

QUESTIONNAIRE OF SENSORY PROCESSING SENSITIVITY IN CHILDREN APPLICATION, CORRECTION AND INTERPRETATION MANUAL

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1. GENERAL DESCRIPTION

1.1. Main characteristics of the manual

The Questionnaire of Sensory Processing Sensitivity in Children (QSPSinCh) is a questionnaire designed to measure the personality trait of sensory processing sensitivity (SPS) of children who are between 3 and 10 years old. SPS is a phenotypic personality trait which is characterized by a deep information process of the environment at cognitive, sensory and emotional levels. SPS has a wide variety of levels, classifying individuals as low, medium and high sensitivity level (Greven et al., 2019). Thus, SPS is a phenomenon which has a great influence on different life areas (Acevedo, 2020).

The questions of the questionnaire are answered by the adult carers of the child. The questionnaire has been developed in a parent version and a teacher version. Due to the specificity of functioning of the child at a preschool and early school age, four versions of the questionnaire were developed:

- Questionnaire of Sensitivity of Sensory Processing in Children – kindergarten teachers’ version (Appendix 1).
- Questionnaire of Sensory Processing Sensitivity in Children – primary school teachers’ version (Appendix 2)
- Questionnaire of Sensory Processing Sensitivity in Children – kindergarten parents’ version (Appendix 3)
- Questionnaire of Sensory Processing Sensitivity in Children – primary school parents’ 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 the QSPSinCh items varies from 33 to 42, depending on the version of the questionnaire (see Table 1). It is scored on a 7-point Likert-type scale. The HSCS is composed by four domains examining the physical, emotional, interpersonal and cognitive sphere affected by sensitive trait. Four versions of the questionnaire are available, two of them for parents (kindergarten and primary education) and the other two for teachers

(kindergarten and primary education). The four versions follow the same structure as displayed in Table 1.

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

Sphere	Description	Number of items			
		Parents' version		Teachers' version	
		Kindergarten	Primary	Kindergarten	Primary
Physical	It assesses the manifestation of children's functioning related to physical aspects such as noises, smells or lights.	10	4	12	7
Emotional	It assesses the manifestation of children's functioning related to emotional aspects such as empathy, emotional processes and self-regulation.	10	12	11	8
Interpersonal	It 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	It 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 the material, noise, as well as internal stimuli such as pain or hunger) it was decided to develop a method allowing to identify a trait on the basis of behaviors occurring in everyday life situations. It was assumed that the trait can be an object of observation and therefore can be measured and based on its quantitative characteristics a diagnosis can be made (in the sense of positive or functional diagnosis).

The present application, correction and interpretation manual includes different sections. First, a sensory processing sensitivity theoretical description and its implications in life areas (chapter 1, General description) are included. Second, indications about the procedure to make an adequate application and correction (chapter 2, Application and Correction Norms) are introduced. Third, a guide to an interpretation with illustrative cases for a better understanding of the obtained results after questionnaire administration (chapter 3, Interpretation Norms) is included. Finally, an initial analysis of the construction and development procedure of QSPSinCh questionnaire and the psychometric properties (including reliability, validity and factor analysis) is presented in chapter 4. It obeys the need to find reliable and valid methods to measure the wide spectrum of SPS.

The publication of this manual will contribute to research in the sensitive processing topic and the suitable comprehension of the assessment of SPS in childhood, in order to develop and design educational programs according to the profiles obtained of SPS.

A description of sensory processing sensitivity and its manifestation on 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 analyzing of the 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 & Uziel, 2020; Ogawa et al., 2019; Pluess, 2015). In recent decades, the SPS has been determined from some studies as a phenotypic trait featured by a more deeply 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 analyze environmental stimuli. This way of information processing allows adaptation to the context for a necessary survival (Pluess et al., 2018). However, significant differences have been observed in the way in which people react to environmental stimuli, with some individuals having greater sensitivity to them, despite the existence of a neurobiological predisposition oriented to the development of 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 IJzendoorn, 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 ease of overstimulation (Acevedo et al., 2014; 2018; Aron, Aron & Jagiellowicz, 2012; Goldberg & Scharf, 2020; Homberg, Schubert, Asan & Aron, 2016; Pluess, 2015).

In addition, from a developmental psychology framework, it is proposed the *Differential Susceptibility* theory (Belsky & Pluess, 2009; Pluess & Belsky, 2015). Individual differences in environmental sensitivity entail two alternative strategies: plasticity and adaptation. According to this biological approach, genes are involved in environmental sensitivity and could make people more vulnerable to context stimulus (Pluess & Belsky, 2015). Recent neurobiological studies have identified several physiological markers of highly sensitivity (Belsky & Pluess, 2016). Thus, it has been demonstrated a significant role of neurotransmitters (serotonin and dopamine) in SPS (Chen et al., 2011; Licht, Mortensen & Knudsen, 2011). Some studies using Functional Magnetic Resonance Image (fMRI) and

voxel-based morphometry (VBM) present the accuracy of detecting subtle changes in the highly sensitive brain (Wu, Zhang, Li, Feng & Yan, 2021). These neuroimaging techniques point out the increasing reaction time and activation of brain areas which deal with high-order visual processing and attention, even also implying affective and cognitive processes (Jagiellowicz et al., 2010; Wu et al., 2021). Specifically, it has been observed that some brain regions are 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 reactivity to environment. This theory determines that some individuals with higher response to stress are more susceptible to suffer from negative consequences when they are involved in negative environments (Ellis & Boyce, 2011).

Other studies about Temperament and Personality traits fairly confirm, from *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 related to the Extraversion domain of personality (Lionetti et al., 2018; Pluess et al., 2017). Thus, highly sensitive populations present behavior difficulties when they are involved in adverse environments, but also positive outcomes experiencing life positive events (Booth, Standage & Fox, 2015; Kibe, Suzuki, Hirano & Boniwell, 2020).

1.2.1. Physical sphere

As aforementioned, highly sensitive people are more reactive to both external and internal stimuli (Meyerson et al., 2020). Firstly, regarding external physical reactivity, contemporary research reports that Highly Sensitive People (HSP) are able to perceive subtle stimulations such as slight odors, sounds, small gestures, changes in the tone of voice and other delicate stimuli (Acevedo, 2020; Meyer & Carver, 2000). Indeed, highly sensitive brain is featured by the avoiding due to the perception of threats that may attack their health and survival, so that this skill allows HSP people be more alert to opportunities, resources and

rewards (Acevedo, 2020; Aron et al., 2012). Previous physiological studies state that HSP present a lower sensitivity threshold so that they are more endowed with coping skills for environment changes even more quickly and adaptatively than non-HSP. Thus, this personality trait could imply a risk factor but even a protective one in response to hostile environment (Hartman & Belsky, 2018; Jagiellowicz, Zarinafsar & Acevedo, 2020).

Considering internal physical reactivity, studies confirm that HSP could suffer from physical fatigue decreasing their physical-health quality of life, especially in highly stimulating contexts during a long period of time with no rest (Pérez-Chacón, Chacón, Borda-Mas & Avargues-Navarro, 2021). In this regard, they usually pay attention to every perceived stimulus in order to answer as fast and adequately as possible (Acevedo, 2020), increasing their sensorial and physical fatigue. Indeed, HSP present more frequently or intensively bodily sensations, such as hunger or pain, than non-HSP (Rappaport & Corbally, 2018). Additionally, it is relevant to emphasize the existence of physiological differences in stress-response systems and self-perceived stress, predisposing for physical symptoms (Benham, 2006; Greven & Homberg, 2020; Meyerson et al., 2020). In fact, highly sensitive brain is also related to the hyperarousability, which produces physiological disturbances such as higher cortisol production, arterial pressure and immune reactivity in HSP (Engel-Yeger et al., 2017).

Although HSP could present reactions of physical discomfort to the environment and difficulties to sleep, these individuals may be exceptionally well-developed sensory perception abilities (Acevedo, 2020).

1.2.2. Cognitive sphere

Specific characteristics of HSP are related to this area such as cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need of control and fear/anxiety thoughts (Weyn et al., 2019). Nevertheless, it is gradually recognizing that the neural plasticity inherent of SPS may breed positive attributes to HSP, such as enhanced creativity, awareness and openness (Bridges & Schendan, 2019; Jagiellowicz et al., 2020). In addition, high sensitivity is extremely related to sleep and HSP 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, research reports that HSP could experience an increase of excitability of the hypothalamic-pituitary-adrenal axis that implies sleep quality disturbances (Engel-Yeger et al., 2017; Zald, 2003).

HSP could remark the ability of detecting subtleties and memorizing a large number of details of observed events, situations, phenomena and also paying attention to the less obvious elements of a situation which may be irrelevant for non-HSP; usually due to 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 with the ability of drawing conclusions from experiences in order to increase efficacy too (Acevedo et al., 2014).

