



QUESTIONNAIRE ON SENSORY PROCESSING SENSITIVITY IN CHILDREN

MANUAL

ON HOW TO APPLY, CORRECT AND INTERPRET THE QUESTIONNAIRE

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1. GENERAL DESCRIPTION



1.1. Main characteristics of the manual

The Questionnaire on Sensory Processing Sensitivity in Children (QSPSInCh) is designed to measure the personality trait of Sensory Processing Sensitivity (SPS) in children aged 3 to 10 years. SPS is a phenotypic personality trait, characterised by deep cognitive, sensory and emotional processing of environmental information. SPS presents a wide range of levels, as individuals may show low, medium and high sensitivity levels (Greven et al., 2019). Thus, the SPS phenomenon greatly influences different spheres of life (Acevedo, 2020).

The questionnaire is addressed to the child's adult carers. Both a Parent and a Teacher version of the questionnaire have been developed. Due to children's specific functioning at preschool and early school ages, four versions of the questionnaire have been designed:

- Questionnaire of Sensitivity of Sensory Processing in Children – Kindergarten Teacher version** (Appendix 1)
- Questionnaire of Sensory Processing Sensitivity in Children – Primary School Teacher version** (Appendix 2)
- Questionnaire of Sensory Processing Sensitivity in Children – kindergarten Parent version** (Appendix 3)
- Questionnaire of Sensory Processing Sensitivity in Children – Primary Sschool Parent version** (Appendix 4)

The developed versions of the questionnaire refer to observational data obtained from parents in one version and from teachers in the other.

The number of QSPSInCh items varies from 33 to 42, depending on the version of the questionnaire (see Table 1). The scoring system is a 7-point Likert-type scale. The HSCS is composed of four domains which examine the physical, emotional, interpersonal and cognitive spheres affected by the sensitive trait. Four versions of the questionnaire are available, two for parents (Kindergarten and Primary school) and the other two for teachers (Kindergarten and Primary school). The four versions all follow the same structure presented in Table 1.

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Table 1. Description of the QSPSinCh spheres and number of items in each one

Sphere	Description	Number of items			
		Parent version		Teacher version	
		Kindergarten	Primary	Kindergarten	Primary
Physical	Assesses the manifestation of children’s functioning related to physical aspects such as noises, smells or lights.	10	4	12	7
Emotional	Assesses the manifestation of children’s functioning related to emotional aspects such as empathy, emotional processes and self-regulation.	10	12	11	8
Interpersonal	Assesses the manifestation of children’s functioning related to interpersonal aspects such as social relationships and their way of communicating.	10	14	7	11
Cognitive	Assesses the manifestation of children’s functioning related to cognitive aspects such as thinking processes or their way of facing tasks.	12	11	9	7

The items are statements. The adult carer (parent, teacher) evaluates the truthfulness of the statements on a seven-point Likert scale (from “Definitely not” to “Definitely, yes”).

Due to the specific functioning of highly sensitive children (e.g., particular sensitivity to external stimuli such as light, temperature, the texture of materials, noise, as well as internal stimuli, such as pain or hunger), a method was developed to identify a trait on the basis of behaviours occurring in everyday life situations. It was assumed that the trait could be an observable element. It could therefore be measured and a diagnosis could be made based on its quantitative characteristics (in the sense of positive or functional diagnosis).

The present application, correction and interpretation manual is divided into different sections. First, a theoretical description of Sensory Processing Sensitivity is provided, together with the implications of this sensitivity across different domains of life (Chapter

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1, General description). Second, the proper procedure for applying and correcting the questionnaire is described (Chapter 2, Application and Correction Norms). Third, an interpretation guide is provided together with illustrative cases allowing for a better understanding of the results obtained from the questionnaire (Chapter 3, Interpretation Norms). Finally, Chapter 4 presents an initial analysis of the construction and development procedure of the QSPSinCh questionnaire and the psychometric properties (including reliability, validity and factor analysis). It addresses the need to find reliable and valid methods to measure the wide spectrum of SPS.

This manual contributes to research on sensitive processing and the appropriate understanding of SPS assessment in childhood. The latter will support, in turn, the development and design of educational programmes in accordance with the SPS profiles obtained.

Sensory Processing Sensitivity and its manifestation in physical, cognitive, emotional and interpersonal spheres are presented below.

1.2. Sensory Processing Sensitivity

SPS has been defined as a continuum which represents a gradient of individual differences in relation to the reception, modulation and information analysis of internal and external stimuli to respond to situational demands (Aron & Aron, 1997, as cited in: Greven et al., 2019; Lionetti et al., 2018; Meyerson, Gelkopf, Eli & Usiel, 2020; Ogawa et al., 2019; Pluess, 2015). In recent decades, the SPS has been defined in some studies as a phenotypic trait characterised by deeper cognitive, sensory and emotional information processing, probably due to a more sensitive brain (Acevedo, 2020; Aron & Aron, 1997; Greven et al., 2019). According to Environmental Sensitivity theory (Pluess, 2015), humans are programmed to perceive and analyse environmental stimuli. This way of processing information allows an adaptation to context necessary for survival (Pluess et al., 2018). Significant differences, however, have been observed in the way in which people react to environmental stimuli; indeed, some individuals are more sensitive to them, despite a neurobiological predisposition towards this adaptive function in humans (Pluess, 2015). Thus, highly sensitive people demonstrate much more reactivity to the environment and context than others (Belsky & Pluess, 2009; Ellis, Boyce, Belsky, Bakermans-Kranenburg & Van IJsendoorn, 2011; Greven, et al., 2019). Hence, this highly sensitive trait has been associated with psychological dimensions such as increased emotional reactivity and empathy, greater awareness of environmental subtleties, and being easily overstimulated

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(Acevedo et al., 2014; 2018; Aron, Aron & Jagiellowicz, 2012; Goldberg & Scharf, 2020; Homberg, Schubert, Asan & Aron, 2016; Pluess, 2015).

The *Differential Susceptibility* theory has also been advanced, based on a developmental psychology framework (Belsky & Pluess, 2009; Pluess & Belsky, 2015). Individual differences in environmental sensitivity lead to two alternative strategies: plasticity and adaptation. According to this biological approach, genes are involved in environmental sensitivity and could make people more vulnerable to contextual stimuli (Pluess & Belsky, 2015). Recent neurobiological studies have identified several physiological markers of high sensitivity (Belsky & Pluess, 2016). Thus, it has been demonstrated that neurotransmitters (serotonin and dopamine) play a significant role in SPS (Chen et al., 2011; Licht, Mortensen & Knudsen, 2011). Some studies, using Functional Magnetic Resonance Image (fMRI) and voxel-based morphometry (VBM), have detected subtle changes in the highly sensitive brain with accuracy (Wu, Shang, Li, Feng & Yan, 2021). These neuroimaging techniques reveal increased reaction time and activation of brain areas which focus on high-order visual processing and attention, even implying additional affective and cognitive processes (Jagiellowicz et al., 2010; Wu et al., 2021). Specifically, some brain regions have been observed to be responsible for sensory integration and awareness, empathy, attention and preparation for action and cognitive self-control, decision making and self-regulation as well (Acevedo et al., 2014). Thus, from a neurobiological perspective, the theory of *Biological Sensitivity to Context* (Ellis & Boyce, 2011) explains the physiological differences in environmental reactivity. According to this theory, some individuals with a higher response to stress are more likely to suffer negative consequences when they are involved in negative environments (Ellis & Boyce, 2011).

Other studies on Temperament and Personality traits confirm, based on *Eysenck's personality theory* (Eysenck, 1967; Sargent, 1981), the existence of a positive association between SPS and Neuroticism (Aron & Aron, 1997; Greven et al., 2019; Homberg et al., 2016). Furthermore, SPS has demonstrated to be negatively correlated with the Extraversion personality trait (Lionetti et al., 2018; Pluess et al., 2017). Thus, highly sensitive populations present behaviour difficulties when they are involved in adverse environments, but there are also favourable outcomes when they experience positive life events (Booth, Standage & Fox, 2015; Kibe, Suzuki, Hirano & Boniwell, 2020).

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1.2.1. Physical sphere

As mentioned above, highly sensitive people are more reactive to both external and internal stimuli (Meyerson et al., 2020). Firstly, in terms of external physical reactivity, according to recent studies, Highly Sensitive Persons (HSPs) are able to perceive subtle stimulations such as slight odours, sounds, small gestures, changes in the tone of voice and other delicate stimuli (Acevedo, 2020; Meyer & Carver, 2000). Indeed, a highly sensitive brain is characterised by avoidance, due to how it perceives threats that may attack the individual's health and survival; this skill therefore allows HSPs to be more alert regarding opportunities, resources and rewards (Acevedo, 2020; Aron et al., 2012). Previous physiological studies have found that HSPs present a lower sensitivity threshold. This means that their coping skills and reactions to environmental changes are even more swift and adaptative than that of non-HSPs. Thus, this personality trait can be regarded as both a risk factor and a protective trait in response to hostile environments (Hartman & Belsky, 2018; Jagiellowicz, Zarinafsar & Acevedo, 2020).

In terms of internal physical reactivity, studies confirm that HSPs may suffer from physical fatigue, which may reduce their physical-health quality of life, especially in highly stimulating contexts over a long period of time with no rest (Pérez-Chacón, Chacón, Borda-Mas & Avargues-Navarro, 2021). HSPs usually pay attention to every perceived stimulus in order to react as fast and adequately as possible (Acevedo, 2020), which leads to increasing their sensorial and physical fatigue. Indeed, HSPs present more frequent or intense bodily sensations such as hunger or pain than non-HSPs (Rappaport & Corbally, 2018). It is also important to emphasise the existence of physiological differences in stress-response systems and self-perceived stress, predisposing the individual to physical symptoms (Benham, 2006; Greven & Homberg, 2020; Meyerson et al., 2020). In fact, a highly sensitive brain is also related to hyperarousability, which produces physiological disturbances in HSPs, such as higher cortisol production, arterial pressure and immune reactivity (Engel-Yeger et al., 2017).

Although the environment may provoke reactions of physical discomfort and sleeping difficulties, HSPs may also have exceptionally well-developed sensory perception abilities (Acevedo, 2020).

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1.2.2. Cognitive sphere

HSPs present specific characteristics in this field, such as cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need for control and fear/anxiety (Weyn et al., 2019). Nevertheless, it is being gradually recognised that the neural plasticity inherent to SPS may generate positive attributes for HSPs, such as enhanced creativity, awareness and openness (Bridges & Schendan, 2019; Jagiellowicz et al., 2020). In addition, high sensitivity is strongly associated with sleep and HSPs have vivid dreams and a rich imagination, as well as a tendency to reflect upon various activities in detail (Bridges & Schendan, 2019; Jagiellowicz et al., 2020). On the other hand, it has been found that HSPs may experience increased excitability of the hypothalamic-pituitary-adrenal axis, leading to sleep quality disturbances (Engel-Yeger et al., 2017; Zald, 2003).

HSPs may have a reinforced ability to detect subtleties and to memorise a large number of details of events, situations, phenomena observed and also to pay attention to the less obvious elements in a situation which may seem irrelevant to non-HSPs; the reason is usually a deeper and longer processing time of new information compared to peers (Aron & Aron, 1997; Jagiellowicz et al., 2020). This provides them with more effective learning from their own experiences and the ability to draw conclusions from experiences to also increase efficacy (Acevedo et al., 2014).

It is important to highlight that some cognitive factors related to attention, inhibitory control and self-regulation behaviours may moderate the effects of an HSP's temperament. In addition, highly sensitive children who present high levels of behavioural inhibition are better at monitoring their performance and are at a lower risk of developing emotional problems; high sensitivity is thus associated with positive mental health outcomes (Boeke, Moscarello, LeDoux, Phelps & Hartley, 2017; Jagiellowicz et al., 2020; McDermott & Fox, 2010; Rothbart, Ellis, Rueda & Posner, 2003; Eisenberg, Downs, Golberstein & Zivin, 2009; White, McDermott, Degnan, Henderson & Fox, 2011). In this way, HSPs can achieve a greater awareness of the long-term consequences of their own actions (Boterberg & Warryen, 2016). However, high sensitivity is also known to be associated with daily activity performance dysfunctions, which have an impact on executive functioning and alter action management (Engel-Yeger & Rosenblum, 2021). This may increase the levels of stress while executing cognitive tasks and it can also generate more distress when performing tricky perceptual ones (Gerstenberg, 2012). Hence, HSPs may tend to avoid situations of increased arousal, as they require only low intensity stimuli to react (Dunn, 1997; Engel-Yeger et al., 2016).

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In addition, other positive aspects of this trait include the analysing and seeking of dependencies, searching for similarities between their current experiences and previous ones, developing coping strategies, and the use of comparisons and figurative schemes (Dean, Little, Tomchek & Dunn, 2018). However, the processing of too many options implies some decision-making difficulties (Acevedo, 2020; Greven et al., 2019). Despite the advantages, HSPs are prone to mental health issues and cognitive fatigue (Engel-Yeger et al., 2019; Jagiellovicz et al., 2020).

In a propitious environment, HS children achieve better marks at school, have more constructive moral attitudes, and can use a more sophisticated vocabulary than their peers (Aron, 2002; Pluess & Belsky, 2013). Hence, some authors indicate that they not only engage in deep thinking, make better decisions, ponder spiritual questions and engage in meaningful work, but they are also gifted, mystical and intuitive (Acevedo, 2020; Aron & Aron, 1997; Aron et al., 2012).

1.2.3. Emotional sphere

In this field, HSP present hyperemotionality or maladaptive emotional responses, deep experience, high levels of stress, attachment to objects and emotional interactions with nature, art and animals (Engel-Yeger & Dunn, 2011; Greven et al., 2019; Ogawa et al., 2019). Crying, flow, negative affect and poor self-regulation feature indeed among the emotional reactions (Acevedo, 2020; Engel-Yeger & Dunn, 2011). SPS levels are significantly associated with socioemotional well-being, manifested as low self-esteem and shame, since they have a fear of being misunderstood as a result of prejudices (Acevedo, Aron & Aron, 2018; Acevedo et al., 2018; Acevedo, 2020; Aron et al., 2010; Iimura, 2021). Nevertheless, HSPs also present positive emotional aspects, such as empathy and sensitivity towards others, intensity of feelings and an intelligent sense of humour (Aron et al., 2012; Acevedo et al., 2017; Acevedo, 2020).

Current research also indicates that HSPs show high empathy levels as they have high emotional intelligence e.g., they can be more in tune with their own thoughts and emotions, be more aware of the emotions of others, more responsive, and conscious of environmental changes (Nocentini, Menesini & Pluess, 2018; Slagt et al., 2018). In this way, beyond empathy, high sensitivity leads to an enhancement of the environment, adjusting to it and making it more comfortable for others, thus contributing to less experienced chaos (Acevedo, 2020). Unlike autism spectrum disorder (ASD), high sensitivity leads to a greater perception of someone's sadness, anger and joy (Acevedo et al., 2014). In

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this way, parents of HS children are more empathetic and aware of their child's needs, which facilitates stability and cooperation in their relationships and trust between close people; this helps in turn HS children to be more socially adapted (Aron et al., 2019; McNamara & Houston, 2009). These emotional abilities could entail benefits for HSPs, but it is necessary to develop appropriate coping strategies for moments when they feel emotionally overwhelmed (Acevedo, 2020; Fehr & Rockenbach, 2004; Preston, Hofelich & Stansfield, 2013; Raghanti et al., 2018). Supportive environments could facilitate the achievement of higher levels of self-regulation in HS children, together with a greater sense of security resulting from the experience of the love of their families (Aron, 2002; Pluess & Belsky, 2013). Hence, they may be considered to be both empathic and nurturing people (Acevedo, 2020). SPS should therefore be interpreted as a susceptibility rather than a vulnerability (Iimura, 2021).

Furthermore, high empathy levels allow them to cope with the feelings of other people; they are also more likely to be capable of identifying injustices and of defending those perceived as weak (Acevedo, 2020; Aron et al., 2012). Consequently, they are more likely to notice the suffering and stress of other people (Acevedo, 2020).

Hence, highly sensitive people present more intensive reactions to images that evoke both pleasant and unpleasant emotions. In fact, HSPs who were reported to have experienced a happy childhood responded more intensely to pleasant photos (Jagiellowicz et al., 2010). These results provide evidence of the positive impact of a highly sensitive child's educational environment. This intense emotional perception of both pleasant and unpleasant emotions can be explained by the role of some brain areas which play an active role in the emotional reaction (limbic system) (Acevedo, 2014). Thus, promoting an individual's daily level of socioemotional well-being should be taken into account to improve the self-control areas (Iimura, 2021).

1.2.4. Interpersonal sphere

This dimension is especially relevant because the characteristics of an HSP's environment can determine the characteristics of an HSP's profile. While the trait itself is not a symptom, symptoms may emerge when individuals experience continued exposure to adversities and maladaptive or stressful environments (Scrimin, Osler, Pozzoli & Moscardino, 2018). Concretely, temperament trait studies have found that a poor childhood is a risk factor that precedes negative emotional consequences for the adult (Aron et al., 2005; Aron, Aron, Nardone & Zhou, 2019; Jagiellowicz et al., 2020). In addition, parenting styles have

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been researched with respect to SPS. This variable may influence children's behaviour, because they may be trained in adaptive self-regulatory technics in order to manage their emotions and thoughts quietly (Degnan & Fox, 2007). Positive parenting styles may similarly have an impact on children's well-being, achieving enhanced social functioning, by reasoning with the child, providing warmth, support, acceptance, responsiveness and autonomy (Eisenberg, Damon & Lerner, 2006; Hane, Cheah, Rubin & Fox, 2008; Hankin et al., 2011; Scrimin et al., 2018). Parental attachment patterns have also even be related to children's quality of life and also to sensory sensitivity: the higher the levels of insecure parental relationships with toddlers, the higher the sensitivity. In fact, a previous study has identified that highly sensitive parents present a tendency towards non-optimal parenting styles, such as permissive, authoritarian styles, less warmth as well as controlling parenting behaviours (Branjerdporn, Meredith, Strong & Green, 2019). Inherent environmental sensitivity leads individuals to be highly influenced by their environment both, "for better and for worse" (Jagiellowicz et al., 2020).

HSPs manifest this personality trait in the form of social distraction and avoidance of overstimulation, mental blocks, and a lack of communication skills to satisfy their needs (Aron, Aron & Davies, 2005; Hofmann & Bitran, 2006). HSPs have been found to adapt more slowly to new people and situations compared to less sensitive peers, due to their desire to carefully observe and reflect upon them. High sensitivity to subtleties is a feature that HSPs may use in sports, interpersonal communication, at school, etc. This feature makes it easier for them to interpret expectations, including those of their peers and teachers (Aron, 2002).

Moreover, according to Dunn's model (1999), HSPs are irritable and present low thresholds for anxious behaviours, resulting in poor social relationships. The population exhibits high reactivity to social rewards and punishment; they show fear when coping with social situations, avoid troubles and reflect on their faults (Kibe et al., 2020; Pluess & Boniwell, 2015). People with hypersensitivity patterns may respond in a maladjusted way to stimuli in the social environment (Engel-Yeger, DeLuca, Hake & Goverover, 2019). Hence, as indicated previously, HSPs who grow up in adverse or inhibiting conditions are more likely to be predisposed to be sick and suffer from negative physical and psychological consequences (Acevedo, 2020; Aron et al., 2005). However, in a supportive environment, HS children achieve higher levels of social competency, and these conditions allow them to benefit from positive upbringings and teaching, unlike non-HS children (Aron, 2002; Pluess & Belsky, 2013). Indeed, social support is a factor that may buffer negative health consequences in HSPs whose childhoods were defined by stressful life events;

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such support can promote resilience, even in the presence of a genotype expected to confer vulnerability to psychological disorders (Pluess & Boniwell, 2015). Moreover, HSPs responded more favourably to the school's resilience-building programmes, resulting in fewer mental health problems in HS children. In addition, these kinds of programmes achieve positive results regarding bullying, and predict positive developmental outcomes (such as decreasing levels of depression and victimisation) (Iimura, 2021; Mitchell et al., 2011; Nocentini et al., 2018; Pluess & Belsky, 2010; Pluess & Boniwell, 2015).

1.3. Sensory Processing Sensitivity assessment

Researchers have encountered difficulties in assessing the SPS trait, since it implies a complex decomposition of personality (Aron, 2020). The first measure, however, for assessing SPS, was the Highly Sensitive Person Scale (HSPS), which is a 27-item self-report questionnaire composed of positive and negative cognitive and emotional responses to environmental stimuli such as art, noises, smells, etc. (Acevedo et al., 2014; Aron & Aron, 1997; Greven et al., 2019; Lionetti et al., 2018). The initial version of this tool was designed using qualitative interviews, including statements that considered some markers of increased sensitivity such as: being highly conscientious, startling easily, having a rich inner life and being more sensitive to pain (Aron & Aron, 1997; Greven et al., 2019). These indicators contributed to creating the construct of SPS, formed by a variety of dimensions, instead of referring to it simply as sensitivity toward sensory stimuli (Greven et al., 2019). In fact, the psychometric properties and validity of the 27-item HSPS have been validated by a number of studies (Acevedo et al., 2014; Greven et al., 2019; Lionetti et al., 2018; Pluess et al., 2018; Rubaltelli et al., 2018).

