control.	Self-control.	Perception of visceral needs.	Biological maturation.
	Attention.	Motivation.	Managing emotions.	Atutoperception.	Organization.
	Atutoperception.	Self-esteem.	Behavior management.	Body awareness.	Self-control.
	Self-awareness.	Self-confidence.	Social interaction.	Organization.	Anxiety control.
	Eye contact.	Self-control.			Self-control.
	Perspective-taking.	Cognitive flexibility.			Reduction in dermatitis episodes.
	Praxis.	Suitability of clothing to the climate.			Emotional homeostasis.
	Communicative intent.	Broadening the food repertoire.			Perspective-taking.
	Autonomy.	Awakening the taste buds.			His negative and pessimistic personality turned positive and optimistic.
	Perception of visceral needs.				
	Deductive reasoning.				
	Solving problem situations.				
	Understanding consignments.				

Legend: ASD: autism; ADHD: attention deficit disorder

Clinical observations include observation, standardized evaluation, and information reported by caregivers regarding occupational performance, making it possible to identify difficulties related to motor planning, motor coordination, vestibular and proprioceptive sensory processing, and vestibular-proprioceptive integration (BLANCHE and REINOSO, 2008). Winnie Dunn's Child Sensory Profile 2 evaluates children aged 3 years and 0 months to 14 years and 11 months. It consists of a questionnaire to be filled out by caregivers, composed of 86 questions regarding behaviors related to sensory systems and what is understood as sensory processing subproducts. This was answered in the presence of the therapist, so it was also an opportunity to gather reports related to sensory processing, including interoceptive processing, despite not being explicitly stated in the Profile.

However, this instrument presents components that relate to interoception. Next, the correlation between interoception and the Child Sensory Profile 2 is made, considering the quadrant and behaviors of the instrument related to this sensory system.

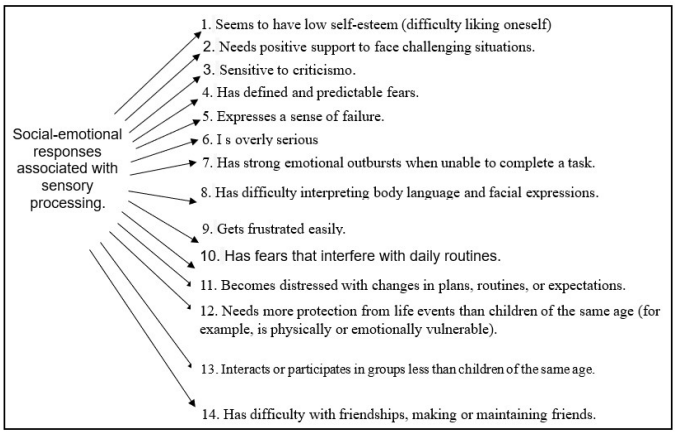


Note: Author, 2023.

Correlation: Items 1 and 2 - Neurons with very small fibers, such as those in the viscera (smooth muscle), send their signals to the spinal cord and then to a specific area in the thalamus (traditionally related to "pain and temperature") (Bundy & Lane, 2020).

Figure 2. Relationahip between Introception and items from the touch processing

It is important to mention that the numbering presented is related to the item topic and differs from the original numbering of the Child Sensory Profile 2. (Figure 2, 3, and 4).The protocol for the poly method is described at the end of the article in Appendix 1.



Note: Author, 2023

Figure 3. Relationship between Interoception and items from the Social-Emotional Responses Associated with Sensory Processing quadrant, form the sensory profile 2

Correlation: **Items 1, 2, 3, and 5 -** According to BUNDY & LANE (2020) and CRAIG (2015), interoceptive input allows for mapping an internal awareness of oneself, which includes self-concepts such as self-esteem and self-confidence. **Items 4 and 10 -** The amygdala is related to fear conditioning, regulating our autonomic and emotional responses to dangerous situations in the environment. The insular cortex also has direct connections with the amygdala and hippocampus of the limbic system. This system aids in emotionally reacting to the environment, creating new memories, and maintaining a state of alertness, such as sleep/wake cycles and other areas of homeostasis. (BUNDY & LANE, 2020; KOSCINSKI, 2018; CRAIG, 2015). **Items 6 and 8 -** Activation of cells in the hypothalamic structure results in hormonal, visceral, and somatic responses aimed at restoring the body's internal balance. Hypothalamic hormones are responsible for mediating signals regarding changes in temperature, hunger, thirst, sleep, mood, stress, and sexual desire. (BUNDY & LANE, 2020). In light of this, failures related to sensory input make it difficult to express emotions, which makes it impossible to interpret the emotional expression of others. **Items 7, 9, and 11 -** Refer to executive functions, focusing on inhibitory control and cognitive rigidity. Cognitive-emotional interactions are related to interoception, including those related to executive functions. (PESSOA, 2010).

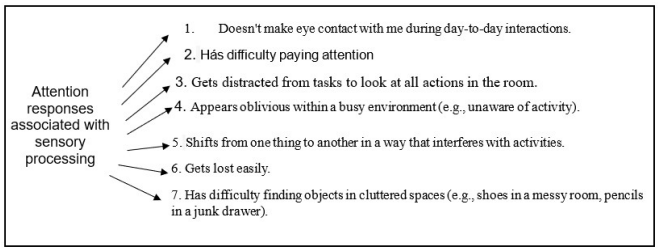


Figure 4. Relationship Between Interoception and Items in the Attention Responses quadrant associated with sensory Profile

Correlation: **Item 1** - In order for there to be eye contact, perspective taking is determinant, as it is from this that the other person will be perceived by the individual, making this contact possible. According to Mahler (2019), perspective taking is related to interoception. Baiano, Job, Santangelo Auvray & Kirsch (2021) highlight that the emotional aspects of perspective taking are related to interoception. **Items 2, 3, 6 and 7** - Refer to attention, that is, executive functions. As mentioned, cognitive-emotional interactions are related to interoception. (PESSOA, 2010). It is worth mentioning studies such as Kutscheidt et. al. (2019), which investigate interoceptive awareness in patients with ADHD, revealing poor performance. **Items 4 and 5** - Involve attentional aspects originating from self-awareness. There is a wealth of experimental evidence demonstrating the profound importance of bodily sensations for human performance (BUNDY & LANE, 2020; CRAIG, 2015). When there are difficulties related to interoceptive sensory input, they extend to sensations, making motivation and consequent attention maintenance unfeasible.