It is important to highlight that some cognitive factors related to attention, inhibitory control and self-regulation behavior may moderate the effects of HSP's temperament. Also, HS children who present high levels of behavioral inhibition exhibit a greater monitoring of performance, being at lower risk for developing emotional problems and it is connected with positive mental health outcomes (Boeke, Moscarello, LeDoux, Phelps & Hartley, 2017; Jagiellovicz et al., 2020; McDermott & Fox, 2010; Rothbart, Ellis, Rueda & Posner, 2003; Eisenberg, Downs, Golberstein & Zivin, 2009; White, McDermott, Degnan, Henderson & Fox, 2011). Therefore, HSP can achieve a better contentiousness of the long-term consequences of their own actions (Botenberg & Warryen, 2016). However, it is also known that high sensitivity is associated with daily activity performance dysfunctions impacting on executive functioning and altering action management (Engel-Yeger & Rosenblum, 2021). This may increase levels of stress while doing some cognitive tasks; but even showing more distressed performing in tricky perceptual ones (Gerstenberg, 2012). Hence, when the HSP's arousal increases, they could tend to avoid situations, since they require low intensity stimuli to react (Dunn, 1997; Engel-Yeger et al., 2016)..

In addition, other positive aspects of this trait are analyzing and seeking dependencies, searching for similarities between the current experience and previous ones, creating coping strategies, and the use of comparisons and figurative schemes (Dean, Little,

Tomchek & Dunn, 2018). However, processing of too many options implies some difficulties in decision-making (Acevedo, 2020; Greven et al., 2019). Despite the advantages, HSP are prone to get mental health and cognitive fatigue (Engel-Yeger et al., 2019; Jagiellovicz et al., 2020).

In a propitious environment, HS children achieve better grades in school, have more constructive moral attitudes and they can make use of a more complicated vocabulary than their peers do (Aron, 2002; Pluess & Belsky, 2013). Hence, some authors indicate that they do 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

This field results in 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 and negative affect and poor self-regulation are indeed found out as some reactions of emotions (Acevedo, 2020; Engel-Yeger & Dunn, 2011). SPS levels are significantly related to socioemotional well-being, manifested as a low self-esteem and shame, since they feel scared of being misunderstood as a result of the prejudices (Acevedo, Aron & Aron, 2018; Acevedo et al., 2018; Acevedo, 2020; Aron et al., 2010; Limura, 2021). Nevertheless, HSP show emotional positive aspects such as empathy and sensitivity towards others, intensity in experiencing feelings and a smart sense of humor (Aron et al., 2012; Acevedo et al., 2017; Acevedo, 2020).

Current research also indicates that HSP show high empathy levels as they present a high emotional intelligence such as being more in tune with their own thoughts and emotions, more aware of the emotions of others, and more responsive to and aware of environmental changes (Nocentini, Menesini & Pluess, 2018; Slagt et al., 2018). In this way and beyond empathy, high sensitivity helps to enhance the environment, adjusting it and making it more comfortable to others, so that it contributes to experience less chaos

(Acevedo, 2020). Unlike autism spectrum disorder (ASD), high sensitivity is more prepared to perceive someone's sadness, anger and joy (Acevedo et al., 2014). Thus, parents of HS children are more empathetic and aware of their child's needs, which facilitates stability and cooperation into relationships and confidence among close people; helping HS children to be more socially adapted (Aron et al., 2019; McNamara & Houston, 2009). These emotional abilities could grant benefits for HSP, but it is necessary to be careful in order to develop appropriate coping strategies when they feel emotionally overwhelmed (Acevedo, 2020; Fehr & Rockenbach, 2004; Preston, Hofelich & Stansfield, 2013; Raghanti et al., 2018). However, supportive environments could facilitate in HS children the achievement of higher levels of self-regulation and a greater sense of security resulting from experiencing the love of their families (Aron, 2002; Pluess & Belsky, 2013). Hence, they may be deemed both empathic and nurturing people (Acevedo, 2020). In this way, SPS should be interpreted as a susceptibility rather than a vulnerability (Limura, 2021).

Furthermore, high empathy levels allow them to cope with the feelings of other people and they are also more likely capable to identify injustices and to defend those perceived as weak (Acevedo, 2020; Aron et al., 2012). Consequently, they notice more likely 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, HSP who were reported to have experienced a happy childhood responded more intensively to pleasant photos (Jagiellowicz et al., 2010). These results provided evidence for the positive impact of highly sensitive child's educational environment. This intense emotional perception of both pleasant and unpleasant emotions may be explained by the role of some brain areas actively involved in emotional reaction of this feature (limbic system) (Acevedo, 2014). Thus, promoting individual's daily level of socioemotional well-being should be taken into account to improve the areas of self-control (Limura, 2021).

1.2.4. Interpersonal sphere

This dimension is especially relevant due to the characteristics of the environment in which HSP are involved could determine the characteristics of the HSP profile. Although the trait itself is not the symptom, but rather these symptoms could emerge when individuals experience continued exposure to adversities and maladaptive or stressful environments (Scrimin, Osler, Pozzoli & Moscardino, 2018). Concretely, temperament trait studies state that a poor childhood is considered a risk factor that precedes adult emotional negative consequences (Aron et al., 2005; Aron, Aron, Nardone & Zhou, 2019; Jagiellowicz et al., 2020). Also, parenting styles have been investigated with respect to SPS. This variable might influence the behavior of children, by training them in adaptive self-regulatory technics in order to manage quietly their emotions and thoughts (Degnan & Fox, 2007). Likewise, positive parenting styles could impact on children' well-being, achieving more social functioning, through 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). Even the parental attachment patterns are related to the children' quality of life and also to the sensory sensitivity, being greater when the levels of insecure parental relationships with toddlers are higher. As a matter of fact, a previous study has identified that parents who are highly sensitive facilitate non-optimal parenting styles, such as permissive, authoritarian, less warmth and also controlling parenting behaviors (Branjerdporn, Meredith, Strong & Green, 2019). Both "for better and for worse", inherent environmental sensitivity allows individuals to be highly influenced by their environment (Jagiellowicz et al., 2020).

HSP 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). Compared to less sensitive peers, slow adaptation to new people and situations is noticed in HSP due to the desire to carefully observe and reflect upon them. Highly sensitivity to subtleties is a feature that HSP may use in sports, interpersonal communication, in 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), HSP are irritated and express anxious behaviors by low thresholds, resulting in poor social relationships. This population exhibits high reactivity to social rewards and punishment and coping social situations presenting fear, avoiding troubles and thinking about their fault (Kibe et al., 2020; Pluess & Boniwell, 2015). People with hypersensitivity patterns could response in a maladjusted way to stimuli in the social environment (Engel-Yeger, DeLuca, Hake & Goverover, 2019). Hence, as indicated previously, HSP growing up in adverse or inhibition conditions are more likely predisposed to sick and suffer from physical and psychological negative 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 upbringing and teaching unlike non-HS children (Aron, 2002; Pluess & Belsky, 2013). Indeed, social support is a factor that may buffer negative health consequences in HSP who suffered a childhood defined by stressful life events, promoting resilience, even in the presence of a genotype expected to confer vulnerability to psychological disorders (Pluess & Boniwell, 2015). Moreover, HSP responded more favorably to the school's resilience building programs, which results in fewer mental health problems in HS children. In addition, this kind of programs obtains a positive impact against bullying predicting positive developmental outcomes (such as decreasing levels of depression and victimization) (Limura, 2021; Mitchell et al., 2011; Nocentini et al., 2018; Pluess & Belsky, 2010; Pluess & Boniwell, 2015).

1.3. Sensory Processing Sensitivity Assessment

Researchers have found difficulties to assess the trait of SPS, since it implies to decompose the personality in a complex way (Aron, 2020). However, the first measure for assessing SPS has been 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 through qualitative interviews, including statements considering 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 create the construct of SPS formed by a variety of dimensions, instead of referring it as simply sensitivity toward sensory stimuli (Greven et al., 2019). In fact, the psychometric properties and validity of the 27-item HSPS have been validated in several 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 recently revised version with 21 questions, has been built during the development of HSP scale for adults (Pluess et al., 2018). Indeed, the HSCS presents a parent-report format in order to assess sensitivity in kindergarten children, using the same items from HSC scale. Previous studies have demonstrated that the HSCS has 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 form of the questions was changed, and parents were asked the questions. The questions were rephrased in such a way that it was the parent who referred to their child's observed behavior. In our study, this version of the scale was used to estimate the validity of the questionnaire.

On the other hand, Aron (2002) developed another 23-item parent report questionnaire measuring SPS in children. This scale is used to analyze the association between SPS and daily functioning (Boterberg & Warreyn, 2016). Although the items of this scale partially overlap HSC questionnaire, this scale is not certainly validated if children with high scores are more sensitive to environmental influences and more deeply cognitive processes (Greven et al., 2019). Likewise, HSP and HSC scales have been translated into a variety of languages (Greven et al., 2019; Kibe et al., 2018; Konrad & Herzberg, 2017; Nocentini et al., 2017; Sengül-Inal and Sümer, 2017; Poirarinsdoittir, 2018).