Thus, the Highly Sensitive Child Scale (HSCS), composed of 12 items, and its recently revised version, with 21 questions, was drawn up as the HSP scale for adults was being developed (Pluess et al., 2018). Indeed, the HSCS presents a parent-report format to assess sensitivity in kindergarten children, using the same items from the HSC scale. Previous studies have shown that the HSCS presents adequate psychometric properties (Pluess et al., 2018; Weyn et al., 2019).

The HSC scale was also used to measure the sensitivity of preschool children (Slagt, Dubas, van Aken, Ellis, & Deković, 2017). For this purpose, the item type was altered, and parents were asked the questions. The questions were rephrased in such a way that it was the parent who referred to the behaviour they observed in their child. In our study, it was this scale's version that was used to estimate the questionnaire's validity.

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On the other hand, Aron (2002) developed another 23-item parent report questionnaire that measures SPS in children. This scale is used to analyse the association between SPS and daily functioning (Botenberg & Warreyn, 2016). Although the items of this scale partially overlap with the HSC questionnaire, this scale does not validate with certainty whether children with high scores are more sensitive to environmental influence and are more subject to deep cognitive processes (Greven et al., 2019). In addition, the HSP and HSC scales have been translated into a variety of languages (Greven et al., 2019; Kibe et al., 2018; Konrad & Herberg, 2017; Nocentini et al., 2017; Şengül-Inal and Sümer, 2017; Poïrarinsdoïttir, 2018).

High sensitivity dimensions highlighted in the scales

The first scale developed to measure Sensory Processing Sensitivity was unidimensional. However, studies conducted using the scale indicate the presence of SPS components/scales. Initial factor analyses on HSP scale scores suggested a unitary sensitivity factor (Aron and Aron, 1997). Subsequent studies shed new light on the first analyses. Research led by Smolewska, McCabe and Woody (2006), among others, pointed to the presence of three factors. In recent years, they have often been used in SPS research as a way of describing high sensitivity characteristics. In-depth analyses of scale adaptations in many countries indicated the presence of two to six factors. The most popular solution, supported by psychometric analyses, is the emergence of the following elements in the HSPS and HSC scales (Pluess et al., 2017; Smolewska et al., 2006):

1. Low Sensory Threshold (LST), or sensitivity to subtle, external stimuli;
2. Ease of Excitation (EOE), or ease of being overwhelmed by internal and external stimuli; and
3. Aesthetic Sensitivity (AES), otherwise known as openness “to” and pleasure “from” aesthetic experiences and positive stimuli/stimulation.

The study found that EOE and LST were moderately associated with self-rated negative emotionality, anxiety and depression. In contrast, LST (but not EOE), was positively correlated with self-rated sensory discomfort. Conversely, AES was associated with positive emotionality, such as positive affect and self-esteem, but not associated with negative emotions, both in adulthood and childhood (Liss, Timmel, Baxley, & Killingsworth, 2005; Pluess et al, 2017; Smolewska et al, 2006). The authors of a review of studies of

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the area of Sensory Processing Sensitivity in the context of Environmental Sensitivity (Greven et al., 2019) noted that the three scales mentioned—LST, EOE and AES—were not an intended outcome. They were not designed, defined or based on the construction of the tool. The scales emerged as a result of factor analysis. This indicates that their meaning was not clear, nor was what these components measured explained or meant when analysed or taken separately.

A continuum or one dimension

Research conducted in the USA indicates that high sensitivity characterises approximately 20% of the population (Aron et al., 2012). Authors of works in the field of Sensory Processing Sensitivity (e.g., Boyce and Ellis, 2005; Aron and Aron, 1997; Belsky and Pluess, 2009; Jagiellowicz et al, 2012) estimate a 10-35% distribution of high sensitivity in the population. The population's trait distribution was first proposed for the concept of Sensory Processing Sensitivity. The proposal constituted an analogy to work on infant reactivity (or behavioural inhibition), as defined by Kagan (1994). In a paper entitled "On the nature of emotion", infants were classified into groups presenting different reactivity. The categorisation was developed based on a theoretical framework of differences in the excitability of limbic structures. They applied this model to the observational assessment of motor responses and crying in infants (Kagan, 1994). In a review, Greven et al. (2019) noted that taxometric analyses conducted in later years supported the SPS theoretical framework, indicating that a minority (approximately 10%) of infants were highly reactive to visual, auditory and olfactory stimuli. The remaining infants were classified as less reactive. Analyses of the results obtained using the HSP and HSC scales were conducted using the latent class analysis method.

The first study identified three classes of HSP in four ethnically diverse UK samples of respondents aged 8-19 years (total N = 3581). It indicated that low HSP characterised 25%-35% of the sample, medium HSP was found in 41-47% of the sample, and high HSP in 20-35% (Pluess et al., 2017). The results obtained were replicated in studies conducted on US adults (N = 451 and N = 450) using the HSP scale, which also revealed three groups: 31% with high sensitivity, 40% with medium sensitivity, and 29% with low sensitivity (Lionetti et al., 2018). The authors of these studies (Pluess et al., 2017; Lionetti et al., 2018) referred to the third group as tulips. A replication of the study conducted on a sample of adolescents attending schools in Germany (sample of 749 adolescents) confirmed the existence of three sensitivity groups, which differed significantly in terms of their respective mean HSP scores. According to the results obtained by the researchers

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(Tillmann et al., 2021, p.9), 17.90% of adolescents belonged to the low sensitivity group, 55.10% to the medium sensitivity group, and 27.00% to the high sensitivity group. The results of the study on the Polish sample of young adolescents resulted in the identification of three groups of adolescents. Each of them was characterised by a significantly different total HSC scale score. Pupils with the highest intensity of the examined trait constituted 37.7% of the total. Those with average sensitivity constituted 21% of the group, and those with lowest sensitivity accounted for 41.8%.

1.4. The profile of a highly sensitive person – summary

As indicated, highly sensitive persons (HSPs) interpret information and environmental stimuli more deeply than other individuals. HSPs can be sometimes classified as over-reactive, dramatic, eccentric, shy, neurotic, anxious or depressive (Degnan & Fox, 2007; Fox, Henderson, Marshall, Nichols & Ghera, 2005). However, recent studies do not consider HS as a disorder, since this would imply that individuals present difficulties to integrate sensory signals (Acevedo, 2020). As mentioned previously, there are various degrees of SPS and people may find that their own threshold is modulated by the environment (Acevedo, 2020; Greven et al., 2019). In addition, SPS may lead to communicating, socialising and mobility, as well as coordination or orientation towards sensory signals (Acevedo, 2020). In fact, the DOES acronym was created to stress that the sensitivity trait represents a cluster of four dimensions: 1) Depth of processing (great amount of detailed information processed in relation to an object, information or stimulus); 2) Overstimulation (processing situations, including the actions and behaviours of other people, more deeply and thoroughly than peers); 3) Emotional reactivity (intensive reactions to both positive and negative emotional life events); and 4) Subtle stimuli (more awareness of details, subtle sounds, touch, smell and other delicate stimuli) (Acevedo et al., 2014; Aron & Aron, 1997; Aron et al., 2012).

Nevertheless, despite this negative perspective based on associations between high sensitivity and mental health problems, there is a 'bright side': HSPs are characterised by beneficial skills, that can improve well-being (Pluess, 2017; Iimura, 2021). It is thus recognised that HSPs can achieve an optimal development (Acevedo, 2020; Aron et al., 2012; Aron, 2020; Greven et al., 2019).



THE PROCESS OF CONSTRUCTING THE QSPSinCh

2.1. Focus groups and testing tool



2. THE PROCESS OF CONSTRUCTING THE QSPSInCh

The questionnaire was initially developed in Poland. It was called KWPSuDz and consisted of several steps. The subsequent versions are described in the following paragraphs. Methodological foundations for constructing the tool were assumed to form the basis for the research conducted.

Basic methodological assumptions

The state of the art reviewed above led to certain assumptions underlying the questionnaire's design. These premises stem from the achievements of developmental and individual differences psychology as well as cross-cultural psychology.

1. Temperament traits are partly biologically determined. They have been present in humans since early ontogeny and are also found in the animal world (see Strelau & Zawadzki, 1998; Strelau & Zawadzki, 2018; Buss & Plomin, 1984, Eysenck, 1970) as emphasised by the assumptions of Environmental Sensitivity (Pluess, 2015). Temperament traits are among those psychological properties that are common to people regardless of the culture in which they grow up - they are universal in nature. Temperament traits, however, can be expressed in different ways (their manifestations can be found in different behaviours), which in turn depend on the specifics of the cultural context. Thus, each trait may manifest itself in different, culturally specific behaviours.

The construction of the questionnaire therefore sought to capture culturally universal definitional components of sensitivity in children. The procedure proposed by Strelau and Angleitner (1994) was followed to build it. The procedure considers, on the one hand, universal aspects of temperament [referred to in cross-cultural psychology as the etic approach]. On the other, it considers culture-specific manifestations of temperament [referred to as the emic approach in cross-cultural psychology] (see Strelau, Zawadzki, 1998).

2. The author of the first Sensory Processing Sensitivity measurement scale considered it to be a unidimensional temperament trait (Aron & Aron, 1997). E. Aron described individuals presenting a high intensity of the trait as highly sensitive, hence she named the developed scale the Highly Sensitive Person Scale (HSPS). The HSP scale was developed (along with a theoretical framework of sensitivity of sensory processing) as a result of exploratory research. Previous research using the scale (e.g., Evans & Rothbart, 2008; Konrad & Herzberg, 2017; Listou Grimen

2. THE PROCESS OF CONSTRUCTING THE QSPSInCh

& Diseth, 2016; Smolewska et al., 2006) shed new light on the assumptions that were originally made. Between two to six factors emerged from the analyses of the studies conducted using the scale. However, given that the analyses were mainly conducted on the data of a group of adults and that the factors emerged from statistical analyses during the construction of the tool, exploratory research of a qualitative nature was conducted.

3. The theoretical basis of the questionnaire is the concept of Sensory Processing Sensitivity in children. Sensory Processing Sensitivity is a trait that describes individual differences in sensitivity to both positive (favourable, supportive, pleasant) and negative (difficult, overwhelming) stimuli from the environment. Sensory Processing Sensitivity is associated with: depth of processing, propensity towards overstimulation, emotional reactivity and empathy, and aesthetic sensitivity. This trait manifests itself in various domains of life. In the questionnaire, the child's activities in four functioning domains are assessed: the physical, emotional, interpersonal relations and cognitive spheres.

2.1. Focus groups and testing tool

The first experimental version of the questionnaire arose from the categorical analyses of the results of focus groups with parents and teachers of highly sensitive children. School psychologists and/or educators were involved in the recruitment of the focus groups. They were provided with a protocol to recruit the groups along with admission and exclusion criteria (e.g. diagnosis of sensory integration disorders, autism spectrum disorders).

Subsequently, semi-structured interviews with parents of highly sensitive children and with teachers of highly sensitive children were developed. The research was conducted in Poland, Spain (in mainland Spain and on the island of Tenerife), Italy, Romania and Macedonia. The research followed the methodology of implementing groups from different countries (Moretti, Vliet, Bensing, & Deledda, 2011). To assess the reliability of the performed research, key informant interviews were conducted in accordance with the Common rules for key informants.

Next, transcriptions were prepared in accordance with the developed rules, based on the common categories that were determined. Based on the categories thus created, questionnaire items were defined. A maximum number of questionnaire items were

2. THE PROCESS OF CONSTRUCTING THE QSPSInCh

generated for each category by two independent teams (experts from the WSEI University and experts from the University of Alicante). They were then translated into Polish. Duplicate items were removed and re-checked to ensure that each category was saturated with questions. Test items were analysed according to item evaluation guidelines. The principles of representativeness, pertinence, clarity, technicalities and comprehension were considered.

In this way, 167 items out of over 200 were selected to be evaluated by competent judges. The test items also underwent ethical and linguistic correctness assessments¹. The consistency of the counted scores made it possible to select the items that the judges agreed upon. The authors tried to keep the questionnaire items short and understandable, free from extreme levels of social approval, varied in content, and appropriate for people representing different cultures and social and professional populations. Regarding the statements, the judges focused on the behaviours that could be the result of nurture (rather than possession of the trait itself) or related to other temperament or personality traits. This resulted in the first version of the questionnaire being tested in Poland. To implement the testing, protocols were developed to collect the socio-demographic data of parents and teachers. An invitation to test the tool was sent to schools and kindergartens in Poland. The tool was subsequently tested in schools and kindergartens that expressed a willingness to cooperate in the research.

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APPLICATION GUIDELINESS

- 3.1. Domains of application
- 3.2. Application norms



3. APPLICATION GUIDELINES

This chapter describes norms and instructions on how to optimally and adequately apply and correct the instrument to obtain the scores and the results profile.

Before applying the questionnaire, it is important that informants read this chapter carefully and become familiar with the instrument.

▷ 3.1. Domains of application

The instrument was developed, standardised and validated to assess the Sensory Processing Sensitivity of children aged between 3 to 6 years old, and between 7 to 10 years old. Two versions were developed to assess the SPS according to the age of the child evaluated:

- ▷ The Kindergarten version: for children aged 3 to 6 years
- ▷ The Primary School version: for children aged 7 to 10 years

The instrument was specifically developed to adjust to the needs and characteristics of educational and family contexts. In this sense, two versions were developed to assess SPS depending on the informant:

- ▷ The Teacher version: teachers answer the questions taking the child's behaviours and attitudes at school into account.
- ▷ The Parent version: parents complete the questions taking the child's behaviours and attitudes in the family context into account.

These two major domains of application are described in more detail below.

▼ The educational context

The educational field is among the domains that can benefit the most from this type of instrument. Schools are highly suitable scenarios for the assessment of this personality trait as routine and systematic evaluations of pupils can be performed to detect characteristics that may be unnoticeable in their environment. In addition, children spend a lot of time at school. Their interactions in this context are thus highly relevant regarding the examination of their sensitivity to sensory processing across the physical, cognitive,

3. APPLICATION GUIDELINES

emotional and interpersonal spheres. For this reason, schools were included among the sources of information when developing the differentiated versions of the instrument. Teachers are privileged informants: they have access to school contexts and can observe children's behaviours in a structured environment from a particular perspective, allowing them to compare the functioning of the evaluated child with that of peers during situations of interaction.



Family context

The family context is also among the most suitable scenarios to apply the instrument. Families represent a major system of influence in a child's development from early stages, as they are the main nucleus in which they grow up. Thus, a child's family has a big impact on his/her personality and emotional and social development. Families model ways of thinking, making decisions, behaviours and attitudes. For this reason, families are also a source of information considered in the design and development of the differentiated versions of the instrument. Parents spend a lot of time with their children, especially during the kindergarten and primary school stages. Therefore, parents are optimal informants of their child's behaviour in a non-structured environment. The possibility of collecting information on the child at home allows obtaining a comprehensive assessment of Sensory Processing Sensitivity both generally and across the different spheres (physical, cognitive, emotional and interpersonal).



Other contexts

Although the instrument has been specifically developed for educational and family contexts, it can also be generalised to a wide variety of contexts (clinical, forensic, educational and research), the main purpose being to assess this Sensory Processing Sensitivity.

For example, this instrument is highly useful for evaluative processes in clinical settings. The reasons children undergo clinical consultations are usually related to possible problems and difficulties in the interpersonal, emotional, and cognitive spheres (e.g., anxiety, depression, learning difficulties, autism spectrum disorder, attention deficit hyperactivity disorder). The instrument can be useful in an initial approach to a child's psychological functioning in terms of the personality traits at the beginning of an evaluative process.

3. APPLICATION GUIDELINES

Moreover, assessing Sensory Processing Sensitivity can lead to relevant information about some of the child's characteristics that can act as protective factors or personal resources in the clinical intervention. Moreover, the multidimensional evaluation that the instrument allows to perform is also adapted to forensic contexts. For instance, an in-depth knowledge of a child's personality can support decision-making in the judicial sphere (e.g., emotional reactivity, extreme sensitivity, emotional regulation problems, difficulties in social interactions, etc.) Finally, the instrument can be a reliable and valid tool for assessing children's Sensory Processing Sensitivity in research.

▶ 3.2. Application norms

One of the instrument's main characteristics is its simplicity and ease of application. The materials are designed to be used autonomously by the informants and they include complete instructions.

The informants may be the parents (in the parent version of the instrument) or the teachers (in the Teacher version of the instrument). In both cases, the informants (parents or teachers) should answer each instrument item according to the child's usual behaviour in the family and school contexts, respectively. In all cases, the informants should work under the supervision of a qualified professional. Supervising professionals should ensure that scoring procedures are reliable and include methods for checking the integrity of the scores.

The age range of application is from 3 to 6 years old (in the Kindergarten version) and from 7 to 10 years old (in the Primary School version).

The selection of the version of the instrument depends on the child's age and the person acting as informant. Thus, a total of four versions are available (see Appendix 1-4 of this manual):

- Parent version in kindergarten education
- Parent version in primary education
- Teacher version in kindergarten education
- Teacher version in primary education

The instrument is applied on an individual basis, using a pencil and paper. It requires little investment in time (approximately 15 minutes to fill out).

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PSYCHOMETRIC PROPERTIES

- 4.1. Sample description
- 4.2. Kindergarten Teachers version
- 4.3. Primary School Teacher version
- 4.4. Kindergarten Parent version
- 4.5. Primary School Parent version



4. PSYCHOMETRIC PROPERTIES

According to the theoretical model described above, the tool comprises four dimensions and measures physical, emotional, interpersonal, and cognitive SPS. A psychometric analysis was carried out for each target group (teachers and parents both in kindergarten and primary education), and descriptive data for each dimension item was presented. These descriptive data of all items used in the instrument's validation process are provided in Appendix 5. An exploratory factor analysis (EFA) and the Item Response Theory (IRT) model parameters were conducted to check the factor structure of the subscales in each target group. Two sub-dimensions were confirmed for each dimension. In some items of different scales, the Item Response Theory (IRT) analysis was not possible as it was not possible to fit a response model for that item. In those cases, the analysis was not performed because some categories in the response scale presented zero frequency of occurrence. Therefore, it was not possible to assess the extent to which the item was measured and how the behaviour associated with the specific sphere was measured. In those cases, these items were ultimately kept in the final instrument because of the indicators of the relationship with the sphere referred to and with the construct generally. This implies that as more answers are obtained for that item, it will be possible to assess the usefulness of that item and its scale of measurement when measuring the trait.

Omega and Alpha reliability indexes were computed for the internal stability scale. In order to check the instrument's convergent validity, a correlation analysis was run with EAS (Temperament Survey for children; Buss & Plomin, 1984) and with HSC (high sensitivity children scale; Pluess et al., 2018; Weyn et al., 2019) for parents and teachers. To finish, percentile criteria were adopted to establish cut-off points in target groups, i.e., the point of detection of high sensitivity.

4.1. Sample description

The study was conducted on a group of 58 people, the vast majority of which were women (which corresponds to the gender distribution of teachers at kindergarten and grades 1-3 of primary school in Poland). The respondents represented a similar number of kindergarten and primary school teachers. They also included teachers who taught both at Kindergarten and at primary school (hence, when asked about the educational stages, there were 30 people in each). The teachers were of different ages (from 20 to 60 years of age). The average age of the respondents was under 43 years ($M = 42.89$; $SD = 9.96$). They were full-time employees, mostly working in higher education – master's degrees (93.1%).

4. PSYCHOMETRIC PROPERTIES

Table 2. Kindergarten and primary school teachers – group description

	N	%	χ^2	df	p
Gender					
Female	57	98.3	54.07	1	<.001
Male	1	1.7			
Employment status as a teacher					
Full-time	58	100			
Part-time (50-90% of full-time hours)	0	0			
Part-time (less than 50% of full-time hours)	0	0			
The highest level of formal education that the teacher has completed					
Secondary level	0	0	93.35	2	<.001
Bachelor degree	3	5.2			
Masters degree	54	93.1			
PhD degree	0	0			
Other	1	1.7			
Type of school/preschool in which the teacher is currently working					
Private	8	13.8	30.414	1	<.001
Semi-private	0	0			
Public	50	86.2			
Educational stages					
Preschool	30	50			
Primary Education	30	50			
Years in which the person is teaching					
First level (2-3 years)	4	5			
1 st year (3-4 years)	9	11.25			
2 nd year (4-5 years)	7	8.75			
3 rd year (5-6 years)	4	5			
Class "zero"/preparation for school (6-7 years)	8	10			
Mixed class	2	2.5			
First class (5-7 years)	9	11.25			
Second class (7-8 years)	12	15			
Third class (8-9 years)	11	13.75			

4. PSYCHOMETRIC PROPERTIES

	N	%	χ^2	df	p
Fourth class (9-10 years)	11	13.75			
Fifth class (10-11 years)	1	1.25			
Mixed class	2	2.5			
Has the teacher ever heard about Sensory Processing Sensitivity?					
Yes	43	74.1	13.517	1	<.001
No	15	25.9			
Has the teacher received specific training courses about Sensory Processing Sensitivity?					
Yes	6	10.3	36.483	1	<.001
No	54	89.7			

Note. Df = degrees of freedom; χ^2 = chi squared test; p = probability associated with the test

The average length of the work experience of the surveyed teachers was over 18 years (M = 18.35; SD = 12,383), and the work experience in the school/kindergarten in which they were currently teaching was less than 14 years (M = 13.61; SD = 10,861). Most respondents had heard about the temperament trait of Sensory Processing Sensitivity (74.1%), though only 10% had undergone some training on sensitivity.