Clinical Case 1

A 6-year 10-month-old boy diagnosed with nonverbal Autism Spectrum Disorder (ASD) presented with a need of "improving sensory issues to reduce psychomotor agitation" (mother's words). The patient also had selective eating habits. He received the diagnosis at 1 year and 9 months and started Applied Behavior Analysis (ABA) therapy, which he continued for about a year. The following year, he increased the frequency of ABA therapy to 5 times a week, and with two years of therapy, he reduced it to 3 times a week. He had a history of 1 and a half years of hydrotherapy and underwent 1 year of speech therapy, which he stopped due to lack of progress, according to reports from the caregivers. He was followed by a pediatric neurologist,but was not taking any medication. In the Sensory Profile 2, he showed alterations in items 1 and 2 of the "Tactile Processing" quadrant, items 7, 8, 9, 11, 12, 13, and 14 of the "Social-Emotional Responses Associated with Sensory Processing" quadrant, and items 1, 2, 3, 4, 5, 6, and 7 of the "Attention Responses Associated with Sensory Processing" quadrant. He started occupational therapy using a sensory integration approach and received the Poli Method twice a week. By the end of the third month of intervention, he developed communicative intention demonstrating the effectiveness of the Poli Method in promoting praxis and speech development. Additionally, the mother reported that he surprised the family by getting up from the couch and going to the fridge to get something to eat, showing the Poli Method's contribution to autonomy. Currently, the parents report that he understands instructions better and can attend to simple requests, demonstrating the Poli Method's contribution to executive functions.

Case 2: Girl, 7 years and 7 months old, complaint: selective eating. She has had reflux since early childhood and has taken medication, but had to stop due to non-adherence. Difficulties with eating have always been present, both in approaching food and trying new things. Over the years, she has had recurrent episodes of vomiting, which were treated as a virus, but the mother now considers the possibility that they may be related to reflux. Recently she was diagnosed with ADHD and Generalized Anxiety Disorder after a neuropsychological evaluation. At evaluation with the Sensory Profile 2, she presented alterations in items 1 and 2 of the "Tactile Processing" quadrant; in items 1, 2, 3, 5, 7, 9, 11, 12, 13, and 14 of the "Socioemotional Responses Associated with Sensory Processing" quadrant; and in items 1, 2, 3, 4, 5, and 7 of the "Attention Responses Associated with Sensory Processing" quadrant. She began occupational therapy with asensory integration approach, applying the Poli Method every two weeks. After six months, she became better at identifying her visceral needs, such as hunger and thirst, and gained more self-confidence and motivation improved, which helped her try new foods, expand her food repertoire, and "awaken" her taste buds, reporting that foods previously tasted the same. Thus, this case revealed the scope of the Poli Method in awakening the taste buds (denoting the relationship between interoception and the gustatory sensory system), identifying visceral needs, and addressing psychosocial aspects such as self-confidence, which was crucial in this case.

Case 3: Boy, 9 years and 5 months old, diagnosed with ASD, complaint: selective eating, cognitive rigidity, and deficit in gross and fine motor coordination. He received the diagnosis of autism at the age of 6, in 2018. He started psychotherapy in August 2017 due to behavioral demands "because he had many crises at school" (mother's words). During evaluationwith theSensory Profile 2, he showed issues in items 1, 2, 3, 4, 5, 7, 9, 11, 12, and 13 of the quadrant "Socioemotional responses associated with sensory processing" and item 6 of the quadrant "Attentional responses associated with sensory processing." He started occupational therapy witha sensory integration approach, applying the Poli Method on a weekly basis. At the end of the first trimester, when he had emotional outbursts, he started to calm down more quickly; after six months, he started to deal better with situations that were previously triggers for his crises, significantly reducing their occurrence and allowing for a reduction in the frequency of psychotherapy (initiated prior to occupational therapy) to every two weeks. Thus, the reach of the Poli Method in relation to emotional regulation is evident.

Case 4: An 8-year-old girl with a diagnosis of overactive bladder aimed at "dealing better with her difficulties" (mother's words), which were related to urine leakage and difficulty in identifying the need to urinate. She underwent pelvic physiotherapy with electrostimulation for urinary control a year ago, showing good performance in the

pelvic electrostimulation activity during the sessions, but with no functional repercussions in daily life. On thesensory profile, she showed changes in items 1 and 2 of the "Tactile Processing" quadrant, item 3 of the "Socioemotional Responses Associated with Sensory Processing" quadrant, and item 3 of the "Attentional Responses Associated with Sensory Processing" quadrant. She started occupational therapy with the sensory integration approach, using the Poli Method on a weekly basis. After six months, she began to better control her urinary sphincter during the day, had greater self-perception and body awareness, transitioned more easily between activities, and her teacher reported that she was better organized. It is noteworthy that prior to occupational therapy, she wetted the bed every night, meaning she had no nighttime urinary control. After six months of intervention, she began to control urine at night once a week, and after nine months, she had three dry nights a week, demonstrating that the Poli Method favors better interpretation of visceral needs (inputs).

Case 5: An 8-year-old girl with a need of "improving her emotional intelligence" (father's words) had a diagnosis of atopic dermatitis associated with high abilities/giftedness. According to the caregiver's reports, dermatitis appeared after emotional episodes of anxiety, anger, and frustration, highlighting her negative and pessimistic interpretation of events that led to these feelings. Additionally, she had a history of food allergies related to sweets and dyes, which also caused dermatitis episodes. She had a one-year history of psychotherapy with almost no results, according to her father. On the sensory profile she showed changes in items 1, 2, 3, 4, 5, 7, 9, and 12 of the "Socioemotional Responses Associated with Sensory Processing" quadrant, and items 3, 5, and 7 of the "Attentional Responses Associated with the Sensory Processing" quadrant. She started occupational therapy witha sensory integration approach using the Poli Method on a weekly basis. After one year of intervention, she showed greater maturity (an aspect facilitated by the biological maturation enabled by sensory integration therapy), improvements in organization, self-control, and a reduction in dermatitis episodes from monthly to quarterly. Furthermore, there was better perspective-taking, with less attention paid to negative occurrences and verbalization of ways to remedy them, demonstrating greater positivity and optimism, revealing the reach of the Poli Method on executive functions (inhibitory control), perspective-taking. It is possible to hypothesize that there was stimulation of the left insula since she showed more positivity and optimism.