Dimensions of high sensitivity highlighted in the scales

The first scale developed to measure sensitivity of sensory processing was unidimensional. However, studies conducted with the use of it, 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. Studies by Smolewska, McCabe and Woody (2006), among others, point to the presence of three factors. In recent years, they have often been used in SPS research as a way of describing characteristics of high sensitivity. 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 are moderately associated with self-rated negative emotionality, anxiety and depression. In contrast, LST (but not EOE), is 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 the area of Sensory Processing Sensitivity in the context of Environmental Sensitivity (Greven et al., 2019) note that the three scales mentioned: LST, EOE and AES are 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 is not clear, nor is it explained what these components measure or mean 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 area of sensory processing sensitivity (e.g. Boyce and Ellis, 2005; Aron and Aron, 1997; Belsky and Pluess, 2009; Jagiellowicz et al, 2012) estimate the distribution of high sensitivity in the population to be 10-35%. The distribution of the trait in the population was first proposed in the concept of sensory processing sensitivity. The proposal constituted an analogy to work on, as defined by Kagan (1994), infant reactivity (or behavioural inhibition). In a paper entitled “On the nature of emotion”, infants were classified into groups of 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) note 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 was characterised by 25-35%, medium HSP by 41-47% and high HSP by 20-35% (Pluess et al., 2017). The results obtained were replicated in studies conducted in 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 the aforementioned studies (Pluess et al., 2017; Lionetti et al., 2018) referred to the third group as tulips. A replication of the study conducted in 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 (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 in the Polish sample of young adolescents resulted in the identification of three groups of adolescents. Each of them was characterized by a

significantly different total score of the HSC scale. Students 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 - 41.8%.

1.4. The profile of the highly sensitive person – summary

As indicated, highly sensitive people (HSP) interpret information and environmental stimuli more deeply than other individuals. Sometimes, HSP could be 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 it as a disorder, since it implies that individuals present difficulties in sensory signals integration (Acevedo, 2020). As mentioned previously, SPS has a variety of degrees and people may find their own threshold modulated by the environment (Acevedo, 2020; Greven et al., 2019). In addition, SPS may lead to communicating, socializing and mobility, and coordination or orientation to sensory signals (Acevedo, 2020). Besides, an acronym named DOES is created to point out that sensitivity trait is characterized by the cluster of four dimensions, which means: 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 behaviors of other people more deeply and thoroughly than their 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 of this negative perspective finding out associations among high sensitivity and mental health problems, it exists a 'bright side' of this phenomenon which makes HSP be characterized by profitable skills, improving their well-being (Pluess, 2017; Limura, 2021). Hence, it is known that HSP might achieve an optimal development (Acevedo, 2020; Aron et al., 2012; Aron, 2020; Greven et al., 2019).

2. THE PROCESS OF CONSTRUCTING THE QSPS_{inCh}

The construction of the questionnaire was initially developed in Poland, which in its first version was called KWPS_{uDz}, consisted of several steps. The subsequent ones will be 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 above-described state resulted in certain assumptions at the basis of construction, which stem from the achievements of developmental and individual differences psychology as well as cross-cultural psychology.

1. Temperament traits are partly biologically determined and 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 emphasized 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, may be expressed in different ways (they may manifest themselves in different behaviours), which in turn may 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 used in the construction. The procedure takes into account, on the one hand, universal aspects of temperament [in cross-cultural psychology referred to as the etic approach]. On the other hand, it takes into account culture-specific manifestations of temperament [in cross-cultural psychology referred to as the [emic approach] (see Strelau, Zawadzki, 1998).

2. The author of the first scale to measure sensitivity of sensory processing considered it to be a unidimensional trait of temperament (Aron & Aron, 1997). E. Aron described individuals endowed with a high intensity of the trait as highly sensitive, hence she named the developed scale the Highly Sensitive Persona 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 & Diseth, 2016; Smolewska et al., 2006) has shed new light on the assumptions 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 from a group of adults and the fact that the factors emerged from statistical analyses in the construction of the tool, it was decided to conduct exploratory research of a qualitative nature.
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. Sensitivity of sensory processing is associated with: depth of processing, propensity to overstimulation, emotional reactivity and empathy, and aesthetic sensitivity. This trait manifests itself in various areas of life. In the questionnaire, the child's activities in four areas of functioning will be assessed: physical, emotional, interpersonal relations and cognitive.

3.1. Focus groups and testing tool

The first experimental version of the questionnaire was developed as a result of 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 process for the focus groups. They were provided with a protocol for recruitment to the groups along with

criteria for admission and exclusion (a.o. diagnosis of sensory integration disorders, autism spectrum disorders).

Subsequently, semi-structured interviews with parents of highly sensitive children and teachers of highly sensitive children were developed. The research was conducted in Poland, Spain (mainland and 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 research conducted, key informant interviews were conducted according to the Common rules for key informant.

Next, transcriptions were prepared in accordance with the developed rules, based on which common categories were developed. Based on the categories thus created questionnaire items for the tool were developed. For each category, a maximum number of questionnaire items were generated in two independent teams (experts from WSEI and experts from UA). They were then translated into Polish. Repetitive items were removed and re-checked to ensure that each category was saturated with questions. Test items were analyzed according to guidelines for the items evaluation. The principles of representativeness, pertinence, clarity, technicalities, comprehension were considered.

In this way, from over 200 items, 167 items were selected for evaluation by competent judges. The test items were also subjected to ethical and linguistic correctness assessments¹. The consistency of the scores counted made it possible to select those items on which there was agreement among the judges. 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. Among the sentences, the judges paid attention to those behaviors that may be the result of nurture (rather than possession of the trait itself), or those related to other temperamental or personality traits. This resulted in the first version of the questionnaire to be tested in Poland. In order to carry out the testing, protocols collecting socio-demographic

^{1 1} The authors would like to thank the experts for their participation in the evaluation: Teresa Panas, Dorota Macander, Zbigniew Gaś, Tomasz Knopik and Justyna Malicka.

data for parents and for teachers were developed. An invitation to test the tool was sent to schools and kindergartens in Poland. Then, the tool was tested in schools and kindergartens which expressed their willingness to cooperate in the research.

3. APPLICATION NORMS

This chapter contains guidelines and instructions to carry out an optimal and right application and correction of the instrument to obtain the scores and the results profile.

Before its application, it is important for the informants to read carefully this chapter to familiarize with the instrument.

3.1. Areas of application

The instrument was developed, standardized and validated for its use in the assessment of the sensory processing sensitivity in children who are between 3 and 6 years old, and between 7 and 10 years old. Two versions have been developed to assess the SPS according to the age of the child evaluated:

The kindergarten version: from 3 to 6 years old.

The primary school version: from to 7 to 10 years old.

The instrument has been specifically developed to adjust to the needs and characteristics of the educational and familiar contexts. In this sense, two versions have been developed to assess SPS depending on who the informant is:

The teachers' version: the teachers are who complete the questions taking into account the behaviors and attitudes of the child in the educational context.

The parents' version: the parents are who complete the questions taking into account the behaviors and attitudes of the child in the familiar context.

In the following paragraphs, more detailed information about these two main areas of applications is presented.

- Educational context

It is one of the areas that can be benefited the most from the use of this type of the instrument. The educative centers are very suitable scenarios to carry out the assessment of this personality trait through routine and systematic evaluations of the students to detect characteristics that may be unnoticeable by their environment. In addition, children spend a lot of time in school, thus their interactions in this context are very relevant to examine their sensitivity to sensory processing in the different spheres: physical, cognitive, emotional and interpersonal. For this reason, the school is one of the sources of information that has been considered in the design and development of the differentiated versions of the instrument. Teachers are privileged informants to access the school context and observe the behavior of the children in a structured environment and with a particular perspective that allows them to compare the functioning of the evaluated child with that other peers during the interaction situations.

- Familiar context

The familiar context is also one of the most suitable scenarios to apply the instrument. The family is one of the most important systems of influence in the development of the child from early stages. The family is the main nucleus in which the child is growing up. Thus, the family has a great impact on the personality, emotional and social development of the child. It models the way of thinking, making decisions, behaviors and attitudes. For this reason, the family is also one of the sources of information that have been considered in the design and development of the differentiated versions of the instrument. Parents spend a lot of time with their children, especially in the kindergarten and primary stages. Therefore, parents are

optimal informants to report the behavior of the children in a non-structured environment. The possibility of having information of the child at home allows to obtain a comprehensive assessment of the sensory processing sensitive in general, and in the different areas (physical, cognitive, emotional and interpersonal).

- Other contexts

Although the instrument has been specifically developed to be applied in educational and familiar contexts, its used can be also generalizable to a wide variety of contexts (clinical, forensic, educational and research) which the main purpose was to assess this sensory processing sensitive.

For example, this instrument is a very suitable tool to contribute to evaluative processes in the clinical setting. The most common reasons for clinical consultation in children are usually related to the possible presence of problems and difficulties in the interpersonal, emotional, and cognitive areas (e.g., anxiety, depression, learning difficulties, autism spectrum disorder, attention deficit hyperactivity disorder). The instrument can be useful to make a first approach to the psychological functioning of the child in terms of the personality traits at the beginning of an evaluative process. Moreover, the assessing of the sensory processing sensitivity can report relevant information about some characteristics of the child that can act as protective factors or personal resources in the clinical intervention. On the other hand, the multidimensional evaluation that the instrument allows to carry out is also suitable for the forensic context. For instance, a depth knowledge of the personality characteristics of the child can be relevant for decision-making in the judicial sphere (e.g., emotional reactivity, extreme sensitivity, emotional regulation problems, difficulties in the social interactions...). Finally, the instrument can be a reliable and valid tool for assessing the sensory processing sensitivity in children in the research context.