Kindergarten teachers completed questionnaires on 257 girls and 289 boys. The children represented all levels of preschool education: the youngest group (13.6%), the group aged 3-4 years (24.7%), children aged 4-5 years (29.4%), children aged 5-6 years (11.4%) and class “zero”, i.e., a group preparing for school education.

Table 3. Kindergarten children – group description (data on the group of Kindergarten teachers)

	N	%	χ^2	df	p
Child's gender					
girl	257	47.1	1.875	1	.0171
boy	289	52.9			
Preschool education level					
first level (2-3 years)	61	13.6	51.033	4	<.001
1 st year 3-4 years	111	24.7			
2 nd year 4-5 years	132	29.4			

4. PSYCHOMETRIC PROPERTIES

	N	%	χ^2	df	p
3 rd year 5-6 years	51	11.4			
class "zero"	94	20.9			
mixed class	0	0			
Did the child have / still has difficulties with adaptation?					
Yes, definitely	84	15.4	124.194	4	<.001
yes, somewhat	121	22.2			
hard to say	28	5.1			
not really	186	34.1			
definitely not	126	23.1			
Is the child currently well adapted to preschool?					
Yes, definitely	263	48.3	455.927	4	<.001
yes, somewhat	191	35			
hard to say	25	4.6			
not really	51	9.4			
definitely not	15	2.8			

Note. Df = degrees of freedom; χ^2 = chi squared test; p = probability associated with the test

The group of children varied in terms of difficulties of adaptation to preschool conditions. According to teachers, about 38% of children had had (or still had) adaptation difficulties to a greater or lesser degree. The vast majority of children (83%), however, were currently well adapted to kindergarten.

Primary school teachers completed questionnaires on 169 girls and 158 boys. These were mainly children attending the first (36%), second (34%) and third (29.4%) classes. According to the teachers, approximately 15% of the surveyed children presented adaptation difficulties, and 92% of the surveyed pupils were currently well adapted to school conditions.

4. PSYCHOMETRIC PROPERTIES

Table 4. Primary school children – group description (data on the group of primary school teachers)

	N	%	χ^2	df	p
Child gender					
girl	169	51.7	.370	1	.543
boy	158	48.3			
Primary school education level					
class "zero" (5-6; 6-7 years)	1	.3	319.404	5	<.001
first class (6-7; 7-8 years)	117	35.8			
second class (7-8; 8-9 years)	111	33.9			
third class (8-9; 9-10 years)	96	29.4			
fourth class (9-10; 10-11 years)	1	.3			
mixed class	1	.3			
Did the child have/still has adaptation difficulties?					
Yes, definitely	16	4.9	224.364	4	<.001
yes, somewhat	33	10.2			
hard to say	18	5.6			
not really	149	46.0			
definitely not	108	33.3			
Is the child currently well adapted to preschool/school?					
Yes, definitely	154	47.5	371.093	4	<.001
yes, somewhat	145	44.8			
hard to say	16	4.9			
not really	6	1.9			
definitely not	3	.9			

Note. Df = degrees of freedom; χ^2 = chi squared test; p = probability associated with the test

A total of 207 parents of preschool children (194 mothers and 13 fathers) participated in the study. When asked about basic sociodemographic data, the surveyed parents answered questions about themselves (about their education, age, place of residence), but also about the child's father/mother. Worthy of note, the data on the children's parents was partly provided by the partners filling in the information.

4. PSYCHOMETRIC PROPERTIES

The mothers' average age was less than 34 years and they were aged between 19-47 years (M = 33.59; SD = 5.359). Most mothers had higher education (67.9%) or secondary education (26.9%). Less than half the mothers lived in rural areas (49.5%), and another 35.4% lived in large cities.

Table 5. Parents of Kindergarten children – group description

	N	%	χ^2	df	p
Mother's education					
primary	3	1.4	241.925	3	<.001
vocational	8	3.8			
secondary level	57	26.9			
higher	144	67.9			
Father's education					
primary	5	2.4	90.717	3	<.001
vocational	35	16.5			
secondary level	85	40.1			
higher	87	41			
Mother's place of residence					
village	105	49.5	113.660	3	<.001
city up to 50 000 inhabitants	23	10.8			
city from 50 000 to 100 000 inhabitants	9	4.2			
city of over 100 000 inhabitants	75	35.4			
Father's place of residence					
village	110	51.9	130.906	3	<.001
city up to 50 000 inhabitants	20	9.4			
city from 50 000 to 100 000 inhabitants	7	3.3			
city of over 100 000 inhabitants	75	35.4			

Note. Df = degrees of freedom; χ^2 = chi squared test; p = probability associated with the test

The mean age of the fathers of children who were administered the questionnaire was 36 years. The men were aged between 22 to 53 years (M = 36.05; SD = 5.285). Fathers most often represented the group of people with higher education (41%), secondary (40.1%), and vocational education (16.5%). Over half the fathers lived in villages (51.9%), and the next largest group was men living in large cities (35.4%).

4. PSYCHOMETRIC PROPERTIES

Table 6. Kindergarten children – group description (data from the group of kindergarten parents)

	N	%	χ^2	df	p
Child gender					
girl	110	49.1	.071	1	.789
boy	114	50.9			
Preschool education level					
first level (2-3 years)	23	10.7			
1 st year 3-4 years	43	20			
2 nd year 4-5 years	47	22.1			
3 rd year 5-6 years	22	10.3			
class “zero” / preparation for school (5-6; 6-7 years)	79	36.9			
mixed class					
Who is the child closest to (most attached to)?					
To mother (legal guardian)	44	20.8	187.283	2	<.001
to father (legal guardian)	6	2.8			
to both parents equally (legal guardians)	162	76.4			
other					

Note. Df = degrees of freedom; χ^2 = chi squared test; p = probability associated with the test

The surveyed parents completed questionnaires on 110 girls and 114 boys. The most numerous group were children attending class “zero” (36.4%), and the next most numerous group were children aged 4-5 (22.1%), aged 3-4 (20%), children aged 2-3 years (10.7 %) and children aged 5-6 years (10.3%). Parents were also asked with whom the child had the closest relationship. Their responses showed that most children (76.4%) had a similar relationship with both parents, 20.8% of children had a closer relationship with their mothers and 2.8% had a closer relationship with their fathers.

A total of 154 parents, 148 mothers and 6 fathers participated in the study with parents of school-age children. The mean age of mothers was 37 years (M = 37.27; SD = 5,32). More than half of them had higher education (56.4%), and 1/3 of the mothers had secondary education. Mothers came mainly from rural areas (50%) and small towns (24.4%).

4. PSYCHOMETRIC PROPERTIES

Table 7. Parents of primary school children – group description

	N	%	χ^2	df	p
Mother's education					
primary	2	1.3	117.026	3	<.001
vocational	14	9			
secondary level	52	33.3			
higher	88	56.4			
Father's education					
primary	5	3.2	50.513	3	<.001
vocational	37	23.7			
secondary level	66	42.3			
higher	48	30.8			
Mother's place of residence					
village	78	50	57.538	3	<.001
city up to 50 000 inhabitants	38	24.4			
city from 50 000 to 100 000 inhabitants	20	12.8			
city of over 100 000 inhabitants	20	12.8			
Father's place of residence					
village	78	50	56.667	3	<.001
city up to 50 000 inhabitants	37	23.7			
city from 50 000 to 100 000 inhabitants	20	12.8			
city of over 100 000 inhabitants	21	13.5			

Note. Df = degrees of freedom; χ^2 = chi squared test; p = probability associated with the test

The mean age of fathers was 39 years (M = 39.07; SD = 5,38). A majority had secondary (30.8%) or higher (30.8%) education. Half of them came from rural areas, and 23.7% from small towns.

The parents filled out questionnaires on 92 girls and 76 boys. These were mainly children attending the first (40.1%), second (49.1%) and third (7.8%) years. Parents' responses showed that the majority of children (68.6%) had a similar relationship with both parents, approximately 1/3 had closer relationships with their mother, and 1.3% with their father.

4. PSYCHOMETRIC PROPERTIES

Table 8. Primary school children – group description (data from the group of primary school parents)

	N	%	χ^2	df	p
Child gender					
girl	92	54.8	1.524	1	.217
boy	76	45.2			
Primary school education level					
class “zero” (5-6; 6-7 years)	2	1.2			
first class (6-7; 7-8 years)	67	40.1			
second class (7-8; 8-9 years)	83	49.7			
third class (8-9; 9-10 years)	13	7.8			
fourth class (9-10; 10-11 years)	2	1.2			
mixed class	0	0			
Who is the child closest to (attached to most)?			106.731	2	<.001
To the mother (legal guardian)	47	30.1			
To the father (legal guardian)	2	1.3			
To both parents equally (legal guardians)	107	68.6			

Note. Df = degrees of freedom; χ^2 = chi squared test; p = probability associated with the test

4.2. Kindergarten Teacher version

Factor analysis

The following Tables 9-12 present factorial loadings for the items of the Kindergarten Teacher version responses in each sphere.

Due to ambiguous factorial loadings, in physical and cognitive spheres, item 7 and items 1 to 6 were removed, respectively.

In accordance with the Item Response Theory (IRT), in the emotional sphere, items 1 to 3 were removed due to the difficulty index. Regarding the interpersonal sphere, items 7 to 13 showed good values on the trait’s discriminability index, whereas items 1 to 6 were removed.

4. PSYCHOMETRIC PROPERTIES

Table 9. Physical sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It1. Has bad noise tolerance	0,896	0,039	0,804	0,196
It2. Finds intense lights unpleasant	0,937	0,121	0,893	0,107
It3. Avoids being in the bright sun	0,938	0,213	0,926	0,074
It4. Badly tolerates tags, scratching materials	0,898	0,328	0,915	0,085
It5. Dislikes certain food textures.	0,824	0,467	0,897	0,103
It6. Perceives some flavours very intensely	0,737	0,588	0,888	0,112
It7. Has a particularly sensitive sense of smell	0,681	0,661	0,901	0,099
It8. If experiences something intensely, complains of pain (e.g., headache, stomach-ache)	0,595	0,739	0,900	0,100
It9. More often than other children, signals a need for rest	0,518	0,801	0,910	0,090
It10. Badly tolerates dirt, wetting, etc. on clothing or hands	0,361	0,883	0,910	0,090
It11. When many things happen at once, is tired than other children	0,256	0,922	0,915	0,085
It12. Easily identifies small changes (or modifications) in the environment/surroundings	0,145	0,933	0,892	0,108
It13. Often complains of pain for no apparent reason	-0,029	0,891	0,795	0,205

<i>IRT Model</i>	Ext1	Ext2	Ext3	Ext4	Dscr
It1. Has bad noise tolerance	1,47	2,5	3,56	4,13	1,79
It2. Finds intense lights unpleasant	0,86	1,72	2,98	3,58	2,35
It3. Avoids being in the bright sun	0,57	1,44	2,65	3,29	3,28
It4. Badly tolerates tags, scratching materials	0,46	1,53	2,6	3,14	3,14
It5. Dislikes certain food textures.	0,22	1,2	2,1	2,7	3,48
It6. Perceives some flavours very intensely	0,06	1,01	1,8	2,64	3,3
It7. Has a particularly sensitive sense of smell	-0,21	0,54	1,83	2,79	2,71
It8. If experiences something intensely, complains of pain (e.g., headache, stomach-ache)	-0,54	0,31	1,25	2,03	2,44
It9. More often than other children, signals a need for rest	-0,88	0,17	1,79	2,65	1,65
It10. Badly tolerates dirt, wetting, etc. on clothing or hands	-1,2	-0,3	1	1,9	1,58
It11. When many things happen at once, is tired than other children	-1,68	-0,74	0,6	1,58	1,41
It12. Easily identifies small changes (or modifications) in the environment/surroundings	-1,87	-1,04	-0,26	0,94	1,48

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity
Ext = extreme values; Dscr = Discrimination index

4. PSYCHOMETRIC PROPERTIES

Table 10. Emotional sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It1. Needs favourite objects to feel better	-0,08	0,75	0,56	0,44
It2. Is easily embarrassed	0,1	0,88	0,79	0,21
It3. Is worried about the assessment of others	0,28	0,88	0,85	0,15
It4. Has a special loathing of insects, e.g., flies, gnats, spiders	0,43	0,81	0,83	0,17
It5. Has a tendency to pessimistic / unfavourable course of events	0,51	0,75	0,83	0,17
It6. Experiences art very much, e.g., is moved by movies and music	0,64	0,66	0,84	0,16
It7. Has a tendency to accumulate emotions	0,73	0,58	0,86	0,15
It8. It's hard to control strong emotions	0,77	0,52	0,86	0,14
It9. Experiences emotions intensely	0,84	0,43	0,89	0,11
It10. Doesn't need much to cry, hysteria	0,88	0,33	0,89	0,11
It11. Fatigue is manifested by aggression	0,91	0,25	0,89	0,11
It12. When many things happen at once, it stresses him/her more than other children	0,92	0,18	0,87	0,13
It13. Needs more time to feel comfortable in a new place	0,9	0,09	0,82	0,18
It14. Once disappointed, avoids similar situations, places and events for a long time	0,82	-0,05	0,68	0,32

<i>IRT Model</i>	Ext1	Ext2	Ext3	Ext4	Dscr
It4. Has a special loathing of insects, e.g., flies, gnats, spiders	0,668	1,623	2,970	3,546	2,379
It5. Has a tendency to pessimistic / unfavourable course of events	0,397	1,100	2,297	2,927	2,692
It6. Experiences art very much, e.g., is moved by movies and music	0,200	0,934	2,017	2,708	3,158
It7. Has a tendency to accumulate emotions	0,050	0,797	1,749	2,528	3,513
It8. It's hard to control strong emotions	-0,023	0,643	1,484	2,532	3,539
It9. Experiences emotions intensely	-0,180	0,527	1,366	2,400	3,543
It10. Doesn't need much to cry, hysteria	-0,345	0,317	1,113	2,173	3,431
It11. Fatigue is manifested by aggression	-0,565	0,084	0,869	2,002	3,106
It12. When many things happen at once, it stresses him/her more than other children	-0,777	-0,233	0,474	1,639	2,774
It13. Needs more time to feel comfortable in a new place	-1,171	-0,736	0,048	1,230	2,363
It14. Once disappointed, avoids similar situations, places and events for a long time	-2,743	-1,689	-0,668	1,185	1,334

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination index

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Table 11. Interpersonal sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It 1. In the new group, remains an observer for a long time before joining the activity	0,04	0,85	0,72	0,28
It 2. Needs additional incentives(stimulus) to get involved in the group	0,15	0,91	0,85	0,15
It 3. In a group where a lot is going on, it seems to be temporarily absent	0,25	0,91	0,89	0,11
It 4. Badly tolerates time pressure in situations of evaluation, competition (tests, competitions)	0,35	0,87	0,88	0,12
It 5. Public appearances (academies, competitions) cost her/him more than other children	0,49	0,79	0,86	0,14
It 6. Rarely signal his/her needs	0,61	0,69	0,86	0,14
It 7. Experiences conflicts with peers particularly intensely and for a long time	0,67	0,64	0,86	0,14
It 8. Feels guilty even when there is no reason to do so	0,75	0,56	0,87	0,13
It 9. Reveals some difficult situations and begins to talk about them after a long time	0,86	0,39	0,89	0,11
It 10. In relations with others, she/he seems shy	0,9	0,31	0,9	0,1
It 11. Doesn't like to be observed	0,92	0,22	0,9	0,1
It 12. Blocks himself/herself when is the centre of attention	0,92	0,16	0,88	0,12
It 13. Reacts disproportionately/exaggerated to criticisms	0,85	0,05	0,73	0,28

<i>IRT Model</i>	Ext1	Ext2	Ext3	Ext4	Dscr
It 7. Experiences conflicts with peers particularly intensely and for a long time	-0,12	1,29	2,06	2,89	3,40
It 8. Feels guilty even when there is no reason to do so	-0,34	0,52	1,18	2,06	3,71
It 9. Reveals some difficult situations and begins to talk about them after a long time	-0,53	0,38	1,03	1,99	3,09
It 10. In relations with others, she/he seems shy	-0,62	0,26	0,81	2,02	2,66
It 11. Doesn't like to be observed	-0,91	-0,27	0,40	1,65	2,33
It 12. Blocks himself/herself when is the centre of attention	-1,22	-0,60	0,07	1,35	1,98
It 13. Reacts disproportionately/exaggerated to criticisms	-2,05	-1,49	-0,71	0,73	1,50

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination index

Table 12. Cognitive sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It 1. Is overwhelmed by a large amount of information at once	0,79	-0,16	0,66	0,35
It 2. Asks deep, thought-provoking questions	0,89	-0,01	0,79	0,21
It 3. He can "drill" the topics she/he is interested in with great determination	0,91	0,11	0,85	0,15
It 4. Has a special sense of humor, often not understood by peers	0,86	0,30	0,84	0,17
It 5. Jokes in an intelligent way	0,83	0,42	0,86	0,14
It 6. Uses rich vocabulary beyond his age	0,78	0,51	0,87	0,13
It 7. Tries to perform the task entrusted by the teacher with great care	0,72	0,59	0,87	0,14
It 8. Is an "expert" in some area of	0,72	0,59	0,87	0,14

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<i>Factorial analysis</i>	RC1	RC2	comm	uni
It 9. Can surprise you with information / knowledge	0,61	0,70	0,87	0,13
It 10. In the face of a new task, analyzes all potential scenarios, anticipating difficulties and threats	0,56	0,74	0,86	0,14
It 11. A slight failure causes the withdrawal of many activities that have been undertaken without any difficulty	0,45	0,79	0,83	0,17
It 12. Before starts task, asks a lot of questions	0,31	0,85	0,82	0,18
It 13. Is creative	0,15	0,88	0,80	0,20
It 14. Likes stability and reproducibility/repetitively in behavior and actions	-0,01	0,87	0,76	0,24
It 15. Easily remembers details and previously experiences	-0,16	0,79	0,65	0,35

<i>IRT Model</i>	Ext1	Ext2	Ext3	Ext4	Dscr
It 3. He can "drill" the topics she/he is interested in with great determination	0,91	2,60	3,76	4,42	2,04
It 4. Has a special sense of humor, often not understood by peers	0,72	2,28	3,36	4,19	1,97
It 5. Jokes in an intelligent way	0,48	1,84	2,73	3,55	2,40
It 6. Uses rich vocabulary beyond his age	0,30	1,58	2,37	3,24	2,71
It 7. Tries to perform the task entrusted by the teacher with great care	0,11	1,58	2,40	3,46	2,85
It 8. Is an "expert" in some area of	-0,06	0,97	1,75	2,85	3,27
It 9. Can surprise you with information/knowledge	-0,26	0,79	1,58	2,57	3,29
It 10. In the face of a new task, analyses all potential scenarios, anticipating difficulties and threats	-0,48	0,38	1,11	2,09	3,70
It 11. A slight failure causes the withdrawal of many activities that have been undertaken without any difficulty	-0,75	0,10	0,85	1,91	3,38
It 12. Before starts task, asks a lot of questions	-1,36	-0,40	0,47	1,63	2,55
It 13. Is creative	-2,56	-1,41	-0,27	1,73	1,50
It 14. Likes stability and reproducibility/repetitively in behaviour and actions	-3,47	-3,09	-1,88	0,71	1,20
It 15. Easily remembers details and previously experiences	-7,33	-6,25	-5,35	-0,54	0,70

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination inde

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Reliability

According to Alfa and Omega indexes, all spheres achieved satisfactory reliability, which was even higher than that of the Highly Sensitive Child (HSC) Scale (see Table 13). The QSPSinCh subscales thus seem to present good accuracy regarding this trait.

Table 13. Reliability for each subscale and total scale

	Alfa	Omega
Physical sphere	0,957	0,811
Emotional sphere	0,956	0,823
Interpersonal sphere	0,960	0,809
Cognitive sphere	0,952	0,832
HSC	0,928	0,724

Note. HSC = Highly Sensitive Child scale

Convergent validity

Table 14 shows that Physical, Emotional, and Interpersonal subscales were strongly correlated with the HSC scale, and the Cognitive subscale presented a moderate correlation. Moreover, our subscales showed moderate correlations with temperament dimensions (emotionality, activity, and sociability). However, as predicted in the literature, our instrument was not measuring shyness according to the negative and weak correlation index. Overall, this means that QSPSinCh measures mostly the same construct.