DISCUSSION

In the five clinical cases presented, it was possible to identify dysfunction in interoceptive processing and its consequences on functional performance regarding the pursuit of emotional and organic balance aimed by interoception, according to Craig (2015), even with different diagnoses and complaints. In case 1, the significant interoceptive deficit was affecting attention to oneself, the environment, and others in the environment, making it difficult to feel the need or interest in communicating. In case 2, there was difficulty identifying visceral needs such as hunger and satiety. In case 3, there was difficulty identifying the emotion growing within oneself, leading to emotional outbursts (crises). In case 4, there was difficulty identifying the visceral need to urinate. In case 5, pessimism and negativity favored anxiety and the occurrence of dermatitis. Therefore, it is evident that patients lack a driving force for adaptive behaviors that are guided by interoception. Interoception is essential for patients to develop confidence and understanding of what their bodies are informing. Individuals rely on their bodies to direct attention to these basic functions to signal the need to flee from a threatening situation or, more commonly, empty the bladder or consume some food, things our bodies signal and execute (Drake *et al*., 2010; Stevenson *et al*., 2015). As we could see in the five cases presented here, when this process is perceived or interpreted inaccurately or inconsistently, the sense of safety, health, and well-being is threatened. Interoceptive stimuli also help the brain create neural representations of the self and the world (Tsakiris & Critchley, 2016). The sensation of safety, consistency, reliability, and precision comes in interpreting interoceptive experiences and using these experiences to direct future action, which was observed as a common difficulty in the five cases reported here. It is noteworthy that a significant improvement was noticed in the clinical condition of the patients afterthe use of the Poli Method, which aims to work with mastery on all these aspects of interoception. The development of the Poli Method started with the primary concept of interoception associated with the viscera (CRAIG, 2015; BUNDY & LANE, 2020). The first aspect considered was to ponder the most internal sensory system (referring to "layers") and the closest to them, the proprioceptive sensory system, which is related to muscles, tendons, and joints. In order to be activated, muscular force and joint movement are necessary, but in the Poli Method, proprioception is activated differently. In this method, clinical reasoning involves its generalized activation, and the strategy adopted for this involves protective reactions and postural adjustment, in order to contract the musculature of the whole body, approaching the viscera in a generalized way, enabling actions such as: a) self-control; b) focused attention; c) self-awareness; d) self-regulation of homeostatic emotions, which involve sexual arousal, hunger, thirst, pain, discomfort, feeling of fullness, fever, constipation, sensory overload, urge to urinate and defecate, body temperature, and physical exertion, all of which are directly related to the viscera; followed by e) ideation, since improving the connection with the viscera and identifying visceral needs is essential for decision-making and developing effective strategies to meet survival needs.

In addition, the clinical reasoning involving the Poli Method included the relationship between interoception and feelings and emotions (CRITCHLEY & GARFINKEL, 2017). Based on this premise, it was considered activating the tactile sensory system. This system provides information mainly through the surface of the skin, about the texture, shape, and size of objects, telling us whether we are touching something or being touched. Moreover, it helps us distinguish threatening sensations from non-threatening ones. It should be emphasized that it is a very important system for regulating behavior, alertness, large and refined movements. Furthermore, it is a sensory system significantly related to emotional development (attachment and bonding), body schema, and the ability to move the whole body, as well as oral-motor and manual skills (SERRANO, 2016). It is fundamental for body awareness, providing a sense of boundaries and giving a bodily edge. We have superficial touch, which provides us with information such as tactile discrimination, and deep touch which, again idealizing "layers," is "beside" proprioception. In the development of the Method, the use of resources that promote weight on the body was considered, stimulating superficial touch through contact of the object with the skin. This includes perception of bodycontour and deep touch, enabling self-regulation of affective emotions. It include happiness, frustration, boredom, distraction, focus, excitement, shame, jealousy, sadness, anxiety, guilt, calmness, fear, and irritation. However, children who were more severely compromised in relation to interoceptive processing, and who also presented deficits in ideational praxis, possibly due to their difficulties with interoception, did not respond to attempts made through somatosensory (tactile and proprioceptive) pathways. At this point, the "sensation passing through the body," a relevant aspect of the Poli Method, was considered. According to Bundy & Lane (2020), there is a wealth of experimental evidence demonstrating the profound importance of bodily sensations for human performance. In these cases, the need was considered to provide the child with the opportunity to experience sensory integration equipment, in order to allow them to "feel" and identify what they liked or disliked, making it possible for them to choose the equipment they wanted to use, assuming that they would choose those that provided the most interesting and pleasant sensations. By providing the experience of sensations promoted by sensory integration equipment and enabling the children to make choices about the equipment, it was possible to identify the sensory systems sought by the children, and to define the sensory system to be worked on in order to promote interoception. In these cases, the focus was on vestibular sensory stimuli. According to Pfeiffer, Serino, and Blanke (2014), this system essentially contributes to neural representations of spatial aspects of bodily self-awareness. Considering that interoception fundamentally consists of

the process by which the nervous system feels and integrates information about the internal state of the body (KHALSA *et al*., 2018), which refers to self-awareness, it is at least interesting that the more severe cases of deficits in interoception processing sought vestibular stimuli. Regarding the failure in interoceptiveprocessing, Poquérusse, Pastore, Dellantonio, and Esposito (2018) conducted a literature review estimating that half of individuals with ASD have this alteration. Kinnaird, Stewart, and Tchanturia (2019) conducted a systematic review and meta-analysis comparing individuals with ASD and neurotypical individuals, concluding that there is a higher prevalence in the autism group (49.93%) compared to neurotypicals (4.89%). In addition, there is research indicating alterations in interoceptive awareness in the following cases: schizophrenia, anxiety disorders, depression, ADHD, eating disorders, obesity, dementia, obsessive-compulsive disorder, post-traumatic stress disorder, panic disorder, substance abuse and dependence, self-injurious behavior, suicide attempts, chronic pain syndromes, sensory processing disorder (MAHLER, 2019). In the five presented cases, it was possible to verify that the approach detailed here regarding the Poli Method was effective in treating interoception deficits through sensory integration therapy, improving interoceptive sensory processing and contributing to the identification of visceral needs, emotional regulation, self-perception, self-awareness, social participation, and psychosocial aspects.