3.2. Application norms

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

The informants can be the parents (in the parents' version of the instrument) or the teachers (in the teacher version of the instrument). In both cases the informants (parents or teachers) should teacher-report about each item of the instrument according to the usual behaviour of the child in the familiar and school contexts, respectively. In all cases, the informants should be working under the supervision of a qualified professional. Supervising professionals should ensure that procedures for scoring 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 to 7 to 10 years old (in the primary version).

The selection of the version of the instrument depends on the age of the child and who is the 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 application of the instrument is individual by pencil and paper and it requires little time investment (completing the issue requires about 15 minutes per application).

4. PSYCHOMETRIC PROPERTIES

According to our theoretical model indicated before, our tool compressed four dimensions measuring SPS: physical, emotional, interpersonal, and cognitive. Psychometric analysis was carried out for each target group (teachers and parents both in kindergarten and primary education), presenting descriptive data for each item of these dimensions. These descriptive data of all items used in the validation process of the tool will be showed in Appendix 5. An exploratory factor analysis (EFA) and an Item Response Theory (IRT) model parameters were carried out to check the factor structure of subscales in each target group confirming two sub-dimensions in each dimension. Omega and Alpha reliability indexes were computed for the internal stability scale. In order to check the convergent validity of our instrument, a correlation analysis was run over with EAS (Temperament Survey for children; Buss & Plomin, 1984) and HSC (high sensitivity children scale; Weyn et al., 2019) for parents and teachers. Finally, percentile criteria were adopted to establish cut-off points in target groups meaning the point for detecting high sensitivity children.

4.1. Sample description

The study was conducted in a group of 58 people, the vast majority represented by women (which corresponds to the gender distribution of teachers of kindergarten and grades 1-3 of primary school in Poland). The respondents represented similarly numerous teachers of kindergartens and primary schools. Among the respondents there were also teachers who teach both in kindergarten and in primary school (hence, when asked about the educational stages, we have 30 people each). The teachers were of different ages (from 20 to 60 years of age). The average age of the respondents is less than 43 years ($M = 42.89$; $SD = 9.96$). They were full-time employees, mostly with higher education - master's degree (93.1%).

Table 2. Teachers of kindergartens and primary schools - group description

	N	%	chi2	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 teachers is currently working					
Private	8	13.8	30.414	1	<.001
Semi-private	0	0			
Public	50	86.2			
Educative stages					
Preschool	30	50			
Primary Education	30	50			
Courses in which the person is teaching					
First level (2-3 years)	4	5			
1st year (3-4 years)	9	11.25			
2nd year (4-5 years)	7	8.75			

3rd year (5-6 years)	4	5
Class „zero”/preparational 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
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			

The average work experience of the surveyed teachers is over 18 years ($M = 18.35$; $SD = 12,383$), and the work experience in the school / kindergarten in which they currently teach is less than 14 years ($M = 13.61$; $SD = 10,861$). Most of the respondents have heard about temperament trait which is sensory processing sensitivity (74.1%), come only 10% participated in training on sensitivity.

Kindergarten teachers completed questionnaires about 257 girls and 289 boys. Children represented all levels of preschool education, both the youngest group (13.6%), the group of 3-4 years old children (24.7%), children 4-5 years old (29.4%), children 5-6 years old (11.4%) and class "zero" that is a group preparing for school education.

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

	N	%	chi2	df	p
Gender of a child					
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
1st year 3-4 years	111	24.7			
2nd year 4-5 years	132	29.4			
3rd year 5-6 years	51	11.4			
class „zero”	94	20.9			
mixed class	0	0			
	N	%	chi2	df	p
Did the child have / still has difficulties with adaptation?					
definitely yes	84	15.4	124.194	4	<.001
rather yes	121	22.2			
hard to say	28	5.1			
rather not	186	34.1			
definitely not	126	23.1			
Is the child currently well adapted to preschool?					
definitely yes	263	48.3	455.927	4	<.001
rather yes	191	35			
hard to say	25	4.6			
rather not	51	9.4			
definitely not	15	2.8			

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

Primary school teachers completed questionnaires about 169 students and 158 students. These were mainly children attending the first (36%), second (34%) and third (29.4%) classes. About 15% of the surveyed children, according to the teachers, had adaptation difficulties, and currently 92% of the surveyed students are well adapted to school conditions.

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

	N	%	chi2	df	p
Gender of a child					
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			
	N	%	chi2	df	p
Did the child have / still has difficulties with adaptation?					
definitely yes	16	4.9	224.364	4	<.001
rather yes	33	10.2			
hard to say	18	5.6			
rather no	149	46.0			

definitely no	108	33.3			
Is the child currently well adapted to preschool/school?					
definitely yes	154	47.5	371.093	4	<.001
rather yes	145	44.8			
hard to say	16	4.9			
rather no	6	1.9			
definitely no	3	.9			

207 parents of preschool children (194 mothers and 13 fathers) participated in the research. 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. In this connection, it should be noted that the data on the parents of children partly come from the partner filling in the information.

The average age of the mothers was less than 34 years. They were women from 19 to 47 years of age ($M = 33.59$; $SD = 5,359$). Mothers most often had higher education (67.9%) or secondary education (26.9%). Less than half of mothers live in rural areas (49.5%), and another 35.4% live in large cities.

Table 5. *Parents of kindergarden children – group description*

	N	%	chi2	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 up 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 up to 100 000 inhabitants	7	3.3			
city of over 100 000 inhabitants	75	35.4			

The mean age of the fathers of children who were asked in the questionnaire was 36 years. The examined men were aged from 22 to 53 ($M = 36.05$; $SD = 5,285$). Fathers most often represented the group of people with higher education (41%), secondary (40.1%), and vocational education (16.5%). More than half of fathers live in villages (51.9%), and the next largest group are men living in large cities (35.4%).

Table 6. *Kindergarden children – group description (data from the group of kindergarden parents)*

	N	%	chi2	df	p
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The gender of a child

girl	110	49.1	.071	1	.789
boy	114	50.9			
Preschool education level					
first level (2-3 years)	23	10.7			
1st year 3-4 years	43	20			
2nd year 4-5 years	47	22.1			
3rd year 5-6 years	22	10.3			
class „zero” / preparational for school (5-6; 6-7 years)	79	36.9			
mixed class					
	N	%	chi2	df	p
With whom, the child is more closely associated (attached)?					
with mother (legal guardian)	44	20.8	187.283	2	<.001
with father (legal guardian)	6	2.8			
same with both parents (legal guardians)	162	76.4			
other					

The surveyed parents completed questionnaires about 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 2-3 years old (10.7%) and children 5-6 years old (10.3%). Parents were also asked with whom the child is more closely related. The declracation shows that most children (76.4%) are similarly related to both parents, 20.8% of children are more closely related to their mothers and 2.8% are more closely related to their fathers.

154 parents, 148 mothers and 6 fathers participated in the study of 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 the countryside (50%) and small towns (24.4%).

Table 7. *Parents of primary school children – group description*

	N	%	chi2	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 up 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 up to 100 000 inhabitants	20	12.8			

city of over 100 000 inhabitants 21 13.5

The mean age of fathers was 39 years ($M = 39.07$; $SD = 5,38$). The most numerous group was represented by people with secondary (30.8%) and higher (30.8%) education. Half of them came from rural areas, and 23.7% of small towns.

Parents filled out questionnaires about 92 girls and 76 boys. These were mainly children attending the first (40.1%), second (49.1%) and third (7.8%) grades. Parents' declarations show that the majority of children (68.6%) are similarly related to both parents, about 1/3 have closer relationships with the mother, and 1.3% with the father.

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

	N	%	chi2	df	p
The gender of a child					
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			
	N	%	chi2	df	p
With whom, the child is more closely associated (attached)?			106.731	2	<.001
with mother (legal guardian)	47	30.1			
with father (legal guardian)	2	1.3			

same with both parents (legal guardians) 107 68.6

4.2. Kindergarten teachers' version

Factor analysis

The following Tables 2-5 present factorial loadings for items of kindergarten teachers' 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.

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

Table 2. 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. Avoid 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 intensively	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 on the hands	0,361	0,883	0,910	0,090
It11. When many things happen at once, is tired more 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

IRT Model

	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. Avoid 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 intensively	0,06	1,01	1,8	2,64	3,3
It8. If experiences something intensely, complains of pain (e.g. headache, stomach ache)	-0,21	0,54	1,83	2,79	2,71
It9. More often than other children, signals a need for rest	-0,54	0,31	1,25	2,03	2,44
It10. Badly tolerates dirt, wetting, etc. on clothing or on the hands	-0,88	0,17	1,79	2,65	1,65
It11. When many things happen at once, is tired more than other children	-1,2	-0,3	1	1,9	1,58
It12. Easily identifies small changes (or modifications) in the environment/surroundings	-1,68	-0,74	0,6	1,58	1,41
It13. Often complains of pain for no apparent reason	-1,87	-1,04	-0,26	0,94	1,48

Note. RC1 and RC2 = subdimensions; Comm = communality; Uni = unicity;

Ext = extremis values; Dscr = Discriminality index.