Table 14. Correlations between subscales and temperament scales

	Physical sphere	Emotional sphere	Interpersonal sphere	Cognitive sphere	HSC
HSC	0,71***	0,59***	0,53***	0,35***	
Emotionality	0,37***	0,52***	0,36***	0,29***	0,40***
Activity	0,28***	0,40***	0,30***	0,12**	0,26***
Sociability	0,31***	0,43***	0,41***	0,06	0,26***
Shyness	-0,16***	-0,22***	-0,11*	-0,13**	-0,25***

Note. HSC = Highly Sensitive Child scale; *p<0.05; **p<0.01; ***p<0.001

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Cut-off points

In order to define the point that determines highly sensitive children based on our scale measurements, we suggest using a percentile criterion. In this way, a mean score value over a percentile of 90 indicates high sensitivity (see Table 15).

Table 15. Percentile scores in each subscale

	P25	P50	P75	P90	P95	P99
Physical sphere	2	3	3	4	4	5
Emotional sphere	2	3	4	4	5	5
Interpersonal sphere	2	3	4	4	5	6
Cognitive sphere	2	3	4	4	5	5

▶ **4.3. Primary School Teacher version**

Factor analysis

The following Tables 16-19 present factorial loadings for items of the Primary School Teacher version responses in each sphere.

In accordance with the Item Response Theory (IRT), in physical and emotional spheres, items 1 to 8 and 15, and items 1 to 6 were removed due to the difficulty index, respectively. Although item 15 of the physical sphere was left unanswered, it was maintained because of the theoretical framework. Likewise, in the interpersonal sphere, items 1, 13 and 14 were removed according to the IRT theory as well. In fact, items 13 and 14 presented a confusing pattern of difficulty index, and item 1 had zero response. In the cognitive sphere, items 1 to 3 and 11 to 13 were also removed.

Table 16. Physical sphere rotated factorial solution and IRT model

Factorial analysis	RC1	RC2	comm	uni
It1. Prefers to be in a quiet environment	-0,19	0,77	0,5	0,5
It2. Loves nice sounds	-0,17	0,82	0,59	0,41
It3. Too hot foods bother her/him	-0,12	0,91	0,77	0,23
It4. Finds intense lights unpleasant	-0,05	0,91	0,81	0,19
It5. Is sensitive to temperature changes	0,03	0,85	0,78	0,22

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Factorial analysis	RC1	RC2	comm	uni
It6. Avoid being in the bright sun	0,16	0,74	0,71	0,3
It7. Badly tolerates tags, scratching materials	0,33	0,6	0,69	0,32
It8. Dislikes certain food textures (e.g. diluted, pasty, lumpy)	0,49	0,48	0,72	0,28
It9. Perceives some flavors very intensely	0,63	0,34	0,76	0,24
It10. Has a particularly sensitive sense of smell	0,73	0,22	0,77	0,23
It11. If experiences something intensely, complains of pain (e.g. headache, stomachache)	0,88	0,03	0,84	0,16
It12. More often than other children, signals a need for rest	0,92	-0,06	0,82	0,18
It13. Badly tolerates dirt, wetting, etc. on clothing or on the hands	0,92	-0,11	0,8	0,21
It14. When many things happen at once, is tired more than other children	0,87	-0,18	0,67	0,33
It15. Easily identifies small changes (or modifications) in the environment/ surroundings	0,79	-0,26	0,51	0,49

IRT Model	Ext1	Ext2	Ext3	Ext4	Dscr
It9. Perceives some flavors very intensely	-1,73	-1,02	1,01	1,81	2,58
It10. Has a particularly sensitive sense of smell	-1,88	-1,14	0,78	1,68	3,39
It11. If experiences something intensely, complains of pain (e.g. headache, stomachache)	-1,86	-1,40	0,29	1,15	4,08
It12. More often than other children, signals a need for rest	-2,11	-1,65	0,08	1,07	3,71
It13. Badly tolerates dirt, wetting, etc. on clothing or on the hands	-2,19	-1,96	-0,34	0,74	3,30
It14. When many things happen at once, is tired more than other children	-4,41	-3,31	-1,04	0,36	1,82
It15. Easily identifies small changes (or modifications) in the environment/ surroundings	NA	NA	NA	NA	NA

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination index

Table 17. Emotional sphere rotated factorial solution and IRT model

Factorial analysis	RC1	RC2	comm	uni
It1. Expresses strong emotions, especially towards loved ones	-0,34	0,82	0,53	0,47
It2. Even small events, everyday situations, can be source of stress for her/ him	-0,2	0,94	0,78	0,22
It3. Needs favourite objects to feel better	-0,08	0,95	0,87	0,13
It4. Is easily embarrassed	0,04	0,89	0,87	0,13
It5. Is worried about the assessment of others	0,16	0,8	0,84	0,16
It6. Has a special loathing for insects	0,29	0,69	0,8	0,2
It7. Has a tendency to pessimistic / unfavourable course of events	0,45	0,54	0,78	0,22
It8. Experiences art very much, e.g. is moved by movies and music	0,63	0,37	0,8	0,2
It9. Has a tendency to accumulate emotions	0,72	0,26	0,83	0,18
It10. It's hard to control strong emotions	0,85	0,09	0,85	0,15
It11. Experiences emotions intensely	-0,92	0	0,88	0,12

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Factorial analysis	RC1	RC2	comm	uni
It12. Doesn't need much to cry, hysteria	-0,97	0,14	0,86	0,15
It13. Fatigue is manifested by aggression	-0,93	0,19	0,75	0,25
It14. When many things happen at once, it stresses him/her more than other children	-0,85	0,23	0,61	0,39

IRT Model	Ext1	Ext2	Ext3	Ext4	Dscr
It7. Has a tendency to pessimistic / unfavourable course of events	-0,16	1,65	2,48	3,34	2,19
It8. Experiences art very much, e.g. is moved by movies and music	-0,24	0,50	1,27	2,21	3,04
It9. Has a tendency to accumulate emotions	-0,30	0,22	0,90	1,84	3,69
It10. It's hard to control strong emotions	-0,42	0,06	0,67	1,63	3,88
It11. Experiences emotions intensely	-0,60	-0,13	0,48	1,29	3,73
It12. Doesn't need much to cry, hysteria	-0,79	-0,34	0,26	1,03	3,21
It13. Fatigue is manifested by aggression	-1,07	-0,70	-0,05	0,65	2,87
It14. When many things happen at once, it stresses him/her more than other children	-1,27	-0,93	-0,44	0,41	2,83

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination index

Table 18. Interpersonal sphere rotated factorial solution and IRT model

Factorial analysis	RC1	RC2	comm	uni
It1. Need more time to establish relationships with peers	0,91	-0,23	0,64	0,36
It2. Needs additional incentives(stimulus) to get involved in the group	0,98	-0,19	0,81	0,19
It3. In a group where a lot is going on, it seems to be temporarily absent	0,97	-0,11	0,89	0,11
It4. Badly tolerates time pressure in situations of evaluation, competition (tests, competitions)	0,89	0,01	0,87	0,13
It5. Public appearances (academies, competitions) cost her/him more than other children	0,83	0,09	0,87	0,13
It6. Rarely signal his/her needs	0,71	0,23	0,85	0,15
It7. Experiences conflicts with peers particularly intensely and for a long time	0,55	0,41	0,86	0,15
It8. Feels guilty even when there is no reason to do so	0,45	0,52	0,87	0,13
It9. The teacher's comments to the group / class are mainly taken to himself/herself	0,28	0,69	0,89	0,11
It10. Reveals some difficult situations and begins to talk about them after a long time	0,12	0,81	0,89	0,11
It11. In relations with others, she/he seems shy	0,02	0,89	0,90	0,10
It12. Approaches newly met people from a distance	-0,12	0,98	0,90	0,10
It13. Doesn't like to be observed	-0,22	1,01	0,85	0,15
It14. Blocks himself/herself when is the centre of attention	-0,21	0,92	0,70	0,30

IRT Model	Ext1	Ext2	Ext3	Ext4	Dscr
It2. Needs additional incentives(stimulus) to get involved in the group	0,371	1,729	3,269	4,654	1,355
It3. In a group where a lot is going on, it seems to be temporarily absent	-0,020	1,161	2,519	4,426	1,828

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<i>IRT Model</i>	Ext1	Ext2	Ext3	Ext4	Dscr
It4. Badly tolerates time pressure in situations of evaluation, competition (tests, competitions)	-0,266	0,730	1,555	2,798	2,163
It5. Public appearances (academies, competitions) cost her/him more than other children	-0,410	0,539	1,287	2,323	2,560
It6. Rarely signal his/her needs	-0,554	0,277	0,904	1,832	3,189
It7. Experiences conflicts with peers particularly intensely and for a long time	-0,683	0,121	0,636	1,515	3,897
It8. Feels guilty even when there is no reason to do so	-0,865	-0,066	0,488	1,305	4,013
It9. The teacher's comments to the group / class are mainly taken to himself/herself	-1,056	-0,293	0,241	1,165	4,027
It10. Reveals some difficult situations and begins to talk about them after a long time	-1,249	-0,447	-0,012	0,926	3,390
It11. In relations with others, she/he seems shy	-1,433	-0,681	-0,216	0,778	2,911
It12. Approaches newly met people from a distance	-1,871	-1,047	-0,556	0,475	2,263

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination index

Table 19. Cognitive sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It1. New situations cause him/her a strong need to search for information, ask questions, dispel doubts	-0,23	0,78	0,53	0,47
It2. Is not satisfied with a superficial and casual answers	-0,03	0,78	0,64	0,36
It3. Is slowly getting used to new people, things and phenomena	0,32	0,63	0,74	0,26
It4. Is overwhelmed by a large amount of information at once	0,48	0,53	0,82	0,19
It5. Asks deep, thought-provoking questions	0,62	0,4	0,84	0,16
It6. He can "drill" the topics she/he is interested in with great determination	0,7	0,33	0,87	0,13
It7. Has a special sense of humour, often not understood by peers	0,78	0,24	0,89	0,11
It8. Jokes in an intelligent way	0,85	0,13	0,89	0,11
It9. Uses rich vocabulary beyond his age	0,89	0,07	0,89	0,11
It10. Tries to perform the task entrusted by the teacher with great care	0,93	-0,01	0,88	0,12
It11. Is an "expert" in some area of	0,99	-0,19	0,85	0,15
It12. Can surprise you with information / knowledge	1	-0,35	0,79	0,21
It13. In the face of a new task, analyses all potential scenarios, anticipating difficulties and threats	0,84	-0,36	0,56	0,45

<i>IRT Model</i>	Ext1	Ext2	Ext3	Ext4	Dscr
It4. Is overwhelmed by a large amount of information at once	-0,203	0,477	1,185	2,423	3,070
It5. Asks deep, thought-provoking questions	-0,259	0,358	0,977	2,340	3,152
It6. He can "drill" the topics she/he is interested in with great determination	-0,412	0,265	0,842	2,108	3,464
It7. Has a special sense of humour, often not understood by peers	-0,544	-0,085	0,339	1,271	4,028

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IRT Model	Ext1	Ext2	Ext3	Ext4	Dscr
It8. Jokes in an intelligent way	-0,817	-0,290	0,113	1,045	3,644
It9. Uses rich vocabulary beyond his age	-0,927	-0,333	-0,026	1,147	3,558
It10. Tries to perform the task entrusted by the teacher with great care	-1,183	-0,594	-0,249	0,690	3,085

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination index

Reliability

All spheres achieved a satisfactory Alfa index. However, despite the fact that Omega indexes were above 0.8 in the interpersonal and cognitive spheres, and were even higher than that of the Highly Sensitive Child (HSC) Scale, the physical and emotional spheres showed lower values (see Table 20). It thus seems that the QSPSinCh subscales presented greater accuracy in terms of interpersonal and cognitive spheres in this trait.

Table 20. Reliability for each subscale and total scale

	Alfa	Omega
Physical sphere	0,93	0,71
Emotional sphere	0,94	0,75
Interpersonal sphere	0,98	0,83
Cognitive sphere	0,95	0,85
HSC	0,95	0,80

Note. HSC = Highly Sensitive Child scale

Convergent validity

As can be seen in Table 21, all subscales presented moderate correlations with the HSC scale. Regarding the temperament scale, the same pattern was found for shyness as there was a negative correlation between our subscales and this subscale. Furthermore, moderate correlations were found between the other temperament dimensions (emotionality, activity, and sociability) and with the QSPSinCh subscales.

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Table 21. Correlations between subscales and temperament scales

	Physical sphere	Emotional sphere	Interpersonal sphere	Cognitive sphere	HSC
HSC	0,52***	0,49***	0,27***	0,35***	
Emotionality	0,32***	0,42***	0,15**	0,34***	0,54***
Activity	0,31***	0,36***	0,34***	0,1	0,24***
Sociability	0,32***	0,47***	0,49***	0,09	0,18**
Shyness	-0,28***	-0,35***	-0,20***	-0,24***	-0,28***

Note. HSC = Highly Sensitive Child scale; **p<0.01; ***p<0.001

Cut-off points

In order to define the point that determines highly sensitive children based on our scale measurements, we suggest using a percentile criterion. In this way, a mean score value over a percentile of 90 indicates high sensitivity (see Table 22).

Table 22. Percentile scores in each subscale

	P25	P50	P75	P90	P95	P99
Physical sphere	3	3	4	5	5	5
Emotional sphere	2	3	4	4	5	5
Interpersonal sphere	2	3	4	5	5	6
Cognitive sphere	3	4	5	5	5	6

4.4. Kindergarten Parent version

Factorial analysis

The following Tables 23-26 present factorial loadings for items of the Kindergarten Parent version responses in each sphere.

In the physical sphere, items 1, 2, 8, 15 and 16 were not accounted for in the IRT model due to the zero frequencies in some of the scale response categories. At the same time, the level of unicity in these items led us to remove it from the scale due to the reduced relationship these items had with the rest of the scale. Moreover, item 9 seemed to be ambiguous in the sub-dimension loading.

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In the emotional sphere, items 1 to 3 and 14 to 16 and in the interpersonal-sphere, items 1, 2, 9, 10, 11 and 16 were removed due to difficulty indexes. Zero frequencies were found for these items.

In the cognitive sphere, items 1, 7, 8 and 13 were also deleted due to difficulty indexes, in which zero responses were found. Although items 6 and 16 had not received any responses, they were maintained because of the theoretical frameworks.

Table 23. Physical sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It1. Has bad noise tolerance	0,73	-0,18	0,43	0,57
It2. Loves nice sounds	0,92	-0,21	0,71	0,29
It3. Too hot foods bother her/him	0,97	-0,16	0,84	0,16
It4. Finds intense lights unpleasant	0,96	-0,08	0,9	0,1
It5. Is sensitive to temperature changes	0,93	-0,02	0,89	0,12
It6. Avoid being in the bright sun	0,83	0,1	0,85	0,15
It7. Dislikes certain food textures (e.g. diluted, pasty, lumpy)	0,75	0,21	0,84	0,16
It8. Perceives some flavors very intensively	0,64	0,34	0,83	0,17
It9. Has a particularly sensitive sense of smell	0,49	0,49	0,8	0,2
It10. If experiences something intensely, complains of pain (e.g. headache, stomach ache)	0,38	0,61	0,82	0,18
It11. More often than other children, signals a need for rest	0,25	0,72	0,84	0,16
It12. Badly tolerates dirt, wetting, etc. on clothing or on the hands	0,08	0,85	0,84	0,16
It13. When many things happen at once, is tired more than other children	-0,04	0,92	0,85	0,15
It14. It is difficult for him to fall asleep, especially after an active day	-0,12	0,92	0,78	0,22
It15. Easily identifies small changes (or modifications) in the environment/surroundings	-0,21	0,87	0,62	0,38
It16. Is happy to try new dishes	-0,24	0,65	0,31	0,69

<i>IRT Model</i>	Ext1	Ext2	Ext3	Ext4	Dscr
It3. Too hot foods bother her/him	0,809	0,960	1,085	1,235	6,508
It4. Finds intense lights unpleasant	0,189	0,557	0,861	1,228	2,668
It5. Is sensitive to temperature changes	-0,519	-0,023	0,388	0,885	1,975
It6. Avoid being in the bright sun	-1,554	-1,051	-0,635	-0,132	1,949
It7. Dislikes certain food textures (e.g. diluted, pasty, lumpy)	-2,197	-1,786	-1,446	-1,035	2,385
It10. If experiences something intensely, complains of pain (e.g. headache, stomach ache)	-0,875	-0,363	0,694	1,404	3,820
It11. More often than other children, signals a need for rest	-1,004	-0,414	0,401	1,085	4,112
It12. Badly tolerates dirt, wetting, etc. on clothing or on the hands	-1,290	-0,786	0,027	0,685	4,019
It13. When many things happen at once, is tired more than other children	-1,779	-1,208	-0,377	0,346	3,240
It14. It is difficult for him to fall asleep, especially after an active day	-2,571	-1,681	-1,016	-0,061	2,253

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination index

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Table 24. Emotional sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It1. Is strongly influenced by the moods and emotions of other people	-0,20	0,81	0,54	0,47
It2. Badly tolerates difficult emotions of others (e.g., sadness, anger, tension)	-0,23	0,96	0,77	0,24
It3. Expresses strong emotions, especially towards loved ones.	-0,14	0,96	0,84	0,16
It4. Even small events, everyday situations, can be source of stress for her/him	-0,02	0,91	0,89	0,11
It5. Needs favourite objects to feel better	0,12	0,81	0,87	0,13
It6. Is easily embarrassed	0,28	0,68	0,84	0,16
It7. Is worried about the assessment of others	0,41	0,54	0,81	0,19
It8. Has a special loathing for insects, e.g. fly, gnat, spider	0,49	0,47	0,82	0,18
It9. Has a tendency to pessimistic / unfavourable course of events	0,60	0,36	0,84	0,16
It10. Experiences art very much, e.g. is moved by movies and music	0,71	0,25	0,86	0,14
It11. Has a tendency to accumulate emotions	0,78	0,17	0,87	0,13
It12. It's hard to control strong emotions	0,91	0,00	0,89	0,11
It13. Experiences emotions intensely	0,95	-0,07	0,88	0,12
It14. Doesn't need much to cry, hysteria	0,97	-0,16	0,81	0,19
It15. Fatigue is manifested by aggression	0,95	-0,23	0,73	0,27
It16. When many things happen at once, it stresses him/her more than other children	0,83	-0,25	0,52	0,48

<i>IRT model</i>	Ext1	Ext2	Ext3	Ext4	Dscr
It4. Even small events, everyday situations, can be source of stress for her/him	0,56	1,33	1,96	2,94	3,28
It5. Needs favourite objects to feel better	0,06	0,98	1,57	2,32	3,61
It6. Is easily embarrassed	-0,38	0,57	1,45	2,26	2,65
It7. Is worried about the assessment of others	0,026	0,864	1,299	2,336	3,084
It8. Has a special loathing for insects, e.g. fly, gnat, spider	-1,17	-0,20	0,70	1,47	2,62
It9. Has a tendency to pessimistic / unfavourable course of events	-0,674	-0,014	0,815	1,769	3,739
It10. Experiences art very much, e.g. is moved by movies and music	-0,912	-0,192	0,533	1,367	3,986
It11. Has a tendency to accumulate emotions	-1,274	-0,504	0,354	1,377	3,752
It12. It's hard to control strong emotions	-1,566	-0,731	0,104	1,052	3,766
It13. Experiences emotions intensely	-1,598	-1,277	-0,146	0,595	4,098

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination index

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Table 25. Interpersonal sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It1. Attaches great importance to how other children assess him/her	0,89	-0,25	0,58	0,42
It2. Needs more time to establish relationships with peers	0,96	-0,19	0,75	0,25
It3. Needs additional incentives(stimulus) to get involved in the group	0,99	-0,13	0,87	0,13
It4. In a group where a lot is going on, it seems to be temporarily absent	0,98	-0,09	0,91	0,09
It5. Badly tolerates time pressure in situations of evaluation, competition (tests, competitions)	0,95	-0,04	0,90	0,10
It6. Public appearances (academies, competitions) cost her/him more than other children	0,86	0,08	0,90	0,10
It7. Rarely signal his/her needs	0,81	0,13	0,90	0,10
It8. Experiences conflicts with peers particularly intensely and for a long time	0,73	0,22	0,88	0,12
It9. The teacher's comments to the group / class are mainly taken to himself/herself	0,63	0,34	0,88	0,12
It10. Reveals some difficult situations and begins to talk about them after a long time	0,46	0,49	0,86	0,14
It11. In relation to others, she/he seems shy	0,36	0,59	0,86	0,14
It12. Approaches newly met people from a distance	0,24	0,70	0,87	0,13
It13. Doesn't like to be observed	0,06	0,85	0,91	0,09
It14. Blocks himself/herself when is the centre of attention	-0,12	0,97	0,92	0,08
It15. Before joins the group, needs more time than peers	-0,20	0,98	0,83	0,17
It16. Reacts disproportionately/exaggerated to criticisms	-0,25	0,94	0,71	0,29