FINAL CONSIDERATIONS

This study presents, in an unprecedented way, the effective evolution of patients in the pediatric universe, concerning their perception of visceral needs, executive functions, emotional regulation, psychosocial aspects, body awareness, and cognition associated with sensory processing. I encourage further research with the Poli Method to understand, in practice, other possibilities for its use and thus enhance the quality of life of pediatric patients and their families. As a contribution, based on the notes of several researchers about the lack of evaluations focused on interoception that do not limit themselves to heart rate or breathing but encompass their totality, this article also proposes the Sensorial Interoception Assessment (child version - from 7 years and 0 months to 13 years and 11 months - and adolescent version - above 14 years), which considers: a) perception of visceral needs, b) affective emotions, c) body awareness, d) social participation, e) self-care, f) metacognition, g) cognition, h) emotional regulation, i) psychosocial aspects, and j) general sensory aspects. Thus, this assessment validates and encompasses the influence of interoception on sensory processing, development, learning, social relationships, and mental health.

Acknowledgments

The Poli Method is named after the maternal family name of the author, and in honor of her ancestors, the pun served as inspiration for this denomination.

REFERENCES

Baiano, C., Job, X., Santangelo, G., Auvray, M., & Kirsch, L. P. (2021). Interactions between interoception and perspective-taking: Current state of research and future directions. *Neuroscience and biobehavioral reviews*, *130*, 252–262. https://doi.org/10.1016/j.neubiorev.2021.08.007.

Bartoli, S., Aguzzi, G., & Tarricone, R. (2010). Impact on quality of life of urinary incontinence and overactive bladder: a systematic literature review. *Urology*, *75*(3), 491–500. https://doi.org/ 10.1016/j.urology.2009.07.1325.

Blanche, Erna Imperatore; Reinoso, Gustavo; Kiefer, Dominique Blanche. Observaciones Clínicas Sensorio-Motoras. Evaluación y aplicación clínica em niños com dificultadeseneldesarrollo y procesamiento sensorial. S/l: SensoryMetrics, 2014.

Bundy, Anita C.; Lane, Shelly. Sensory Integration – Theory and practice. 3ª. ed. Philadelphia: F. A. Davis, 2020.

Coyne, K. S., Sexton, C. C., Kopp, Z. S., Ebel-Bitoun, C., Milsom, I., & Chapple, C. (2011). The impact of overactive bladder on mental health, work productivity and health-related quality of life in the UK and Sweden: results from EpiLUTS. *BJU international*, *108*(9), 1459–1471. https://doi.org/10.1111/j.1464-410X.2010.10013.xKINNAIRD, Emma; Kinnaird, E., Stewart, C., & Tchanturia, K. (2018). Taste sensitivity in anorexia nervosa: A systematic review. *The International journal of eating disorders*, *51*(8), 771–784. https://doi.org/10.1002/eat.22886

Dobbin A. (2015). Books: *How Do You Feel? An Interoceptive Moment with Your Neurobiological Self*: Neurology Just Got More Interesting.... *The British Journal of General Practice*, *65*(641), 657–658. https://doi.org/10.3399/bjgp15X687985CRITCHLEY, H.D.; GARFINKEL, S.N. Interoception and emotion**.** Current Opinion in Psychology, 17 (2017), pp. 7-14.

DUNN, W. Sensory Profile and Supplement. San Antonio: The Psychological Corporation, 1999.

Gibson J. (2019). Mindfulness, Interoception, and the Body: A Contemporary Perspective. *Frontiers in psychology*, *10*, 2012. https://doi.org/10.3389/fpsyg.2019.02012

Haylen, B. T., Freeman, R. M., Swift, S. E., Cosson, M., Davila, G. W., Deprest, J., Dwyer, P. L., Fatton, B., Kocjancic, E., Lee, J., Maher, C., Petri, E., Rizk, D. E., Sand, P. K., Schaer, G. N., Webb, R., International Urogynecological Association, International Continence Society, & Joint IUGA/ICS Working Group on Complications Terminology (2011). An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint terminology and classification of the complications related directly to the insertion of prostheses (meshes, implants, tapes) and grafts in female pelvic floor surgery. *Neurourology and urodynamics*, *30*(1), 2–12. https://doi.org/10.1002/nau.21036KHALSA SS, *et al*., Interoception e Mental

Khalsa, S. S., Adolphs, R., Cameron, O. G., Critchley, H. D., Davenport, P. W., Feinstein, J. S., Feusner, J. D., Garfinkel, S. N., Lane, R. D., Mehling, W. E., Meuret, A. E., Nemeroff, C. B., Oppenheimer, S., Petzschner, F. H., Pollatos, O., Rhudy, J. L., Schramm, L. P., Simmons, W. K., Stein, M. B., Stephan, K. E., … Interoception Summit 2016 participants (2018). Interoception and Mental Health: A Roadmap. Biological psychiatry. Cognitive neuroscience and neuroimaging, 3(6), 501–513. https://doi.org/ 10.1016/j.bpsc.2017.12.004

KOSCINSKI, Cara N. Interoception: How I Feel – Sensing my world from the inside out. S/l: The Pocket OT, 2018.

Kutscheidt, K., Dresler, T., Hudak, J., Barth, B., Blume, F., Ethofer, T., Fallgatter, A. J., & Ehlis, A. C. (2019). Interoceptive awareness in patients with attention-deficit/hyperactivity disorder (ADHD). *Attention deficit and hyperactivity disorders*, *11*(4), 395–401. https://doi.org/10.1007/s12402-019-00299-3

Kwon, B. E., Kim, G. Y., Son, Y. J., Roh, Y. S., & You, M. A. (2010). Quality of life of women with urinary incontinence: a systematic literature review. *International neurourology journal*, *14*(3), 133–138. https://doi.org/10.5213/inj.2010.14.3.133.