Table 3. Emotional sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It 1. 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 for insects, e.g. fly, gnat, spider	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, it avoids similar situations, places and events for a long time	0,82	-0,05	0,68	0,32	
IRT Model	Ext1	Ext2	Ext3	Ext4	Dscr
It4. Has a special loathing for insects, e.g. fly, gnat, spider	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, it 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 = extremis values;

Dscr = Discriminality index.

Table 4. Interpersonal sphere rotated factorial solution and IRT model

Factorial analysis	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 = extremis values

Dscr = Discriminality index.

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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	0,67	0,64	0,86	0,14
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 = extremis values

Dscr = Discriminality index.

Reliability

According to Alfa and Omega indexes, all spheres achieved satisfactory reliability, even higher than Highly Sensitive Child (HSC) Scale (see Table 6). So that it seems that QSPSinCh subscales present good accuracy in terms of this trait.

Table 6. 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 7 shows that Physical, Emotional, and Interpersonal subscales had strong correlation with HSC scale, and Cognitive subscale presented a moderate correlation to it. Moreover, our subscales demonstrated moderate correlations to temperament dimensions (emotionality, activity, and sociability). However, as predicted in the literature, our instrument was not measuring shyness according to negative and weak correlation index. This all means that QSPSinCh is measuring mostly the same construct.

Table 7. Correlations between subscales and temperamental 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***
Sociabilty	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; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Cut-off points

In order to get point for identify highly sensitive children according to measures in our scales, we suggest using a percentile criteria being warning of high sensitivity with a mean score over the value of percentile 90 (see Table 8).

Table 8. Score for percentiles 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

4.2. Primary school teachers' version

Factor analysis

The following tables 9-12 present factorial loadings for items of primary school teachers' version responses in each sphere.

According to 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. Likewise, in interpersonal sphere, items 1, 13 and 14 were removed according to IRT theory too. In fact, items 13 and 14 had a confusing pattern of difficulty index, and item 1 had zero response. In cognitive sphere, items 1 to 3 and 11 to 13 were also removed.

Table 9. Physical sphere rotated factorial solution and IRT model.

<i>Factorial analysis</i>	RC1	RC2	comm	uni
It1. Prefers to be in a quiet environment	-0,19	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
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 intensively	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 intensively	-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 = extremis values;

Dscr = Discriminality index.

Table 10. 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 favorite 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 / unfavorable 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	
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 / unfavorable 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 = extremis values;

Dscr = Discriminality index.

Table 11. Interpersonal sphere rotated factorial solution and IRT model.

<i>Factorial analysis</i>	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 center of attention	-0,21	0,92	0,70	0,30	
<i>IRT Model</i>	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
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 = extremis values;

Dscr = Discriminality index.

Table 12. 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 humor, 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, analyzes 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 humor, often not understood by peers	-0,544	-0,085	0,339	1,271	4,028
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 = extremis values;

Dscr = Discriminality index.

Reliability

All spheres achieved satisfactory Alfa index. However, despite Omega indexes are above 0.8 in interpersonal and cognitive spheres, even higher than Highly Sensitive Child (HSC) Scale, physical and emotional spheres showed lower values (see Table 13). So that it seems that QSPSinCh subscales present better accuracy in terms of interpersonal and cognitive spheres in this trait.

Table 13. 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 14, all subscales had moderate correlations with HSC scale. Regarding temperamental scale, the same pattern with shyness was found as a negative correlation between our subscales and this subscale. Furthermore, moderate correlations were found among the other temperament dimensions (emotionality, activity, and sociability) and QSPSinCh subscales.

Table 14. Correlations among subscales and temperamental 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 get point for identify highly sensitive children according to measures in our scales, we suggest using a percentile criteria being warning of high sensitivity with a mean score over the value of percentile 90 (see Table 15).

Table 15. Score for percentiles 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 parents' version Factorial analysis

The following Tables 16-19 present factorial loadings for items of kindergarten parents' version responses in each sphere.

In physical sphere, items 1, 2, 8, 15 and 16 were not accounted in 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 invite us to remove from the scale due to the low relation these items have with the rest of the scale. Moreover, item 9 seems to be ambiguous in the sub-dimension loading.

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

In cognitive sphere, items 1, 7, 8 and 13 were also deleted due to difficulty indexes, in which zero responses were found.

Table 16. 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; Cor = communality; Uni = unicity; Ext = extreme values; Dscr = Discrimination index.

Tabl

e 17. Emotional sphere rotated factorial solution and IRT model

<i>Factorial analysis</i>	RC1	RC2	comm	uni
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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 favorite 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; Cor = communality; Uni = unicity; Ext = extreme values; Dscr = Discrimination index.

Tab

le 18. 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. Need 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 relations with 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 center 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 = extremis values;

Dscr = Discriminality index.

Table 19. 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 humor, 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, analyzes 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, analyzes 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 = extremis values;

Dscr = Discriminality index.

Reliability

Alfa parameter indicates that all spheres achieved satisfactory scores. Although Omega indexes are above 0.8 in emotional and interpersonal spheres, being higher than Highly Sensitive Child (HSC) Scale, physical, emotional, and cognitive spheres showed lower values (see Table 20). QSPSinCh subscales present better accuracy in terms of emotional and interpersonal spheres in this trait.

Table 20. 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 21 shows correlations among HSC, EAS and QSPSinCh dimensions. Physical and emotional QSPSinCh subscales had strong and significant correlations with HSC scale. Whereas interpersonal and cognitive subscales had moderate correlations with HSC scale. Temperamental scale indicates a negative correlation between our subscales and shyness subscale. Furthermore, moderate correlations were found among emotionality and sociability temperament dimensions and QSPSinCh subscales. Finally, Activity dimension did not correlate with any subscales of QSPSinCh.

Table 21. Correlations among subscales and temperamental 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

Cut-off points

In order to get point for identify highly sensitive children according to measures in our scales, we suggest using a percentile criteria being warning of high sensitivity with a mean score over the value of percentile 90 (see Table 22).

Table 22. Score for percentiles 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 parents' version

Factorial analysis

The following Tables 23-26 present factorial loadings for items of primary school parents' version responses in each sphere.

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

Moreover, in emotional and interpersonal sphere, assuming 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 in these items.

Finally, in cognitive sphere, items 1 and 13 to 16 were not analyzed due to a problem in model adjustment.

Table 23. 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 flavors	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	
IRT model	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 = extremis values

Dscr = Discriminality index.

Table 24. Emotional sphere rotated factorial solution and IRT model

Factorial analysis	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 / unfavorable 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	
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	
IRT model	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 / unfavorable 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 = extremis values

Dscr = Discriminality index.

Table 25. 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, it 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	
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 center 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 center 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 = extremis values;
Dscr = Discriminality index.

Table 26. 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 humor, 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	
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, analyzes 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	
<i>IRT model</i>	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 = extremis values;

Dscr = Discriminality index.

Reliability

Both Alfa and Omega indexes show that all spheres achieved excellent scores (see Table 27). In fact, all QSPSinCh subscales present better accuracy than HSC scale.

Table 27. 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

Convergent validity

Correlations among HSC, EAS and QSPSinCh dimensions can be observed in Table 28. Physical and emotional QSPSinCh subscales had strong and significant correlations with HSC scale. Interpersonal and cognitive subscales had moderate correlations with HSC scale. Temperamental scale indicates negative correlations between our subscales and shyness subscale. Furthermore, moderate correlations were found among almost emotionality and sociability temperament dimensions and QSPSinCh subscales. Finally, Activity dimension correlates weakly with QSPSinCh subscales.

Table 28. Correlations among subscales and temperamental 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 get point for identify highly sensitive children according to measures in our scales, we suggest using a percentile criteria being warning of high sensitivity with a mean score over the value of percentile 90 (see Table 29).

Table 29. Score for percentiles 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

5. CORRECTION AND INTERPRETATION NORMS

5.1. Correction norms

The QSPSinCh allows to get the score of the manifestation of sensitivity in different spheres: physical, emotional, interpersonal, and cognitive. The first step to achieve the rating consists of obtaining the raw scores in each subscale of the QSPSinCh. In order to get the score of each subscale, a mean of the items is required. This mean is calculated by summing the score of the items and dividing among the total number of them. In this way, the score could comprise between 1 and 7.

5.2. Interpretation norms

Once the QSPSinCh has been administered and scores are obtained, the next step consists of the interpretation of the profile. Thus, the following Tables 30-33 show the interpretation of the four spheres (physical, emotional, interpersonal and emotional) in each version both kindergarten and primary school children.

