

EDITED BY:
M. BARYŁA-MATEJCZUK

Psychological aspects
of HUMAN HIGH
SENSITIVITY:
CONCEPTS - IDENTIFICATION - SUPPORT
ACADEMIC HANDBOOK



**Psychological aspects
of human high sensitivity:
concepts - identification - support.**

Academic handbook

Edited by:
Monika Baryła-Matejczuk

Lublin 2023

WSEI UNIVERSITY

Publishing series:
Monographs of the Faculty of Human Sciences of WSEI

Psychological aspects of human high sensitivity: concepts - identification - support.
Academic handbook
First edition

Editors:
Monika Baryła-Matejczuk

Reviewers:
Katarzyna Markiewicz, PhD, Prof. of WSEI University,
Jacek Pyżalski, PhD, Prof. of UAM

Correction:
Teresa Markowska

Translation:
Beata Machulska-Maziarczyk

DTP:
Marta Krysińska-Kudlak

Cover design:
Patrycja Kaczmarek

Cover artwork:
The cover was designed using assets from Shutterstock.com
Cover art: Josep Suria / Shutterstock.com

@Copyright by
Innovatio Press, Lublin 2023

Creative Commons
(CC BY-SA 4.0)

This publication has been funded with the support from the European Commission (project no: 2020-1-PL01-KA203-082261). This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Printed in Poland
Innovatio Press Publishing House
WSEI University
20-209 Lublin, Projektowa 4
tel.: +48 81 749 17 77, fax: +48 81 749 32 13
www.wsei.lublin.pl, e-mail:
wydawnictwo@wsei.lublin.pl

ISBN electronic version: 978-83-67550-04-8

TABLE OF CONTENTS

Introduction	6
---------------------------	----------

Chapter 1

Environmental sensitivity: conceptualization and explanation of high sensitivity models	9
--	----------

Rosario Ferrer-Cascales, Nicolás Ruiz-Robledillo, Natalia Albaladejo-Blázquez, Borja Costa-López, Manuel Fernández-Alcántara, María Rubio-Aparicio, Manuel Lillo-Crespo

Introduction	10
1.1 Environmental Sensitivity frameworks	12
1.1.1 Sensory Processing Sensitivity theory	15
1.1.2 Differential Susceptibility theory	19
1.1.3 Diathesis-Stress theory	20
1.1.4 Vantage Sensitivity theory	21
1.2 Biological Sensitivity to Context theory	22
1.2.1 Illustrative representation of the environmental sensitivity meta-framework	24
Remember	26
Summary	27
Revision questions	29
Bibliography	31

Chapter 2

Identifying high sensitivity	36
---	-----------

Monika Baryła-Matejczuk

Introduction	37
2.1 Characteristics of highly sensitive people	38
2.1.1 Characteristics of highly sensitive people – sensitivity aspects understood as a temperamental trait	38
2.1.2 Characteristics of highly sensitive people – trait demonstration in the functioning spheres	40
2.2 Identifying highly sensitive children and adults	43
2.3 Sensitivity measurement tools	46
2.3.1 Highly Sensitive Person Scale	46
2.3.2 Highly Sensitive Child Scale for Parents	47
2.3.3 Highly Sensitive Person (Child) Scale – Child Short Form	48
2.3.4 High Sensitive Child Rating System	48

2.4 One or many sensitivity dimensions	50
2.5 High sensitivity and other personality and temperament traits	59
Summary	64
Revision questions	65
Bibliography	66

Chapter 3

Education and prevention in the context of highly sensitive people 73

Wiesław Poleszak

3.1 Compendium of knowledge on prevention – essence, models and impact strategies	74
3.1.1 Two approaches to the understanding of problem behaviour prevention	74
3.1.2 Types of prevention activities identified according to the recipients	76
3.1.3 Prevention strategies and types of prevention programmes	78
3.2 Need for support in the environment of highly sensitive people	81
3.2.1 Protection factors and risk factors – causes of development problems	82
3.2.2 High sensitivity versus selected functioning problems	85
3.3 Support for the implementation of development tasks at different stages of life	86
3.3.1 Personality traits of highly sensitive people and the need for support	86
3.3.2 Educational environment and the proper development of highly sensitive people	89
3.3.3 Prevention levels and the recommended content of prevention activities	91
Revision questions	95
Bibliography	96

Chapter 4

Effective methods to support highly sensitive children and adults 99

*Rosario Ferrer-Cascales, Nicolás Ruiz-Robledillo, Natalia Albaladejo-Blázquez,
Borja Costa-López, Manuel Fernández-Alcántara, María Rubio-Aparicio,
Manuel Lillo-Crespo*

Introduction	100
4.1 Psychological support methods for highly sensitive children and adults	101
4.1.1 Emotional strategies	102
4.1.2 Cognitive strategies	103
4.1.3 Interpersonal strategies	104
4.1.4 Resilience as a forerunner of psychological strength in highly sensitive individuals	106

Table of contents

4.2 Managing highly sensitive children at school	107
4.2.1 How to deal with highly sensitive children in the classroom: the role of the education professionals	107
4.2.2 School-based psychological intervention programs	109
4.3 Improvements of psychological well-being in highly sensitive children and adults through health and education supportive methods	111
Remember	115
Summary	116
Revision questions	118
Bibliography	120

INTRODUCTION

In recent years, the issue of environmental sensitivity has generated interest not only among many researchers, but also practitioners. Reports indicating the potential mental health risks related to increased sensitivity due to external and internal stimuli have also increased the interest of clinicians, psychologists and psychotherapists in this issue. The process of collectively shifting our focus to the significance of the environment of closest development for highly sensitive people has undoubtedly provided a useful space in which to highlight the role of institutional support, from the level of kindergartens, schools, and even universities. This book is the outcome of international collaboration between researchers, with the common objective being to highlight the application value of the area of study which, in turn, resulted in a publication that systematically presents the issues over which many questions and controversies have arisen. The book attempts to discuss the issue which is widely known as *high sensitivity* in a coherent manner in the context of conceptualization, etiology, diagnosis as well as preventive and intervention solutions related to potential mental health problems.

Sensory processing sensitivity is a trait closely connected with the temperament of an individual, with a high intensity occurring among about 20-30 % of the population. Research has confirmed that highly sensitive people process information and stimuli from the environment in a far more intensive and deeper way than others. They are more sensitive to both positive and negative experiences. The trait, and, to be more precise, its intensity, is particularly important in the context of children. For highly sensitive children, inadequate development conditions can become particularly burdensome and, as a consequence, they can have serious implications for their future. However, the handbook focuses on content related to high human sensitivity, and emphasizes the development of a deeper understanding of the construct, without indicating the stage of development of the person characterized by this trait. A part of the content (e.g. selected diagnostic tools, the specificity of the manifestation of the trait) concerns children, another part refers to adults. Yet, we also draw the reader's attention to the fact that, for both adults and children, highly sensitive people are not a homogeneous group, and that high sensitivity overlaps with developmental stages and the age-specific impacts of individual and social factors which can potentially modify the degree of sensitivity.

The book has an indirect and direct target audience. It is designed for students who can use sensitivity knowledge to work with colleagues and/or clients, pupils or patients. We also made an effort to target those who, by virtue of their professional

interests or responsibilities, support highly sensitive children, young people and adults. Given the content of the handbook, the publication may be useful for students of the human sciences, including psychology, pedagogy, nursing, and also management. We would also recommend it to anyone broadly interested in the issue of sensitivity. While we are aware that parts of the book may be difficult to process, we are convinced that the knowledge and guidance that can be found in the book will both help the reader to gain a better insight into the nature of sensitivity and thereby support it more effectively.

The subsequent parts of the book therefore address issues that raise awareness concerning understanding, diagnosis, prevention and support for highly sensitive people. The book consists of four chapters. Each chapter starts with an introduction and contains key content concerning the issue to be addressed. The boxes located in different sections provide an overview of the relevant research results, areas that need to be highlighted and remembered as well as questions to be considered by the reader. A summary of each section is based on revision questions to check the knowledge of a given area.

The first chapter (ENVIRONMENTAL SENSITIVITY: CONCEPTUALIZATION AND EXPLANATION OF HIGH SENSITIVITY MODELS) provides information concerning our understanding and science-based models of high sensitivity. The authors undertake to define and conceptualise environmental sensitivity, describe selected concepts and approaches that are important to the development of an understanding of the environmental sensitivity framework and explain how to differentiate between a positive and a negative impact of the environment on highly sensitive people.

The second chapter of the handbook, IDENTIFYING HIGH SENSITIVITY, provides an insight into the identification of highly sensitive persons and the methods used to measure the traits defined as such. It presents the characteristics of highly sensitive people, paying particular attention to those aspects which are generally attributed as playing a key role in recognising the intensity of a trait. The tools that have been developed to date, the self-description and observation scales designed to measure environmental sensitivity and sensory processing sensitivity are discussed.

In the subsequent chapter, SUPPORT FOR HIGHLY SENSITIVE PEOPLE - EDUCATION AND PREVENTION, the reader will find a basic knowledge of what education and prevention is available to support highly sensitive people and what the relationship between these two approaches involves. In this context, elements of knowledge concerning the functioning of highly sensitive people and their potential development difficulties are presented. The authors successively present proposals for educational and prevention activities, taking into account the levels of difficulty encountered by highly sensitive children and young people.

The last part, EFFECTIVE METHODS TO SUPPORT HIGHLY SENSITIVE CHILDREN AND ADULTS, analyses the effects of various psychological measures which may be particularly beneficial for highly sensitive people. The authors seek to answer certain questions pertaining to which types of activities in the context of health and education can help to support the development of highly sensitive

people. Environmental programmes and activities related to the work and organization of an educational institution as a whole were also listed. The programmes described are oriented towards self-empowerment skills linked to high sensitivity traits. The issue of a theoretical framework and practical response strategies, based on psychological research, has also been raised.

We will leave it to the reader to decide how to use the handbook and hope that its content becomes a valuable addition to the ones already presented to students of human sciences. We would appreciate any comments concerning the publication, these will allow us to eliminate any shortcomings, and to correct any mistakes that may have occurred, and also to shape it in a way that will ultimately meet the expectations of students.

CHAPTER 1

ENVIRONMENTAL SENSITIVITY: CONCEPTUALIZATION AND EXPLANATION OF HIGH SENSITIVITY MODELS

Rosario Ferrer-Cascales¹
Nicolás Ruiz-Robledillo²
Natalia Albaladejo-Blázquez³
Borja Costa-López⁴
Manuel Fernández-Alcántara⁵
María Rubio-Aparicio⁶
Manuel Lillo-Crespo⁷

¹ Faculty of Health Science, Department of Health Psychology, University of Alicante, Spain, ORCID: 0000-0001-6015-7454; e-mail: rosario.ferrer@ua.es

² Faculty of Health Science, Department of Health Psychology, University of Alicante, Spain, ORCID: 0000-0002-7522-5162; e-mail: nicolas.ruiz@ua.es

³ Faculty of Health Science, Department of Health Psychology, University of Alicante, Spain, ORCID: 0000-0002-9116-9092; e-mail: natalia.albaladejo@ua.es

⁴ Faculty of Health Science, Department of Health Psychology, University of Alicante, Spain, ORCID: 0000-0002-6658-768X; e-mail: borja.costa@ua.es

⁵ Faculty of Health Science, Department of Health Psychology, University of Alicante, Spain, ORCID: 0000-0002-3481-8156; e-mail: mfernandeza@ua.es

⁶ Faculty of Health Science, Department of Health Psychology, University of Alicante, Spain, ORCID: 0000-0002-2599-4246; e-mail: maria.rubio@ua.es

⁷ Faculty of Health Science, Department of Nursing, University of Alicante, Spain, ORCID: 0000-0003-2053-2808, e-mail: manuel.lillo@ua.es

Abstract

Humans and other living beings are sensitive to the environment. Some of them differ in the way they are influenced by environmental conditions. Therefore, environmental sensitivity, which is defined as the ability to perceive and process external

stimuli, has been broadly studied. Such a concept includes different theories which all concur that only a minority of the population possesses a significantly higher environmental sensitivity, and that highly sensitive individuals differ in their response to both positive and negative features of the environment. That sensitivity alludes to internal and external stimuli, such as internal events and sensory, physical and social environments. The factors linked to a strengthened environmental sensitivity can be genetic, behavioral/temperamental and physiological. Every theoretical contribution is unique, but they share some key elements as well. The Sensory Processing Sensitivity theory conceives that sensitivity to be a personality trait manifested in depth of processing, ease of overstimulation, emotional reactivity and awareness of subtleties. The Differential Susceptibility model, which includes the Diathesis-Stress and Vantage Sensitivity theories, suggests that some individuals are more predisposed to be both negatively and positively influenced by the environment, depending on whether its conditions are adverse or thriving. The biological Sensitivity to Context approach proposes that sensitivity is shaped by early environmental conditions, and it is increased by stress response systems. Throughout this chapter, the conceptualization of environmental sensitivity and every theoretical contribution which is included in the Environmental Sensitivity meta-framework will be discussed, as well as the aspects on which they agree and differ.

Key words: environmental sensitivity, sensory processing sensitivity, differential susceptibility, diathesis-stress, vantage sensitivity, biological sensitivity to context.

After reading this chapter, you will learn:

- the definition and conceptualization of environmental sensitivity
- the most prominent theories on environmental sensitivity
- the reasons of creating different frameworks of environmental sensitivity
- how to distinguish the positive and negative environmental influences on highly sensitive people
- the importance of the theoretical perspective of the environmental sensitivity

Introduction

It is well-known that humans are sensitive to the environment, as well as other species in the animal kingdom (Acevedo, 2020; Greven & Homberg, 2020; Pluess, 2015). Nevertheless, people differ in the way they are influenced by environmental stimuli (Lionetti et al., 2018; Lionetti et al., 2019), given that some humans show much more responsivity and sensitivity to the environment compared to others (Greven et al., 2019). That is the reason why environmental sensitivity has been widely studied over the past few years (Aron et al., 2005; Greven et al., 2019).

The concept of *environmental sensitivity* has been defined as the ability of individuals to perceive and process external stimuli (Bröhl et al., 2020), and several approaches have focused on its characterization, both from areas related to research and clinical practice (Pluess, 2015). Generally speaking, the concept of “environment” in the expression “environmental sensitivity”, refers to a vast amount of both prominent external and internal stimuli. Specifically, it alludes to internal events (e.g., feelings, thoughts, sensations related to the body such as pain, thirst, or hunger), sensory environments (e.g., olfactory, visual, tactile, auditory), physical environments (e.g., caffeine intake, food), and social environments (e.g., crowds, other people’s mood, childhood experiences) (Greven et al., 2019; Greven & Homberg, 2020). Even if environmental sensitivity has been broadly studied, high sensitivity to environmental influences is a minority construct. In other words, only a small percentage of the population can be identified as being highly sensitive to the environment and its influences and stimuli (Acevedo, 2020; Lionetti et al., 2018). In fact, this is one of the characteristics of environmental sensitivity, and one of the main aspects on which every theoretical contribution agrees.

The term environmental sensitivity includes several theories which all explain individual differences in the ability to perceive, process and analyze stimuli from the environment (Greven et al., 2019). These theories are as follows: Sensory Processing Sensitivity theory (SPS; Aron & Aron, 1997); Differential Susceptibility theory (Belsky, 1997), which merges Diathesis-Stress theory (Belsky & Pluess, 2009; Gottesman & Shields, 1967; Hankin & Abela, 2005) and Vantage Sensitivity theory (Pluess & Belsky, 2013); and Biological Sensitivity to Context theory (Ellis & Boyce, 2011). These concepts will be discussed in the following paragraphs of this chapter. It is worth noting that in psychology, the subject of differentiated sensitivity was also taken up by other concepts explaining temperament (including a Regulative Theory of Temperament of J. Strelau). For the sake of consistency of the environmental sensitivity model framework, only selected approaches will be discussed.

Since there are several theoretical approaches in terms of what is the cause of such heightened sensitivity to the environment, the different theories are presented in full detail. Moreover, it must be taken into account that theoretical contributions addressing differences in sensitivity to the environment will be mentioned in chronological order, so as to be able to fathom how the same concept has evolved over the years, depending on the theoretical approach utilized. Apart from explaining such theories, it will be addressed the fact that sensitivity to the environment has two sides and what are the reasons behind. On the one hand, individuals might be more negatively influenced by adverse environments. On the other hand, they could as well be more positively influenced by thriving ones. In other words, this gives support to the idea that there are two sides of the same coin. While there is a dark side of environmental sensitivity, which can negatively affect individuals, there is also a bright side, characterized by enabling individuals to benefit from environmental conditions (Iimura, 2021).