MAHLER, Kelly J. Interoception: The eighth sensory system. 2020.

McMahon, K., Anand, D., Morris-Jones, M., & Rosenthal, M. Z. (2019). A Path From Childhood Sensory Processing Disorder to Anxiety Disorders: The Mediating Role of Emotion Dysregulation and Adult Sensory Processing Disorder Symptoms. *Frontiers in integrative neuroscience*, *13*, 22. https://doi.org/10.3389/fnint.2019.00022Milsom I, Milsom, I., Coyne, K. S., Nicholson, S., Kvasz, M., Chen, C. I., & Wein, A. J. (2014). Global prevalence and economic burden of urgency urinary incontinence: a systematic review. *European urology*, *65*(1), 79–95. https://doi.org/10.1016/j.eururo. 2013.08.031

MOMO, Aline; SILVESTRE, Claudia. Integração Sensorial nos Transtornos do Espectro Autista. In: SCHWARTZMAN, José Salomão; De ARAÚJO, Ceres Alves. Transtorno do Espectro Autista - TEA. São Paulo: Memnon, 2011.

Pessoa L. (2010). Emergent processes in cognitive-emotional interactions. *Dialogues in clinical neuroscience*, *12*(4), 433–448. https://doi.org/10.31887/DCNS.2010.12.4/l

Porges S. W. (2022). Polyvagal Theory: A Science of Safety. Frontiers in integrative neuroscience, 16, 871227. https://doi.org/10.3389/fnint.2022.871227Poquérusse, J., Pastore, L., Dellantonio, S., & Esposito, G. (2018). Alexithymia and Autism Spectrum Disorder: A Complex Relationship. *Frontiers in psychology*, *9*, 1196. https://doi.org/10.3389/fpsyg.2018.01196.

Schmidt, R. A., & Lee, T. D. (2011). Motor control and learning: A behavioral approach (5th ed.). Champaign, IL: HumanKinetics.

SERRANO, Paula. A Integração Sensorial - No desenvolvimento e aprendizagem da criança. Bibliottabeca da Educação e Formação. Lisboa: Papa-Letras, 2016.

Tsigos, C., Kyrou, I., Kassi, E., &Chrousos, G. P. (2020). Stress: Endocrine Physiology and Pathophysiology. In K. R. Feingold (Eds.) et. al., *Endotext*. MDText.com, Inc.

Ulrich-Lai, Y. M., & Herman, J. P. (2009). Neural regulation of endocrine and autonomic stress responses. *Nature reviews. Neuroscience*, *10*(6), 397–409. https://doi.org/10.1038/nrn2647

Neurosense
TERAPIA OCUPACIONAL - CURSOS & REABILITAÇÃO

SENSORY EVALUATION OF INTEROCEPTION - CHILDREN
M.ScThais CarolinePereira,CREFITO 8/6868-TO, Brasil

		INTEROCPETIVE PERCEPTION			
INFLUENCES OF INTEROCEPTION	SENSORIAL AND BEHAVIORAL ASPECTS INFLUENCED BY INTEROCEPTION	ALWAYS	FREQUENTLY	OCCASIONALLY	NEVER
VICERAL (HOMEOSTATIC EMOTIONS)					
\Body Signals.	1.I perceive the sensations of my body (e.g. stomach ache, toothache).	1	2	3	4
	2.I only notice the sensations of my body when they are very strong (e.g. very strong pain).	4	3	2	1
Hunger and thirst.	3. I can feel when I am hungry or thirsty.	1	2	3	4
	4.To feel that I am hungry, I wait for my stomach to growl.	1	2	3	4
	5. I need to be called to eat because I need to be reminded to do it	4	3	2	1
	6. I realize that I am thirsty when I feel my mouth or throat dry.	1	2	3	4
	7.I need to be offered water or juice to be reminded to drink something.	4	3	2	1
Pain.	8. I can locate the pain in my body.	1	2	3	4
Diseade.	9.I realize that I am sick when I feel too weak to get up and move, or when my body is hot inside or I feel like vomiting.	1	2	3	4
Fullness.	10. I feel a sensation of peace (lightness) in my body.	1	2	3	4
Constipation.	11. I realize that I am constipated (the poop "doesn't want to come out") when I feel stomach pain.	1	2	3	4
Sensory overload.	12. I realize that I am overwhelmed when I am very irritable and doing stereotypies (self-regulating movements) non-stop.	1	2	3	4
Need to urinate.	13. I feel when I need to pee.	1	2	3	4
Need to defecate.	14. I feel when I need to poop.	1	2	3	4
Body temperature.	15. I am sensitive to being too cold or too hot.	4	3	2	1
Room temperature	16. I feel when it's hot and I need to wear less clothing.	1	2	3	4
	17. I feel when it's cold and I need to bundle up.	1	2	3	4
Heart rate.	18. I feel when my heart beats faster, like after running or when I get nervous.	1	2	3	4
	19. I feel when my heart beats slower, like when I lay down to sleep and my body relaxes.	1	2	3	4
Breathing.	20. I feel when my breathing becomes faster, like when I'm running.	1	2	3	4
	21. I feel when my breathing becomes slower, like after stopping running.	1	2	3	4
	22.I feel when I am short of breath, like when I am anxious or nervous.	1	2	3	4
Physical fatigue.	23.I know I am tired when my body feels heavy, or when I take longer to do things.	1	2	3	4
Nausea.	24.I realize when my stomach feels "upset," like when I ate something that didn't agree with me or when I am traveling by car.	1	2	3	4
Sleepiness	25. I know I am sleepy when I feel the urge to lie down, my body feels heavy, and I can't keep my eyes open.	1	2	3	4
	26.I have difficulty sleeping.	4	3	2	1
	27.I realize that when I sleep, I toss and turn in bed (roll over in bed, kick the wall next to the bed).	4	3	2	1
Emotions and affect					
Happiness/Sadness/Joy/ frustation.	28.I realize when I feel one of those.	1	2	3	4
Boredom	29. I notice that I get frustrated when things don't happen as I imagined or wanted.	1	2	3	4
	30. I get frustrated several times a day.	4	3	2	1
Boredom.	31. Sometimes I feel bored.	1	2	3	4