Table 30. Interpretation for kindergarten parents' 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 area are less influenced by subtle odors, sounds, small gestures, changes in the tone of voice and other delicate stimuli.	Children with medium sensitivity in the physical area are moderately influenced by subtle odors, sounds, small gestures, changes in the tone of voice and other delicate stimuli.	Children with high sensitivity in the physical area are strongly influenced by subtle odors, sounds, small gestures, changes in the tone of voice and other delicate stimuli.
They are disturbed to a	They are disturbed to a small	They are disturbed to a

minimum extent with artificial light, noise, or material texture at home.	extent with artificial light, noise, or material texture at home.	significant extent with 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.
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 overloaded than other children even in ordinary, everyday situations.
They occasionally have problems with falling asleep (especially after an active day).	From time to time, they have problems with falling asleep (especially after an active day).	They often have problems with falling asleep (especially after an active day).
They are able to tolerate quite well everyday situations when is hungry or experiences a mild pain.	They do not tolerate very well everyday situations is hungry or experiences a mild pain.	They fail to tolerate everyday situations well when they are hungry or experiences a mild pain.
<i>Cognitive sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the cognitive area present less levels of cognitive rigidity, cognitive overload, deep cognitive processing, perfectionism, the need of control and fear/anxiety	Children with medium sensitivity in the cognitive area present moderate levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need of control and fear/anxiety	Children with high sensitivity in the cognitive area present high levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need of control and

thoughts.	thoughts.	fear/anxiety thoughts.
	In some situations, stability and repetitiveness make them feel safe.	In majority of situations, stability and repetitiveness make them feel safe
		In majority of 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, especially 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 large amount of information, especially given simultaneously.
They occasionally analyze topics and issues of their interest with great involvement and curiosity.	They usually analyze topics and issues of their interest with great involvement and curiosity.	In numerous situations, they analyze topics and issues of their interest with great involvement and curiosity.
	They seek to complete tasks entrusted to them with great care.	In majority of situations, they seek to complete tasks entrusted to them with great care.
From time to time, a minor setback may cause to withdraw from numerous activities that they priorly undertook without difficulty.	A minor setback may cause to withdraw from numerous activities that they priorly undertook without difficulty.	A minor setback may cause to withdraw from numerous activities that they priorly undertook without difficulty.
<i>Emotional sphere</i>		

Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the emotional area present weakly deep experiences, little expression and somatic manifestation of emotions, low levels of stress, slight attachment to objects and few emotional interactions with nature, art, and animals.	Children with medium sensitivity in the emotional area 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 area present strongly 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 emotions intensely and they do not accumulate them.	They experience emotions intensely and they accumulate them.	In numerous situations, they experience emotions intensely and they accumulate them.
They are prone to anticipate optimistic course of events.	They may be occasionally prone to anticipate pessimistic and/or negative course of events (gloom-mongering).	In majority of situations, they may be prone to anticipate pessimistic and/or negative course of events (gloom-mongering).
Sometimes it happens that minor events, everyday situations 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).	It often happens that minor events, everyday situations become a source of stress (e.g. school trip/ nursery school trip).
They experience art intensely (e.g. he/she is moved by fairy tales, movies, music).		In majority of situations experiences art intensely (e.g. he/she is moved by fairy tales,

		movies, music).
They are usually not concerned about opinions of others, and it is difficult to embarrass them.	To a small extent, they are usually not concerned about opinions of others, and it is difficult to embarrass them.	They are always concerned about opinions of others, and it is easy to embarrass them.
They rarely demonstrate aversion toward insects.	They quite often demonstrate aversion toward insects.	They very often demonstrate aversion toward insects
<i>Interpersonal sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the interpersonal area do not usually feel stress under social situations. In general, they enjoy the situations in which they have to stay 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 area feel moderate stress under social situations. They do not like too much the situations in which they have to stay in a large group for a long time and sometimes they prefer working in small groups or alone.	Children with high sensitivity in the interpersonal area feel strong stress under social situations. They hate the situations in which they have to stay 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 activity, within a very active group, sometimes seems to be	In majority of situations, they need encouragement to join group activity, within a very active group seems to be

	absent.	absent.
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 majority of 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.	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 approaches new acquaintances with a distance.	They give an impression of being shy and fearful in relations with others and approaches new acquaintances with a distance.	They often give an impression of being shy and fearful in relations with others and approaches new acquaintances with a distance.

Table 31. Interpretation for primary school parents' 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 area are less influenced by subtle odors, sounds, small gestures, changes in the tone of voice and other	Children with medium sensitivity in the physical area are moderately influenced by subtle odors, sounds, small gestures, changes in the tone of	Children with high sensitivity in the physical area are strongly influenced by subtle odors, sounds, small gestures, changes in the tone of voice

delicate stimuli.	voice and other delicate stimuli.	and other delicate stimuli.
They are disturbed to a minimum extent with artificial light, noise, or material texture at home.	They are disturbed to a small extent with artificial light, noise, or material texture at home.	They are disturbed to a significant extent with 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.
<i>Cognitive sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the cognitive area present less levels of cognitive rigidity, cognitive overload, deep cognitive processing, perfectionism, the need of control and fear/anxiety thoughts.	Children with medium sensitivity in the cognitive area present moderate levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need of control and fear/anxiety thoughts.	Children with high sensitivity in the cognitive area present high levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need of control and fear/anxiety thoughts.
	In some situations, stability and repetitiveness make them feel safe.	In majority of situations, stability and repetitiveness make them feel safe
		In majority of 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, especially 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 large amount of information, especially given simultaneously.
They occasionally analyze topics and issues of their interest with great involvement and curiosity.	They usually analyze topics and issues of their interest with great involvement and curiosity.	In numerous situations, they analyze topics and issues of their interest with great involvement and curiosity.
	They seek to complete tasks entrusted to them with great care.	In majority of situations, they seek to complete tasks entrusted to them with great care.
<i>Emotional sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the emotional area present weakly deep experiences, little expression and somatic manifestation of emotions, low levels of stress, slight attachment to objects and few emotional interactions with nature, art, and animals.	Children with medium sensitivity in the emotional area 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 area present strongly 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 usually do not burst into	From time to time, they burst	They often burst into tears and

tears and get hysterical due to a trivial reason.	into tears and get hysterical due to a trivial reason.	get hysterical due to a trivial reason.
They do not usually experience emotions intensely and they do not accumulate them.	They experience emotions intensely and they accumulate them.	In numerous situations, they experience emotions intensely and they accumulate them.
They are prone to anticipate optimistic course of events.	They may be occasionally prone to anticipate pessimistic and/or negative course of events (gloom-mongering).	In majority of situations, they may be prone to anticipate pessimistic and/or negative course of events (gloom-mongering).
They experience art intensely (e.g. he/she is moved by fairy tales, movies, music).		In majority of situations experiences art intensely (e.g. he/she is moved by fairy tales, movies, music).
They occasionally react to moods and emotions of others.	They react strongly to moods and emotions of others.	They usually react strongly to moods and emotions of others.
They are usually not concerned about opinions of others, and it is difficult to embarrass them.	To a small extent, they are usually not concerned about opinions of others, and it is difficult to embarrass them.	They are always concerned about opinions of others, and it is easy to embarrass them.
They rarely demonstrate aversion toward insects.	They quite often demonstrate aversion toward insects.	They very often demonstrate aversion toward insects
<i>Interpersonal sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)

Children with low sensitivity in the interpersonal area do not usually feel stress under social situations. In general, they enjoy the situations in which they have to stay 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 area feel moderate stress under social situations. They do not like too much the situations in which they have to stay in a large group for a long time and sometimes they prefer working in small groups or alone.	Children with high sensitivity in the interpersonal area feel strong stress under social situations. They hate the situations in which they have to stay 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 activity, within a very active group, sometimes seems to be absent.	In majority of situations, they need encouragement to join group activity, within a very active group seems to be absent.
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 majority of 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.	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 give an impression of being shy and fearful in relations with others and approaches new	They often give an impression of being shy and fearful in relations with others and

approaches new acquaintances with a distance.	acquaintances with a distance.	approaches new acquaintances with a distance.
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Table 32. Interpretation for kindergarten teachers' 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 area are less influenced by subtle odors, sounds, small gestures, changes in the tone of voice and other delicate stimuli.	Children with medium sensitivity in the physical area are moderately influenced by subtle odors, sounds, small gestures, changes in the tone of voice and other delicate stimuli.	Children with high sensitivity in the physical area are strongly influenced by subtle odors, 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 consistencies of food (e.g. runny, mushy, lumpy).	They occasionally perceive tastes and smells very intensely, dislike certain consistencies of food (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, stomachache) and they signal the need to rest.	They very often experience things intensely, complain of pain (e.g., headache, stomachache) and signal the need to rest.
In some situations, when there	In many situations, when there	When there are usually many

are many things going on at the same time in a group/class they get very tired.	are many things going on at the same time in the class, they get very tired.	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 area present less levels of cognitive rigidity, cognitive overload, deep cognitive processing, perfectionism, the need of control and fear/anxiety thoughts.	Children with medium sensitivity in the cognitive area present moderate levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need of control and fear/anxiety thoughts.	Children with high sensitivity in the cognitive area present high levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need of control and fear/anxiety thoughts.
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 are able to analyze topics of interest with great commitment and they become "experts".	They very often ask a lot of questions; they are able to analyze topics of interest with great commitment and they become "experts".
They usually undertake tasks without asking additional questions.		They often display a particular sense of humor, joking in an intelligent way.
<i>Emotional sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in	Children with medium	Children with high sensitivity