<i>IRT model</i>	Ext1	Ext2	Ext3	Ext4	Dscr
It3. Needs additional incentives(stimulus) to get involved in the group	0,704	1,639	2,698	3,204	3,074
It4. In a group where a lot is going on, it seems to be temporarily absent	0,349	1,124	2,123	2,529	3,540
It5. Badly tolerates time pressure in situations of evaluation, competition (tests, competitions)	-0,093	0,683	1,728	2,311	3,077
It6. Public appearances (academies, competitions) cost her/him more than other children	-0,514	0,397	1,525	2,025	2,730
It7. Rarely signal his/her needs	-0,905	-0,008	1,289	1,716	2,665
It8. Experiences conflicts with peers particularly intensely and for a long time	-1,075	-0,093	1,098	1,556	2,541
It12. Approaches newly met people from a distance	0,233	0,306	0,367	0,440	13,355
It13. Doesn't like to be observed	-0,660	-0,358	-0,108	0,194	3,249
It14. Blocks himself/herself when is the center of attention	-1,711	-1,193	-0,766	-0,248	1,896
It15. Before joins the group, needs more time than peers	-3,070	-2,518	-2,062	-1,511	1,778

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination index

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Table 26. Cognitive sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It 1. Shows signs of tension when starts working on a new task	-0,16	0,78	0,52	0,48
It2. Is strongly attached to his/her way of thinking	-0,16	0,91	0,73	0,27
It3. New situations cause him/her a strong need to search for information, ask questions, dispel doubts	-0,09	0,94	0,83	0,17
It4. Is not satisfied with a superficial and casual answers	-0,03	0,91	0,84	0,16
It5. Is slowly getting used to new people, things and phenomena	0,10	0,82	0,79	0,21
It6. Is overwhelmed by a large amount of information at once	0,39	0,62	0,80	0,20
It7. Asks deep, thought-provoking questions	0,52	0,48	0,79	0,21
It8. He can "drill" the topics she/he is interested in with great determination	0,63	0,38	0,81	0,19
It9. Has a special sense of humour, often not understood by peers	0,71	0,26	0,81	0,19
It10. Jokes in an intelligent way	0,77	0,18	0,80	0,20
It11. Uses rich vocabulary beyond his age	0,84	0,07	0,83	0,17
It12. Tries to perform the task entrusted by the teacher with great care	0,91	-0,04	0,85	0,15
It13. Is an "expert" in some area of	0,97	-0,17	0,86	0,14
It14. Can surprise you with information / knowledge	0,98	-0,23	0,83	0,17
It15. In the face of a new task, analyses all potential scenarios, anticipating difficulties and threats	0,95	-0,24	0,79	0,21
It16. A slight failure causes the withdrawal of many activities that have been undertaken without any difficulty	0,83	-0,20	0,60	0,41

<i>IRT model</i>	Ext1	Ext2	Ext3	Ext4	Dscr
It2. Is strongly attached to his/her way of thinking	0,524	1,525	2,746	3,134	2,744
It3. New situations cause him/her a strong need to search for information, ask questions, dispel doubts	-0,042	0,909	2,085	2,478	3,557
It4. Is not satisfied with a superficial and casual answers	-0,530	0,404	1,810	2,389	3,347
It5. Is slowly getting used to new people, things and phenomena	-1,141	0,038	1,757	2,320	2,403
It6. Is overwhelmed by a large amount of information at once	NA	NA	NA	NA	NA
It9. Has a special sense of humour, often not understood by peers	-0,92	-0,63	0,53	1,65	3,81
It10. Jokes in an intelligent way	-1,23	-0,88	0,20	1,33	3,63
It11. Uses rich vocabulary beyond his age	-1,28	-0,91	-0,29	0,97	4,17
It12. Tries to perform the task entrusted by the teacher with great care	-1,79	-1,57	-0,60	0,68	3,49
It14. Can surprise you with information / knowledge	-2,29	-1,85	-1,00	0,17	2,74
It15. In the face of a new task, analyses all potential scenarios, anticipating difficulties and threats	-2,03	-1,60	-1,02	-0,21	2,96
It16. A slight failure causes the withdrawal of many activities that have been undertaken without any difficulty	NA	NA	NA	NA	NA

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination index

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Reliability

The Alfa parameter indicates that all spheres achieved satisfactory scores. Although Omega indexes were above 0.8 in the emotional and interpersonal spheres, and were higher than that of the Highly Sensitive Child (HSC) Scale, physical, emotional, and cognitive spheres showed lower values (see Table 27). The QSPSinCh subscales presented greater accuracy in the emotional and interpersonal spheres in this trait.

Table 27. Reliability for each subscale and total scale

	Alfa	Omega
Physical sphere	0,95	0,78
Emotional sphere	0,96	0,83
Interpersonal sphere	0,97	0,83
Cognitive sphere	0,95	0,78
HSC	0,91	0,72

Note. HSC = Highly Sensitive Child scale

Convergent validity

Table 28 shows correlations between the HSC, EAS and QSPSinCh dimensions. The physical and emotional QSPSinCh subscales presented strong and significant correlations with the HSC scale. For their part, the interpersonal and cognitive subscales showed moderate correlations with the HSC scale. The temperament scale presented a negative correlation between our subscales and the shyness subscale. Furthermore, moderate correlations were found between the emotionality and sociability temperament dimensions and the QSPSinCh subscales. Finally, the Activity dimension did not correlate with any QSPSinCh subscales.

Table 28. Correlations between subscales and temperament scales

	Physical sphere	Emotional sphere	Interpersonal sphere	Cognitive sphere	HSC
HSC	0,70***	0,64***	0,44***	0,47***	
Emotionality	0,41***	0,45***	0,21**	0,30***	0,36***
Activity	-0,02	-0,06	-0,1	-0,03	-0,05
Sociability	0,33***	0,43***	0,44***	0,37***	0,27***
Shyness	-0,28***	-0,37***	-0,25***	-0,34***	-0,26***

Note. HSC = Highly Sensitive Child scale; **p<0.01; ***p<0.001

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Cut-off points

In order to define the point that determines highly sensitive children based on our scale measurements, we suggest using a percentile criterion. In this way, a mean score value over a percentile of 90 indicates high sensitivity (see Table 29).

Table 29. Percentile scores in each subscale

	P25	P50	P75	P90	P95	P99
Physical sphere	3	3	4	5	5	6
Emotional sphere	2	3	4	5	5	5
Interpersonal sphere	2	3	3	5	5	5
Cognitive sphere	3	4	4	5	5	6

▶ **4.5. Primary School Parent version**

Factorial analysis

The following Tables 30-33 present factorial loadings for items of Primary School Parent version responses in each sphere.

In the physical sphere, items 3 to 6 were maintained because of the IRT model. Other items were removed due to errors in the iterative process. Zero responses were obtained for these items.

Moreover, in the emotional and interpersonal spheres, on the basis of the IRT model, items 1, 2 and 15 were deleted in the first domain, and items 1 and 10 were removed in the second domain. Zero responses were found for these items.

Finally, in the cognitive sphere, items 1 and 13 to 16 were not analysed due to a problem in the model's adjustment. Although item 7 did not receive any responses, it was maintained because of the theoretical frameworks.

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Table 30. Physical sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It1. prefers to be in a quiet environment	0,8	-0,19	0,55	0,46
It2. Has bad noise tolerance	0,93	-0,21	0,73	0,27
It3. Loves nice sounds	0,97	-0,15	0,86	0,14
It4. Too hot foods bother her/him	0,93	-0,01	0,91	0,09
It5. Finds intense lights unpleasant	0,85	0,08	0,86	0,14
It6. Is sensitive to temperature changes	0,71	0,24	0,81	0,19
It7. Is sensitive to some flavours	0,59	0,38	0,81	0,19
It8. Has a particularly sensitive sense of smell	0,43	0,55	0,81	0,19
It9. If experiences something intensely, complains of pain (e.g. headache, stomach ache)	0,35	0,64	0,84	0,17
It10. More often than other children, signals a need for rest	0,18	0,79	0,87	0,13
It11. Badly tolerates dirt, wetting, etc. on clothing or on the hands	0,12	0,81	0,82	0,18
It12. When many things happen at once, is tired more than other children	-0,05	0,92	0,84	0,16
It13. It is difficult for him to fall asleep, especially after an active day	-0,18	0,96	0,78	0,22
It14. Easily identifies small changes (or modifications) in the environment/surroundings	-0,2	0,86	0,61	0,39
It15. Often complains of pain for no apparent reason	-0,24	0,67	0,33	0,67

<i>IRT model</i>	Ext1	Ext2	Ext3	Ext4	Dscr
It3. Loves nice sounds	0,404	0,926	1,544	2,111	3,677
It4. Too hot foods bother her/him	-0,353	0,348	1,290	2,020	3,722
It5. Finds intense lights unpleasant	-0,734	0,204	0,921	1,661	3,800
It6. Is sensitive to temperature changes	-1,339	-0,036	0,843	1,642	2,507

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination index

Table 31. Emotional sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It1. Intense experiences remain in his/her memory for a long time	0,78	-0,22	0,5	0,5
It2. Can empathize with the situation of another child	0,96	-0,25	0,78	0,23
It3. Is strongly influenced by the moods and emotions of other people	0,98	-0,22	0,83	0,17
It4. Expresses strong emotions, especially towards loved ones (emotion puffs up, rebound)	0,93	-0,07	0,87	0,13
It5. Is worried about the assessment of others	0,84	0,08	0,85	0,15
It6. Has a special loathing for insects, e.g. fly, gnat, spider	0,7	0,24	0,8	0,2
It7. Has a tendency to pessimistic / unfavourable course of events	0,65	0,32	0,82	0,18
It8. Experiences art very much, e.g. is moved by movies and music	0,6	0,37	0,8	0,2
It9. Has a tendency to accumulate emotions	0,46	0,51	0,78	0,22
It10. It's hard to control strong emotions	0,29	0,67	0,8	0,2

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<i>Factorial analysis</i>	RC1	RC2	comm	uni
It11. Experiences emotions intensely	0,15	0,8	0,84	0,16
It12. Doesn't need much to cry, hysteria	0,05	0,89	0,88	0,12
It13. Fatigue is manifested by aggression	-0,15	0,98	0,85	0,15
It14. When many things happen at once, it stresses him/her more than other children	-0,2	0,93	0,72	0,28
It15. Can be frightened of own thoughts and imaginations	-0,2	0,75	0,46	0,54

<i>IRT model</i>	Ext1	Ext2	Ext3	Ext4	Dscr
It3. Is strongly influenced by the moods and emotions of other people	0,527	1,125	1,835	2,308	2,800
It4. Expresses strong emotions, especially towards loved ones (emotion puffs up, rebound)	0,030	0,698	1,251	1,926	3,583
It5. Is worried about the assessment of others	-0,400	0,366	0,968	1,625	3,571
It6. Has a special loathing for insects, e.g. fly, gnat, spider	-0,856	0,054	0,691	1,285	3,759
It7. Has a tendency to pessimistic / unfavourable course of events	-1,143	-0,352	0,394	0,848	4,224
It8. Experiences art very much, e.g. is moved by movies and music	-1,459	-0,870	0,101	0,627	3,615
It9. Has a tendency to accumulate emotions	-1,229	-0,767	-0,223	0,587	3,798
It10. It's hard to control strong emotions	-1,485	-1,083	-0,426	0,291	4,172
It11. Experiences emotions intensely	-1,895	-1,390	-0,610	-0,062	4,717
It12. Doesn't need much to cry, hysteria	-2,141	-1,585	-0,842	-0,345	4,812
It13. Fatigue is manifested by aggression	-2,158	-1,705	-1,216	-0,598	5,047
It14. When many things happen at once, it stresses him/her more than other children	-2,721	-2,473	-1,612	-0,904	3,817

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination index

Table 32. Interpersonal sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It1. If has a choice, prefers to spend time alone or with one trusted person	0,89	-0,21	0,62	0,38
It2. Attaches great importance to how other children assess him/her	1	-0,19	0,83	0,17
It3. Need more time to establish relationships with peers	1,01	-0,15	0,91	0,09
It4. Needs additional incentives(stimulus) to get involved in the group	0,99	-0,09	0,93	0,07
It5. In a group where a lot is going on, seems to be temporarily absent	0,94	-0,01	0,94	0,06
It6. Public appearances (academies, competitions) cost her/him more than other children	0,9	0,04	0,92	0,08
It7. Rarely signal his/her needs	0,82	0,14	0,91	0,09
It8. Experiences conflicts with peers particularly intensely and for a long time	0,72	0,25	0,9	0,11
It9. The teacher's comments to the group / class are mainly taken to himself/herself	0,62	0,35	0,88	0,12
It10. Reveals some difficult situations and begins to talk about them after a long time	0,45	0,5	0,84	0,16
It11. In relations with others, she/he seems shy	0,33	0,62	0,86	0,15

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<i>Factorial analysis</i>	RC1	RC2	comm	uni
It12. Approaches newly met people from a distance	0,15	0,79	0,9	0,1
It13. Doesn't like to be observed	0,06	0,87	0,92	0,08
It15. Blocks himself/herself when is the centre of attention	-0,07	0,94	0,9	0,1
It15. Before joins the group, needs more time than peers	-0,22	0,98	0,8	0,2
It16. Reacts disproportionately/exaggerated to criticisms	-0,27	0,92	0,65	0,35

<i>IRT model</i>	Ext1	Ext2	Ext3	Ext4	Dscr
It2. Attaches great importance to how other children assess him/her	1,072	1,897	3,014	3,641	3,175
It3. Need more time to establish relationships with peers	0,596	1,793	2,692	3,236	3,094
It4. Needs additional incentives(stimulus) to get involved in the group	0,377	1,323	1,995	2,643	3,156
It5. In a group where a lot is going on, it seems to be temporarily absent	-0,010	0,815	1,662	2,148	3,675
It6. Public appearances (academies, competitions) cost her/him more than other. children	-0,479	0,260	1,504	1,873	2,965
It7. Rarely signal his/her needs	-1,010	0,144	0,892	1,416	2,568
It8. Experiences conflicts with peers particularly intensely and for a long time	-1,661	-0,479	0,427	1,078	2,020
It9. The teacher's comments to the group / class are mainly taken to himself/herself	-1,268	-0,079	0,485	1,479	2,230
It11. In relations with others, she/he seems shy	-0,615	0,039	0,909	1,742	2,758
It12. Approaches newly met people from a distance	-0,741	0,168	0,883	1,557	3,212
It13. Doesn't like to be observed	-0,890	-0,447	0,403	1,086	4,112
It15. Blocks himself/herself when is the centre of attention	-1,110	-0,592	0,072	0,716	4,278
It15. Before joins the group, needs more time than peers	-1,597	-0,923	-0,354	0,299	3,032
It16. Reacts disproportionately/exaggerated to criticisms	-2,209	-1,557	-1,135	-0,210	2,219

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination index

Table 33. Cognitive sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It1. Shows signs of tension when starts working on a new task	-0,29	0,77	0,51	0,49
It2. Is strongly attached to his/her way of thinking	-0,24	0,88	0,68	0,32
It3. New situations cause him/her a strong need to search for information, ask questions dispel doubts	-0,12	0,89	0,75	0,25
It4. Is not satisfied with a superficial and casual answers	0,06	0,87	0,82	0,18
It5. Is slowly getting used to new people, things and phenomena	0,2	0,79	0,81	0,19
It6. Is overwhelmed by a large amount of information at once	0,33	0,67	0,77	0,23
It7. Asks deep, thought-provoking questions	0,51	0,52	0,77	0,23
It8. He can "drill" the topics she/he is interested in with great determination	0,67	0,36	0,8	0,2
It9. Has a special sense of humour, often not understood by peers	0,72	0,3	0,81	0,19
It10. Jokes in an intelligent way	0,81	0,19	0,84	0,16

4. PSYCHOMETRIC PROPERTIES

Factorial analysis	RC1	RC2	comm	uni
It11. Uses rich vocabulary beyond his age	0,88	0,08	0,86	0,14
It12. Tries to perform the task entrusted by the teacher with great care	0,92	-0,03	0,85	0,15
It13. Is an "expert" in some area of	0,96	-0,13	0,86	0,14
It14. Can surprise you with information / knowledge	0,96	-0,22	0,82	0,18
It15. In the face of a new task, analyses all potential scenarios, anticipating difficulties and threats	0,88	-0,23	0,69	0,31
It16. Easily remembers details and previously experiences	0,77	-0,23	0,51	0,49

IRT model	Ext1	Ext2	Ext3	Ext4	Dscr
It2. Is strongly attached to his/her way of thinking	0,447	1,265	2,338	2,987	2,173
It3. New situations cause him/her a strong need to search for information, ask questions dispel doubts	-0,112	0,597	1,257	2,461	3,563
It4. Is not satisfied with a superficial and casual answers	-0,450	0,323	0,974	1,748	3,828
It5. Is slowly getting used to new people, things and phenomena	-0,674	-0,004	0,730	1,429	3,878
It6. Is overwhelmed by a large amount of information at once	-1,254	-0,391	0,525	1,141	3,556
It7. Asks deep, thought-provoking questions	NA	NA	NA	NA	NA
It8. He can "drill" the topics she/he is interested in with great determination	-1,307	-0,746	0,128	0,836	3,684
It9. Has a special sense of humor, often not understood by peers	-1,320	-0,904	-0,123	0,612	4,232
It10. Jokes in an intelligent way	-1,529	-1,143	-0,310	0,273	4,523
It11. Uses rich vocabulary beyond his age	-1,740	-1,515	-0,504	0,251	3,686
It12. Tries to perform the task entrusted by the teacher with great care	-2,107	-1,711	-0,716	-0,185	3,817

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity; Ext = extreme values
Dscr = Discrimination index

Reliability

Both Alfa and Omega indexes showed that all spheres achieved excellent scores (see Table 34). In fact, all QSPSinCh subscales presented greater accuracy than the HSC scale.

Table 34. Reliability for each subscale and total scale

	Alfa	Omega
Physical sphere	0,95	0,98
Emotional sphere	0,95	0,98
Interpersonal sphere	0,97	0,99
Cognitive sphere	0,94	0,98
HSC	0,93	0,91

Note. HSC = Highly Sensitive Child scale

4. PSYCHOMETRIC PROPERTIES

Convergent validity

Correlations between the HSC, EAS and QSPSInCh dimensions can be observed in Table 35. The physical and emotional QSPSInCh subscales presented strong and significant correlations with the HSC scale. Interpersonal and cognitive subscales had moderate correlations with the HSC scale. The temperament scale indicates negative correlations between our subscales and the shyness subscale. Furthermore, moderate correlations were found between almost all emotionality and sociability temperament dimensions and the QSPSInCh subscales. Finally, the Activity dimension presented a weak correlation with the QSPSInCh subscales.

Table 35. Correlations between the subscales and temperament scales

	Physical sphere	Emotional sphere	Interpersonal sphere	Cognitive sphere	HSC
HSC	0,71***	0,54***	0,49***	0,35***	
Emotionality	0,40***	0,54***	0,31***	0,32***	0,32***
Activity	0,19*	0,29***	0,26***	0,16*	0,25**
Sociability	0,32***	0,49***	0,46***	0,18*	0,29***
Shyness	-0,31***	-0,45***	-0,24**	-0,31***	-0,31***

Note. HSC = Highly Sensitive Child scale; *p<0.05; **p<0.01; ***p<0.001

Cut-off points

In order to define the point that determines highly sensitive children based on our scale measurements, we suggest using a percentile criterion. In this way, a mean score value over a percentile of 90 indicates high sensitivity (see Table 36).

Table 36. Percentile scores in each subscale

	P25	P50	P75	P90	P95	P99
Physical sphere	3	3	4	5	5	6
Emotional sphere	3	4	5	5	5	6
Interpersonal sphere	2	3	4	5	6	6
Cognitive sphere	3	4	5	5	5	6



CORRECTION AND INTERPRETATION NORMS

5.1. Correction norms

5.2. Interpretation norms

5.3. Illustrative cases

Case 1. Highly sensitive child profile

Case 2. Low-medium sensitive child profile



5. CORRECTION AND INTERPRETATION NORMS

5.1. Correction norms

The QSPSinCh allows to obtain the manifestation of sensitivity score across the different physical, emotional, interpersonal, and cognitive spheres. The first step consists of obtaining the raw scores for each QSPSinCh subscale. To generate the score of each subscale, a mean of the items is required. This mean is calculated by adding up the items' scores and dividing the sum by the total number of items. In this way, the score is comprised between 1 and 7.

5.2. Interpretation norms

Once the QSPSinCh has been administered and the scores have been obtained, the next step is to interpret the profile. The following Tables 37-40 show the interpretation of the four spheres (physical, emotional, interpersonal and emotional) for both versions, the Kindergarten and Primary School children questionnaires.