Apart from that, over the chapter it will be briefly mentioned how the environmental sensitivity models are related to other constructs or theories, such as temperamental and personality theoretical approaches (see also paragraph 2.4. High sensitivity and other personality and temperament traits). What is more, it will also be addressed the fact that different aspects regarding brain regions activations or their volumes can have an impact on sensitivity to the environment. Additionally, it will be provided empirical evidence which supports the fact that sensory processing sensitivity, differential susceptibility, diathesis-stress, and vantage sensitivity are in fact markers of sensitivity to the environment.

1.1 Environmental Sensitivity frameworks

As it has been explained, since the 1990s emerged several theoretical frameworks, whose focus were individual differences in sensitivity to the environment. The most renowned in recent years were the Sensory Processing Sensitivity, the Differential Susceptibility, and the Biological Sensitivity to Context theories (Boyce & Ellis, 2005; Greven et al., 2019; Lionetti et al., 2018; Lionetti et al., 2019b). Even though every theoretical approach regarding sensitivity to the environment provides unique contributions, all of them agree on two fundamental aspects: minority of the population possesses a significantly higher sensitivity to environmental influences, and highly sensitive individuals differ in their response not only to negative environmental conditions, but also to positive features of the environment (Greven & Homberg, 2020; Greven et al., 2019; Pluess, 2015, Tillman et al., 2021). Terms related to positive and negative environmental conditions will appear throughout the handbook. Positive conditions are understood here as conditions supportive to human development (such as constructive styles of upbringing, parental attitudes and styles, adequate parental care), conditions rich in protective factors, and generally conducive to health. Negative conditions are understood (depending on the cited studies) as those rich in risk factors, potentially affecting the emergence of problems in the area of mental health (such as violence, parental failure).

In an attempt to integrate every single theoretical contribution in the field of sensitivity to the environment, the Environmental Sensitivity meta-framework emerged (Pluess, 2015). This last concept has been defined as the ability of individuals to perceive and process external stimuli (Bröhl et al., 2020), and it could be useful concerning research and practical applications (Pluess, 2015).

Since many empirical studies have focused on psychological, physiological or genetic sensitivity factors, it seems that environmental sensitivity might be driven by several mechanisms (Greven & Homberg, 2020; Pluess, 2015). Nevertheless, there is a strong likelihood that these sensitivity factors reflect biological mechanisms which jointly influence neurobiological susceptibility as the underlying main mechanism of environmental sensitivity. This means that specific characteristics of the central nervous system are reflected by a heightened environmental sensitivity,

resulting in an easier and deeper registration of environmental information (Pluess, 2015; Tillman et al., 2021).

It goes without saying that individual differences in environmental sensitivity are shaped by both environmental influences and genetic factors (Assary et al., 2020; Pluess, 2015). Notwithstanding, the extent to which genetics can influence such differences depends on those conditions in the environment experienced by individuals, particularly in early stages of development. For instance, increased environmental sensitivity could be predicted by the quality of the prenatal environment, but only in those children who carry sensitivity genes (Pluess, 2015). In fact, a study whose sample comprised monozygotic, opposite sex dizygotic and same-sex dizygotic twins has brought to light that 47% of the variation in sensitivity is caused by the influence of genetics (Assary et al., 2020). Another investigation found that 15% of the variance of environmental sensitivity is explained by the dopaminergic system (Chen et al., 2011). These findings indeed provide evidence to claim that both genetics factors and environmental sensitivity are related.

Apart from genetics, there are certain aspects of the brain structure and functioning which have been found to be related to sensitivity to the environment. One investigation (Pluess et al., 2020), whose sample consisted of same-sex twins, dizygotic and monozygotic, focused on the volume of different brain regions and whether that volume is somehow related to the impact that environmental influences can have on individuals. The findings of the study indicated that, in boys with a larger left amygdala, there was a significant correlation between higher environmental quality (environment rich in factors that protect and promote human health) lower total problems (Pluess et al., 2020). In fact, that association was not statistically significant in boys whose amygdala volume was smaller. Additionally, those boys who had a large left amygdala, when growing up in thriving, caring and encouraging environments, had more prosocial behaviors and experienced less adversity (Pluess et al., 2020).

As for the brain functioning, some studies have analyzed individuals' brains while undergoing functional magnetic resonance imaging (fMRI). One of these investigations found that higher scores in environmental sensitivity were in fact associated with greater activations in certain areas of the brain. Those areas play an essential role in attention and alertness towards relevant stimuli in terms of social interaction (e.g., the cingulate area), emotional meaning making (e.g., middle temporal gyrus), and action planning and control of movements (e.g., premotor area) (Acevedo et al., 2014). Apart from that, highly sensitive individuals showed stronger activation of the dorsolateral prefrontal cortex, which plays a crucial role in decision-making, complex tasks and higher order cognitive processing (Acevedo et al., 2014). Another fMRI study found that for those individuals who viewed positive images (conducive to positive emotions) the trait of sensory processing sensitivity was associated with a stronger reward response in the nucleus accumbens and the ventral tegmental area, both characterized by having high levels of dopamine (Acevedo et al., 2017). As for the results of individuals who had to view negative

pictures (conducive to negative emotions), it was found a strong activation in the amygdala, given that it plays a crucial role in the detection of aversive stimuli. There was also an activation of the secondary somatosensory cortex, which is involved in attention, sensorimotor integration, self-perception, memory and learning (Acevedo et al., 2017).

Another investigation addressing brain regions and their association with the trait of sensory processing sensitivity is the fMRI study of Jagiellowicz et al. (2011). Specifically, participants were scanned while they were doing a task which involved acknowledgment of subtle or significant changes in pictures of landscapes. Its results reflected that highly sensitive individuals take much more time to respond to subtle changes in images, apart from showing stronger activations in brain areas which are involved in visual attention (Jagiellowicz et al., 2011).

Certainly, there are several possible markers of environmental sensitivity which have already been identified, such as genetic, psychological and physiological factors (Lionetti et al., 2018; May et al., 2020). Nevertheless, these factors do not completely nor directly represent markers of sensitivity. That is the reason why environmental sensitivity remains the most accurate attempt to measure levels of neurosensitivity in humans (May et al., 2020). Even it has originally postulated the hypothesis that environmental sensitivity could be presented as a general factor, investigations has proven that a three-factor structure has been much more adequate and suitable for the data so far (Pluess et al., 2018). These three factors are as follows: Ease of Excitation (EOE), which is related to the fact that highly sensitive individuals might be easily overwhelmed by both internal and external stimuli (e.g., negative responses to being hungry or thirsty, or to having to experience many things at once); Low Sensory Threshold (LST), which refers and unpleasant sensory arousal to external influences (e.g., reactions to loud noises and bright lights); and Aesthetic Sensitivity (AES), which refers to aesthetic awareness (e.g., being moved by music and arts very deeply). Apart from being a tool which can be utilized with adults, later on the scale was adapted to children, which made it possible for the Highly Sensitive Child Scale to be developed (Pluess et al., 2018).

Additionally, the Environmental Sensitivity meta-framework does make a differentiation between sensitivity types as well (Greven & Homberg, 2020; Pluess, 2015). It has been hypothesized that the combination of specific sensitivity genes and diverse environmental conditions could promote the development of different types of sensitivity (Pluess, 2015). Therefore, it could be said that if the environment tends to be generally neutral, this will facilitate the development of a general sensitivity to both negative and positive environments, which is associated with the Differential Susceptibility theory (Ellis et al., 2011; Greven & Homberg, 2020; Pluess, 2015). If the environment tends to be supportive, this may result in the development of a sensitivity towards thriving and positive environments, which is connected with the Vantage Sensitivity theoretical approach (Pluess, 2015). Lastly, if the environment is predominantly adverse, this could promote the development of a heightened sensitivity towards threatening and negative environmental conditions, which is related

to the Diathesis-Stress theory (Belsky & Pluess, 2009; Greven & Homberg, 2020; Pluess, 2015). Moreover, it has been suggested that adversity in early stages of development can increase sensitivity towards adversity in those individuals carrying sensitivity genes. For instance, adolescents in early institutional care who carried the 5-HTTLPR short allele were more likely to face emotional problems when experiencing recent stressful life events (Pluess, 2015).

The following sections will show different frameworks of environmental sensitivity, which have been developed in the past few years from experts in order to clarify the theoretical aspects of this concept. Thus, five main theories were created to respond the need to fill in the theoretical gaps of environmental sensitivity beyond its merely physical feature.

1.1.1 Sensory Processing Sensitivity theory

This theoretical approach states that the concept of Sensory Processing Sensitivity (SPS) is both a psychological and biological trait which is associated with a strengthened sensitivity to the environmental influence, enhanced awareness, empathy, self-reflection and depth of processing (Acevedo, 2020; Greven & Homberg, 2020; Pluess, 2015). Regarding its origin, it ought to be noted that SPS began to be studied 20 years ago, which had been studying and a vast number of investigations had been carrying out (Aron et al., 2005; 2010; 2012). Additionally, it should be pointed out that the SPS theory was influenced by personality and temperament theories. Specifically, they were the result of qualitative research conducted with children and adults who identified themselves as shy, introverted or easily overwhelmed by environmental stimuli (Greven & Homberg, 2020; Greven et al., 2019). Therefore, it is not unexpected to state that the term of SPS is a concept utilized in science in order to describe the highly sensitive personality (Greven & Homberg, 2020).

From this theoretical perspective, the SPS concept is considered to be an inherited temperament trait which reflects individuals' differences in the way of integrating and analyzing environmental stimuli (Aron et al., 2005; Greven et al., 2019; Lionetti et al., 2019a). In other words, it has been proposed that the SPS term is a measurable personality dimension (de Villiers et al., 2018). According to researchers, SPS is a stable personality trait which emerges in childhood and is shaped by the environment while growing up (Pluess, 2015). Given that it is a minority trait and only a small percentage of the population actually possesses it, which appears to be found in approximately 20% of the population and in more than one hundred species, it could be confirmed the existence of different levels of sensitivity (Aron et al., 2005; Greven & Homberg, 2020; Jagiellowicz et al., 2016, Pluess, 2015). That is, some individuals could be low sensitive and some others could be highly sensitive, but without forgetting about those whose levels of sensitivity are medium (Acevedo, 2020; Lionetti et al., 2018).

As a representation of the idea that sensory processing sensitivity is a continuum ranging from low to high sensitivity to external influences, and also taking into

consideration that there is a medium level of such sensitivity, the dandelion-tulip-orchid metaphor is utilized to describe those patterns (Greven et al., 2019; Lionetti et al., 2018). In the beginning, it was only used the dandelion-orchid metaphor, given that it was only conceived the existence of two levels of environmental sensitivity: low and high (Boyce & Ellis, 2005). According to that allegory, dandelions represent those individuals whose levels of sensitivity to the environment are low, whereas the concept of orchids is utilized to describe those who show higher levels of the exact same sensitivity (Boyce & Ellis, 2005). Nevertheless, when it was discovered the existence of a group of population whose levels of sensitivity to the environment were neither low nor high, but medium, the expression of tulip entered the equation (Lionetti et al., 2018).

In relation to the different sensitivity groups, the first studies carried out on SPS discovered only two groups: low and high levels of SPS (Aron et al., 2005; Greven et al., 2019). That is why SPS tended to be conceived as a category trait, rather than a continuum (Aron et al., 2005; Greven et al., 2019). In spite of this, a recent investigation threw light on this issue, since three groups of sensitivity were found when recruiting individuals ranging from 8 to 19 years old (Pluess et al., 2018). In fact, the percentages of such groups were as follows: low (25-35%), medium (41-47%), and high (20-35%) sensitive groups (Pluess et al., 2018). Because of that, it has been suggested that the trait of SPS is not a category concept, but a continuous trait, which will explain that individuals fall into three different sensitivity classes (Greven et al., 2019; Pluess et al., 2018) (read more in Chapter 2).

Regarding those individuals who are highly sensitive, from the SPS perspective they are quite sensitive to subtleties since they have a greater awareness of the environment and a low sensory threshold when it comes to perceiving information (Aron et al., 2005; Chavez et al., 2021; Greven & Homberg, 2020; Iimura & Kibe, 2020). Due to such a low sensory threshold, they are easily overstimulated by stimuli and have an increased emotional and physiological reactivity to the environmental influences (Aron et al., 2005; Greven & Homberg, 2020; Iimura & Kibe, 2020). What is more, they process information in depth and more thoroughly (Aron et al., 2005; Greven & Homberg, 2020; Iimura & Kibe, 2020). In novel situations they are easily overstimulated, apart from needing more time to observe and being less likely to act owing to that novelty (Aron et al., 2005; Chavez et al., 2021; Greven & Homberg, 2020; Lionetti et al., 2019a).

Furthermore, some genetic studies have found an association between SPS and the short allele of the serotonin transporter polymorphism (5-HTTLPR, Aron et al., 2005), or with the dopamine receptor D4 gene (DRDR; Greven et al., 2019). Nevertheless, that is not the only association which has come to light, because it has also been found that the dopamine system contributes in fact to the highly sensitive personality trait (Chen et al., 2011). One of the reasons for this is the fact that the dopaminergic system is related to attentional, motivational and reward processes (Pluess & Belsky, 2013). Apart from genetics, differences in SPS are also associated with a more sensitive central nervous system (Pluess, 2015).

Similar to the Differential Susceptibility and the Biological Sensitivity to Context theories, this theoretical contribution makes reference to those inter-individual differences in sensitivity, independent of being in a positive or negative environment (Bröhl et al., 2020; Chavez et al., 2021). One difference between the two aforementioned theories and the SPS theory is their origin. While the former was developed from childhood developmental approaches, the latter emerged from research and perspectives in adults and focused on individual differences in cognitive processes and emotional reactivity (Greven & Homberg, 2020). What makes the SPS model unique is the fact that it is the first theory to conceive sensitivity to the environment as a personality trait, which is reflected in emotional reactivity, depth of processing, sensitivity to subtleties, ease of overstimulation and empathy (Greven & Homberg, 2020).

Focusing on the core elements of the SPS theory, there exists an acronym which is rather useful to remember them, which is “DOES” (Greven et al., 2019). The first letter stands for the depth of processing, which can be observed in highly sensitive individuals. Principally, it makes reference to the tendency to employ more complex and deeper processing strategies in order to plan an effective course of actions (Aron et al., 2012; Homberg et al., 2016). Owing to the deployment of such complex strategies, it is obvious why SPS has been linked to “pause to check”, since highly sensitive individuals do need more time to process stimuli exhaustively, mainly in novel situations (Aron et al., 2005; Homberg et al., 2016).

The second letter of the acronym, the O, is for overstimulation. Without a shred of doubt, highly sensitive individuals are easily overstimulated, which can lead them to generally withdraw from social contexts, to experience shyness or even to have a poorer decision-making process (Homberg et al., 2016; Greven et al., 2019). This characteristic would explain why individuals high on SPS, in comparison to those whose levels of SPS were lower, work faster and more accurately on difficult perceptual tasks, but feel more stressed when doing such tasks (Homberg et al., 2016).

The third letter of the acronym, the E, stands for emotional reactivity, as well as physiological stress reactivity and arousability (Aron et al., 2012; Pluess, 2015). According to SPS theory, the trait is characterized by having stronger emotional responses (both positive and negative), and empathy to others’ affective cues (Acevedo et al., 2018). In fact, a fMRI investigation studied participants’ response to viewing photos of partners and strangers with negative and positive facial expressions (Acevedo et al., 2014). Its results indicated that SPS had an association with more activation in brain regions associated with empathy, such as the inferior frontal gyrus and the insula (Acevedo et al., 2014). Other research studies have determined activations unique to SPS that have been shown in neural structures related to reward processing, physiological homeostasis and pain-control, self-other processing, awareness and reflective-thinking, and self-control (Acevedo et al., 2018). Moreover, SPS have shown clear activations in amygdala, hippocampus, and hypothalamus, which are associated with emotional, self-control and executive function (Acevedo et al., 2018). This would suggest that highly sensitive individuals integrate sensory information to a greater degree in response to others’ affective states (Homberg et al., 2016).