<p>the emotional area present weakly deep experiences, little expression and somatic manifestation of emotions, low levels of stress, slight attachment to objects and few emotional interactions with nature, art, and animals.</p>	<p>sensitivity in the emotional area 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.</p>	<p>in the emotional area present strongly deep experiences, intense expression and somatic manifestation of emotions, high levels of stress, attachment to objects and emotional interactions with nature, art, and animals.</p>
<p>They do not usually experience emotions intensely and they do not accumulate them.</p>	<p>They experience emotions intensely and they accumulate them.</p>	<p>In numerous situations, they experience emotions intensely and they accumulate them.</p>
<p>They are prone to anticipate optimistic outlook on the course of events.</p>	<p>They may have a tendency to anticipate pessimistic and / or unfavorable course of events (so called "gloom-mongering"), though they usually approach issues and tasks optimistically.</p>	<p>They very often tend to predict a pessimistic and/or unfavorable course of events (so called "gloom-mongering").</p>
<p>Sometimes they get intensely emotional, and a trivial reason makes them cry or become hysterical.</p>	<p>Sometimes they may be intensely emotional, and a trivial reason makes them cry or become hysterical</p>	<p>They very often experience emotions very intensely and a trivial reason makes them cry, they get hysterical, and once disappointed, and they avoid similar situations, places, events for a long time.</p>
<p>They occasionally get stressed when there are many things going on in the group/class at the same time.</p>	<p>They tend get stressed when there are many things going on in the group/class at the same time.</p>	<p>They tend get stressed when there are many things going on in the group/class at the same time.</p>

<i>Interpersonal sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the interpersonal area do not usually feel stress under social situations. In general, they enjoy the situations in which they have to stay 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 area feel moderate stress under social situations. They do not like too much the situations in which they have to stay in a large group for a long time and sometimes they prefer working in small groups or alone.	Children with high sensitivity in the interpersonal area feel strong stress under social situations. They hate the situations in which they have to stay in a large group for a long time and they always prefer working in small groups or alone.
They normally handle conflict situations 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 when there is no reason for it.
Sometimes they 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.	Sometimes they make an impression of being shy.	They tend to make an impression of being shy in most situations.
They can cope well with being observed.	They often dislike being observed and being the center of	They very often dislike being observed and being the center

	attention in class, so that they get blocked and overreact to criticism.	of attention in class, so that they get blocked and overreact to criticism.
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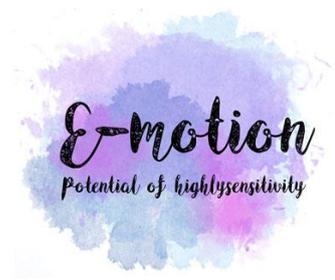
Table 33. Interpretation for primary school teachers' version.

Sensitivity Continuum		
<i>Physical sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the physical area are less influenced by subtle odors, sounds, small gestures, changes in the tone of voice and other delicate stimuli.	Children with medium sensitivity in the physical area are moderately influenced by subtle odors, sounds, small gestures, changes in the tone of voice and other delicate stimuli.	Children with high sensitivity in the physical area are strongly influenced by subtle odors, 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, stomachache) and they signal the need to rest.	They very often experience things intensely, complain of pain (e.g., headache, stomachache) 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	In many situations, when there are many things going on at the same time in the class, they get	When there are usually many things going on in the class at the same time they tend to get

very tired.	very tired.	very tired.
<i>Cognitive sphere</i>		
Low (Until P50)	Medium (From P50 to P90)	High (Above P90)
Children with low sensitivity in the cognitive area present less levels of cognitive rigidity, cognitive overload, deep cognitive processing, perfectionism, the need of control and fear/anxiety thoughts.	Children with medium sensitivity in the cognitive area present moderate levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need of control and fear/anxiety thoughts.	Children with high sensitivity in the cognitive area present high levels of cognitive inflexibility, cognitive overload, deep cognitive processing, perfectionism, the need of control and fear/anxiety thoughts.
	In many situations, they ask a lot of questions; they are able to analyze topics of interest to them with great involvement.	They often ask a lot of questions, and they are able to analyze topics of interest to them with great involvement.
Sometimes they may 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 humor, joking in an intelligent way, often not understood by their peers.
<i>Emotional sphere</i>		
Low	Medium	High

(Until P50)	(From P50 to P90)	(Above P90)
Children with low sensitivity in the emotional area present weakly deep experiences, little expression and somatic manifestation of emotions, low levels of stress, slight attachment to objects and few emotional interactions with nature, art, and animals.	Children with medium sensitivity in the emotional area 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 area present strongly 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 have a tendency to anticipate pessimistic and / or unfavorable course of events (so called "gloom-mongering"), but usually approach issues and tasks optimistically.	They very often tend to predict a pessimistic and/or unfavorable course of events (so called "gloom-mongering").
They occasionally get intensely emotional, and a trivial reason makes them cry or become hysterical.	Sometimes they may be intensely emotional, and a trivial reason makes them cry or become hysterical	They very have intense emotions, and a trivial reason makes them cry or get hysterical.
They occasionally get stressed when there are many things going on in the group/classroom at the same time.	They tend get stressed when there are many things going on in the classroom at the same time.	They tend get stressed when there are many things going on in the classroom at the same time.
<i>Interpersonal sphere</i>		
Low	Medium	High

(Until P50)	(From P50 to P90)	(Above P90)
Children with low sensitivity in the interpersonal area do not usually feel stress under social situations. In general, they enjoy the situations in which they have to stay 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 area feel moderate stress under social situations. They do not like too much the situations in which they have to stay in a large group for a long time and sometimes they prefer working in small groups or alone.	Children with high sensitivity in the interpersonal area feel strong stress under social situations. They hate the situations in which they have to stay 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) cost them more than other children.	They do not tend to handle time pressure well (e.g. during a test, competition) and public appearances (assemblies, competitions) cost them more than other children.
They normally handle conflict situations 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.
Sometimes they 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 appear to be bold.	Sometimes they keep 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.
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5.3. Illustrative cases

Case 1. Highly sensitive child profile.

ID information:

Gender: Male

Age: 4 years old

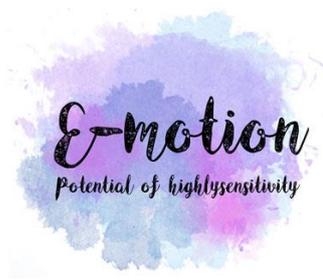
Educative level: Kindergarten

Version: Teachers' version

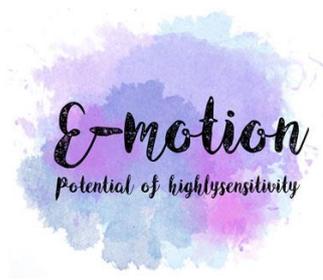
These are the following scores in the kindergarten Teachers' version of the QSPSinCh. They are presented in each four spheres.

Table 34. 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		
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, it 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



	2.Feels 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 taks, asks a lot of questions	7
	9. Is creative	5
Total mean score = 5,67 >P90		

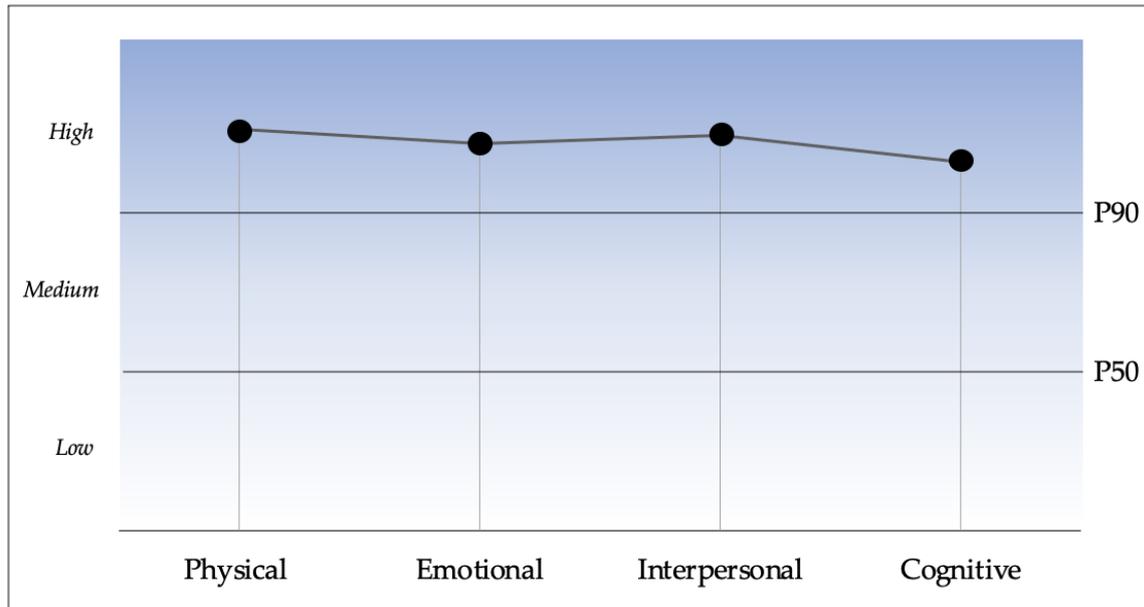


Figure 1. Highly sensitive 4-year-old child profile.

Finally, in order to interpretate the QSPSinCh scores and the profile that has been indicated, please, see the aforementioned Table 32.