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Motivation/Energy/ Arousal/Mood/ Excitement.	32. I feel like doing things.	1	2	3	4
Same.	33. I am embarrassed and shy.	4	3	2	1
Anxiety	34. I know I'm anxious when my breathing or heart rate changes (I forget to breathe, feel short of breath, or my heart races).	1	2	3	4
	35. I know I'm anxious when I start to scratch myself.	1	2	3	4
Guilty	36. I feel guilty when I do something wrong.	1	2	3	4
Fear.	37. I'm afraid of things that don't involve heights or getting off the ground (e.g. dogs, darkness).	4	3	2	1
Irritation.	38. I can tell when I'm getting irritated.	1	2	3	4
	39. I only know I'm irritated when I'm hitting or kicking what's in front of me.	4	3	2	1
BODY AWARENESS					
Body consciousness.	40. I can identify body parts on myself and on those around me.	1	2	3	4
Peri-personal space.	41.I feel calm when someone is close to me.	1	2	3	4
	42.When someone is too close to me, I feel invaded.	4	3	2	1
	43.When I go to the mall or market, I like to walk close to the walls (on the sides) or to stay in places with fewer people.	4	3	2	1
Praxis.	44. When I'm hot, I take off some clothes.	1	2	3	4
	45. When I'm cold, I put on more clothes.	1	2	3	4
	46. When I'm hungry, I grab something (food) to eat.	1	2	3	4
	47. When I'm thirsty, I grab something (liquid) to drink.	1	2	3	4
Motor irritation	48. I can imitate what I see people doing (e.g. blink, stick out my tongue, do jumping jacks).	1	2	3	4
SOCIAL PARTICIPATION					
Perspective taking.	49. I can recognize when I'm wrong and the other person is right.	1	2	3	4
	50.I have a sense of how I should behave in different situations.	1	2	3	4
	51. I understand facial expressions (e.g. when a person smiles because he/she is happy or "frowns" because is angry).	1	2	3	4
	52. I understand body language (e.g. when a person crosses their arms wanting to isolate themselves and not talk).	1	2	3	4
	53. I understand metaphors (e.g. when they say it's "raining cats and dogs" to mean it's raining heavily).	1	2	3	4
	54. I understand when "I'm not needed" and prefer that I leave so they can talk alone.	1	2	3	4
	55. I realize when I'm invading someone else's space (e.g. when the person feels uncomfortable because I'm too close to them, or when I move around and almost bump into the person unintentionally).	1	2	3	4
	56. I have a sense of danger (e.g. I know that if I jump from the top of a cabinet, I can hurt myself when I hit the ground).	1	2	3	4
	57. I can change my facial expression according to the situation (e.g. smile when someone says something funny or "frown" to show that I didn't like something).	1	2	3	4
	58. I can change my body posture according to the situation (e.g. cross my arms or legs to show that I didn't like something).	1	2	3	4
Social touch.	59. I stay in my room most of the day.	4	3	2	1
	60. I have meals near my family.	1	2	3	4
	61. I have meals with my family.	1	2	3	4
Comunication	62. When I want to communicate, I make eye contact.	1	2	3	4
	63.When I want to communicate, I take the caregiver's hand and lead them to my target (liquid, food, object).	1	2	3	4
	64.If nonverbal, when I want to communicate, I express communicative intent (with eye contact and vocalizations).	1	2	3	4
Empathy.	65. I can imagine what the other person may be feeling.	1	2	3	4
Bonding	66. I have friends and I try to talk to them frequently.	1	2	3	4
Synchrony.	67.I have a connection with my father and/or mother.	1	2	3	4
SELF-CARE					
Toilet use.	68. I take a shower every day.	1	2	3	4
	69.I brush my teeth every day.	1	2	3	4
Dressing.	70. I wear pajamas to sleep and change clothes when I wake up.	1	2	3	4
Sleeping.	71. I "fight with sleep" (ex. at night, I start to get restless because I prefer to stay awake playing instead of sleeping).	4	3	2	1
Pain perception.	72. When I am in pain, I ask my parents for medicine or to see a doctor.	1	2	3	4
METACOGNITION					
Self-defense	73.I understand when they are bullying me.	1	2	3	4
	74. I perceive when they want to hit me.	1	2	3	4
	75. I know how to defend myself (ex. when someone takes something that belongs to me, I take it back).	1	2	3	4
Self-reflection.	76. I can reflect on my actions to evaluate if I did right or wrong.	1	2	3	4
Self-awareness.	77. I can express what I like and what I don't like.	1	2	3	4
	78. When referring to myself, I speak as if I were another person (ex. instead of saying "I played soccer," I say "my name played soccer").	4	3	2	1
Self-management.	79. I can organize myself to take a shower, get dressed to go out, and brush my teeth.	1	2	3	4
80. Alert.I finish everything I start.	80. I'm always on alert, thinking about what could happen (e.g. afraid of touching something I don't like).	4	3	2	1