The fourth and last letter of the aforementioned acronym, the S, is for subtleties. This means that highly sensitive individuals show greater awareness of environmental subtleties, such as lightning or smells, due to possessing a heightened sensitivity to subtle stimuli (Greven et al., 2019; Homberg et al., 2016).

As a matter of fact, there are several studies in which it was analyzed the relationship between SPS theory and other personality and temperamental theories. The main personality theories which have been compared to the SPS model in different studies are Eysenck's personality theory (Aron & Aron, 1997), Gray's Reinforcement Sensitivity theory (Amiri & Navab, 2019; Pluess et al., 2018), Rothbart's temperamental model (Evans & Rothbart, 2006; Sobocko & Zelenski, 2015), and McCrae and Costa five-factor model of personality (Assary et al., 2020; Bröhl et al., 2020).

Focusing on Eysenck's personality theory, one article carried out seven studies to examine the relationship between that theory and the SPS model (Aron & Aron, 1997). Its results indicate that there was a positive correlation between introversion and environmental sensitivity ($r = 0.29$; $p < 0.01$) (Aron & Aron, 1997).

Regarding Gray's Reinforcement Sensitivity theory, different studies have found positive and moderate correlations between SPS and Behavioral Inhibition System (Pluess et al., 2018; Sobocko & Zelenski, 2015). Nevertheless, some other investigations have discovered positive but weaker associations between SPS and Behavioral Activation System (Şengül-İnal et al., 2018; Smolewska et al., 2006).

As for Rothbart's temperamental model, some studies found strong and positive correlations between negative affectivity, sensory discomfort, ease of excitation (EOE) and low sensory threshold (LST) (Evans & Rothbart, 2008; Sobocko & Zelenski, 2015). It must be pointed out that EOE and LST are two of the three factors into which the HSPS is divided. However, another study found low associations between such variables (Pluess et al., 2018).

Concerning McCrae and Costa's five-factor model of personality, some consistent and moderate to strong correlations between the sensitivity trait and neuroticism were found, which might reflect a strengthened sensitivity to negative environmental conditions (Lionetti et al., 2019a). Moreover, negative correlations were found as well between SPS and extraversion (Lionetti et al., 2018; Smolewska et al., 2006). In the case of openness, studies have found a positive association with SPS, and even a strong one with the third factor of the HSPS, which is known as aesthetic sensitivity (AES; Lionetti et al., 2018; Şengül-İnal et al., 2018). As for conscientiousness and agreeableness, significant correlations were found only with AES (Lionetti et al., 2018; Sobocko & Zelenski, 2015).

One of the questions which have arisen owing to the relationship between the aforementioned theories is whether the construct of SPS could already be captured by other temperamental traits. Despite having found a moderate relationship between personality traits and SPS, some meta-analyses have gathered enough information to support the fact that the construct of SPS is indeed a largely distinct trait (Lionetti et al., 2018). On the whole, and even if these theories are different from each other and possess unique defining aspects, all of them have in common the

fact that they reflect how individuals differ in response to the environment (Greven & Homberg, 2020).

1.1.2 Differential Susceptibility theory

The Differential Susceptibility approach, which is influenced by evolutionary theories and developmental psychology, suggests that highly susceptible individuals are more predisposed to be negatively affected by adverse conditions in the environment (Chavez et al., 2021; Greven et al., 2019). However, this theory also posits that those individuals are more likely to take advantage and benefit from positive and thriving environmental conditions (Pluess, 2015; Slagt et al., 2017). Moreover, from this theoretical approach it has been proposed that some individuals might be more sensitive in a physiological and neurological way (de Villiers et al., 2018). This, in fact, causes them to process, perceive, and react to environmental stimuli more strongly (de Villiers et al., 2018).

As for the reasons why some individuals may be more influenced, both positively and negatively depending on the environment, it has been argued it is due to a strategy of evolution (Greven et al., 2019; Iimura & Kibe, 2020). What this means is that in order for nature to maintain fitness and diversity of species, there are differences in sensitivity. Such differences (low and high sensitivity) represent two developmental strategies, which are low and high plasticity (Belsky and Pluess, 2009; Greven et al., 2019; Lionetti et al., 2019b). Instead of speaking in terms of “vulnerability”, it is about being “developmentally plastic” or “malleable” (Pluess & Belsky, 2013).

Even though the Diathesis-Stress and Differential Susceptibility theories appear to be similar, there is a substantial difference between the two of them. While the former posits that some individuals tend to be more easily affected by environmental adversities, the latter states that apart from being more likely to be affected negatively, they could also benefit more from thriving conditions in the environment (Greven et al., 2019; Pluess & Belsky, 2013). Notwithstanding, it must be highlighted that the Diathesis-Stress theory is integrated in the Differential Susceptibility framework, alongside the Vantage Sensitivity theory (Greven et al., 2019).

Regarding empirical evidence which supports the Differential Susceptibility theory, and consequently, the hypothesis that highly sensitive individuals might be both positively and negatively affected by environmental conditions, there are few studies. To cite one example, one investigation focused on the effect of environmental sensitivity on negative affectivity and adverse parental environment (Belsky & Pluess, 2009). Specifically, it was found that while highly sensitive individuals scored higher on negative affectivity when having reported a tricky and complicated childhood, they obtained lower scores on negative affect when they did not have such a troubled infancy (Aron et al., 2005). This suggests that while highly sensitive individuals might be negatively influenced by adverse conditions, they might as well benefit disproportionately from thriving and positive environments, which

supports the Differential Susceptibility theoretical approach (Aron et al., 2005). Another investigation aimed at kindergarten children compared negative emotionality and environmental sensitivity as susceptibility markers (Slagt et al., 2017). Notwithstanding, it was found that children's negative emotionality was not related to changes in child behavior and changes in parenting. In fact, it was also discovered that environmental sensitivity interacted with both positive and negative parenting in predicting externalizing behavior, but that was not the case for prosocial behavior. This meant that externalizing behavior decreased when negative parenting decreased in highly sensitive children, but those types of behaviors did also increase when negative parenting increased, which supports the Differential Susceptibility model (Slagt et al., 2017).

Given that the Differential Susceptibility approach can be conceived as a combination of two opposite theories, both of them are presented in order to understand their origins and how they have evolved until becoming the two sides of the same coin. This is what is known as the dark and bright sides of sensitivity to the environment.

1.1.3 Diathesis-Stress theory

The Diathesis-Stress theory, also called the transactional or dual-risk model, posits that some individuals possess certain characteristics which make them more susceptible to risks or threats in the environment (Belsky & Pluess, 2009). This implies that those individuals are at higher risk of being negatively affected by environmental adversities, and therefore, they are more likely to develop diseases when facing environmental stressors (Belsky & Pluess, 2009; Greven & Homberg, 2020; Iimura, 2021). As a matter of fact, it is called the dual-risk model as well because of the interaction between vulnerability factors and stressors coming from the environment (Belsky & Pluess, 2009; Greven & Homberg, 2020). Among the vulnerability factors, there are behavioral, genetic, or physiological ones (Belsky & Pluess, 2009; Greven & Homberg, 2016; Uher & McGuffin, 2008). Another conceptualization of this model could be the dark side of sensitivity to environmental influences (Iimura, 2021).

Furthermore, the Diathesis-Stress model postulates that psychological problems are caused indeed by the interaction between two factors. On the one hand, there exists an individual's inherent tendency to vulnerability. On the other hand, there is some type of external stimuli which causes stress. In other words, if an individual who is more likely predisposed to experiences some kind of stressor, they could face some problems as a consequence of that combination (Belsky & Pluess, 2009; de Villiers et al., 2018).

As for the vulnerability factors which have been linked to a heightened sensitivity to the environment, they can be genetic (e.g., short allele of the serotonin transporter gene polymorphism), behavioral/temperamental (e.g., negative emotionality or difficult temperament), and physiological (e.g., high physiological

reactivity) (Belsky & Pluess, 2009; Greven & Homberg, 2020; Greven et al., 2019; Lionetti et al., 2018).

There are few studies which support the hypothesis of the Diathesis-Stress theory related to high sensitivity, that is, the suggestion that some highly sensitive individuals, when experiencing some stressful situations and possessing certain types of inherent vulnerability factors, might suffer more the negative consequences of environmental adversities (Aron & Aron, 1997; Belsky & Pluess, 2009; Booth et al., 2015; Liss et al., 2005). For instance, a study found an interaction between environmental sensitivity and parenting. Specifically, it was found that highly sensitive individuals who reported having an unhappy childhood obtained higher scores on social introversion and negative emotionality, whereas there was no difference between highly and non-highly sensitive individuals on those traits when they reported having a happy childhood (Aron & Aron, 1997; Belsky & Pluess, 2009). Furthermore, in another investigation, individuals whose scores indicated high levels of environmental sensitivity reported the highest depression scores, but only when parental care was low (Liss et al., 2005). However, when parental quality was high, environmental sensitivity scores were not correlated with depression scores (Liss et al., 2005). Another study focused on the effect of environmental sensitivity on life satisfaction and childhood experiences (Booth et al., 2015). Its results indicate that highly sensitive people reported lower life satisfaction when having experienced a negative childhood. Nevertheless, there was no such difference observed in life satisfaction between highly and non-highly sensitive participants when it comes to reporting positive childhood experiences (Booth et al., 2015).

1.1.4 Vantage Sensitivity theory

As a result of the conceptualization of both the Diathesis-Stress and Differential Susceptibility theories, the focus started to be placed on the evaluation of the positive effects of interventions, rather than persisting in paying more attention to inter-individual differences in responsivity to negative conditions in the environment (Greven & Homberg, 2020). One concept which has emerged over the past year is what is known as the “bright side” of susceptibility to the environment and it is in accordance with what Vantage Sensitivity theory symbolizes (de Villiers et al., 2018; Iimura, 2021; Pluess & Belsky, 2013). Basically, Vantage Sensitivity is a concept which represents the tendency of highly sensitive individuals to take advantage of certain positive conditions in the environment, and benefit in a disproportionate way from support and enrichment, and from thriving experiences, such as intervention programs (Iimura, 2021; Lionetti et al., 2019b; Pluess & Belsky, 2013). Other expressions utilized in order to describe this theoretical approach are the bright side of sensitivity to the environment (Iimura, 2021).

Concerning the underlying factors which explain individual differences in Vantage Sensitivity, there are genetic (e.g., serotonin transporter-linked polymorphic region), physiological (e.g., cortisol reactivity) and psychological characteristics

(e.g., negative emotionality in early stages of development) (de Villiers et al., 2018; Pluess, 2015; Pluess & Boniwell, 2015). Therefore, it has been proposed that those individuals who have such characteristics, when experiencing an extreme but positive situation, will have their levels of physical and cognitive functioning increased, whereas those who lack such factors will maintain their level of optimal organism functioning (Pluess & Belsky, 2013).

Recent data which supports the hypothesis that some individuals do in fact benefit more from positive experiences comes from different school-based interventions (Iimura, 2021). To cite one example, Pluess & Boniwell (2015) analyzed whether there were differences between the two sensitivity groups before and after taking part in a school-based intervention aimed at preventing depression. Its results suggested that those girls scoring high on Sensory Processing Sensitivity did in fact benefit from the intervention, since their depression scores lowered. Nevertheless, when comparing with the non-highly sensitive girls, the school-based intervention was not successful (Pluess & Boniwell, 2015). Another study utilized a school-based anti-bullying intervention aimed at children (Nocentini et al., 2018). Specifically, its results reflected that highly sensitive boys, compared to those who did not score high on that personality trait, benefited significantly more than non-highly sensitive boys, in terms of reduced internalizing problems and victimization. Therefore, these findings provide evidence to support the Vantage Sensitivity model.



Each of these theories mentioned (Diathesis-Stress, Sensory Processing Sensitivity, Differential Susceptibility, Biological Sensitivity to context, and Vantage Sensitivity) attempt to explain the construct of environmental sensitivity. They also tried to determine the impact of the environment through a meta-framework, including the theories created before. However, what do you think about the characteristics they share? What do you think about the different proposals?

1.2 Biological Sensitivity to Context theory

As for this theoretical approach, the focus is on physiological differences in reactivity to the environment and its stimuli, or even stress (e.g., immune reactivity, arterial pressure, cortisol production) (Boyce & Ellis, 2005). As a matter of fact, this theory suggests that early exposure to extreme conditions in the environment, both positive and negative, increases an individual's neurobiological susceptibility (Boyce & Ellis, 2005; Gunnar, 1994). This means that environmental influences can have an impact on shaping differences in sensitivity to the environment over time (Aron & Aron, 1997; Greven et al., 2019; Pluess, 2015). That is, those individuals who are exposed to thriving or adverse environmental conditions might develop a higher physiological reactivity and, therefore, a heightened sensitivity to the environment (Kohn, 1991; Lionetti et al., 2019b; Pluess, 2015).

Consequently, neurobiological susceptibility to extreme positive or negative environments reflects a strengthened reactivity in stress response systems (Aron & Aron, 1997; Boyce & Ellis, 2005; Ellis & Boyce, 2011; Greven et al., 2019). What is more, it has been found that both environmental and genetic factors do play a vital role in the adjustment of biological stress response systems during stages of early development. In fact, the neurobiological systems are characterized by a notorious early plasticity (Boyce & Ellis, 2005). All of this entails that not only do stress response systems increase susceptibility to adverse environments, but they also increment susceptibility to supportive conditions (Boyce & Ellis, 2005; Greven et al., 2019).

Based on the statement that individual differences in stress reactivity represent variations in susceptibility to both negative and positive features of the environment, it is proposed by this theoretical approach a U-shaped and curvilinear relationship between encouragement versus stress in early stages of development and the creation of Biological Sensitivity to Context (Boyce & Ellis, 2005; Greven & Homberg, 2020). Basically, this would reflect how individuals who experience very stressful situations in their early infancy might develop strengthened reactivity profiles. Whereas those children who experience the opposite, that is, thriving and encouraging situations in their early childhood, could in fact develop heightened reactivity profiles as well (Boyce & Ellis, 2005). Regarding those individuals who are raised in supportive environments, it could be said that their levels of biological sensitivity to context are lower, and they would also be represented in the U-shaped curvilinear relationship postulated by this model as can be seen in Figure 1 (Boyce & Ellis, 2005; Greven & Homberg, 2020).

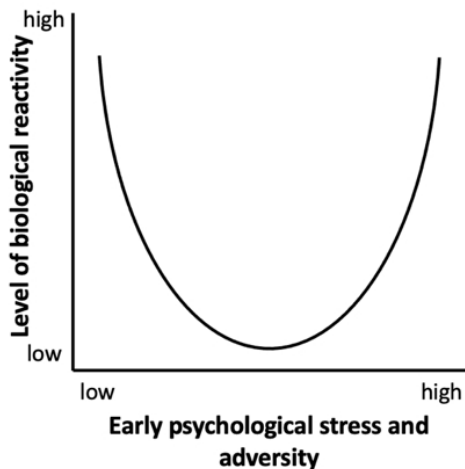


Figure 1.1. Biological sensitivity to context (Boyce & Ellis, 2005). U-shaped curvilinear relationship between level of biological reactivity and psychological stress.

Unlike the Differential Susceptibility or Sensory Processing Sensitivity theories, the Biological Sensitivity to Context emphasizes how crucial it is the role that early environmental influences play in shaping differences in sensitivity to the environment (Greven et al., 2019; Pluess, 2015). Therefore, the importance placed on genetics by the Differential Susceptibility theory is not the central aspect by which the Biological Sensitivity to Context theory is characterized (Greven et al., 2019). Without a shred of doubt, they play a role in the model, given that individuals who are genetically predisposed to becoming environmentally sensitive are more likely to do so, but only when exposed to very stressful or supportive environments during childhood (Boyce & Ellis, 2005; Greven & Homberg, 2020).

1.2.1 Illustrative representation of the environmental sensitivity meta-framework

Given that sensitivity to the environment can be studied and examined from different theoretical perspectives, the different models of environmental sensitivity are presented. As can be seen in Figure 2, the key aspects of each theory are synthesized in order to better understand what each model represents.