Case 2. Low-medium sensitive child profile

ID information:

Gender: Female

Age: 8 years old

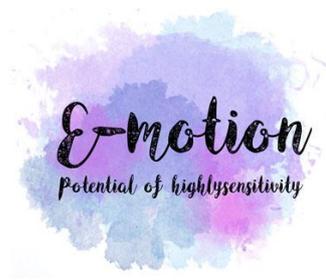
Educative level: Primary school

Version: Parents' version

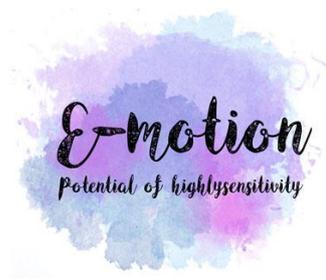
These are the following scores in the primary school Parents' version of the QSPSinCh. They are presented in each four spheres.

Table 35. 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		
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		
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		

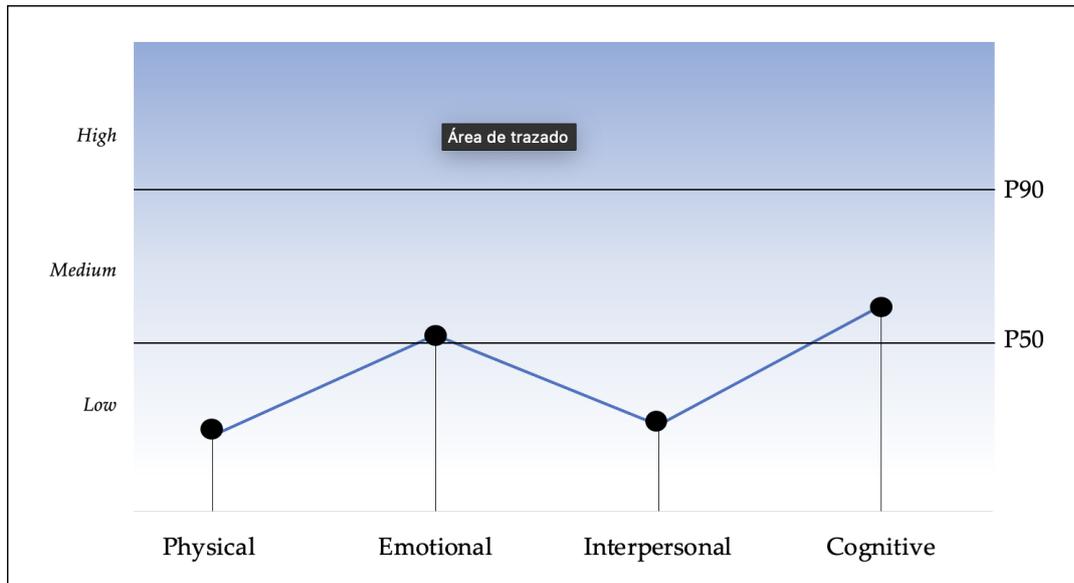


Figure 2. Low-medium sensitive 8-year-old child profile

Finally, in order to interpretate the QSPSinCh scores and the profile that has been indicated, please, see the aforementioned Table 31.

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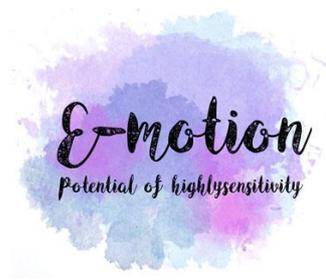
INTERPERSONAL SPHERE

	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

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 tasks, asks a lot of questions	1	2	3	4	5	6	7
9. Is creative	1	2	3	4	5	6	7



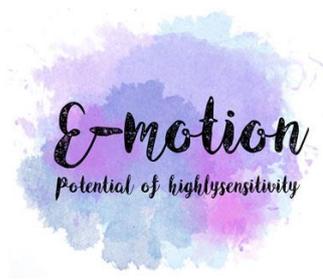
6. When many things happen at once, is tired more than other children	1	2	3	4	5	6	7
7. Easily identifies small changes (or modifications) in the environment/surroundings	1	2	3	4	5	6	7

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

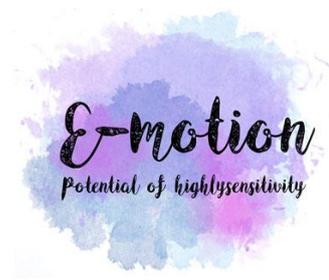
	1	2	3	4	5	6	7
	Not at all		Moderately			Extremely	
1. Needs additional incentives(stimulus) to get involved in the group	1	2	3	4	5	6	7
2. In a group where a lot is going on, it seems to be temporarily	1	2	3	4	5	6	7



absent							
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
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



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

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 favorite 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	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 OF SENSORY PROCESSING SENSITIVITY IN CHILDREN

Primary school parents' version

Name and surname or initials of a child _____

Child's date of birth _____ Sex of a child _____

This questionnaire makes statements about the different characteristics and behaviors of children. Please read each one carefully. Please indicate to what extent the statement describes your student. There is no right or wrong answers here 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
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

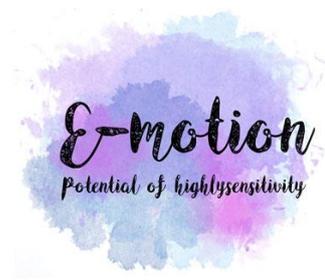
10. Uses rich vocabulary beyond his age	1	2	3	4	5	6	7
11. Tries to perform the task entrusted by the teacher with great care	1	2	3	4	5	6	7

APPENDIX 5

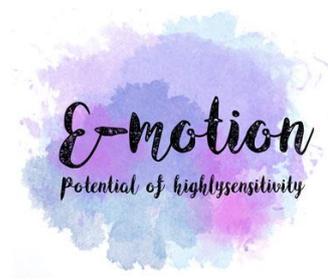
ITEMS DESCRIPTIVE ANALYSES

Descriptive Analyses for teachers' version in kindergarten education (N=541)

<i>Physical Subscale</i>	Mean	SD
It1. Has bad noise tolerance	1,88	0,89
It2. Finds intense lights unpleasant	2,12	0,96
It3. Avoid 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
<i>Emotional Subscale</i>	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



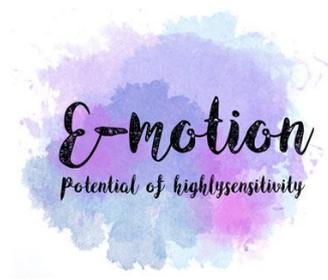
It5. Has a tendency to pessimistic / unfavourable course of events	2,69	1,23
It6. Experiences art very much, e.g. is moved by movies and music	2,90	1,27
It7. Has a tendency to accumulate emotions	3,13	1,36
It8. It's hard to control strong emotions	3,34	1,44
It9. Experiences emotions intensely	3,57	1,48
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
<i>Interpersonal subscale</i>		
	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
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
<i>Cognitive subscale</i>		
	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 previously experiences	5,76	1,03

Descriptive Analyses for teachers' version in primary education (N=324)

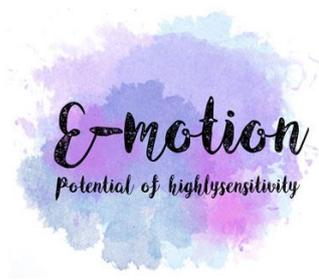
<i>Physical Subscale</i>	Mean	SD
It1. Prefers to be in a quiet environment	2,08	0,96
It2. Loves nice sounds	2,36	1
It3. Too hot foods bother her/him	2,68	1,05
It4. Finds intense lights unpleasant	2,97	1,05
It5. Is sensitive to temperature changes	3,2	1,06
It6. Avoid being in the bright sun	3,44	1,06
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 intensely	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
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
<i>Emotional Subscale</i>	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
<i>Interpersonal subscale</i>	Mean	SD



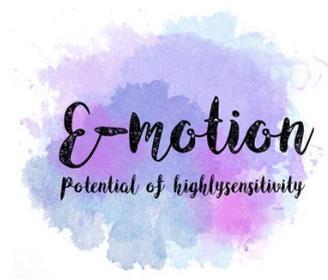
It1. Need more time to establish relationships with peers	1,92	0,99
It2. Needs additional incentives(stimulus) to get involved in the group	2,16	1,13
It3. In a group where a lot is going on, it seems to be temporarily absent	2,36	1,21
It4. Badly tolerates time pressure in situations of evaluation, competition (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
<i>Cognitive subscale</i>	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
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 parents' version in kindergarten education (N=204)

<i>Physical Subscale</i>	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
<i>Emotional Subscale</i>	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
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
<i>Interpersonal subscale</i>	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
<i>Cognitive subscale</i>	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,	2,59	1,20

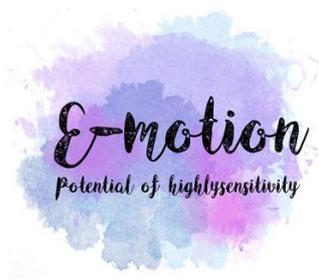


dispel doubts

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

Descriptive Analyses for parents' version in primary education (N=168)

<i>Physical Subscale</i>	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
<i>Emotional Subscale</i>	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
<i>Interpersonal subscale</i>	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
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
<i>Cognitive subscale</i>	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