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COGNITION					
Intuition.	81. I can tell when something inside me tells me to do or not do something (e.g. when I see a candy and take it without asking, I feel like I need to do it when nobody's looking, and then feel guilty for understanding that I might have done something wrong).	1	2	3	4
Attention.	82. When I need to, I can pay attention in class.	1	2	3	4
	83. I finish everything I start.	1	2	3	4
Decision-making.	84. I find it easy to make choices (e.g. choosing which song I want to listen to or which game I want to play).	1	2	3	4
Abstration.	85. When asked to imagine something, I can do it.	1	2	3	4
Problem-solving.	86. I struggle to think of solutions to problems.	4	3	2	1
	87. When I have a problem, I can't think of anything else.	4	3	2	1
Ideation.	88. I'm creative.	1	2	3	4
	89. I have difficulty coming up with new ideas (e.g. I play with the same things in the same way).	4	3	2	1
	90. I do things the harder way.	4	3	2	1
EMOTIONAL REGULATION					
Resilience.	91. When things don't go the way I wanted, I get angry and think about it for a long time.	4	3	2	1
Emotional well-being.	92. I can see the good side of things (e.g. I understand that what my parents tell me is not to fight or correct me, but to guide me).	1	2	3	4
	93. I only see the bad side of things (e.g. when my parents talk to me, it's always to fight and call my attention).	4	3	2	1
Self-confidence.	94. I believe in my potential.	1	2	3	4
	95. I enjoy learning new things and am always seeking knowledge.	1	2	3	4
	96. I have difficulty working in a team because I like to do things my own way.	1	2	3	4
Identifying feelings and emotions.	97. I am a very organized person and like to keep things neat and clean.	1	2	3	4
	98. I am very shy and have difficulty speaking in public.	1	2	3	4
	99. I love to travel and experience new places and cultures.	1	2	3	4
	100.My body expresses when I am happy or excited, by making little noises, flapping, jumping, spinning, or doing any other self-regulating movement.	1	2	3	4
PSYCHOSOCIAL ASPECTS					
Self-esteem.	101.I have good self-esteem (I like myself).	1	2	3	4
Self-control.	102. I have strong emotional outbursts (e.g. when I am angry, I punch and kick things or people; I scream and curse).	4	3	2	1
	103. I can tell when I am going to have a meltdown.	1	2	3	4
	104. When I have a meltdown, it takes me a long time to calm down (I stay angry for a long time and often don't see what I am doing).	4	3	2	1
	105. When I realize I am going to have a meltdown, I go to my room or a calm and secluded place.	1	2	3	4
	106. When I realize I am going to have a meltdown, I can calm myself down by using satisfying objects or making satisfying body movements.	1	2	3	4
SENSORY ASPECTS					
Gustatory.	107. All food seems to have the same taste, everything is bland.	4	3	2	1
Visual.	108. I am bothered by bright lights.	4	3	2	1
Olfactory.	109. I am bothered by different smells (food, perfume).	4	3	2	1

Table 3. Sensory Evaluation of Interoception – Adolescent/Adult

Neurosense TERAPIA OCUPACIONAL · CURSOS & REABILITAÇÃO

SENSORY EVALUATION OF INTEROCEPTION - ADOLESCENT/ADULT

M.ScThais CarolinePereira,CREFITO 8/6868-TO, Brasil

		INTEROCPETIVE PERCEPTION			
INFLUENCES OF INTEROCEPTION	SENSORIAL AND BEHAVIORAL ASPECTS INFLUENCED BY INTEROCEPTION	Always	Frequently	Occasionally	Never
VICERAL (HOMEOSTATIC EMOTIONS)					
Body Signals.	1.Understand the signals of my body.	1	2	3	4
	2. I only understand the signals of my body when they are very strong.	4	3	2	1
Sexual arousal.	3.When I see “hot” images, related to sex, in movies or near me, I feel physical changes in my body.	1	2	3	4
Hunger and thirst.	4. I have difficulty identifying when I am hungry or thirsty.	4	3	2	1
	5. I notice that I´m hungry when I identify changes in my body (like stomach growling) or changes in my mood (getting irritable)).	1	2	3	4
	6. I need external cues to remember to eat or drink.	4	3	2	1
	7.I notice that I´m thirsty when I feel my mouth or throat dry.	1	2	3	4
Pain.	8. I can locate the pain in my boy.	1	2	3	4
	9. I notice that I´m in pain when I´m irritable or aggressive.	1	2	3	4
Illness.	10. I notice that I´m sick when I feel discomfort, pain, fever our nausea.	1	2	3	4

……Continue

Fullness.	11.I feel a sense of peace in my body.	1	2	3	4
Constipation.	12.I notice that I'm constipated when I feel stomach pain or pay attention to the number of days without bowel movement or identify changes in my mood (such as irritability, bad mood, or aggression).	1	2	3	4
Sensory overload.	13. I notice that I´m sensorially overwhelmed when I feel weak and just want to sleep, when I can´t concentrate, or when I identify changes in my mood (like irritability or aggression).	1	2	3	4
Need to urinate.	14.I can identify I need to urinate.	1	2	3	4
Need to defecate.	15.I can identify I need to defecate.	1	2	3	4
Body temperature.	16.I am sensitive to cold or heat.	4	3	2	1
Ambient temperature.	17.I can identify when it's hot and I need to wear light clothes or when it's cold and I need to bundle up.	1	2	3	4
	18.I can identify when I'm hot or cold and do something to feel less hot or less cold (like taking off/putting on a piece of clothing or changing into lighter clothes or warmer clothes).	1	2	3	4
Heart rate.	19. I can perceive when my heart rate speeds up or slows down.	1	2	3	4
Breathing.	20. I can perceive when my breathing speeds up or slows down, and when I'm panting (short of breath).	1	2	3	4
Physical fatigue.	21. I notice that I'm physically tired when I feel my body heavy, or have difficulty concentrating, or when my body doesn't respond as intended.	1	2	3	4
Nausea.	22. When I'm nauseous, I notice that my stomach feels "queasy" and sometimes I get a headache.	1	2	3	4
Sleep.	23.I realize I'm sleepy when I feel my body heavy and I can't "think straight".	1	2	3	4
	24. I have difficulties with sleep (difficulty falling asleep, insomnia or restless sleep).	4	3	2	1
EMOTIONAL FEELINGS					
Happiness/sadness/joy.	25. I can identify when I'm happy, sad, or joyful.	1	2	3	4
Frustration.	26.I can identify when I'm frustrated.	1	2	3	4
	27.I frequently and easily get frustrated.	4	3	2	1
Boredom.	28.I can identify when I'm feeling bored.	1	2	3	4
Motivation/Vigor/Arousal/ Disposition /Excitement.	29. I feel vivacity (a desire to do things) within me.	1	2	3	4
Shame.	30. I am embarrassed and shy.	4	3	2	1
Anxiety.	31. I can identify when I'm anxious through changes in my breathing and/or heart rate.	1	2	3	4
Guilty.	32. I often feel guilty..	4	3	2	1
Fear.	33.I have predictable fears that are not related to the force of gravity.	4	3	2	1
Irritation.	34.I can tell when I'm getting annoyed.	1	2	3	4
	35.I only realize I'm irritated when I'm very agitated and/or aggressive.	4	3	2	1
BODY AWARENESS					
Assertive body image.	36. When I look in the mirror, I see a visual image consistent with the mental image or conscious perception I have of my body.	1	2	3	4
Body schema.	37. I can identify the parts of my body (trunk and body segments, bilaterally).	1	2	3	4
Peri-personal space.	38.I feel calm when someone is near me.	1	2	3	4
	39.When someone is very close to me, I feel invaded.	4	3	2	1
	40.When I go to public places like malls and markets, I try to walk close to the walls or stay in areas with fewer people around.	4	3	2	1
Praxis.	41. When I feel a bodily need like hunger, thirst, heat, or cold, I take actions to solve the situation and feel comfortable.	1	2	3	4
Motor irritation.	42. I can imitate facial and bodily gestures that I observe in people and images.	1	2	3	4
SOCIAL PARTICIPATION					
Perspective – taking	43. I can identify when I am right or wrong and when others are right or wrong, assertively and in accordance with the situation.	1	2	3	4
	44. I can identify how to behave in different situations, with different people and in different environments.	1	2	3	4
	45.I understand facial expressions.	1	2	3	4
	46. I understand body language.	1	2	3	4
	47. I understand metaphors.	1	2	3	4
	48.I understand when I am not needed in a situation and it is expected that I leave the environment (for example, when someone wants to have a private conversation and prefers that I am not present).	1	2	3	4
	49.I perceive when I am invading someone else's space.	1	2	3	4
	50. I have a sense of danger.	1	2	3	4
	51.I can modify my facial expression according to different situations.	1	2	3	4
	52.I can modify my body language according to different situations.	1	2	3	4
Social touch.	53.I spend a good part of my day in my room.	4	3	2	1
	54.I have my meals near my family.	1	2	3	4
	55.I have my meals together with my family.	1	2	3	4
Empathic communication.	56. When I want to communicate, I establish eye contact.	1	2	3	4
	57.I can understand the feelings of others.	1	2	3	4
Bonding.	58.I establish friendships.	1	2	3	4
Attunement.	59.I can feel in tune with another person, identifying our connection.	1	2	3	4
AUTOCARE					
Using the bathroom.	60. I take a shower frequently (every day or every two days).	1	2	3	4
	61.I brush my teeth every day.	1	2	3	4
	62. I identify my personal scent and know when I need to reapply deodorant, use foot powder, or take a shower.	1	2	3	4