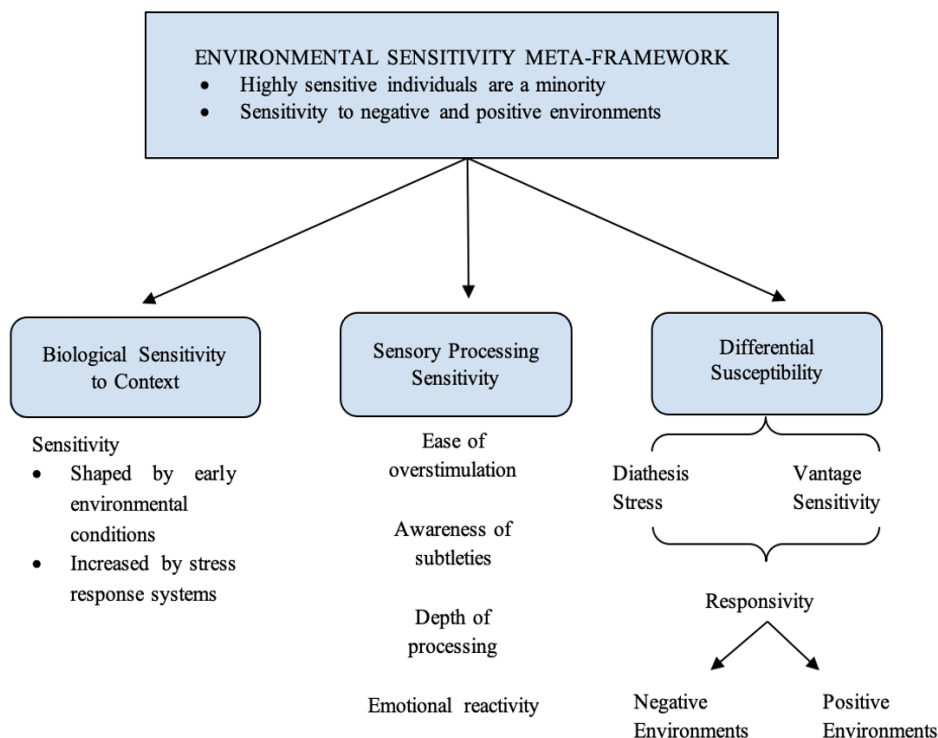
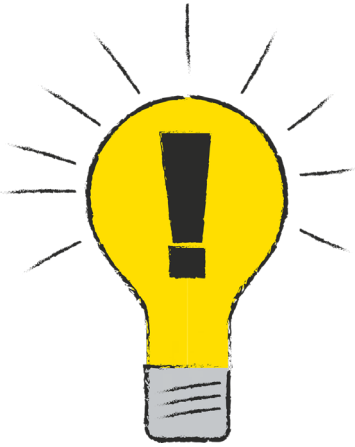


Figure 1.2. Models of Environmental Sensitivity (Greven et al., 2019).

From the Environmental Sensitivity meta-framework, the Neurosensitivity hypothesis was postulated (Greven & Homberg, 2020; Pluess, 2015). It is suggested by this hypothesis that both early environments and sensitivity genes, as well as their interaction, can shape the sensitivity of the central nervous system (Greven & Homberg, 2020; Pluess, 2015). In other words, the sensitivity of the central nervous system is determined by the effect and interaction of environmental and genetic factors. Perhaps, this would be the results observed in the study by Acevedo et al. (2021). In which they examined brain connectivity by functional magnetic resonance imaging in 15 healthy adults (9 women and 6 men) by observing them in a resting state after completing a social affective empathy task. The results showed that highly sensitive (vs. low sensitive) individuals had enhanced patterns of neural connectivity within the ventral attention, dorsal attention and limbic networks following the affective/social task. These brain regions play a role in memory consolidation, physiological homeostasis and deliberative cognitive processing. In fact, these findings support the fact that depth of processing is a key element of environmental sensitivity. Indeed, these findings support the fact that depth of processing is a key element of environmental sensitivity. Given that some individuals possess a higher degree of sensitivity in the way they process sensory information, that might entail a greater likelihood for the development of psychopathology. In fact, although sensitivity and sensory processing are similar but not the same terms, a recent systematic review analyzed fourteen studies in order to prove whether there was an association between sensory processing and quality of life (Costa-López et al., 2021). Despite these results indeed indicate a negative, moderate and significant association between these variables (Costa-López et al., 2021), this trait has been also labeled as a 'bright side', promoting a positive health functioning in response to positive environments (Sweitzer et al., 2012). Highly sensitive individuals may therefore take the form of security of attachment from sensitive parenting, academic achievement resulting from high-quality childcare, prosocial behaviors due to supportive social networks, and life satisfaction stemming from positive life events (Pluess & Belsky, 2012).



Remember

- Environmental Sensitivity has been defined as the ability to perceive and process external stimuli.
- Individual differences in Environmental Sensitivity are shaped by both genetic factors and environmental influences.
- Only a small percentage of the population is highly sensitive.
- The most renowned theories on individual differences in sensitivity to the environment are: Sensory Processing Sensitivity, Differential Susceptibility and Biological Sensitivity to Context.
- Environmental Sensitivity was postulated as an attempt to integrate every theoretical contribution in the field of individual differences in sensitivity to the environment.
- Highly sensitive individuals might be positively influenced by thriving environments, and negatively affected by adverse ones.

Summary

All of the aforementioned theories explained (Diathesis-Stress, Sensory Processing Sensitivity, Differential Susceptibility, Biological Sensitivity to context, and Vantage Sensitivity) are characterized by being unique, but at the same time they share some key aspects. In fact, they all try to explain the reasons why some individuals develop and show greater sensitivity and responsiveness to the environment. Perhaps, every model proposed could partially be true and what could differ is the type of environment in which individuals are immersed, which would therefore shape the type of sensitivity to the environment that will be developed. This would be related to the sensitivity types described in the meta-framework of environmental sensitivity, as described in this chapter. Nevertheless, those sensitivity types are to be examined in an empirical way.

As a matter of fact, future research ought to make use of longitudinal and experimental studies, given that correlational investigations do have their limitations. Not only should participants be imagined in perceived negative conditions in the environment, but they should also be exposed to positive environments in order to examine the veracity of the different theoretical approaches. The main reason is that controlling both positive and negative environmental variables will provide the scientific community with reliable empirical data. Apart from that, this would also be beneficial, since the trait of sensory processing sensitivity would achieve more empirical evidence to support its uniqueness. Additionally, this would help distinguish the sensory processing sensitivity trait from other temperamental and personality constructs.

Furthermore, it is of the utmost importance to understand how the central hypothesized characteristics in the Sensory Processing Sensitivity model are related to each other. This means that it is necessary to know the relationship between ease of stimulation, depth of processing, sensitivity to subtleties in the environment, and emotional reactivity and empathy. Additionally, it remains unclear the role that the biological systems play in responsivity. That is, it is still unknown if the same biological systems which support sensitivity to adverse conditions in the environment are also the ones which are related to sensitivity to positive environmental conditions.

By knowing better and profoundly the sensory processing sensitivity construct, it could also be possible and achievable to prevent some problems that highly sensitive individuals might face throughout their life cycle, as a consequence of being much more sensitive to the environment. By the same token and taking into consideration that experiences in early stages of life have a profound impact on individuals' sensitivity, some interventions could be promoted from the educational point of view. In this way, individuals high in sensory processing sensitivity could disproportionately benefit from such interventions, which will decrease the likelihood of developing diseases or illnesses in the long term.

All in all, every theoretical approach on the field of environmental sensitivity provides specific information to explain why some individuals differ in the

responsivity they show and possess towards the environment. In fact, there is empirical evidence which supports the different sensitivity models, as it has been explained in the different sections of this chapter. Therefore, the emerging picture seems to be complex and there is a strong need to continue studying the construct of environmental sensitivity, given that it has a vast number of implications for those who show much more sensitivity to the environment. One of those is the possible relationship that exists between sensory processing sensitivity and quality of life, as it has already been addressed in this chapter. That is the reason why highly sensitive individuals must be provided with the suitable and appropriate tools and skills, so that they can cope with stressful situations on a daily basis and in every context of their life. As a matter of fact, this could be beneficial for their quality of life, well-being and daily functioning, given that they could face problems and despite being predisposed to be negatively influenced by adverse conditions, they could solve them adequately and in a healthy way.



Revision questions

Read the following statements related to the chapter and guess if they are True or False. Then, justify your response if needed.

1. The concept of environmental sensitivity implies the perception and processing, not only of the intern stimuli, but also of the sensory, physical and social extern stimuli.
2. Most of the general population can be categorized as highly sensitive to environmental stimuli.
3. The Sensory Processing Sensitivity Theory suggests that the environmental sensitivity could be understood as a personality trait.
4. From the Sensory Processing Sensitivity Theory, highly sensitive people tend to avoid environmental stimuli. They therefore may present less awareness of the environment and process the information in a general manner. They could point out less emotional and physiological response to environmental influences.
5. It is known that the noradrenergic system is associated with the sensitivity trait, and its relationship with the attentional, motivational and rewarding processes.
6. The acronym DOES refers to the depth of processing, ease of overstimulation, empathy, emotional reactivity, and sensitivity to subtleties.
7. The Differential Susceptibility theory hypothesizes the relationship between Diathesis-Stress theory and high sensitivity.
8. The Differential Susceptibility Theory highlights the tendency of the highly sensitive individuals to take advantage of the positive features of the environment, and to benefit





from the support and intervention programs, in which they work out other psychological variables.

9. The Biological Sensitivity to Context Theory suggests that individuals, who are genetically predisposed to be highly sensitive, present more likelihood to present high sensitivity in stressful of supportive contexts during their childhood.
10. The Neurosensitivity approach points out that both genetic and environmental factors determine the sensitivity of the central nervous system. Due to this, some individuals may present a high level of sensitivity when processing information, considering this trait as a protector factor to copy psychopathologies.

Bibliography

- Acevedo, B. P. (2020). The basics of sensory processing sensitivity. In B. P. Acevedo (Ed.), *The Highly Sensitive Brain. Research, Assessment, and Treatment of Sensory Processing Sensitivity* (pp. 1-15). <https://doi.org/10.1016/C2018-0-03130-8>
- Acevedo, B. P., Aron, E. N., Aron, A., Sangster, M. D., Collins, N., & Brown, L. L. (2014). The highly sensitive brain: an fMRI study of sensory processing sensitivity and response to others' emotions. *Brain and behavior*, 4(4), 580–594. <https://doi.org/10.1002/brb3.242>
- Acevedo, B., Aron, E., Pospos, S., & Jessen, D. (2018). The functional highly sensitive brain: a review of the brain circuits underlying sensory processing sensitivity and seemingly related disorders. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 373(1744), 20170161.
- Acevedo, B. P., Jagiellowicz, J., Aron, E., Marhenke, R., & Aron, A. (2017). Sensory processing sensitivity and childhood quality's effects on neural responses to emotional stimuli. *Clinical Neuropsychiatry*, 14(6), 359-272.
- Acevedo, B. P., Santander, T., Marhenke, R., Aron, A., & Aron, E. (2021). Sensory Processing Sensitivity Predicts Individual Differences in Resting-State Functional Connectivity Associated with Depth of Processing. *Neuropsychobiology*, 80(2), 185–200. <https://doi.org/10.1159/000513527>
- Amiri, S., & Navab, A. G. (2019). Emotion regulation, brain behavioural systems, and sensory sensitivity in sociocultural attitudes towards appearance in adolescents. *Neuropsychiatry i Neuropsychologia*, 14, 32-38. <https://doi.org/10.5114/nan.2019.87726>
- Aron, E. N., & Aron, A. (1997). Sensory-processing sensitivity and its relation to introversion and emotionality. *Journal of personality and social psychology*, 73(2), 345–368. <https://doi.org/10.1037//0022-3514.73.2.345>
- Aron, E. N., Aron, A., & Davies, K. M. (2005). Adult shyness: the interaction of temperamental sensitivity and an adverse childhood environment. *Personality and Social Psychology Bulletin*, 31(2), 181-197. <https://doi.org/10.1177/0146167204271419>
- Aron, E. N., Aron, A., & Jagiellowicz, J. (2012). Sensory processing sensitivity: a review in the light of the evolution of biological responsivity. *Personality and social psychology review: an official journal of the Society for Personality and Social Psychology, Inc*, 16(3), 262–282. <https://doi.org/10.1177/1088868311434213>
- Aron, A., Ketay, S., Hedden, T., Aron, E. N., Rose Markus, H., & Gabrieli, J. D. (2010). Temperament trait of sensory processing sensitivity moderates cultural differences in neural response. *Social cognitive and affective neuroscience*, 5(2-3), 219–226. <https://doi.org/10.1093/scan/nsq028>
- Assary, E., Zavos, H., Krapohl, E., Keers, R., & Pluess, M. (2020). Genetic architecture of Environmental Sensitivity reflects multiple heritable components: a twin study with adolescents. *Molecular Psychiatry*, 26, 4896-4904. <https://doi.org/10.1038/s41380-020-0783-8>

- Belsky, J. (1997) Variation in Susceptibility to Environmental Influence: An Evolutionary Argument. *Psychological Inquiry*, 8(3), 182-186. https://doi.org/10.1207/s15327965pli0803_3
- Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: differential susceptibility to environmental influences. *Psychological bulletin*, 135(6), 885–908. <https://doi.org/10.1037/a0017376>
- Booth, C., Standage, H., & Fox, E. (2015). Sensory-processing sensitivity moderates the association between childhood experiences and adult life satisfaction. *Personality and Individual Differences*, 87, 24-29. <https://doi.org/10.1016/j.paid.2015.07.020>
- Boyce, W. T., & Ellis, B. J. (2005). Biological sensitivity to context: I. An evolutionary-developmental theory of the origins and functions of stress reactivity. *Development and psychopathology*, 17(2), 271–301. <https://doi.org/10.1017/S0954579405050145>
- Bröhl, A. S., Leeuwen, K. V., Pluess, M., De Fruyt, F., Bastin, M., Weyn, S., Goossens, L., & Bijttebier, P. (2020). First look at the five-factor model personality facet associations with sensory processing sensitivity, *Current Psychology*. <https://doi.org/10.1007/s12144-020-00998-5>
- Chavez, C., De Pauw, S., Van IJzendoorn, M. H., De Maat, D. A., Kok, R., & Prinzie, P. (2021). No differential susceptibility or diathesis stress to parenting in early adolescence: personality facets predicting behaviour problems. *Personality and Individual Differences*, 170(1), 110406. <https://doi.org/10.1016/j.paid.2020.110406>
- Costa-López, B., Ferrer-Cascales, R., Ruiz-Robledillo, N., Albaladejo-Blázquez, N., & Baryła-Matejczuk, M. (2021). Relationship between Sensory Processing and Quality of Life: A Systematic Review. *Journal of clinical medicine*, 10(17), 3961. <https://doi.org/10.3390/jcm10173961>
- De Villiers, B., Lionetti, F., & Pluess, M. (2018). Vantage sensitivity: a framework for individual differences in response to psychological intervention. *Social Psychiatry and Psychiatric Epidemiology: The International Journal for Research in Social and Genetic Epidemiology and Mental Health Services*, 53(6), 545-554. <https://doi.org/10.1007/s00127-017-1471-0>
- Dunn, W. (2007). Supporting children to participate successfully in everyday life by using sensory processing knowledge. *Infants and Young Children*, 20(2), 84-101. <https://doi.org/10.1097/01.IYC.0000264477.05076.5d>
- Ellis, B. J., & Boyce, W. T. (2011). Differential susceptibility to the environment: toward an understanding of sensitivity to developmental experiences and context. *Development and psychopathology*, 23(1), 1–5. <https://doi.org/10.1017/S095457941000060X>
- Ellis, B. J., Boyce, W. T., Belsky, J., Bakermans-Kranenburg, M. J., Van IJzendoorn, M. H. (2011). Differential susceptibility to the environment: An evolutionary-neurodevelopmental theory. *Development and Psychopathology*, 23(1), 7–28. DOI: 10.1017/S0954579410000611