Table 37. Interpretation of the Kindergarten Parent version

Sensitivity Continuum		
Physical sphere		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the physical field are less influenced by subtle odours, sounds, small gestures, changes in the tone of voice and other delicate stimuli.	Children with medium sensitivity in the physical field are moderately influenced by subtle odours, sounds, small gestures, changes in the tone of voice and other delicate stimuli.	Children with high sensitivity in the physical field are strongly influenced by subtle odours, sounds, small gestures, changes in the tone of voice and other delicate stimuli.
They are disturbed to a minimum extent by artificial light, noise, or material texture at home.	They are disturbed to a small extent by artificial light, noise, or material texture at home.	They are disturbed to a significant extent by artificial light, noise, or material texture at home
In individual situations at home, they experience discomfort due to certain tastes.	There are situations at home in which they experience discomfort due to certain tastes.	They often experience discomfort at home due to certain tastes or smells.

5. CORRECTION AND INTERPRETATION NORMS

Sensitivity Continuum		
They feel less overloaded than other children even in ordinary, everyday situations.	They feel more overloaded than other children even in ordinary, everyday situations.	They cope much worse with overload than other children even in ordinary, everyday situations.
They occasionally have difficulties falling asleep (especially after an active day).	From time to time, they have difficulties falling asleep (especially after an active day).	They often have difficulties falling asleep (especially after an active day).
They can tolerate quite well everyday situations when hungry or in mild pain.	They do not tolerate everyday situations very well when hungry or in mild pain.	They cannot tolerate everyday situations when hungry or in mild pain.
Cognitive sphere		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the cognitive field present lower levels of cognitive rigidity, cognitive overload, deep cognitive processing, perfectionism, the need for control and fear/anxiety.	Children with medium sensitivity in the cognitive field present moderate levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need for control and fear/anxiety.	Children with high sensitivity in the cognitive field present high levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need for control and fear/anxiety.
	In some situations, stability and repetitiveness make them feel safe.	In most situations, stability and repetitiveness make them feel safe.
		In most situations, they need more time than other children to become accustomed to new things and phenomena.
They are rarely overwhelmed by a large amount of information, even when given simultaneously.	Situations in which they are overwhelmed by a large amount of information, especially given simultaneously, are moderately difficult for them.	They are often overwhelmed by a large amount of information, especially when given simultaneously.

5. CORRECTION AND INTERPRETATION NORMS

Sensitivity Continuum		
They occasionally analyse topics and issues of their interest with great involvement and curiosity.	They usually analyse topics and issues of their interest with great involvement and curiosity.	In numerous situations, they analyse topics and issues of their interest with great involvement and curiosity.
	They seek to complete tasks entrusted to them with great care.	In most situations, they seek to complete tasks entrusted to them with great care.
From time to time, a minor setback may cause them to withdraw from numerous activities that they previously undertook without difficulty.	A minor setback may cause them to withdraw from numerous activities that they previously undertook without difficulty.	A minor setback may cause them to withdraw from numerous activities that they previously undertook without difficulty.
Emotional sphere		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the emotional field present mildly deep experiences, little expression and somatic manifestation of emotions, low levels of stress, only a reduced attachment to objects and few emotional interactions with nature, art, and animals.	Children with medium sensitivity in the emotional field present moderately deep experiences, moderate expression and somatic manifestation of emotions, medium levels of stress, some attachment to objects and certain emotional interactions with nature, art, and animals.	Children with high sensitivity in the emotional field present intensely deep experiences, intense expression and somatic manifestation of emotions, high levels of stress, attachment to objects and emotional interactions with nature, art, and animals.
They do not usually experience intense emotions and they do not accumulate them.	They experience intense emotions and they accumulate them.	In numerous situations, they experience intense emotions and they accumulate them.
They are prone to anticipating the course of events with optimism.	They may be occasionally prone to being pessimistic and/or viewing the course of events negatively (gloom-mongering).	In most situations, they are prone to being pessimistic and/or viewing the course of events negatively (gloom-mongering).

5. CORRECTION AND INTERPRETATION NORMS

Sensitivity Continuum		
Minor events, everyday situations sometimes become a source of stress (e.g., school trip/nursery school trip).	From time to time, even minor events, everyday situations become a source of stress (e.g., school trip/nursery school trip).	Minor events, everyday situations often become a source of stress (e.g., school trip/nursery school trip).
They do not experience art intensely (e.g., he/she is moved by fairy tales, films, music).		In most situations, they experience art intensely (e.g., he/she is moved by fairy tales, films, music).
They are usually not concerned about the opinions of others, and it is difficult to embarrass them.	They are somewhat unconcerned about the opinions of others, and it is difficult to embarrass them.	They are always concerned about the opinions of others, and it is easy to embarrass them.
They rarely show aversion toward insects.	They show aversion toward insects quite often.	They very often show aversion toward insects.
Interpersonal sphere		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the interpersonal field do not usually feel stress in social situations. In general, they enjoy being in a large group for a long time and they rarely prefer working in small groups or alone.	Children with medium sensitivity in the interpersonal field feel moderate stress in social situations. They do not like having to stay in a large group for a long time very much and sometimes prefer working in small groups or alone.	Children with high sensitivity in the interpersonal field feel intense stress in social situations. They hate being in a large group for a long time and they always prefer working in small groups or alone.
They occasionally need more time than their peers to join group activities, especially within a new group.	They need more time than their peers to join group activities, especially within a new group.	They usually need more time than their peers to join group activities, especially within a new group.
They usually do not need encouragement to join group activities.	Sometimes they need encouragement to join group activities. When they are within a very active group, they may sometimes seem to be absent.	In most situations, they need encouragement to join group activities. When they are within a very active group, they seem absent.

5. CORRECTION AND INTERPRETATION NORMS

Sensitivity Continuum		
They handle time pressure and public speaking quite well.	Sometimes they handle time pressure badly and deal with public speaking worse than other children.	In most situations, they handle time pressure badly and deal with public speaking worse than other children.
They deal with conflicts well.	In some situations, they try to avoid conflicts.	Situations in which they strive to avoid conflicts are very common.
They rarely give an impression of being shy and fearful in relations with others and they approach new acquaintances at a distance.	They give an impression of being shy and fearful in relations with others and they approach new acquaintances at a distance.	They often give an impression of being shy and fearful in relations with others and approach new acquaintances at a distance.

Table 38. Interpretation for Primary School Parent version

Sensitivity Continuum		
<i>Physical sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the physical field are less influenced by subtle odours, sounds, small gestures, changes in the tone of voice and other delicate stimuli.	Children with medium sensitivity in the physical field are moderately influenced by subtle odours, sounds, small gestures, changes in the tone of voice and other delicate stimuli.	Children with high sensitivity in the physical field are strongly influenced by subtle odours, sounds, small gestures, changes in the tone of voice and other delicate stimuli.
They are minimally disturbed by artificial light, noise, or material texture at home.	They are moderately disturbed by artificial light, noise, or material texture at home.	They are significantly disturbed by artificial light, noise, or material texture at home
In individual situations at home, they may experience discomfort due to certain tastes.	There are situations at home in which they experience discomfort due to certain tastes.	They often experience discomfort at home due to certain tastes or smells.

5. CORRECTION AND INTERPRETATION NORMS

Sensitivity Continuum		
Cognitive sphere		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the cognitive field present lower levels of cognitive rigidity, cognitive overload, deep cognitive processing, perfectionism, the need for control and lower fear/anxiety.	Children with medium sensitivity in the cognitive field present moderate levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need for control and fear/anxiety.	Children with high sensitivity in the cognitive field present high levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need for control and fear/anxiety.
	In some situations, stability and repetitiveness make them feel safe.	In most situations, stability and repetitiveness make them feel safe
		In most situations, they need more time than other children to get accustomed to new things and events.
They are rarely overwhelmed by a large amount of information, even when given simultaneously.	Situations in which they are overwhelmed by a large amount of information, especially when given simultaneously, are moderately difficult for them.	They are often overwhelmed by a large amount of information, especially when given simultaneously.
They occasionally analyse topics and issues of their interest with great involvement and curiosity.	They usually analyse topics and issues of their interest with great involvement and curiosity.	In numerous situations, they analyse topics and issues of their interest with great involvement and curiosity.
	They seek to complete tasks entrusted to them with great care.	In most situations, they seek to complete tasks entrusted to them with great care.

5. CORRECTION AND INTERPRETATION NORMS

Sensitivity Continuum		
<i>Emotional sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the emotional field present low levels of deep experiences, little expression and somatic manifestation of emotions, low levels of stress, reduced attachment to objects and few emotional interactions with nature, art, and animals.	Children with medium sensitivity in the emotional field present moderate levels of deep experiences, moderate expression and somatic manifestation of emotions, medium levels of stress, some attachment to objects and certain emotional interactions with nature, art, and animals.	Children with high sensitivity in the emotional field present high levels of deep experiences, intense expression and somatic manifestation of emotions, high levels of stress, attachment to objects and emotional interactions with nature, art, and animals.
They do not usually burst into tears or become hysterical for a trivial reason.	From time to time, they burst into tears and become hysterical for a trivial reason.	They often burst into tears and become hysterical for a trivial reason.
They do not usually experience intense emotions and they do not accumulate them.	They experience intense emotions and they accumulate them.	They experience intense emotions and they accumulate them in numerous situations.
They are prone to anticipating the course of events with optimism.	They may occasionally be prone to anticipating the course of events with pessimism and/or negatively (gloom-mongering).	In most situations, they are prone to anticipating the course of events with pessimism and/or negatively (gloom-mongering).
They experience art intensely (e.g., moved by fairy tales, films, music).		In most situations, they experience art intensely (e.g., moved by fairy tales, films, music).
They occasionally react to the moods and emotions of others.	They react strongly to the moods and emotions of others.	They usually react strongly to the moods and emotions of others.
They are usually not concerned about the opinions of others, and it is difficult to embarrass them.	They are usually concerned about the opinions of others only to a limited extent, and it is difficult to embarrass them.	They are always concerned about the opinions of others, and it is easy to embarrass them.
They rarely show aversion toward insects.	They show aversion toward insects quite often.	They show aversion toward insects very often.

5. CORRECTION AND INTERPRETATION NORMS

Sensitivity Continuum		
<i>Interpersonal sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the interpersonal field do not usually feel stress in social situations. In general, they enjoy being in a large group for a long time and they rarely prefer working in small groups or alone.	Children with medium sensitivity in the interpersonal field feel moderate stress in social situations. They do not like having to stay in a large group for a long time very much and sometimes prefer working in small groups or alone.	Children with high sensitivity in the interpersonal field feel intense stress in social situations. They hate having to be in a large group for a long time and always prefer working in small groups or alone.
They occasionally need more time than their peers to join group activities, especially within a new group	They need more time than their peers to join group activities, especially within a new group.	They usually need more time than their peers to join group activities, especially within a new group.
They usually do not need encouragement to join group activities.	They sometimes need encouragement to join group activities and within a very active group, they may sometimes seem to be absent.	In most situations, they need encouragement to join group activities, and within a very active group, they may seem to be absent.
They handle time pressure and public speaking quite well.	They may sometimes handle time pressure badly and deal with public speaking worse than other children.	In most situations, they handle time pressure badly and deal with public speaking worse than other children.
They deal with conflicts well.	In some situations, they seek to avoid conflicts.	It is common for them to seek to avoid conflict.
They rarely give the impression of being shy and fearful in relations with others. They approach new acquaintances at a distance.	They give an impression of being shy and fearful in relations with others and approach new acquaintances at a distance.	They often give the impression of being shy and fearful in relations with others and approach new acquaintances at a distance.

5. CORRECTION AND INTERPRETATION NORMS

Table 39. Interpretation for the Kindergarten Teacher version

Sensitivity Continuum		
<i>Physical sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the physical field are less influenced by subtle odours, sounds, small gestures, changes in the tone of voice and other delicate stimuli.	Children with medium sensitivity in the physical field are moderately influenced by subtle odours, sounds, small gestures, changes in the tone of voice and other delicate stimuli.	Children with high sensitivity in the physical field are strongly influenced by subtle odours, sounds, small gestures, changes in the tone of voice and other delicate stimuli.
They occasionally perceive tastes intensely.	They occasionally perceive tastes very intensely, dislike certain food textures (e.g., runny, mushy, lumpy).	They occasionally perceive tastes and smells very intensely, dislike certain food textures (e.g., runny, mushy, lumpy).
Occasionally, when experiencing something intensely, they complain of pains (e.g., headaches, stomach-ache) and they signal the need to rest.	When experiencing something intensely, they complain of pain (e.g., headache, stomach-ache) and they signal the need to rest.	They very often experience things intensely, complain of pain (e.g., headache, stomach-ache) and signal the need to rest.
In some situations, when there are many things going on at the same time in a group/class, they get very tired.	In many situations, when there are many things going on at the same time in the class, they get very tired.	When there are usually many things going on in the class at the same time, they get very tired.
<i>Cognitive sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the cognitive field present lower levels of cognitive rigidity, cognitive overload, deep cognitive processing, perfectionism, the need for control and fear/anxiety.	Children with medium sensitivity in the cognitive field present moderate levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need for control and fear/anxiety.	Children with high sensitivity in the cognitive field present high levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need for control and fear/anxiety.

5. CORRECTION AND INTERPRETATION NORMS

Sensitivity Continuum		
They usually cope well with tasks, since they do not mind the amount of information given at once.	In many situations, they ask a lot of questions; they can analyse topics of interest with great involvement and they become “experts”.	They ask a lot of questions very often; they can analyse topics of interest with great involvement and they become “experts”.
They usually undertake tasks without asking additional questions.		They often display a particular sense of humour, joking in an intelligent way.
Emotional sphere		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the emotional field present low levels of deep experiences, little expression and somatic manifestation of emotions, low levels of stress, reduced attachment to objects and few emotional interactions with nature, art, and animals.	Children with medium sensitivity in the emotional field present moderately deep experiences, moderate expression and somatic manifestation of emotions, medium levels of stress, some attachment to objects and certain emotional interactions with nature, art, and animals.	Children with high sensitivity in the emotional field present intensely deep experiences, intense expression and somatic manifestation of emotions, high levels of stress, attachment to objects and emotional interactions with nature, art, and animals.
They do not usually experience intense emotions and they do not accumulate them.	They experience intense emotions and they accumulate them.	They experience intense emotions and they accumulate them in numerous situations.
They are prone to anticipating the course of events with optimism.	They tend to anticipate the course of events pessimistically and/or unfavourably (“gloom-mongering”), though they usually approach issues and tasks optimistically.	They very often tend to predict a pessimistic and/or unfavourable course of events (“gloom-mongering”).
They may sometimes become intensely emotional, and a trivial reason makes them cry or become hysterical.	They may sometimes become intensely emotional, and a trivial reason makes them cry or become hysterical	They often experience emotions very intensely and a trivial reason makes them cry, they get hysterical, and once disappointed, they avoid similar situations, places, events for a long time.

5. CORRECTION AND INTERPRETATION NORMS

Sensitivity Continuum		
They occasionally get stressed when there are many things going on in the group/class at the same time.	They tend to become stressed when there are many things going on in the group/class at the same time.	They tend to get stressed when there are many things going on in the group/class at the same time.
Interpersonal sphere		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the interpersonal field do not usually feel stress in social situations. In general, they enjoy being in a large group for a long time and they rarely prefer working in small groups or alone.	Children with medium sensitivity in the interpersonal field feel moderate stress in social situations. They do not like having to stay in a large group for a long time very much and sometimes prefer working in small groups or alone.	Children with high sensitivity in the interpersonal field feel intense stress in social situations. They hate having to stay in a large group for a long time and they always prefer working in small groups or alone.
They normally handle conflicts with peers well.	They tend to experience conflicts with peers intensely and over a long period of time.	They usually experience conflicts with peers particularly intensely and for a long time, and they feel guilty even without reason.
They sometimes reveal and start to talk about difficult situations experienced at school only after a long time.	They reveal and start to talk about difficult situations experienced at school only after a long time.	They very often reveal and start to talk about difficult situations experienced at school only after a long time.
They give the impression of being bold.	They sometimes give the impression of being shy.	They tend to seem shy in most situations.
They can cope well with being observed.	They often dislike being observed and being the centre of attention in class, and therefore become blocked and overreact to criticism.	They very often dislike being observed and being the centre of attention in class, and therefore become blocked and overreact to criticism.

5. CORRECTION AND INTERPRETATION NORMS

Table 40. Interpretation for Primary School Teacher version

Sensitivity Continuum		
<i>Physical sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the physical field are less influenced by subtle odours, sounds, small gestures, changes in the tone of voice and other delicate stimuli.	Children with medium sensitivity in the physical field are moderately influenced by subtle odours, sounds, small gestures, changes in the tone of voice and other delicate stimuli.	Children with high sensitivity in the physical field are strongly influenced by subtle odours, sounds, small gestures, changes in the tone of voice and other delicate stimuli.
They occasionally perceive tastes and smells intensely.	Sometimes they perceive tastes and smells very intensely.	Sometimes they perceive tastes and smells very intensely.
Occasionally, when experiencing something intensely, they complain of pains (e.g., headaches, stomach-ache) and they signal the need to rest.	When experiencing something intensely, they complain of pain (e.g., headache, stomach-ache) and they signal the need to rest.	They very often experience things intensely, complain of pain (e.g., headache, stomach-ache) and signal the need to rest.
In some situations, when there are many things going on at the same time in a group/class, they get very tired.	In many situations, when there are many things going on at the same time in the class, they get very tired.	When there are many things going on in the class at the same time, they usually get very tired.
<i>Cognitive sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the cognitive field present lower levels of cognitive rigidity, cognitive overload, deep cognitive processing, perfectionism, the need for control and fear/anxiety.	Children with medium sensitivity in the cognitive field present moderate levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need for control and fear/anxiety.	Children with high sensitivity in the cognitive field present high levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need for control and fear/anxiety.

5. CORRECTION AND INTERPRETATION NORMS

Sensitivity Continuum		
	In many situations, they ask a lot of questions; they can analyse topics of interest to them with great involvement.	They often ask a lot of questions, and they can to analyse topics of interest to them with great involvement.
They may sometimes be overwhelmed by the large amount of information given at one time by the teacher.	Sometimes they may be overwhelmed by the large amount of information given at one time by the teacher.	They are usually overwhelmed by the large amount of information given at one time by the teacher.
		They often show a particular sense of humour, joking in an intelligent way, that is often not understood by their peers.
Emotional sphere		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the emotional field present mildly deep experiences, little expression and somatic manifestation of emotions, low levels of stress, reduced attachment to objects and few emotional interactions with nature, art, and animals.	Children with medium sensitivity in the emotional field present moderately deep experiences, moderate expression and somatic manifestation of emotions, medium levels of stress, some attachment to objects and certain emotional interactions with nature, art, and animals.	Children with high sensitivity in the emotional field present intensely deep experiences, intense expression and somatic manifestation of emotions, high levels of stress, attachment to objects and emotional interactions with nature, art, and animals.
They tend to have an optimistic outlook on the course of events.	They may tend to be pessimistic and/or view the course of events unfavourably (“gloom-mongering”), but usually approach issues and tasks optimistically.	They are often pessimistic and/or view the course of events unfavourably (“gloom-mongering”).
They occasionally get intensely emotional, and they may cry or become hysterical for a trivial reason.	Sometimes they may be intensely emotional, and a trivial reason makes them cry or become hysterical.	They experience highly intense emotions, and they cry or become hysterical for a trivial reason.

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Sensitivity Continuum		
They occasionally become stressed when there are many things going on in the group/ classroom at the same time.	They tend to get stressed when there are many things going on in the classroom at the same time.	They tend to get stressed when there are many things going on in the classroom at the same time.
Interpersonal sphere		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the interpersonal field do not usually feel stress in social situations. In general, they enjoy being in a large group for a long time and they rarely prefer working in small groups or alone.	Children with medium sensitivity in the interpersonal field feel moderate stress in social situations. They do not like having to be in a large group for a long time very much and sometimes prefer working in small groups or alone.	Children with high sensitivity in the interpersonal field feel intense stress in social situations. They hate having to be in a large group for a long time and they always prefer working in small groups or alone.
They can usually handle time pressure well (e.g., during a test, competition) and public speaking (assemblies, competitions).	In many situations, they do not tolerate time pressure well (e.g., during a test, competition) and public appearances (school assemblies, competitions) are harder for them than for other children.	They are usually not good at handling time pressure well (e.g., during a test, competition) and public appearances (assemblies, competitions) are harder for them than for other children.
They normally handle conflicts with peers well.	They tend to experience conflicts with peers intensely and over a long period of time.	They tend to experience conflicts with peers intensely and over a long period of time.
They sometimes reveal and start to talk about difficult situations experienced at school only after a long time.	They reveal and start to talk about difficult situations experienced at school only after a long time.	They usually reveal and start to talk about difficult situations experienced at school only after a long time.
They appear to be bold.	Sometimes they keep a distance and appear to be shy when they meet new people at school.	In most situations, they keep a distance and appear to be shy when they meet new people at school.



5.3. Illustrative cases

Case 1. Highly sensitive child profile

ID information:

Gender: Male

Age: 4 years old

Education level: Kindergarten

Version: Teacher version

The scores of the Kindergarten Teacher version of the QSPSinCh are presented below for each of the four spheres.