……..Continue

Dressing.	63.I wear one set of clothes to sleep in and another for the day.	1	2	3	4
Sleeping.	64. I allow myself to sleep when my body is tired or when I realize I am feeling sleepy.	1	2	3	4
Pain perception.	65.When I notice I am in pain, I seek medical attention or take medication to feel better.	1	2	3	4
METACOGNITION					
Self-defense.	66.I can identify when I am being physically or emotionally threatened.	1	2	3	4
	67.I know how to defend myself physically or emotionally.	1	2	3	4
Self-reflection.	68.I allow myself to reflect on my actions, recognizing when I am right or wrong assertively.	1	2	3	4
Self-awareness.	69. I can identify my personal limits, abilities, and difficulties without judging or blaming myself for my findings.	1	2	3	4
	70. I can identify what pleases or displeases me.	1	2	3	4
	71.I refer to myself in the first person.	1	2	3	4
Self-management.	72. I can organize myself regarding self-care (such as bathing, clothing, teeth brushing, medication, and food preparation).	1	2	3	4
Alertness.	73.I notice that my body is always on alert, prepared for what might happen (fear of potential stimuli).	4	3	2	1
COGNITION					
Intuition.	74.I can identify my intuition when my thoughts and feelings diverge (for example, when I think of doing something but "feel" that I shouldn't).	1	2	3	4
Attention.	75.When necessary, I can focus my attention.	1	2	3	4
	76.I have difficulty finishing what I start.	4	3	2	1
	77. Sometimes I am in a busy environment (with movement around me), and to avoid becoming overwhelmed, I stare off into the distance with a vacant gaze.	4	3	2	1
Decision-making.	78.I have an easy time making decisions and choices.	1	2	3	4
Abstration.	79.I am able to abstract (visualize mental images).	1	2	3	4
Problem-solving.	80. I problem solve situations assertively.	1	2	3	4
	81.I tend to focus on the problem, with difficulty finding a solution.	4	3	2	1
Ideation.	82. I am creative.	1	2	3	4
	83.I have difficulty thinking or planning an action.	4	3	2	1
	84. I struggle with common tasks, finding them difficult, requiring effort, or taking longer than necessary.	4	3	2	1
	85.I have difficulty generating ideas, so I tend to do the same things in the same way.	4	3	2	1
EMOCIONAL REGULATION					
Resilience.	86.When plans don't go as expected, I keep thinking about it for a long time.	4	3	2	1
Emocional well-being.	87.I am an optimistic and positive person.	1	2	3	4
	88.I am a negative and pessimistic person.	4	3	2	1
Self-confidence.	89.I feel confident to execute my plans.	1	2	3	4
	90. I feel confident to express my opinions.	1	2	3	4
	91. I feel comfortable communicating when something is bothering me.	1	2	3	4
Identifying feelings and emotions.	92.I identify my feelings and emotions.	1	2	3	4
	93.My gaze changes when I am happy or excited.	1	2	3	4
	94.My facial and body expressions change when I am happy or excited.	1	2	3	4
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PSICOSSOCIAL ASPECTS					
Self-esteem.	95. I have good self-esteem (I like myself).	1	2	3	4
Self-control.	96. I have strong emotional outbursts.	4	3	2	1
	97. I recognize when I am going to have a crisis.	1	2	3	4
	92. When I have a crisis, I quickly regain my composure.	1	2	3	4
	99.When I realize that I am going to have a crisis, I can withdraw to isolate myself.	1	2	3	4
	100. When I realize that I am going to have a crisis, I can calm myself down by doing activities or using sensory resources that make me feel well.	1	2	3	4
GENERAL SENSORY ASPECTS					
Gustatory.	101. Foods seem to have the same bland taste.	4	3	2	1
Visual.	102.I have difficulty with bright lights, such as white light bulbs	4	3	2	1
Olfactory.	103. I have difficulty accepting different smells.	4	3	2	1

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