- Evans, D. E., & Rothbart, M. K., (2008). Temperamental sensitivity: Two constructs or one? *Personality and Individual Differences*, 44(1), 108-118. <https://doi.org/10.1016/j.paid.2007.07.016>
- Gottesman, I. I., & Shields, J. (1967). A polygenic theory of schizophrenia. *Proceedings of the National Academy of Sciences of the United States of America*, 58(1), 199-205. <https://doi.org/10.1073/pnas.58.1.199>
- Greven, C. U., & Homberg, J. R. (2020). Sensory processing sensitivity— For better or for worse? Theory, evidence, and societal implications. In B. P. Acevedo (Ed.), *The Highly Sensitive Brain. Research, Assessment, and Treatment of Sensory Processing Sensitivity* (pp. 51-74). <https://doi.org/10.1016/C2018-0-03130-8>
- Greven, C. U., Lionetti, F., Booth, C., Aron, E. N., Fox, E., Schendan, H. E., Pluess, M., Bruining, H., Acevedo, B., Bijtbeier, P., & Homberg, J. (2019). Sensory Processing Sensitivity in the context of Environmental Sensitivity: a critical review and development of research agenda. *Neuroscience and biobehavioral reviews*, 98, 287-305. <https://doi.org/10.1016/j.neubiorev.2019.01.009>
- Gunnar, M. R. (1994). Psychoendocrine studies of temperament and stress in early childhood: Expanding current models. In J. E. Bates & T. D. Wachs (Eds.). *Temperament: Individual differences at the interface of biology and behavior*, pp. 175-198. Washington, DC: American Psychological Association.
- Hankin, B. L., & Abela, J. R. (Eds.). (2005). *Development of psychopathology: A vulnerability-stress perspective*. Sage Publications.
- Homberg, J. R., Schubert, D., Asan, E., & Aron, E. N. (2016). Sensory processing sensitivity and serotonin gene variance: Insights into mechanisms shaping environmental sensitivity. *Neuroscience and Biobehavioral Reviews*, 71, 472-283. <https://doi.org/10.1016/j.neubiorev.2016.09.029>
- Iimura, S., & Kibe, C. (2020). Highly sensitive adolescent benefits in positive school transitions: Evidence for vantage sensitivity in Japanese high-schoolers. *Developmental psychology*, 56(8), 1565-1581. <https://doi.org/10.1037/dev0000991>
- Iimura S. (2021). Highly sensitive adolescents: The relationship between weekly life events and weekly socioemotional well-being. *British journal of psychology (London, England: 1953)*, 112(4), 1103-1129. <https://doi.org/10.1111/bjop.12505>
- Jagiellowicz, J., Aron, A., & Aron, E. (2016). Relationship between the temperament trait of sensory processing sensitivity and emotional reactivity. *Social behavior and personality*, 44(2), 185-200. <https://doi.org/10.2224/sbp.2016.44.2.185>
- Jagiellowicz, J., Xu, X., Aron, A., Aron, E., Cao, G., Feng, T., & Weng, X. (2011). The trait of sensory processing sensitivity and neural responses to changes in visual scenes. *Social cognitive and affective neuroscience*, 6(1), 38-47. <https://doi.org/10.1093/scan/nsq001>
- Kohn, P. M. (1991). Reactivity and anxiety in the laboratory and beyond. In J. Strelau & A. Angleitner (Eds.). *Explorations in temperament: International perspectives on theory and measurement*. London: Plenum Press.

- Lionetti, F., Aron, A., Aron, E. N., Burns, G. L., Jagiellowicz, J., & Pluess, M. (2018). Dandelions, tulips and orchids: evidence for the existence of low-sensitive, medium-sensitive and high-sensitive individuals. *Translational psychiatry*, 8(1), 24. <https://doi.org/10.1038/s41398-017-0090-6>
- Lionetti, F., Pastore, M., Moscardino, U., Nocentini, A., Pluess, K., & Pluess, M. (2019a). Sensory Processing Sensitivity and its association with personality traits and affect: a meta-analysis. *Journal of Research in Personality*, 81(4), 138-152. <https://doi.org/10.1016/j.jrp.2019.05.013>
- Lionetti, F., Aron, E. N., Aron, A., Klein, D. N., & Pluess, M. (2019b). Observer-rated environmental sensitivity moderates children's response to parenting quality in early childhood. *Developmental Psychology*, 55(11), 2389-2402. <https://doi.org/10.1037/dev0000795>
- Liss, M., Timmel, L., Baxley, K., & Killingsworth, P. (2005). Sensory processing sensitivity and its relationship to parental bonding, anxiety, and depression. *Personality and Individual Differences*, 39(8), 1429-1439. <https://doi.org/10.1016/j.paid.2005.05.007>
- May, A. K., Norris, S. A., Richter, L. M., & Pitman, M. M. (2020). A psychometric evaluation of the Highly Sensitive Person Scale in ethnically and culturally heterogeneous South African samples. *Current Psychology*. <https://doi.org/10.1007/s12144-020-00988-7>
- Nocentini, A., Manesini, E., & Pluess, M. (2018). The Personality Trait of Environmental Sensitivity Predicts Children's Positive Response to School-Based Anti-bullying Intervention. *Clinical Psychological Science*, 6(6), 848-859. <https://doi.org/10.1177/2167702618782194>
- Pluess, M. (2015). Individual differences in Environmental Sensitivity. *Child development perspectives*, 9(3), 138-143. <https://doi.org/10.1111/cdep.12120>
- Pluess, M., Assary, E., Lionetti, F., Lester, K. J., Krapohl, E., Aron, E. N., & Aron, A. (2018). Environmental sensitivity in children: Development of the Highly Sensitive Child Scale and identification of sensitivity groups. *Developmental psychology*, 54(1), 51-70. <https://doi.org/10.1037/dev0000406>
- Pluess, M., & Belsky, J. (2013). Vantage sensitivity: individual differences in response to positive experiences. *Psychological bulletin*, 139(4), 901-916. <https://doi.org/10.1037/a0030196>
- Pluess, M., De Brito, S. A., Bartoli, A. J., McCrory, E., & Viding, E. (2020). Individual differences in sensitivity to the early environment as a function of amygdala and hippocampus volumes: An exploratory analysis in 12-year-old boys. *Development and psychopathology*, 1-10. Advance online publication. <https://doi.org/10.1017/S0954579420001698>
- Pluess, M., & Boniwell, I. (2015). Sensory-Processing Sensitivity predicts treatment response to a school-based depression prevention program: Evidence of Vantage Sensitivity. *Personality and Individual Differences*, 82, 40-45. <https://doi.org/10.1016/j.paid.2015.03.011>

- Rabinowitz, J. A., & Drabick, D. (2017). Do children fare for better and for worse? Associations among child features and parenting with child competence and symptoms. *Developmental Review, 45*, 1-30. <https://doi.org/10.1016/j.dr.2017.03.001>
- Şengül-İnal, G., Kirimer-Aydinli, F., & Sümer, N. (2018). The Role of Attachment Insecurity and Big Five Traits on Sensory Processing Sensitivity. *The Journal of psychology, 152*(7), 497–514. <https://doi.org/10.1080/00223980.2018.1482255>
- Slagt, M., Dubas, J. S., Van Aken, M., Ellis, B. J., Deković, M. (2017). Children's differential susceptibility to parenting: an experimental test of "for better and for worse". *Journal of Experimental Child Psychology, 154*, 78-97. <https://doi.org/10.1016/j.jecp.2016.10.004>
- Smolewska, K. A., McCabe, S. B., & Woody, E. Z. (2006). A psychometric evaluation of the Highly Sensitive Person Scale: The components of sensory-processing sensitivity and their relation to the BIS/BAS and "Big Five". *Personality and Individual Differences, 40*(6), 1269-1279. <https://doi.org/10.1016/j.paid.2005.09.022>
- Sobocko, K., & Zelenski, J. M. (2015). Trait sensory-processing sensitivity and subjective well-being: Distinctive associations for different aspects of sensitivity. *Personality and Individual Differences, 83*, 44-49. <https://doi.org/10.1016/j.paid.2015.03.045>
- Sweitzer, M. M., Halder, I., Flory, J. D., Craig, A. E., Gianaros, P. J., Ferrell, R. E., & Manuck, S. B. (2012). Polymorphic variation in the dopamine D4 receptor predicts delay discounting as a function of childhood socioeconomic status: Evidence for differential susceptibility. *Social Cognitive & Affective Neuroscience*. doi:10.1093/scan/nss020
- Tillmann, T., Bertrams, A., El Matany, K., & Lionetti, F. (2021). Replication of the existence of three sensitivity groups in a sample of German adolescents. *European Journal of Developmental Psychology, 18*(1), 131-143. <https://doi.org/10.1080/17405629.2020.1763791>
- Uher, R., & McGuffin, P. (2008). The moderation by the serotonin transporter gene of environmental adversity in the etiology of mental illness: Review and methodological analysis. *Molecular Psychiatry, 13*, 131– 146.

CHAPTER 2

IDENTIFYING HIGH SENSITIVITY

Monika Baryła-Matejczuk

Faculty of Human Sciences, Institute of Psychology, WSEI University, Lublin, Poland, ORCID: 0000-0003-2321-9999, e-mail: monika.baryla@wsei.lublin.pl

Abstract

Reliable tools for measuring a personal trait are an important step in conducting research in the area of environmental sensitivity as well as practical implementation of knowledge of the field. The initial recognition of traits is often based on behaviour analysis, which, in the case of the so-called high sensitivity, may be mistaken in a clinical image for disorders. The use of a reliable, tailor-made sensitivity assessment tool should mark the beginning of the process of supporting both highly sensitive children and adults. This chapter provides an insight into identification of highly sensitive persons and the methods of measuring personal traits behind this definition. Initially, the characteristics of the highly sensitive was carried out, with particular attention to those aspects which are attributed a key role in recognizing the intensity of the trait. The high sensitivity aspects that may be an indication of the existence of a high intensity of the trait and the way in which it manifests itself in different spheres of functioning, i.e. physical, emotional, interpersonal and cognitive were taken into account. In turn, the tools developed so far, self-description and observation scales designed to measure environmental sensitivity and sensory processing sensitivity were discussed. Both adult and children scales were considered. The issue of factors, which can be found in the most common scales of sensitivity measurement conducted in different countries, was addressed. The last paragraph deals with the issue of features which, in psychological studies, have sought to explain the differences in individual perceptions, processing and response to environmental stimuli. Reference was also made to studies of the correlation between sensitivity understood and the concepts of environmental sensitivity with temperament traits as presented by Eysensck, Gray, Rothbart, Costa and McCrae.

Key words: assessment, high sensitivity, environmental sensitivity, sensory processing sensitivity, measurement, psychometric tools, psychometry

After reading this chapter, you will:

- be aware of the high sensitivity aspects understood as a trait
- know what the characteristic behaviour of highly sensitive people in the life cycle is like
- be familiar with child and adult sensitivity assessment tools (scales)
- distinguish sensory processing sensitivity from other personality and temperament traits
- distinguish behaviours related to temperament traits from disorders

Introduction

According to the research carried out to date, people differ in sensitivity to the environment and minority of the population (around 30 %) is very or highly sensitive to the environmental stimuli (cf. Ellis, Boyce, Belsky, Bakermans-Kranenburg, & Van Ijzendoorn, 2011; Ellis, Essex, & Boyce, 2005; Francesca Lionetti et al., 2018, 2019; Pluess, 2017a; Pluess et al., 2018). It has therefore been assumed that it is important to capture how humans receive and process the stimuli reaching them in order to assess sensitivity, moreover how humans respond to them depends to a large extent on other temperament and personality traits, not to mention the social situation, adaptability and previous experiences. In this context, it seems difficult to characterize highly sensitive people, and to be more precise - their common and possibly universal personal traits.

As we know from the previous chapter, one of the concepts describing different sensitivity to stimuli, i.e. sensory processing sensitivity (SPS), accounts for sensitivity differences by referring to the intensity of a temperament trait. This concept assumes that a high degree of intensity associated with the structure of the nervous system is the basis for particular sensitivity of some people. Temperament is defined here as a set of inherited traits that are already apparent at an early stage of human development. It is therefore assumed that a child is born with specific sensitivity potential because the trait is genetically conditioned. Although the basic level of sensitivity is determined by genes, there have been some differences in the level of sensitivity in adult life in the research of monozygotic twins (Assary, Zavos, Krapohl, Keers, & Pluess, 2020). Researchers assume that this is mainly due to life experiences. This is another issue to be taken into account when analyzing methods to identify increased sensitivity in humans.

The research conducted to date shows that life experience can change the potential intensity of sensitivity. How do you think what kind of experiences? Do you have in mind any specific circumstances in a child's life, which could be relevant to the child's subsequent sensitivity to environmental stimuli?



2.1 Characteristics of highly sensitive people

Let's now turn to the characteristics of highly sensitive people. The two temperament traits mentioned, namely genetic conditionality and early traceability, distinguish temperament traits from those of personality (cf. Buss & Plomin, 1984). Sensory processing sensitivity is therefore rather mentioned as a temperament trait describing individual differences in sensitivity to both positive (favourable, supportive, pleasant) and negative (difficult, aggravating, stressful) stimuli from the environment.

In view of the above, two ways of characterizing a trait in children and adults can be distinguished. According to the first one there are some sensitivity aspects that are universal in nature, i.e. all highly sensitive people (Aron & Aron, 1997). In view of the above, two ways of characterizing a trait in children and adults can be distinguished. According to the first one there are some sensitivity aspects that are universal in nature, i.e. all highly sensitive people (Aron & Aron, 1997). The second one shows that sensitivity can manifest itself in different human spheres – especially social and emotional (Acevedo, Aron, Pospos, & Jessen, 2018; Aron, Aron, & Jagiellowicz, 2012; Baryła-Matejczuk et al., 2021). The second one shows that sensitivity can manifest itself in different human spheres – especially social and emotional (Acevedo, Aron, Pospos, & Jessen, 2018; Aron, Aron, & Jagiellowicz, 2012; Baryła-Matejczuk et al., 2021).

2.1.1 Characteristics of highly sensitive people – sensitivity aspects understood as a temperamental trait

The first approach, proposed by the author of the concept of sensory processing sensitivity, Elaine N. (2013) Aron, is to distinguish four aspects of high sensitivity understood as personality traits (the concept described in paragraph 1.1. Sensory Processing Sensitivity Theory). According to the researcher, in order to say that a person is highly sensitive, it is necessary to verify whether they are characterized by each of the four aspects of high sensitivity, i.e.:

- depth of processing;
- overstimulation;
- emotional reactivity and empathy;
- awareness of subtleties.

According to environmental sensitivity researchers, (Acevedo et al., 2014; Aron et al., 2012; Greven et al., 2019; Pluess, 2015) found in roughly 20% of humans and over 100 other species, is a trait associated with greater sensitivity and responsiveness to the environment and to social stimuli. Self-report studies have shown that high-SPS individuals are strongly affected by others' moods, but no previous study has examined neural systems engaged in response to others' emotions. Methods: This study examined the neural correlates of SPS (measured by the standard short-form Highly Sensitive Person [HSP] scale it is the first aspect, i.e. depth of processing combined with emotional reactivity, which constitutes its main

component, leading to greater awareness of subtleties and, consequently, greater overstimulation, i.e. greater fatigue.

Depth of the processing therefore refers to the amount of detailed information processed in relation to an object, information or a stimulus (cf. Craik & Lockhart, 1972). Deep processing is, in other words, an attempt to capture the sense and meaning of a given experience. For adults, deep processing is sometimes referred to as too much analysis and thinking on a topic, detailed consideration of different courses of action, replication of different scenarios, drawing far-reaching conclusions, awareness of long-term consequences of own actions. It is also about analyzing and looking for dependencies, similarities between the current situation and previous ones, making associations, comparisons and metaphors. In the case of children, however, it is considered that depth of processing may be reflected in the intensity of the feelings or in the rich imagination and 'living' dreams (cf. Acevedo et al., 2014; Aron, 2002; Boterberg & Warreyn, 2016).

Another feature, emotional reactivity, is linked to depth of processing. One of the psychological definitions of emotional reactivity says that it is a tendency towards frequent and intense emotional stimulation. The characteristics of emotional reactivity are the stimulation threshold, the ease with which a person becomes emotionally stimulated, as well as the intensity of emotional experience (Eisenberg, Spinrad, & Eggum, 2010, cf. Strelau, 2006). In highly sensitive children, strong emotions are extremely rapid and their experience is usually very intense. Reactivity is associated with both pleasant and difficult emotions (see also 2.4. High sensitivity and other personality and temperament traits). According to Aron (2002), the emotional reactivity of highly sensitive persons is linked to the level of their empathy. However, given the specific nature of the emotional instability typical of children, it is more adequate to refer to it as empathy or sympathy in the case of children.

Awareness of subtleties is listed as another aspect of high sensitivity. This trait is identified as attention to details, subtle sounds, touch, smell and other delicate stimuli. This attentiveness may be manifested, for example, by paying attention to changes in the appearance of persons or places, taking notice of subtle smells, capturing sensitive sounds, e.g. bird singing, paying attention to a pleasant texture of material, observing and often reacting to changes in the tone of voice, glimpses, small gestures (cf. Aron, 2002).