Table 41. QSPSinCh score summary table. Case 1

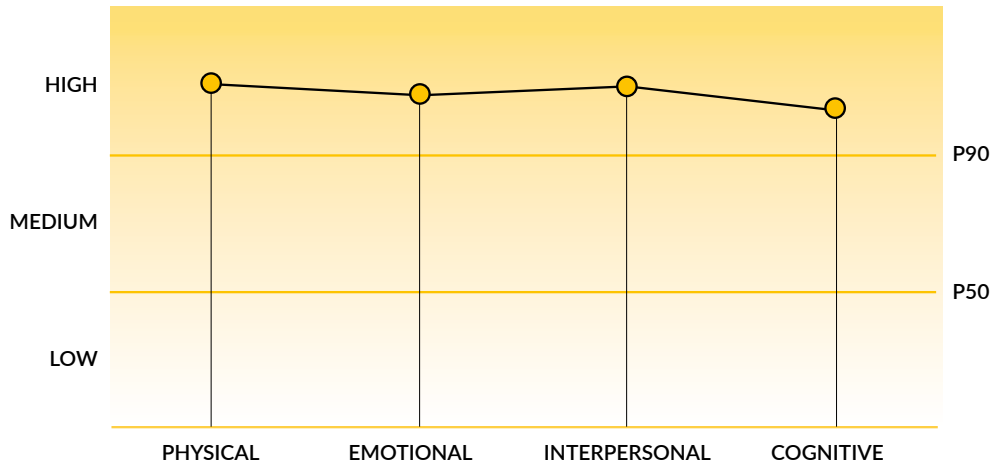
Sphere	Items	Raw score
Physical	1.Has bad noise tolerance	6
	2.Finds intense lights unpleasant	7
	3.Avoids being in the bright sun	5
	4.Badly tolerates tags, scratching materials	5
	5.Dislikes certain food textures (e.g. diluted, pasty, lumpy)	7
	6. Perceives some flavors very intensively	7
	7.If experiences something intensely, complains of pain (e.g. headache, stomach ache)	6
	8.More often than other children, signals a need for rest	5
	9.Badly tolerates dirt, wetting, etc. on clothing or on the hands	6
	10.When many things happen at once, is tired more than other children	7
	11.Easily identifies small changes (or modifications) in the environment/surroundings	5
	12. Often complains of pain for no apparent reason	7
Total mean score = 6,08 >P90		

5. CORRECTION AND INTERPRETATION NORMS

Sphere	Items	Raw score
Emotional	1.Has a special loathing for insects, e.g. fly, gnat, spider	6
	2.Has a tendency to pessimistic / unfavorable course of events	5
	3.Experiences art very much, e.g. is moved by movies and music	5
	4.Has a tendency to accumulate emotions	6
	5.It's hard to control strong emotions	7
	6.Experiences emotions intensely	6
	7.Doesn't need much to cry, hysteria	7
	8.Fatigue is manifested by aggression	5
	9.When many things happen at once, it stresses him/her more than other children	5
	10.Needs more time to feel comfortable in a new place	6
	11.Once disappointed, avoids similar situations, places and events for a long time	7
Total mean score = 5,90 >P90		
Sphere	Items	Raw score
Interpersonal	1.Experiences conflicts with peers particularly intensely and for a long time	7
	2Feels guilty even when there is no reason to do so	6
	3.Reveals some difficult situations and begins to talk about them after a long time	6
	4.In relations with others, she/he seems shy	6
	5.Doesn't like to be observed	5
	6.Blocks himself/herself when is the center of attention	7
	7.Reacts disproportionately/exaggerated to criticisms	5
Total mean score = 6 >P90		
Sphere	Items	Raw score
Cognitive	1.Jokes in an intelligent way	5
	2.Uses rich vocabulary beyond his age	7
	3.Tries to perform the task entrusted by the teacher with great care	5
	4.Is an "expert" in some area of	5
	5.Can surprise you with information / knowledge	6
	6.In the face of a new task, analyzes all potential scenarios, anticipating difficulties and threats	5
	7.A slight failure causes the withdrawal of many activities that have been undertaken without any difficulty	6
	8.Before starts tasks, asks a lot of questions	7
	9. Is creative	5
Total mean score = 5,67 >P90		

5. CORRECTION AND INTERPRETATION NORMS

Figure 1. Highly sensitive 4-year-old child profile



To finish, to interpret the QSPSinCh scores and the indicated profile, see Table 39 above.

Case 2. Low-medium sensitive child profile

ID information:

- Gender: Female
- Age: 8 years old
- Education level: Primary school
- Version: Parent version

The scores of the Primary School Parent version of the QSPSinCh are presented below for each of the four spheres.

Table 42. QSPSinCh score summary table. Case 2

Sphere	Items	Raw score
Physical	1.Loves nice sounds	1
	2.Too hot foods bother her/him	2
	3.Finds intense lights unpleasant	3
	4.Is sensitive to temperature changes	2
Total mean score = 2 ≤P50		

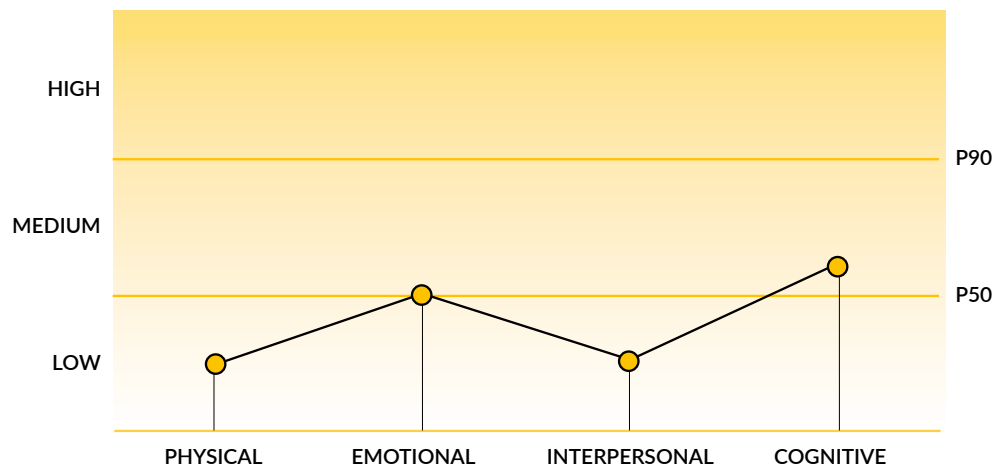
5. CORRECTION AND INTERPRETATION NORMS

Sphere	Items	Raw score
Emotional	1.Is strongly influenced by the moods and emotions of other people	3
	2.Expresses strong emotions, especially towards loved ones (emotion puffs up, rebound)	3
	3.Is worried about the assessment of others	3
	4.Has a special loathing for insects, e.g. fly, gnat, spider	4
	5.Has a tendency to pessimistic / unfavorable course of events	3
	6.Experiences art very much, e.g. is moved by movies and music	3
	7.Has a tendency to accumulate emotions	3
	8.It's hard to control strong emotions	4
	9.Experiences emotions intensely	4
	10.Doesn't need much to cry, hysteria	3
	11.Fatigue is manifested by aggression	4
	12. When many things happen at once, it stresses him/her more than other children	3
P50< Total mean score = 3,33 <P90		
Sphere	Items	Raw score
Interpersonal	1.Attaches great importance to how other children assess him/her	1
	2.Needs more time to establish relationships with peers	2
	3.Needs additional incentives(stimulus) to get involved in the group	3
	4. In a group where a lot is going on, it seems to be temporarily absent	3
	5.Public appearances (academies, competitions) cost her/him more than other children	3
	6.Rarely signals his/her needs	1
	7.Experiences conflicts with peers particularly intensely and for a long time	2
	8.The teacher's comments to the group / class are mainly taken to himself/herself	3
	9.In relations with others, she/he seems shy	2
	10.Approaches newly met people from a distance	3
	11.Doesn't like to be observed	2
	12.Blocks himself/herself when is the center of attention	2
	13.Before joins the group, needs more time than peers	2
	14. Reacts disproportionately/exaggerated to criticisms	1
Total mean score = 2,14 ≤P50		

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Sphere	Items	Raw score
Cognitive	1. Is strongly attached to his/her way of thinking	4
	2. New situations cause him/her a strong need to search for information, ask questions, dispel doubts	4
	3. Is not satisfied with a superficial and casual answers	4
	4. Is slowly getting used to new people, things and phenomena	3
	5. Is overwhelmed by a large amount of information at once.	3
	6. Asks deep, thought-provoking questions	3
	7. He can "drill" the topics she/he is interested in with great determination	4
	8. Has a special sense of humor, often not understood by peers	4
	9. Jokes in an intelligent way	4
	10. Uses rich vocabulary beyond his age	4
	11. Tries to perform the task entrusted by the teacher with great care	4
P50< Total mean score = 3,72 <P90		

Figure 2. Low-medium sensitive 8-year-old child profile



To finish, to interpret the QSPSinCh scores and the indicated profile, see Table 38 above.

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APPENDIX 1

QUESTIONNAIRE ON SENSORY PROCESSING SENSITIVITY IN CHILDREN

Kindergarten Teacher version

Name and surname or initials of child _____

Child's date of birth _____ Sex of child _____

This questionnaire presents statements describing the different characteristics and behaviours of children. Please read each one carefully and indicate to what extent the statement describes your pupil. There are no right or wrong answers because every child is different.

PHYSICAL SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Has bad noise tolerance	1	2	3	4	5	6	7
2. Finds intense lights unpleasant	1	2	3	4	5	6	7
3. Avoids being in the bright sun	1	2	3	4	5	6	7
4. Badly tolerates tags, scratching materials	1	2	3	4	5	6	7
5. Dislikes certain food textures (e.g. diluted, pasty, lumpy)	1	2	3	4	5	6	7
6. Perceives some flavors very intensely	1	2	3	4	5	6	7
7. If experiences something intensely, complains of pain (e.g. headache, stomach ache)	1	2	3	4	5	6	7
8. More often than other children, signals a need for rest	1	2	3	4	5	6	7
9. Badly tolerates dirt, wetting, etc. on clothing or on the hands	1	2	3	4	5	6	7
10. When many things happen at once, is tired more than other children	1	2	3	4	5	6	7
11. Easily identifies small changes (or modifications) in the environment/ surroundings	1	2	3	4	5	6	7
12. Often complains of pain for no apparent reason	1	2	3	4	5	6	7

APPENDIX 1

EMOTIONAL SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Has a special loathing for insects, e.g. fly, gnat, spider	1	2	3	4	5	6	7
2. Has a tendency to pessimistic / unfavorable course of events	1	2	3	4	5	6	7
3. Experiences art very much, e.g. is moved by movies and music	1	2	3	4	5	6	7
4. Has a tendency to accumulate emotions	1	2	3	4	5	6	7
5. It's hard to control strong emotions	1	2	3	4	5	6	7
6. Experiences emotions intensely	1	2	3	4	5	6	7
7. Doesn't need much to cry, hysteria	1	2	3	4	5	6	7
8. Fatigue is manifested by aggression	1	2	3	4	5	6	7
9. When many things happen at once, it stresses him/her more than other children	1	2	3	4	5	6	7
10. Needs more time to feel comfortable in a new place	1	2	3	4	5	6	7
11. Once disappointed, it avoids similar situations, places and events for a long time	1	2	3	4	5	6	7

INTERPERSONAL SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Experiences conflicts with peers particularly intensely and for a long time	1	2	3	4	5	6	7
2. Feels guilty even when there is no reason to do so	1	2	3	4	5	6	7
3. Reveals some difficult situations and begins to talk about them after a long time	1	2	3	4	5	6	7
4. In relations with others, she/he seems shy	1	2	3	4	5	6	7
5. Doesn't like to be observed	1	2	3	4	5	6	7
6. Blocks himself/herself when is the center of attention	1	2	3	4	5	6	7
7. Reacts disproportionately/exaggerated to criticisms	1	2	3	4	5	6	7

APPENDIX 1

COGNITIVE SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Jokes in an intelligent way	1	2	3	4	5	6	7
2. Uses rich vocabulary beyond his age	1	2	3	4	5	6	7
3. Tries to perform the task entrusted by the teacher with great care	1	2	3	4	5	6	7
4. Is an "expert" in some area of	1	2	3	4	5	6	7
5. Can surprise you with information / knowledge	1	2	3	4	5	6	7
6. In the face of a new task, analyzes all potential scenarios, anticipating difficulties and threats	1	2	3	4	5	6	7
7. A slight failure causes the withdrawal of many activities that have been undertaken without any difficulty	1	2	3	4	5	6	7
8. Before starts taks, asks a lot of questions	1	2	3	4	5	6	7
9. Is creative	1	2	3	4	5	6	7

APPENDIX 2

QUESTIONNAIRE ON SENSORY PROCESSING SENSITIVITY IN CHILDREN

Primary School Teacher version

Name and surname or initials of child _____

Child's date of birth _____ Sex of child _____

This questionnaire presents statements describing the different characteristics and behaviours of children. Please read each one carefully and indicate to what extent the statement describes your pupil. There are no right or wrong answers because every child is different.

PHYSICAL SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Perceives some flavors very intensively	1	2	3	4	5	6	7
2. Has a particularly sensitive sense of smell	1	2	3	4	5	6	7
3. If experiences something intensely, complains of pain (e.g. headache, stomach ache)	1	2	3	4	5	6	7
4. More often than other children, signals a need for rest	1	2	3	4	5	6	7
5. Badly tolerates dirt, wetting, etc. on clothing or on the hands	1	2	3	4	5	6	7
6. When many things happen at once, is tired more than other children	1	2	3	4	5	6	7
7. Easily identifies small changes (or modifications) in the environment/ surroundings	1	2	3	4	5	6	7

APPENDIX 2

EMOTIONAL SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Has a tendency to pessimistic / unfavorable course of events	1	2	3	4	5	6	7
2. Experiences art very much, e.g. is moved by movies and music	1	2	3	4	5	6	7
3. Has a tendency to accumulate emotions	1	2	3	4	5	6	7
4. It's hard to control strong emotions	1	2	3	4	5	6	7
5. Experiences emotions intensely	1	2	3	4	5	6	7
6. Doesn't need much to cry, hysteria	1	2	3	4	5	6	7
7. Fatigue is manifested by aggression	1	2	3	4	5	6	7
8. When many things happen at once, it stresses him/her more than other children	1	2	3	4	5	6	7

INTERPERSONAL SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Needs additional incentives(stimulus) to get involved in the group	1	2	3	4	5	6	7
2. In a group where a lot is going on, it seems to be temporarily absent	1	2	3	4	5	6	7
3. Badly tolerates time pressure in situations of evaluation, competition (tests, competitions)	1	2	3	4	5	6	7
4. Public appearances (academies, competitions) cost her/him more than other children	1	2	3	4	5	6	7
5. Rarely signals his/her needs	1	2	3	4	5	6	7
6. Experiences conflicts with peers particularly intensely and for a long time	1	2	3	4	5	6	7
7. Feels guilty even when there is no reason to do so	1	2	3	4	5	6	7
8. The teacher's comments to the group / class are mainly taken to himself/herself	1	2	3	4	5	6	7

APPENDIX 2

9. Reveals some difficult situations and begins to talk about them after a long time	1	2	3	4	5	6	7
10. In relations with others, she/he seems shy	1	2	3	4	5	6	7
11. Approaches newly met people from a distance	1	2	3	4	5	6	7

COGNITIVE SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Is overwhelmed by a large amount of information at once	1	2	3	4	5	6	7
2. Asks deep, thought-provoking questions	1	2	3	4	5	6	7
3. He can "drill" the topics she/he is interested in with great determination	1	2	3	4	5	6	7
4. Has a special sense of humor, often not understood by peers	1	2	3	4	5	6	7
5. Jokes in an intelligent way	1	2	3	4	5	6	7
6. Uses rich vocabulary beyond his age	1	2	3	4	5	6	7
7. Tries to perform the task entrusted by the teacher with great care	1	2	3	4	5	6	7

APPENDIX 3

QUESTIONNAIRE ON SENSORY PROCESSING SENSITIVITY IN CHILDREN

Kindergarten Parent version

Name and surname or initials of child _____

Child's date of birth _____ Sex of child _____

This questionnaire presents statements describing the different characteristics and behaviours of children. Please read each one carefully and indicate to what extent the statement describes your son/daughter". There are no right or wrong answers because every child is different.

PHYSICAL SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Too hot foods bother her/him	1	2	3	4	5	6	7
2. Finds intense lights unpleasant	1	2	3	4	5	6	7
3. Is sensitive to temperature changes	1	2	3	4	5	6	7
4. Avoids being in the bright sun	1	2	3	4	5	6	7
5. Dislikes certain food textures (e.g. diluted, pasty, lumpy)	1	2	3	4	5	6	7
6. If experiences something intensely, complains of pain (e.g. headache, stomach ache)	1	2	3	4	5	6	7
7. More often than other children, signals a need for rest	1	2	3	4	5	6	7
8. Badly tolerates dirt, wetting, etc. on clothing or on the hands	1	2	3	4	5	6	7
9. When many things happen at once, is tired more often than other children	1	2	3	4	5	6	7
10. It is difficult for him to fall asleep, especially after an active day	1	2	3	4	5	6	7

APPENDIX 3

EMOTIONAL SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Even small events, everyday situations, can be source of stress for her / him (e.g. school trip / pre-school exit)	1	2	3	4	5	6	7
2. Needs favourite objects to feel better	1	2	3	4	5	6	7
3. Is easily embarrassed	1	2	3	4	5	6	7
4. Is worried about the assessment of others	1	2	3	4	5	6	7
5. Has a special loathing for insects, e.g. fly, gnat, spider	1	2	3	4	5	6	7
6. Has a tendency to pessimistic / unfavorable course of events	1	2	3	4	5	6	7
7. Experiences art very much, e.g. is moved by movies and music	1	2	3	4	5	6	7
8. Has a tendency to accumulate emotions	1	2	3	4	5	6	7
9. It's hard to control strong emotions	1	2	3	4	5	6	7
10. Experiences emotions intensely	1	2	3	4	5	6	7

INTERPERSONAL SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Needs additional incentives(stimulus) to get involved in the group	1	2	3	4	5	6	7
2. In a group where a lot is going on, it seems to be temporarily absent	1	2	3	4	5	6	7
3. Badly tolerates time pressure in situations of evaluation, competition (tests, competitions)	1	2	3	4	5	6	7
4. Public appearances (academies, competitions) cost her/him more than other children	1	2	3	4	5	6	7
5. Rarely signals his/her needs	1	2	3	4	5	6	7
6. Experiences conflicts with peers particularly intensely and for a long time	1	2	3	4	5	6	7
7. Approaches newly met people from a distance	1	2	3	4	5	6	7
8. Doesn't like to be observed	1	2	3	4	5	6	7
9. Blocks himself/herself when is the center of attention	1	2	3	4	5	6	7
10. Before joins the group, needs more time than peers	1	2	3	4	5	6	7

APPENDIX 3

COGNITIVE SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Is strongly attached to his/her way of thinking	1	2	3	4	5	6	7
2. New situations cause him/her a strong need to search for information, ask questions, dispel doubts	1	2	3	4	5	6	7
3. Is not satisfied with a superficial and casual answers	1	2	3	4	5	6	7
4. Is slowly getting used to new people, things and phenomena	1	2	3	4	5	6	7
5. Is overwhelmed by a large amount of information at once	1	2	3	4	5	6	7
6. Has a special sense of humor, often not understood by peers	1	2	3	4	5	6	7
7. Jokes in an intelligent way	1	2	3	4	5	6	7
8. Uses rich vocabulary beyond his age	1	2	3	4	5	6	7
9. Tries to perform the task entrusted by the teacher with great care	1	2	3	4	5	6	7
10. Can surprise you with information / knowledge	1	2	3	4	5	6	7
11. In the face of a new task, analyzes all potential scenarios, anticipating difficulties and threats	1	2	3	4	5	6	7
12. A slight failure causes the withdrawal of many activities that have been undertaken without any difficulty	1	2	3	4	5	6	7

APPENDIX 4

QUESTIONNAIRE ON SENSORY PROCESSING SENSITIVITY IN CHILDREN

Primary School Parent version

Name and surname or initials of child _____

Child's date of birth _____ Sex of child _____

This questionnaire presents statements describing the different characteristics and behaviours of children. Please read each one carefully and indicate to what extent the statement describes your son/daughter". There are no right or wrong answers because every child is different.

PHYSICAL SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Loves nice sounds	1	2	3	4	5	6	7
2. Too hot foods bother her/him	1	2	3	4	5	6	7
3. Finds intense lights unpleasant	1	2	3	4	5	6	7
4. Is sensitive to temperature changes	1	2	3	4	5	6	7

EMOTIONAL SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Is strongly influenced by the moods and emotions of other people	1	2	3	4	5	6	7
2. Expresses strong emotions, especially towards loved ones (emotion puffs up, rebound)	1	2	3	4	5	6	7
3. Is worried about the assessment of others	1	2	3	4	5	6	7
4. Has a special loathing for insects, e.g. fly, gnat, spider	1	2	3	4	5	6	7

APPENDIX 4

5. Has a tendency to pessimistic / unfavorable course of events	1	2	3	4	5	6	7
6. Experiences art very much, e.g. is moved by movies and music	1	2	3	4	5	6	7
7. Has a tendency to accumulate emotions	1	2	3	4	5	6	7
8. It's hard to control strong emotions	1	2	3	4	5	6	7
9. Experiences emotions intensely	1	2	3	4	5	6	7
10. Doesn't need much to cry, hysteria	1	2	3	4	5	6	7
11. Fatigue is manifested by aggression	1	2	3	4	5	6	7
12. When many things happen at once, it stresses him/her more than other children	1	2	3	4	5	6	7

INTERPERSONAL SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Attaches great importance to how other children assess him/her	1	2	3	4	5	6	7
2. Needs more time to establish relationships with peers	1	2	3	4	5	6	7
3. Needs additional incentives(stimulus) to get involved in the group	1	2	3	4	5	6	7
4. In a group where a lot is going on, it seems to be temporarily absent	1	2	3	4	5	6	7
5. Public appearances (academies, competitions) cost her/him more than other children	1	2	3	4	5	6	7
6. Rarely signals his/her needs	1	2	3	4	5	6	7
7. Experiences conflicts with peers particularly intensely and for a long time	1	2	3	4	5	6	7
8. The teacher's comments to the group / class are mainly taken to himself/herself	1	2	3	4	5	6	7
9. In relations with others, she/he seems shy	1	2	3	4	5	6	7
10. Approaches newly met people from a distance	1	2	3	4	5	6	7
11. Doesn't like to be observed	1	2	3	4	5	6	7
12. Blocks himself/herself when is the center of attention	1	2	3	4	5	6	7
13. Before joins the group, needs more time than peers	1	2	3	4	5	6	7
14. Reacts disproportionately/exaggerated to criticisms	1	2	3	4	5	6	7

APPENDIX 4

COGNITIVE SPHERE

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Is strongly attached to his/her way of thinking	1	2	3	4	5	6	7
2. New situations cause him/her a strong need to search for information, ask questions, dispel doubts	1	2	3	4	5	6	7
3. Is not satisfied with a superficial and casual answers	1	2	3	4	5	6	7
4. Is slowly getting used to new people, things and phenomena	1	2	3	4	5	6	7
5. Is overwhelmed by a large amount of information at once.	1	2	3	4	5	6	7
6. Asks deep, thought-provoking questions	1	2	3	4	5	6	7
7. He can "drill" the topics she/he is interested in with great determination	1	2	3	4	5	6	7
8. Has a special sense of humor, often not understood by peers	1	2	3	4	5	6	7
9. Jokes in an intelligent way	1	2	3	4	5	6	7
10. Uses rich vocabulary beyond his age	1	2	3	4	5	6	7
11. Tries to perform the task entrusted by the teacher with great care	1	2	3	4	5	6	7

APPENDIX 5

DESCRIPTIVE ANALYSES OF ITEMS

Descriptive Analyses of the Kindergarten Teacher version (N=541)

Physical Subscale	Mean	SD
It1. Has bad noise tolerance	1,88	0,89
It2. Finds intense lights unpleasant	2,12	0,96
It3. Avoids being in the bright sun	2,27	1,00
It4. Badly tolerates tags, scratching materials	2,44	1,08
It5. Dislikes certain food textures.	2,64	1,18
It6. Perceives some flavours very intensively	2,86	1,23
It7. Has a particularly sensitive sense of smell	3,03	1,28
It8. If experiences something intensely, complains of pain (e.g. headache, stomach ache)	3,24	1,32
It9. More often than other children, signals a need for rest	3,48	1,39
It10. Badly tolerates dirt, wetting, etc. on clothing or on the hands	3,75	1,42
It11. When many things happen at once, is tired more than other children	4,07	1,51
It12. Easily identifies small changes (or modifications) in the environment/surroundings	4,41	1,56
It13. Often complains of pain for no apparent reason	4,99	1,50
Emotional Subscale	Mean	SD
It 1. Needs favourite objects to feel better	1,60	0,76
It2. Is easily embarrassed	1,95	0,87
It3. Is worried about the assessment of others	2,21	0,95
It4. Has a special loathing for insects, e.g. fly, gnat, spider	2,45	1,09
It5. Has a tendency to pessimistic / unfavourable course of events	2,69	1,23
It6. Experiences art very much, e.g. is moved by movies and music	2,90	1,27
It7. Has a tendency to accumulate emotions	3,13	1,36
It8. It's hard to control strong emotions	3,34	1,44
It9. Experiences emotions intensely	3,57	1,48
It10. Doesn't need much to cry, hysteria	3,83	1,52
It11. Fatigue is manifested by aggression	4,12	1,53
It12. When many things happen at once, it stresses him/her more than other children	4,44	1,57
It13. Needs more time to feel comfortable in a new place	4,83	1,53
It14. Once disappointed, it avoids similar situations, places and events for a long time	5,34	1,37
Interpersonal subscale	Mean	SD
It 1. In the new group, remains an observer for a long time before joining the activity	1,82	0,86
It 2. Needs additional incentives(stimulus) to get involved in the group	2,06	1,01
It 3. In a group where a lot is going on, it seems to be temporarily absent	2,27	1,10
It 4. Badly tolerates time pressure in situations of evaluation, competition (tests, competitions)	2,46	1,18
It 5. Public appearances (academies, competitions) cost her/him more than other children	2,69	1,27
It 6. Rarely signal his/her needs	2,94	1,38

APPENDIX 5

It 7. Experiences conflicts with peers particularly intensely and for a long time	3,11	1,45
It 8. Feels guilty even when there is no reason to do so	3,37	1,53
It 9. Reveals some difficult situations and begins to talk about them after a long time	3,70	1,62
It 10. In relations with others, she/he seems shy	3,97	1,67
It 11. Doesn't like to be observed	4,30	1,69
It 12. Blocks himself/herself when is the centre of attention	4,66	1,69
It 13. Reacts disproportionately/exaggerated to criticisms	5,20	1,59
Cognitive subscale	Mean	SD
It 1. Is overwhelmed by a large amount of information at once	1,82	0,78
It 2. Asks deep, thought-provoking questions	2,05	0,88
It 3. He can "drill" the topics she/he is interested in with great determination	2,24	0,99
It 4. Has a special sense of humor, often not understood by peers	2,47	1,17
It 5. Jokes in an intelligent way	2,67	1,29
It 6. Uses rich vocabulary beyond his age	2,87	1,37
It 7. Tries to perform the task entrusted by the teacher with great care	3,09	1,44
It 8. Is an "expert" in some area of	3,28	1,49
It 9. Can surprise you with information / knowledge	3,50	1,54
It 10. In the face of a new task, analyzes all potential scenarios, anticipating difficulties and threats	3,73	1,54
It 11. A slight failure causes the withdrawal of many activities that have been undertaken without any difficulty	4,01	1,52
It 12. Before starts tasks, asks a lot of questions	4,39	1,45
It 13. Is creative	4,85	1,36
It 14. Likes stability and reproducibility/repetitively in behavior and actions	5,27	1,21
It 15. Easily remembers details and previous experiences	5,76	1,03

Descriptive Analyses for Primary School Teacher version (N=324)

Physical Subscale	Mean	SD
It1. Prefers to be in a quiet environment	2,08	0,96
It2. Loves nice sounds	2,36	1
It3. Too hot foods bother her/him	2,68	1,05
It4. Finds intense lights unpleasant	2,97	1,05
It5. Is sensitive to temperature changes	3,2	1,06
It6. Avoid being in the bright sun	3,44	1,06
It7. Badly tolerates tags, scratching materials	3,73	1,05
It8. Dislikes certain food textures (e.g. diluted, pasty, lumpy)	3,92	1,08
It9. Perceives some flavors very intensively	4,13	1,04
It10. Has a particularly sensitive sense of smell	4,31	1,05
It11. If experiences something intensely, complains of pain (e.g. headache, stomachache)	4,55	1,06
It12. More often than other children, signals a need for rest	4,78	1,09

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It13. Badly tolerates dirt, wetting, etc. on clothing or on the hands	5,05	1,08
It14. When many things happen at once, is tired more than other children	5,36	1,07
It15. Easily identifies small changes (or modifications) in the environment/surroundings	5,8	1,05
Emotional Subscale	Mean	SD
It1. Expresses strong emotions, especially towards loved ones	1,64	0,82
It2. Even small events, everyday situations, can be source of stress for her/him	1,94	0,93
It3. Needs favorite objects to feel better	2,19	1,06
It4. Is easily embarrassed	2,41	1,11
It5. Is worried about the assessment of others	2,62	1,16
It6. Has a special loathing for insects	2,86	1,22
It7. Has a tendency to pessimistic / unfavorable course of events	3,13	1,28
It8. Experiences art very much, e.g. is moved by movies and music	3,43	1,39
It9. Has a tendency to accumulate emotions	3,72	1,45
It10. It's hard to control strong emotions	3,98	1,48
It11. Experiences emotions intensely	4,33	1,46
It12. Doesn't need much to cry, hysteria	4,68	1,42
It13. Fatigue is manifested by aggression	5,08	1,34
It14. When many things happen at once, it stresses him/her more than other children	5,52	1,21
Interpersonal subscale	Mean	SD
It1. Need more time to establish relationships with peers	1,92	0,99
It2. Needs additional incentives(stimulus) to get involved in the group	2,16	1,13
It3. In a group where a lot is going on, it seems to be temporarily absent	2,36	1,21
It4. Badly tolerates time pressure in situations of evaluation, competition (tests, competitions)	2,66	1,4
It5. Public appearances (academies, competitions) cost her/him more than other children	2,86	1,45
It6. Rarely signal his/her needs	3,11	1,53
It7. Experiences conflicts with peers particularly intensely and for a long time	3,35	1,59
It8. Feels guilty even when there is no reason to do so	3,54	1,63
It9. The teacher's comments to the group / class are mainly taken to himself/herself	3,77	1,64
It10. Reveals some difficult situations and begins to talk about them after a long time	4,01	1,67
It11. In relations with others, she/he seems shy	4,26	1,69
It12. Approaches newly met people from a distance	4,58	1,67
It13. Doesn't like to be observed	4,94	1,62
It14. Blocks himself/herself when is the center of attention	5,37	1,48
Cognitive subscale	Mean	SD
It1. New situations cause him/her a strong need to search for information, ask questions, dispel doubts	2,06	0,88
It2. Is not satisfied with a superficial and casual answers	2,45	1,03
It3. Is slowly getting used to new people, things and phenomena	2,99	1,26
It4. Is overwhelmed by a large amount of information at once	3,38	1,42
It5. Asks deep, thought-provoking questions	3,71	1,53
It6. He can "drill" the topics she/he is interested in with great determination	3,94	1,58

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It7. Has a special sense of humor, often not understood by peers	4,19	1,63
It8. Jokes in an intelligent way	4,49	1,62
It9. Uses rich vocabulary beyond his age	4,72	1,63
It10. Tries to perform the task entrusted by the teacher with great care	4,95	1,6
It11. Is an "expert" in some area of	5,28	1,44
It12. Can surprise you with information / knowledge	5,63	1,24
It13. In the face of a new task, analyzes all potential scenarios, anticipating difficulties and threats	6,08	1,08

Descriptive Analyses for Parent version in Kindergarten education (N=204)

Physical Subscale	Mean	SD
It1. Has bad noise tolerance	1,36	0,66
It2. Loves nice sounds	1,74	1,06
It3. Too hot foods bother her/him	2,01	1,2
It4. Finds intense lights unpleasant	2,29	1,27
It5. Is sensitive to temperature changes	2,52	1,34
It6. Avoid being in the bright sun	2,84	1,46
It7. Dislikes certain food textures (e.g. diluted, pasty, lumpy)	3,2	1,56
It8. Perceives some flavours very intensively	3,48	1,56
It9. Has a particularly sensitive sense of smell	3,8	1,53
It10. If experiences something intensely, complains of pain (e.g. headache, stomach ache)	4,12	1,47
It11. More often than other children, signals a need for rest	4,45	1,49
It12. Badly tolerates dirt, wetting, etc. on clothing or on the hands	4,88	1,46
It13. When many things happen at once, is tired more than other children	5,29	1,35
It14. It is difficult for him to fall asleep, especially after an active day	5,73	1,19
It15. Easily identifies small changes (or modifications) in the environment/surroundings	6,27	0,96
It16. Is happy to try new dishes	6,68	0,6
Emotional Subscale	Mean	SD
It1. Is strongly influenced by the moods and emotions of other people	1,43	0,79
It2. Badly tolerates difficult emotions of others (e.g., sadness, anger, tension)	1,7	0,98
It3. Expresses strong emotions, especially towards loved ones.	1,97	1,09
It4. Even small events, everyday situations, can be source of stress for her/him	2,23	1,21
It5. Needs favorite objects to feel better	2,49	1,36
It6. Is easily embarrassed	2,78	1,42
It7. Is worried about the assessment of others	3,16	1,49
It8. Has a special loathing for insects, e.g. fly, gnat, spider	3,5	1,53
It9. Has a tendency to pessimistic / unfavourable course of events	3,86	1,56
It10. Experiences art very much, e.g. is moved by movies and music	4,15	1,53
It11. Has a tendency to accumulate emotions	4,41	1,51

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It12. It's hard to control strong emotions	4,74	1,46
It13. Experiences emotions intensely	5,03	1,41
It14. Doesn't need much to cry, hysteria	5,38	1,31
It15. Fatigue is manifested by aggression	5,75	1,22
It16. When many things happen at once, it stresses him/her more than other children	6,2	1,07
Interpersonal subscale	Mean	SD
It1. Attaches great importance to how other children assess him/her	1,52	0,77
It2. Need more time to establish relationships with peers	1,81	1,03
It3. Needs additional incentives(stimulus) to get involved in the group	2,11	1,18
It4. In a group where a lot is going on, it seems to be temporarily absent	2,26	1,24
It5. Badly tolerates time pressure in situations of evaluation, competition (tests, competitions)	2,42	1,32
It6. Public appearances (academies, competitions) cost her/him more than other children	2,64	1,40
It7. Rarely signal his/her needs	2,83	1,46
It8. Experiences conflicts with peers particularly intensely and for a long time	3,08	1,50
It9. The teacher's comments to the group / class are mainly taken to himself/herself	3,30	1,57
It10. Reveals some difficult situations and begins to talk about them after a long time	3,55	1,59
It11. In relations with others, she/he seems shy	3,80	1,58
It12. Approaches newly met people from a distance	4,06	1,60
It13. Doesn't like to be observed	4,43	1,60
It14. Blocks himself/herself when is the center of attention	4,78	1,58
It15. Before joins the group, needs more time than peers	5,18	1,43
It16. Reacts disproportionately/exaggerated to criticisms	5,62	1,36
Cognitive subscale	Mean	SD
It 1. Shows signs of tension when starts working on a new task	1,87	0,95
It2. Is strongly attached to his/her way of thinking	2,24	1,12
It3. New situations cause him/her a strong need to search for information, ask questions, dispel doubts	2,59	1,20
It4. Is not satisfied with a superficial and casual answers	2,89	1,23
It5. Is slowly getting used to new people, things and phenomena	3,23	1,29
It6. Is overwhelmed by a large amount of information at once	3,60	1,28
It7. Asks deep, thought-provoking questions	3,90	1,28
It8. He can "drill" the topics she/he is interested in with great determination	4,22	1,33
It9. Has a special sense of humor, often not understood by peers	4,50	1,33
It10. Jokes in an intelligent way	4,82	1,35
It11. Uses rich vocabulary beyond his age	5,13	1,35
It12. Tries to perform the task entrusted by the teacher with great care	5,40	1,21
It13. Is an "expert" in some area of	5,62	1,18
It14. Can surprise you with information / knowledge	5,83	1,10
It15. In the face of a new task, analyzes all potential scenarios, anticipating difficulties and threats	6,02	1,06
It16. A slight failure causes the withdrawal of many activities that have been undertaken without any difficulty	6,33	0,91

APPENDIX 5

Descriptive Analyses for Primary School Parent version (N=168)

Physical Subscale	Mean	SD
It1. prefers to be in a quiet environment	1,52	0,94
It2. Has bad noise tolerance	1,81	1,15
It3. Loves nice sounds	2,13	1,28
It4. Too hot foods bother her/him	2,45	1,39
It5. Finds intense lights unpleasant	2,68	1,48
It6. Is sensitive to temperature changes	3,04	1,50
It7. Is sensitive to some flavors	3,40	1,55
It8. Has a particularly sensitive sense of smell	3,79	1,62
It9. If experiences something intensely, complains of pain (e.g. headache, stomach ache)	4,17	1,65
It10. More often than other children, signals a need for rest	4,54	1,66
It11. Badly tolerates dirt, wetting, etc. on clothing or on the hands	4,90	1,60
It12. When many things happen at once, is tired more than other children	5,35	1,56
It13. It is difficult for him to fall asleep, especially after an active day	5,79	1,30
It14. Easily identifies small changes (or modifications) in the environment/surroundings	6,18	1,06
It15. Often complains of pain for no apparent reason	6,66	0,67
Emotional Subscale	Mean	SD
It1. Intense experiences remain in his/her memory for a long time	1,55	0,98
It2. Can empathize with the situation of another child	1,97	1,24
It3. Is strongly influenced by the moods and emotions of other people	2,27	1,44
It4. Expresses strong emotions, especially towards loved ones (emotion puffs up, rebound)	2,66	1,56
It5. Is worried about the assessment of others	3,03	1,66
It6. Has a special loathing for insects, e.g. fly, gnat, spider	3,49	1,72
It7. Has a tendency to pessimistic / unfavorable course of events	3,87	1,79
It8. Experiences art very much, e.g. is moved by movies and music	4,19	1,72
It9. Has a tendency to accumulate emotions	4,55	1,66
It10. It's hard to control strong emotions	4,97	1,58
It11. Experiences emotions intensely	5,38	1,47
It12. Doesn't need much to cry, hysteria	5,69	1,35
It13. Fatigue is manifested by aggression	6,02	1,26
It14. When many things happen at once, it stresses him/her more than other children	6,31	1,05
It15. Can be frightened of own thoughts and imaginations	6,62	0,71
Interpersonal subscale	Mean	SD
It1. If has a choice, prefers to spend time alone or with one trusted person	1,58	1,00
It2. Attaches great importance to how other children assess him/her	1,91	1,35
It3. Need more time to establish relationships with peers	2,18	1,52
It4. Needs additional incentives(stimulus) to get involved in the group	2,37	1,63
It5. In a group where a lot is going on, it seems to be temporarily absent	2,58	1,68
It6. Public appearances (academies, competitions) cost her/him more than other. Children	2,72	1,73

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It7. Rarely signal his/her needs	2,97	1,84
It8. Experiences conflicts with peers particularly intensely and for a long time	3,17	1,90
It9. The teacher's comments to the group / class are mainly taken to himself/herself	3,45	1,93
It10. Reveals some difficult situations and begins to talk about them after a long time	3,80	1,91
It11. In relations with others, she/he seems shy	4,07	1,91
It12. Approaches newly met people from a distance	4,42	1,85
It13. Doesn't like to be observed	4,69	1,74
It15. Blocks himself/herself when is the center of attention	5,07	1,68
It15. Before joins the group, needs more time than peers	5,46	1,54
It16. Reacts disproportionately/exaggerated to criticisms	5,96	1,33
Cognitive subscale	Mean	SD
It1. Shows signs of tension when starts working on a new task	1,73	0,91
It2. Is strongly attached to his/her way of thinking	2,16	1,15
It3. New situations cause him/her a strong need to search for information, ask questions dispel doubts	2,61	1,3
It4. Is not satisfied with a superficial and casual answers	3,02	1,44
It5. Is slowly getting used to new people, things and phenomena	3,44	1,53
It6. Is overwhelmed by a large amount of information at once	3,89	1,6
It7. Asks deep, thought-provoking questions	4,28	1,59
It8. He can "drill" the topics she/he is interested in with great determination	4,72	1,46
It9. Has a special sense of humor, often not understood by peers	4,98	1,48
It10. Jokes in an intelligent way	5,3	1,44
It11. Uses rich vocabulary beyond his age	5,55	1,38
It12. Tries to perform the task entrusted by the teacher with great care	5,82	1,32
It13. Is an "expert" in some area of	6,04	1,15
It14. Can surprise you with information / knowledge	6,3	1,01
It15. In the face of a new task, analyzes all potential scenarios, anticipating difficulties and threats	6,47	0,92
It16. Easily remembers details and previously experiences	6,67	0,78

ACRONYMS

SPS	Sensory Processing Sensitivity
HS	High sensitivity
HSP	Highly sensitive person/persons/people
HSC	Highly sensitive child/children
EAS	Temperament Survey for Children
QSPSinCh	Questionnaire on Sensory Processing Sensitivity in Children
LST	Low Sensory Threshold
EOE	Ease of Excitation
AES	Aesthetic Sensitivity
USA	United States of America
UK	United Kingdom
EFA	Exploratory factorial analysis
IRT	Item Response Theory

MANUAL

ON HOW TO APPLY, CORRECT AND INTERPRET THE

QUESTIONNAIRE OF SENSORY PROCESSING SENSITIVITY IN CHILDREN



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