In one research, experiences and perception of sensory processing sensitivity in highly sensitive adults were described (Bas et al., 2021). The participants reported a lot of observations on the increased level of trait, such as having strong negative and positive emotions (requiring much more time to process them), being empathic, feeling connected with other people, taking notice of them and seeing/understanding their emotions. They also highlighted overthinking and

worrying too much. Highly sensitive people reported that they needed a large amount of time to take decisions and more intense relationships and significance when talking to others. In addition, they can easily be affected by overstimulation due to sensory and social stimuli, and they are dispersed or not thinking clearly due to this overstimulation. They have the ability to capture a large amount of details and information. The difficulty for the highly sensitive was an unstable and low self-assessment.

Another characteristic of the highly sensitive, viewed as a natural consequence of the previous three is susceptibility to overwhelmness. When a person is attentive to what is happening in and around them, they process other people's situations and behaviour more thoroughly and carefully, at the same time undergoing mental and physical strain and exhaustion faster than people who receive fewer stimuli and information. Highly sensitive children see everything that is new and think about it more frequently and more intensely than their peers. They are therefore more quickly overwhelmed and exhausted, which, according to Aron (2002), is the consequence of more in-depth and intense processing.

2.1.2 Characteristics of highly sensitive people – trait demonstration in the functioning spheres

The second approach to clarifying the functioning of highly sensitive people assumes that the intensity of the trait, i.e. sensory processing sensitivity is observed in different spheres of functioning. The categories of traits of highly sensitive persons, which have been selected on the basis of an analysis of the results of the focus groups of teachers and parents of highly sensitive children (Baryła-Matejczuk et al., 2021) will be listed below. Literature analysis and focus group research results suggest that these categories do not exploit the list of high sensitivity indicators, but mark a good beginning as regards the identification process. Identifying the spheres of functioning is also useful for children's functional diagnosis, identifying areas where working with children is particularly important.

The following symptoms of sensitivity in different spheres refer to children of pre-school age and early school age. The research was carried out as part of the 'E-motion' project¹.

¹ Project "E-motion. High sensitivity potential" was implemented with the support of the European Commission, agreement number: 2018-1-PL01-KA201-051033, <https://highlysensitive.eu/>

Table 2.1.

Trait categories of highly sensitive children based on the results analysis of focus groups among teachers and parents of highly sensitive children

Physical sphere	Emotional sphere	Interpersonal sphere	Cognitive sphere
Sensitivity to external stimuli	Deep experience of emotions	Group roles	Lack of flexibility
Sensitivity to internal stimuli	Empathy/syntony	Time for integration with the group	Overwhelming
Responses to physical discomfort	Emotional dependence	Dispersal by social interactions	Sense of humour
Responses to the environment	Intensive reactions	Mental blockage while being under pressure of time or outcome	Deep processing
Problems with getting asleep/sleep	Somatic demonstration of emotions	Lack of communication on needs/difficulties	Repetition of questions
Dealing with (physical complexity): crying, avoidance, isolation.	Intensive stress experience	Strong responses to social rewards and penalties	Perfectionism
	Attachment to the site	Dealing with: responding with fear, anxiety, conflict avoidance, sense of guilt, seeking support	Intuitive processing
	Interaction with nature		Self-assessment
	Interaction with art		Perseverance in task performing
	Interaction with animals		Gentle and calm discipline
	Dealing with crying, overactivity, negative attitudes, flow		Episodic memory
			Need for control
			Creativity
		Dealing with: asking questions, responding with fear, anxiety	

The results of the focus group research conducted among teachers and parents of highly sensitive children show that, in the physical sphere, these children are distinguished by the intensity of their response to external stimuli. They are usually hindered by bright artificial light, noise, texture of material, clothes tags, suits in socks, as well as certain flavours and smells. Highly sensitive children also react strongly to hunger and pain, being usually unable to identify the sources of discomfort. It may therefore happen that unnamed physical discomfort is the cause

of difficult behaviour of a child. Highly sensitive children may complain about wet clothes, stains, dirty hands and may be particularly attached to certain clothes. These children are more likely to signal a need for rest than their peers, and find it more difficult to get asleep, especially after an active day. Parents' reports also show that, while being overwhelmed, they are most likely to respond with crying, avoiding similar situations or becoming isolated from others.

In the emotional sphere, a profound experience of emotions is characteristic of highly sensitive children. Insignificant (from an adult's perspective) reason may make highly sensitive children burst into tears or demonstrate hysterical behaviour. Experiencing emotions in an intense way, they tend to accumulate them, find it difficult to stop their strong feelings (both unpleasant and pleasant), have a tendency to predict pessimistic and/or adverse course of events (so-called gloom-mongering), and are even able to get scared of their own thoughts and perceptions. Small events or everyday situations are sometimes a source of stress (e.g. changing a classroom, school trip, nursery school outing). Highly sensitive children are strongly responsive to the moods and emotions of others, fear the judgements of others and easily become ashamed. The experiences perceived are often felt in the body (e.g. they have a stomachache or a headache, they are prone to vomiting). The reports given by parents of highly sensitive children show that such children experience, in a very intense way, music, films, fables, and are fond of coming into contact with nature, and usually abhor insects. In situations of overwhelmness, they burst into tears, feel anxious, and are perceived to be very stimulated or absent-minded.

Highly sensitive children need more time than their peers to have fun together with other children, particularly in a new group. They expect encouragement to join team activities and give an impression of being mentally absent in a very active group. Highly sensitive children feel uncomfortable under pressure of time and public speaking usually costs them much more than other children. They try to avoid conflicts, and take comments made to the whole group or class to themselves. In relationships with other people, they happen to feel timid, shy, keeping a distance from new children. In difficult situations, they react with fear, anxiety, often with a sense of guilt, withdrawal, and seek support, usually in an adult person. In the classroom, they seek the teacher's approval and frequently repeated assurances that their performance is adequate.

In the cognitive sphere, highly sensitive children are characterized by signs of tension when they start working on a new task, and by a strong need to seek information, ask questions, dispel doubts. The conditions for their safety include stability and repetitiveness as such children like to be informed about changes. They happen to be strongly tied to their way of thinking and they are slower than their peers in becoming accustomed to new things or phenomena. They are overwhelmed by a large amount of information, especially given at the same time. They tend to explore topics of interest to them with great commitment and interest. Children who are highly sensitive are usually conscientious and try to perform their tasks with a high degree of accuracy and without making mistakes.

Functional magnetic resonance imaging (*FMRI*) has shown which brain regions are more active in highly sensitive people (Acevedo et al., 2014; B. P. Acevedo, Jagiełłowicz, Aron, Marhenke, & Aron, 2017; Jagiełłowicz et al., 2011) found in roughly 20% of humans and over 100 other species, is a trait associated with greater sensitivity and responsiveness to the environment and to social stimuli. Self-report studies have shown that high-SPS individuals are strongly affected by others' moods, but no previous study has examined neural systems engaged in response to others' emotions. Methods: This study examined the neural correlates of SPS (measured by the standard short-form Highly Sensitive Person [HSP] scale. According to researchers, knowledge of which brain areas are involved in sensory processing sensitivity gives an overview of the characteristics of highly sensitive people. According to Jagiełłowicz et al., (2011) highly sensitive people are prone to responding to subtle changes in stimulus. Another study (Acevedo et al., 2014) found that highly sensitive people are characterized by increased awareness, empathy, reactivity, greater integration of sensory information and planning. The third study (Acevedo et al., 2017) also found stronger activations in brain areas related to memory, awareness, physiological regulation in response to emotional stimuli, reflective thinking and depth of processing.

2.2 Identifying highly sensitive children and adults

Leading authors in the area of environmental sensitivity (Aron & Aron, 1997; Aron et al., 2012; Belsky & Pluess, 2009; Boyce & Ellis, 2005) integrated, and highly conserved repertoire of central neural and peripheral neuroendocrine responses designed to prepare the organism for challenge or threat. Developmental experience plays a role, along with heritable, polygenic variation, in calibrating the response dynamics of these systems, with early adversity biasing their combined effects toward a profile of heightened or prolonged reactivity. Conventional views of such high reactivity suggest that it is an atavistic and pathogenic legacy of an evolutionary past in which threats to survival were more prevalent and severe. Recent evidence, however, indicates that (a estimate the distribution of high sensitivity in the population to constitute between 10 % and 35 %. For the first time, the trait distribution in the population was proposed on the basis of the concept of sensory processing sensitivity. The proposal was an analogy to the scientific paper, defined by Kagan (1994), on infant reactivity (or behavioural inhibition). In the paper entitled '*On the*

nature of emotion', infants were classified into their different reactivity groups. The categorization was developed based on the theoretical framework on differences in the excitability of limbic structures (Kagan, 1994). In a study review by Greven and co-authors (2019), the authors point out that taximetric analyses carried out in later years supported the theoretical SPS framework, pointing out that the minority (around 10 %) of infants were highly reactive to visual, hearing and olfactory stimuli. Other infants were classified into a group with less reactivity. The results were described in F. Borries' doctoral dissertation (2012, unpublished doctoral dissertation, after: Greven et al., 2019) entitled: 'Do the 'Highly Sensitive' exist? A taxonomic investigation of the personality' pointed to the existence of a group of highly sensitive people, who represented 15-20 %.

Initially, a metaphor of flowers – orchids and dandelions was used to illustrate the distribution of a trait (such as sensory processing sensitivity) in the population. According to this metaphor, dandelions reflect a trait found in the majority of the population. These are people who are less sensitive to both positive and negative environmental impacts. Orchids are much more sensitive to a difficult environment and develop better in favourable conditions (Boyce & Ellis, 2005).

The primary sources also report that environmental sensitivity is normally distributed in the population and people highly reactive to the environment constitute around 20 % (e.g.: (Boyce & Ellis, 2005). Information indicating the proportion of highly sensitive people is taken from research results of a few publications only (e.g. Boyce & Ellis, 2005; Ellis, Essex, & Boyce, 2005; Lionetti et al., 2018; Pluess et al., 2018; Tillmann et al., 2021). The analysis of latent classes (LCA) was used to investigate or confirm assumptions about identifiable groups with different levels of sensitivity for whom processing sensitivity or environmental sensitivity was the background. It was initially assumed that, undoubtedly, there were highly sensitive people in the population and for them the analogy of orchids was used, i.e. those who perform exceptionally well in favourable conditions and exceptionally bad in the unfavourable, aversive, poor ones. Low-sensitive people (dandelions) were also found and assumed to be more resilient and conditions are not important for their growth (m.in. Boyce & Ellis, 2005). The studies done by Pluess et al. (2018) and Lionetti et al. (2018) also demonstrate the presence of a third group (both adults and children) of average sensitive people compared to tulips.

HSP and HSC scale studies in four ethnically differentiated samples in Great Britain (8-19 years; in total, N=3581) and the USA (adults, N=906) showed that the respondents could be divided into three groups. Low (25 %-35 %), average (41 %-47 %) and highly (20-35 %) sensitive people were selected (Lionetti et al., 2018; Pluess et al., 2018). The data from both test groups (UK and USA) indicate that respondents' results ranging from 3.8 (in a 7 step scale) would indicate a high sensitivity of the respondent. However, taking into account that this result is relatively low, this area requires further research and the authors demonstrating the categorization approach suggest a solution of 30 %-40 %-30 %. (Lionetti, 2020).

As the evolutionary approach would imply the absence of intercultural differences as a relatively constant trait in different populations, other researchers (Monika Baryła-Matejczuk, Kata, & Poleszak, 2022; Tillmann et al., 2021; Yano & Oishi, 2021) have replicated the assumptions, for example among German teenagers and Polish teenagers. The research in a sample of adolescents attending schools in Germany (749 teenagers) was carried out using a shortened 10-item version of the original tool 'Highly Sensitive Person, who, in the research done by Tillmann, El Matany, & Duttweiler, 2018 shows a structure with two correlated factors, i.e. Sensitive Openness to Stimuli and Overexcitability / Negative Affect from Overstimulation. The results of these studies confirmed the existence of three sensitivity groups, which differed significantly in terms of the respective average HSP scale scores. According to the results obtained by researchers, (Tillmann et al., 2021, p.9) 134 adolescents (17.90 %) belong to a low sensitivity group, 413 (55.10 %) belong to an average sensitivity group and 202 (27.00 %) belong to a high sensitivity group. On the other hand, Polish research, using a 12 -question self-descriptive HSC scale carried out in a group of young teenagers (a sample of 928 people), show that pupils with the highest level of the trait tested accounted for 37.7 % of the total population. The middle sensitivity group was found to represent 21 % of the population tested and the population with the lowest sensitivity represented the remaining 41.8 % of the population. Given the size of extreme groups and differences in comparison with the research carried out so far, the question arises about the significance of age, developmental patterns, impact of culture and properties of the research tools used.

Differences can be observed in the groups of the research cited above. It is likely that the causes of the discrepancies should be found in both the sample selection, the research tools used and the age of the research group. However, three different sensitivities were confirmed in each research – low, average and highly sensitive people who have been analogically compared to orchids, tulips and milk (cf. (Francesca Lionetti et al., 2018).

In conclusion, these discoveries suggest that the SPS is a continuously explored trait forming a continuum and the population can be divided into three groups based on the trait intensity. There is also a need for further research in the area and for the development of measures that meet the needs of early identification of a trait. A team from Queen Mary University of London led by Michael Pluess,

a team from Stony Brook University with Elain N. Aron, is working on the development of sensory processing sensitivity measurement tools. In addition, the research and development of scales are carried out by the Francesci Lionetti team (University d'Annunzio of Chieti-Pescara) or by an international research team led by Monika Baryła-Matejczuk (the WSEI University of Lublin).

2.3 Sensitivity measurement tools

Symptoms of high sensitivity, particularly in children may take a clinical picture characteristic of attention deficits, anxiety disorders or sensory integration disorders. In accordance with the positive diagnosis approach (Hornowska, Brzezińska, Appelt, & Kaliszewska-Czeremska, 2014), the research using psychometrically developed tools serves not only to diagnose difficulties (as it is sometimes assumed by referring to it as diagnosing) but to know (especially in the case of children) strengths and resources, talents, aptitudes, to learn how to develop them, how to foster (child) development and adequately support (adult).

Several research tools have been developed on the basis of the concepts of environmental sensitivity and sensory processing sensitivity. Among the measures used to assess the level of sensitivity are:

1. Highly Sensitive Person Scale – *HSP* – original version consisting of 27 questions developed by Elain N. Aron and Arthur Aron (Aron & Aron, 1997)
2. Highly Sensitive Child Scale for Parents – 23 questions developed by Elain N. Aron as a tool for parents (Aron, 2002)
3. Highly Sensitive Person Scale – Child Short Form, which in the literature is the most frequently referred to as Highly Sensitive Child – *HSC* - a self-description scale consisting of 12 questions developed by Michel Pluess team (Pluess et al., 2018)
4. Highly Sensitive Child Rating System (Lionetti, Pluess, Aron, Aron, & Klein, 2019)

2.3.1 Highly Sensitive Person Scale

The first measure for assessing sensory processing sensitivity resulting from the research carried out in this area was Highly Sensitive Person Scale – *HSPS* (Aron and Aron, 1997). The scale, together with the theoretical framework of the sensory processing sensitivity concept, was developed as a result of exploration research. Initially, the authors (Aron & Aron, 1997). Initially, the authors (Aron & Aron, 1997) made operationalization of the term sensitive in a clinical and everyday context. Elaine Aron and Arthur Aron (1997) conducted a series of in-depth qualitative interviews with 39 adults who considered themselves highly sensitive but also introverted or easily overwhelmed by various stimuli. Researchers encountered difficulties in assessing the SPS trait, as it required, for example, a distinction of temperament and personality from other traits.

Their first measure consisted of 60 questionnaire items, containing statements taking into account some of the increased sensitivity markers, such as high conscientiousness, fear, having a rich inner life, increased sensitivity to hunger and pain, or easiness to react by fear or surprise. The questionnaire thus consisted of questions about positive and negative cognitive and emotional reactions to environmental stimuli such as noise, smells but also beauty and art. The indicators developed have contributed to the design of a multi-aspect SPSconstruct instead of simply identifying it as sensitivity to sensory stimuli (Greven et al., 2019, cf. (Little, Dean, Tomchek, & Dunn, 2017). The questionnaire was tested on a sample of 604 psychology students of the first-degree studies and 301 individuals selected from the population. As a result of the research carried out, a scale of 27 items has been developed, currently used for the evaluation of the SPS in adults (Aron & Aron, 1997). The respondents refer to each of the questions on a seven-step Likert scale. Since the publication of the HSPS scale in 1997, numerous studies have been carried out, both in the area of personality psychology and individual differences (see meta-analysis F. Lionetti, Pastore, et al., 2019). Recent years have also included studies in the field of development psychology and psychometric tools being developed in this area.

2.3.2 Highly Sensitive Child Scale for Parents

Another tool designed to measure sensory processing sensitivity, this time in children, is a questionnaire in which parents answer the questions about their child. The questionnaire was drawn up by Elaine Aron (2002) and published in the popular science book entitled 'Highly Sensitive Children'. The book takes a form of a guidebook and the questions are formulated in such a way that allowed them to be answered *yes* or *no*. The parent evaluates the child's sensitivity by answering questions such as 'Is your child easy to scare?', 'Does your child complain about rough clothes, seams in socks, tags in clothes', 'Doesn't your child usually enjoy large surprises', 'Does your child notice the smallest atypical/bad smell', 'Is your child willing to change clothes quickly if it feels they are wet or dirty (e.g. with sand)'. The questionnaire consists of 23 questions and was used in Belgian research to analyze the relevance of sensitivity in children aged 3-16 for their daily functioning (Boterberg & Warreyn, 2016). The psychometric properties of the scale have not yet been confirmed by the author, while the research conducted in Belgium (253 parents responding to the 5-step Likert scale) provide evidence of a two-factor scale structure, i.e. Overreaction to Stimuli and Depth of Processing. The research has also shown that parents' assessment can provide valuable information to identify children with everyday functioning problems. The SPS coexisted in functioning difficulties (e.g. problems with sleep, food, frequent cry). Sensitivity coexisted with both positive and negative responses to stimuli (Boterberg & Warreyn, 2016).

2.3.3 Highly Sensitive Person (Child) Scale – Child Short Form

The basis for the design of the Highly Sensitive Child (HSC) scale was the adult HSP scale. Although the full name of the scale is ‘Highly Sensitive Person – a short version for children, it is referred to as a Highly Sensitive Child in many publications (see Lionetti, 2020). The scale contains 12 questions and is used to self-assess the sensitivity of children from the age of 8 (Pluess et al., 2018). Respondents answer questions on the 7th Likert scale (a 5-step scale was also used for younger children (see Nocentini, Menesini, & Pluess, 2018). A factor analysis of scale has shown that the HSC scale has sufficient internal consistency and good psychometric properties in independent samples (Pluess et al., 2018). The scale is being analyzed intensively, particularly in English research, which confirmed, among the others, that children with high results on this scale are more sensitive to the effects of psychological intervention programmes (Pluess & Boniwell, 2015) a notion proposed in the concept of Vantage Sensitivity. The current study investigated whether the personality trait Sensory-Processing Sensitivity moderated the efficacy of a new school-based intervention aimed at the prevention of depression. Method: Using a two-cohort treatment/control design with one cohort serving as the control group (. N=, 197. Other research (Slagt, Semon, Aken, & Ellis, 2017) suggest that sensory processing sensitivity may be the correlative of individual differences in susceptibility to positive and negative parenthood.

The HSC scale was also used to measure the sensitivity of children in a format for parents (Costa-López, Ruiz-Robledillo, Albaladejo-Blázquez, Baryła-Matejczuk, & Ferrer-Cascales, 2022; Goldberg et al., 2018; Slagt et al., 2017; Weyn et al., 2019) register and process information about the environment, which differs among children and adolescents. The Highly Sensitive Child (HSC. For this purpose, the questions have been reformulated and asked to parents. The questions were reformulated in such a way that it was the parent who referred to the child’s observed behaviour. The versions of the HSC scale for parents can be found in the study “Assessment of sensory processing sensitivity across the lifespan” (Lionetti, 2020)

2.3.4 High Sensitive Child Rating System

Another tool to measure high sensitivity is the Highly Sensitive Child Rating-System. The tool assesses the observation of the SPS-related behaviour in pre-school children aged 3-5 (Lionetti, Aron, Aron, Klein and Pluess, 2017, for: Greven et al., 2019). As Lionetti (2020) points out, the tools mentioned so far have many strengths. One of them is the short completion time, which allows research to be carried out in different environments. In addition, versions of the HSC scale (both self-descriptive and parental version) have strong psychometric properties. She also points out that the perception of parents is not always a reliable source of information (e.g. in the case of families incapable of raising a child, families at risk of exclusion) or that a parent is not always available to complete the questionnaire. The observation scale was developed, among other things, to fill this gap. The observation scale and the whole rating system is the first attempt to directly capture

sensitivity at the observation level. The design of the tool was based on the definition of the SPS in children described by E. Aron, as well as on a broader environmental sensitivity construction (Pluess, 2015). The HSC rating system consists of 10 scales (Lionetti, Pluess, et al., 2019). A series of laboratory episodes from the *Laboratory Temperament Assessment Battery (lab-TAB)* procedure has been designed. This is the procedure used to encode the temperament traits. The behaviour was assessed by external observers trained in this method. The HSC-RS scale validation was carried out in a group of 292 US middle class children and was limited to one-off measurement.

Table 2.2.

*The Highly Sensitive Child Rating System (HSC-RS)
observed temperament indicators*

LabTAB episodes	HSC-RS Scales
Risk room	1. Pause to check before exploring a new environment 2. Cautious and collaborative attitude toward the experimenter
Tower of patience	3. Attending to experimenter's directions
Stranger approach	4. Compliance with the experimenter's request 5. Fearfulness in response to the stranger's entrance
Exploring new objects	6. Hesitancy paired with curiosity
Pop-up snakes	7. Positive response/overexcitement
Transparent box	8. Attention to toys' detailed features 9. Careful perseverance when trying to open the box
Impossibly perfect children	10. Preference for (and commitment to drawing) beautiful circles Impossibly perfect children

Source: (Francesca Lionetti, 2020)

The research carried out so far shows that the HSC-SR scale is best characterized by an inivariate solution and that this sensitivity factor is not the same as the other temperament traits assessed using Lab-TAB (e.g. sociality, positive affect/interest, dysphoria, fear/braking and impulsiveness vs limitation) (Dyson, Olinio, Durbin, Goldsmith, & Klein, 2012) with separate models proposing different trait dimensions. This research has relied almost exclusively on parent-report measures. The present study used an alternative approach, a laboratory observational measure, to explore the structure of temperament in preschoolers. A 2-stage factor analytic approach, exploratory factor analyses (n = 274).

It can be assumed that the tool will be useful in conducting research on the sensitivity of younger children. The research has shown (Lionetti, Pluess, et al., 2019) that the scale captures sensitivity to both positive and negative parenthood. 3-year-olds with

high sensitivity scores, being more sensitive to the effects of negative parenthood (especially permissive parenthood). The research showed increased externalization of behavioural problems at the age of 3 and internalization of behavioural problems at the age of 3 and 6 in these highly sensitive children. In addition, the same children showed the highest level of social competence in response to positive parenthood, and the results remained stable after taking into account the control of the negative affect (Lionetti, Aron et al., 2019). The newly developed observation measurement is capable of capturing the increased sensitivity to stimuli and offers the possibility to study sensitivity in young children. Combined with the scales of parental reports, it allows for a multi-level and multi-faceted assessment of the sensitivity of small children. Proper collection and encoding of observed behaviour will be key to the quality of the research. This is because unqualified observatories may misinterpret the child's signals (cf. Greven et al., 2019).

2.4 One or many sensitivity dimensions

As we know from the previous paragraph, the first measure for assessing sensory processing sensitivity as a result of the research carried out in this area was the High-Sensitive Person (HSPS) Scale (Aron & Aron, 1997). As we know from the previous paragraph, the first measure for assessing sensory processing sensitivity as a result of the research carried out in this area was the Highly Sensitive Person Scale (HSPS) (Aron & Aron, 1997). The SPS was not assumed to be a simple, one-dimensional sensitivity to sensory stimuli, but factor analyses on the results of the HSP scale suggested its one-dimensional character. The monofactor solution has been identified as the best explanation of the results obtained also in other research (Hofmann & Bitran, 2007; Neal, Edelmann, & Glachan, 2002). The SPS was not assumed to be a simple, one-dimensional sensitivity to sensory stimuli, but factor analyses on the results of the HSP scale suggested its one-dimensional character. The monofactor solution has been identified as the best explanation of the results obtained also in other research (Hofmann & Bitran, 2007; Neal, Edelmann, & Glachan, 2002). On the other hand, one of the most frequently cited subjects in the literature showing the psychometric properties of the HSP scale indicates that it is not one-dimensional (Smolewska, McCabe, & Woody, 2006). The research done by Smolewska, McCabe and Woody (2006) on student sample data showed good compliance rates for both the original Aron and Aron model and their three-factor model. The matching of Chi square for the three-factor model was much better (Smolewska et al., 2006).

The most common solution, supported by psychometric analyses, is to identify the following factors on both the HSP and HSC scale:

1. Low Sensory Threshold (LST), i.e. sensitivity to subtle external stimuli,
2. Ease of Excitation (EOE),
3. Aesthetic Sensitivity (AES), i.e. openness "to" and pleasure "from" aesthetic experiences and positive stimuli/stimulants.

These names function as accepted in many studies and reviews, and the factors themselves have been replicated in a number of international studies (including: Greven et al., 2019; Grimen & Diseth, 2016b). Three separate factors also best describe the structure of the abbreviated Norwegian version of the scale (Grimen & Diseth, 2016), the Polish version (Monika Baryła-Matejczuk, Poleszak, & Porzak, 2021), and also in one of the German versions (Konrad & Herzberg, 2017). It should be noted, however, that some test items in the cited studies against the original version of the Aron scale have been deleted (Grimen & Diseth, 2016; Smolewska et al., 2006) and others added (Konrad & Herzberg, 2017).

Table 2.3.

*Questions on the Highly Sensitive Child Scale
in a self-description version and the factors indicated*

Items	Factors
1. I notice when small things have changed in my environment	Aesthetic Sensitivity
2. Loud noises make me feel uncomfortable	Low Sensory Thresholds
3. I love nice smells	Aesthetic Sensitivity
4. I get nervous when I have to do a lot in little time	Ease of Excitation
5. Some music can make me really happy	Aesthetic Sensitivity
6. I am annoyed when people try to get me to do too many things at once	Ease of Excitation
7. I don't like watching TV programmes that have a lot of violence in them	Low Sensory Thresholds
8. I find it unpleasant to have a lot going on at once	Ease of Excitation
9. I don't like it when things change in my life	Ease of Excitation
10. I love nice tastes	Aesthetic Sensitivity
11. I don't like loud noises	Low Sensory Thresholds
12. When someone observes me, I get nervous. This makes me perform worse than normal	

According to the results obtained by Pluess et al. (2018)

Other tool adaptations and tests indicate, among the others, the two-factor structure of the tool (for example Ershova et al., 2018; Evans & Rothbart, 2008; Montoya-Pérez et al., 2019; Rinn, Mullet, Jett, & Nyikos, 2018) McCabe, and Woody (2006, but also four-factor structure (Meyer, Ajchenbrenner, & Bowles, 2005; Şengül-İnal & Sümer, 2020) and five-factor structure (May, Norris, Richter, & Pitman, 2020).

The qualitative studies carried out using the systematic literature review (PRISMA) allow for the identification of many studies illustrating the factor structure of the HSP scale. Conducted as part of the ‘High sensitivity – innovative module in human sciences’ (HSP) project No: 2020-1-PL01-KA203-082261 systematic literature review indicates that the PubMed, ScienceDirect and Scopus databases 386 articles have been published containing the key words “sensory processing sensitivity” OR “highly sensitive person scale [Title/Abstract]” AND “environmental sensitivity [Title/Abstract]” AND “personality trait” AND “assessment”. After the deletion of the recurrent articles, the titles and summaries of 366 articles were analyzed and, in line with the exclusion criteria adopted, 353 articles were removed. Finally, 13 articles were included in the review. The characteristics of the articles, the tools used and the dimensions of sensitivity are shown in the table below.

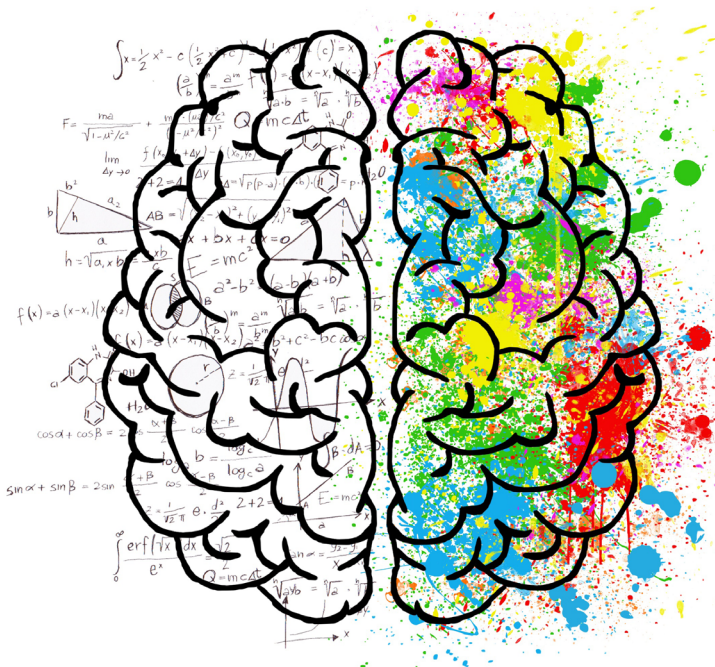


Table 2.4.
Overview of articles, tools used and sensitivity dimension used in a systematic literature review studies

Authors	Country	sample size	Age (years)	Research tools	Sensory processing sensitivity factors
Aron & Aron (1997)	USA	N = 235	M = 8.27 (± 3.28)	HSPS	One main sensitivity factor
Evans & Rothbart (2008)	USA	N = 297	> 18	HSPS	Two-factor structure: — <i>negative affect</i> — Orienting sensitivity
Smolewska et al. (2006)	Canada	N = 851 Men: n = 257 Women: n = 594	M = 19.70 (± 2.90)	HSPS	Three-factor structure: — Aesthetic Sensitivity (AES). — Low Sensory Threshold (LST). — Ease of Excitation (EOE).
Konrad & Herzberg (2017)	Germany	N = 3588 Men: n = 573 Women: n = 3015	M = 39.17 (± 11.47)	HSPS	Three-factor structure: — AES. — LST. — EOE.

Ershova et al. (2018)	Russia	N = 860 Men: n = 247 Women: n = 613	M = 20.40 (\pm 4.80)	HSPS	Three-factor structure: — AES, — LST, — EOE.
Pluess et al. (2018)	Great Britain	N = 334 Men: n = 83 Women: n = 251	M = 12.06 (\pm 0.67)	HSCS self-de- scription	Three-factor structure: — AES, — LST, — EOE.
Hellwig & Roth (2021)	Germany	N = 289 Men: n = 81 Women: n = 208		HSPS	Three-factor structure: — AES, — LST, — EOE.
Weyn et al. (2021)	Belgium and the United Kingdom	N = 3056 Belgium: N = 1094 UK: N = 1962	Belgium: M = 13.40 (\pm 1.37) UK: M = 15.59 (\pm 2.55)	HSCS	Three-factor structure: — AES, — LST, — EOE.

Keresteš et al. (2021)	Croatia	N = 714	7-20	HSPS	Three-factor structure: — AES. — LST. — EOE.
Meyer et al. (2005)	Great Britain	N = 156 Men: n = 47 Women: n = 109	M = 30.20	HSPS	Four-factor structure: - Sensitivity to overstimulation - Sensitivity to external stimulus - Aesthetic sensitivity - Harm avoidance
Øngül-İsnal & Sümer (2020)	Turkey	N = 412 Men: n = 171 Women: n = 241	M = 21.63 (\pm 2.00)	HSPS	Four-factor structure: - Sensitivity to overstimulation - Sensitivity to external stimulus - Aesthetic sensitivity - Harm avoidance

May et al. (2020)	South Africa	N = 94 Men: n = 15 Women: n = 79	M = 22.36	HSPS	Five-factor structure - Negative affect - Neural sensitivity - Propensity to overwhelm - Careful processing - Aesthetic sensitivity
Chacón et al. (2021)	Spain	N = 8358	M = 33.44 (± 11.53)	HSPS	Five-factor structure: - Sensitivity to overstimulation - Aesthetic sensitivity - Low sensory threshold - Fine psychophysiological discrimination - Harm avoidance

The Meyer, Ajchenbrenner and Bowles studies (Meyer et al., 2005) resulted in an indicative solution (1) General Sensitivity/Overstimulation (2) Adverse Reactions to Strong Sensations (3) Psychological Fine-Discrimination and (4) Controlled Harm-Avoidance. An alternative model was also presented in Turkish sample studies (Şengül-İnal & Sümer, 2020), where the authors identified the following factors 1) sensitivity to external stimuli 2) aesthetic sensitivity 3) harm avoidance 4) sensitivity to overstimulation. Studies by May, Norris, Richter and Pitman (2020) point to a five-factor solution taking into account: (1) negative affect, (2) neural sensitivity, (3) propensity to overwhelm, (4) heavy processing and (5) aesthetic sensitivity. Chacón et al also indicates a five-factor solution (2021) mentioning Sensitivity to overstimulation, Aesthetic sensitivity, Low sensory threshold, Fine psychophysiological discrimination and Harm avoidance.

In addition, a number of scientific studies have been carried out so far, illustrating the relationship between individual sensitivity factors and other variables of psychological nature. The studies found, among the others, that EOE and LST are moderately linked to negative emotionality, anxiety and depression. LST (but not EOE) is positively correlated with self-assessment of sensory discomfort, AES was linked to positive emotionality, such as positive affect and self-assessment, but was not linked to negative emotionality, both in adulthood and in childhood (Liss, Timmel, Baxley, & Killingsworth, 2005; Pluess et al., 2018; Smolewska et al., 2006).

The authors of the research review on sensory processing sensitivity in the context of environmental sensitivity (Greven et al., 2019) also pay special attention to the fact that the three scales: LST, EOE and AES are not intended, they were not designed, defined and do not form the basis for the design of the tool. The scales were derived from a factor analysis. This indicates that their meaning is not clear, nor is it clear what these components measure or mean when analyzed or taken into account separately.

Analyses carried out on the results of the HSP Parent Questionnaire, in which they assessed their children's performance (23 questions) (Aron, 2002; Boterberg and Warreyn, 2016) have shown two factors:

1. overreaction to stimuli, which included elements related to overstimulation, intensity of emotions and sensory sensitivity (e.g. questions about whether a child is upset when hearing loud sounds) and
2. depth of processing, which included questions about a child's cognitive curiosity, intuition, sense of humour, thought-provoking questions.

The results obtained account for the fact that the Parent Questionnaire contains additional (and partially different) questions compared to the more extensively analyzed self-descriptive HSC scale for children (Greven et al., 2019). The result of the factor analysis may suggest that the inclusion of other research items may capture certain aspects of the SPS that are currently not included in the HSC Self-Assessment Questionnaire (see also: Nocentini, Menesini, & Pluess, 2018; Pluess et al., 2017; Pluess and Boniwell, 2015; Slagt et al., 2017).

The research carried out using the observational scale of the Highly Sensitive Child for nursery school children, in turn, (Lionetti, Pluess, et al., 2019) points to a single-factor solution. The identified SPS factor correlates moderately and negatively with assertiveness, which captures the extent to which a child makes requests or demands, makes suggestions or draws attention. The SPS factor also correlated moderately and positively with pressure/coercion (which refers to regulatory aspects as inhibitors, effort control). In addition, in the scientific studies conducted, the temperament factors accounted for only half of the SPS variances. In conclusion, these results suggest that although the SPS is related to moderately observed temperament, it is not fully explained by other temperament factors (Dyson, Olino, Dunn, Goldsmith and Klein, 2012 for: Greven et al., 2019).

Both HSC and HSP scores tend to demonstrate normal distribution in the population (Booth, Standage, & Fox, 2015; Pluess et al., 2018). There are also studies showing a slight trend towards bimodal distribution (Aron et al., 2012; Lionetti et al., 2018). The authors of the review of research on high sensitivity (Greven et al., 2019) highlight potential cultural differences in results in the area of high sensitivity. The studies show that the scale of HSC remains unchanged in intercultural studies, including the basic structure of the scale being conceptualized in the same way among the British and the Belgians. The studies also demonstrate that e.g. Belgium tends to produce higher results mainly on the AES scale, and this trend was also reflected in the research on Italian children (Nocentini et al., 2017, for: Lionetti, 2020). This suggests that some elements/scales may need to be adapted to the specificities of the culture.

HSP and HSC scales have been translated into many languages and their psychometric properties have been cross-culturally verified in many studies. The structure of sensory processing sensitivity has been thoroughly analyzed in the following different countries the United States (Evans and Rothbart, 2008), Canada (Smolensk et al., 2006), Germany, (Hellwig & Roth, 2021; Konrad & Herzberg, 2017; Tillmann et al., 2021) Aron and Aron (1997) Russia (Ershova et al., 2018), the United Kingdom (Pluess et al., 2018), Belgium (Weyn i in., 2021)(Keresteš, Mikac, & Tomas, 2021), Croatia (Şengül-İnal & Sümer, 2020), Turkey, South Africa (May et al., 2020), Spain (Chacón et al., 2021); Italy (Nocentini et al., 2018)(Kibe & Hirano, 2019), Japan, Iceland (Þórarinsdóttir, 2018), Poland (Baryła-Matejczuk, Kata, Poleszak, 2022; Baryła-Matejczuk et al., 2021; Baryła-Matejczuk, Porzak, & Poleszak, 2022).

The research carried out, in particular in the area of SPS and mental disorders, show that control of other personality and temperament traits as well as potential

developmental difficulties and disorders should also be taken into account when designing future SPS research. One of the key recommendations for research in the area of high sensitivity is to control negative emotionality (emotionality and neuroticism). The reason for this is that many of the questions of the tools developed so far contain negative statements, questions that may involve negative emotionality and neuroticism.

2.5 High sensitivity and other personality and temperament traits

As we know from the previous chapter, sensory processing sensitivity is a trait that describes people-to-people differences in environmental sensitivity, both positive and negative. According to the research done so far, SPS is an inherited trait of temperament that can be modified by environmental impacts (cf. Keers & Pluess, 2017), and people with high levels of the trait intensity are described as highly sensitive. This trait involves psychopathology risks and problems related to, among other things, stress when a person is raised, grows up in inappropriate, negative conditions/environment (Belsky & Pluess, 2009; Hofmann & Bitran, 2007; Liss, Mailloux, & Erchull, 2008; Liss et al., 2005; Pluess & Belsky, 2010). In addition, this trait brings specific benefits (including positive mood, increased awareness, intensity of experiences, aesthetic sensitivity, empathy, reactions to interventions) when a person is raised, grows up in a positive, supportive environment (Kibe, Suzuki, Hirano, & Boniwell, 2020; Pluess & Belsky, 2013; Pluess & Boniwell, 2015). High sensitivity is not a disorder, although it may seem to resemble it (cf. Liss, Mailloux and Erchull, 2008). The population shows differences in continuum from low to high environmental sensitivity. It has been a little over twenty years now since the first publications on sensory processing appeared (Aron and Aron, 1997). This trait is not a new discovery (see, among the others, Klages, 1978) but also over the years, it has been understood and interpreted in a different way than today. The US psychologist Elaine N. Aron highlighted and disseminated *high sensitivity* issues, confirming the assumption that the SPS co-existed with emotional reactivity (Aron, Aron & Jagiełłonowicz, 2012). According to the authoress, as highly sensitive people prefer to observe first before they enter new situations, they are often referred to as shy. Aron and Aron (1997) assumed that the SPS was a trait associated with, but different from, other temperament and personality constructs. The concept explaining the differentiated sensitivity to stimuli has been developed on the basis of a comprehensive literature review (including animals as well), which may refer to the general trait of the temperamental sensitivity or metatrait of environmental sensitivity. The metatrait puts in order the differences in temperament and personality by determining the degree to which individual behaviour is driven by environmental influence (Aron et al., 2012). Therefore, sensitivity to assumptions about temperament and personality of different authors was addressed. The current SPS research have been compared, among the others, with traits understood as:

- H.J. Eysenck's (1970) PEN model of personality,
- J.A. Gray's (1982; Gray & McNaughton, 2000) neuropsychological temperament model ,
- developmental temperament model by M. Rothbart (1986),
- five-factor personality model (McCrae & Costa, 1996).

Eysenck's PEN Model of Personality is classified as a factor personality theory (cf. Gasiul, 2012) although the assumptions made, including the biological background of the traits and their universality, are close to temperament theories. The author assumes the existence of three independent personality dimensions: psychoticity, extraversion/introversion, neuroticity. According to the Eysenck concept, differences in introversion/extraversion dimension refer to the optimal level of stimulation at which the individual performs best. For people with a high level of introversion, this level is significantly lower than for those with high levels of extraversion. Neuroticism, in turn, includes the tendency to react with distress and emotional instability. In a series of seven scientific studies, Aron and Aron (1997) verified the SPS links with introversion and neuroticism. On the basis of the test results, it can be assumed that the positive relationship of introversion with the SPS is low to moderate. As regards introversion, the research carried out by Aron and Aron (1997) shows that not all highly sensitive people have a social introversion profile. On the other hand, the trait has quite big links with neuroticism. The results of successive analyses with the use of another introversion measurement tool, *Myers Briggs Type Indicator*, indicate a weak correlation (0.14). As regards the correlation between HSPS and neuroticism measured by the scales of the Big Five tool, it was moderate, positive and important.

Gray's Reinforcement Sensitivity Theory (RST), also called the 'sensitivity to reinforcement theory', describes the neuronal mechanisms for the functioning of the reward and penalty system. He points out that the middle forebrain plexus creates a behavioural activation system that interacts with behavioural inhibition system and a non-specific reticular activation system (cf. Gasiul, 2012). It thus assumes the existence of three behavioural control systems: behavioural activation system (*BAS*), behavioural inhibition (*BIS*) and fight-flight-freezing system (*FFFS*) (Gray, 1982; Gray, McNaughton, 2000). According to Aron and Aron (1997), the SPS is particularly linked to the functioning of the *BIS* system, as highly sensitive people need to stop before they start operating. Based on this assumption, Smolewska et al. (2006) confirmed the positive relationship of the behavioural inhibition system with sensory processing sensitivity and its three factors. The same research also found that *BAS* is largely unrelated to SPS. The ambiguity of the results obtained was also highlighted (see, among the others Pluss et al., 2017). In order to summarize the research report in the box below, an excerpt of a systematic literature review including the research on SPS relationships with other personality and temperament traits will be presented.

In the² articles analyzed as part of the systematic literature review*, six research pointed to a link between sensory processing sensitivity and the systems mentioned within the framework of Gray's reinforcement sensitivity theory (Amiri & Navab, 2019; Pluess et al., 2018; Şengül-İnal, Kirimer-Aydinli, & Sümer, 2018; Smolewska et al., 2006; Sobocko and Zelenski, 2015; Yano and Oishi, 2021). The results of the five research showed a positive and moderate correlation between SPS and BIS (*Behavioural inhibition System*; Pluess et al., 2018; Öngül-İsnal et al., 2018; Smolewska et al., 2006; Sobocko and Zelenski, 2015; Yano and Oishi, 2021), while only three of them showed a positive and weak correlation with BAS (*Behavioural Activation System*; Öngül-İsnal et al., 2018; Smolewska et al., 2006; Yano and Oishi, 2021). Focusing on SPS dimensions, the low sensory sensitivity threshold (LST) and aesthetic sensitivity (AES) had weak links with BIS (Amiri and Navab, 2019; Smolewska et al., 2006). The ease of stimulation (EOE) and LST had a moderate link with BIS (Pluess et al., 2018; Sobocko and Zelenski, 2015; Yano and Oishi, 2021). As regards BAS, all three SPS dimensions (EOE, LST and AES) either poorly correlated with it (Amiri and Navab, 2019; Pluess et al., 2018; Smolewska et al., 2006; Yano and Oishi, 2021) or in general (Sobocko and Żeleński, 2015). AES had a moderate relationship with BAS according to three research (Amiri and Navab, 2019; Pluess et al., 2018; Yano and Oishi, 2021). In addition, regression analyses showed that BIS and BAS provided for the SPS and accounted for 23 % of its variance (Pigül-İsnal et al., 2018).

Another theory compared to the assumptions of environmental sensitivity in research in the area is Mary Rothbart's developmental temperament model (2011). The author defines temperament as biologically dependent individual differences in reactivity and self-regulation. According to Rothbart and colleagues, temperamental (Rothbart, 2011; Rothbart & Derryberry, 1981) reactivity refers to the response to changes in the external and indoor environments, measured by latency, duration and intensity of emotional, exploratory and motor responses. Self-regulation refers to processes used to modulate reactivity (especially executive attention and effort control processes). The research done by Evans and Rothbart (2008) verified the

² Systematic literature review carried out as part of the High sensitivity – innovative module in human sciences (HSP) project No: 2020-1-PL01-KA203-082261 in PubMed, ScienceDirect and Scopus databases

relationship of SPS to the temperament dimensions and aspects of the Rothbart model in adults. In the case of SPS, a two-factor conceptualization was used (other than in the tri-factor structure of EOE, LST and AES; according to Lionetti et al., 2018; Pluss et al., 2017). The research cited (Evans and Rothbart, 2008) concluded that the negative impact (the combined EOE/LST component) has a strong positive relationship with negative emotionality (especially sensory discomfort), a moderate negative relationship with the effort control and a relatively low negative relationship with positive emotional emotionality/extraversion. Aesthetic sensitivity was found to have a strong positive relationship with all aspects of the exploratory sensitivity and a low to moderate positive link with positive affectivity/extraversion and affiliative motivation. Sobocko et al. took part in the replicas of the research (2015) confirming the positive relationship between the SPS component related to negative emotionality (EOE/LST) and the negative reactivity of the Rothbart model (see also: Greven et al., 2019; Khodarahimi, Mirderkvand, & Amraei, 2021). As regards the AES, the factor has strong links with the explorative sensitivity and all its aspects (Evans and Rothbart, 2008; Sobocko and Zelenski, 2015), moderate link to positive emotionality/extraversion (Evans and Rothbart, 2008; Pluess et al., 2018) and low with affiliation (Evans and Rothbart, 2008) and exercise control (Pluess et al., 2018).

Five-factor personality model (McCrae & Costa, 1996) also called the Big Five is the result of lexical statistical analyses and covers the most practical and theoretical significance of basic personality traits. The concept in research is still very popular, although new research lines are also being undertaken (among others: TheseStrus & Ciecuch, 2014). These traits include extraversion, neuroticism, openness to experience, agreeableness and conscientiousness, and each trait has a number of specific aspects. The SPS as a global construct was found to be positively linked to neuroticism and negatively linked to extraversion. In addition, most research found a positive link between SPS and openness to experience. In the articles cited, the links between SPS as a global construct and agreeableness and conscientiousness domains were irrelevant (Grimen & Diseth, 2016; Francesca Lionetti et al., 2018; Pluess et al., 2018; Smolewska et al., 2006; Sobocko & Zelenski, 2015).

Other research (e.g. national HSP and HSC scale adaptations) that correlate the sensitivity construct with other personality and temperament concepts can also be found in the literature. The research done by Smolewska and co-researchers (2006), who predicted the contribution of neuroticism and sensitivity of BIS to anticipating changes in SPS, have already been referred to several times. According to their research, both neuroticism and the sensitivity of the BIS were positive for changes in SPS, so were the SPS components: EOE and LST. The correlations with neuroticism were much stronger than those with the sensitivity of BIS. In addition, neuroticism (but no longer BIS) positively anticipated AES, although this link was weaker than the links with the other two sub-scales and with the SPS as a global construct. In two research involving children, multiple regression analyses were used to investigate the links between BIS and BAS sensitivity, positive and negative emotionality/affectivity, and exercise control with SPS as a global design, as well as with EOE, LST and AES components (Pluess et al., 2017). Multidimensional models provided between 26 % and 34 % of the variance of the global SPS score and between 15 and 35 % of the SPS component variances (read more in Pluess et al., 2017). However, these different personality designs at best explained a small part of the SPS variances, suggesting that the SPS is not fully explained or captured by the existing temperament and personality constructs (Pluess et al., 2017).

When the three SPS dimensions were analyzed separately, a differentiated picture of the relationship with a trait emerges. In the ongoing research (among the others (Ahadi & Basharpour, 2010; Grimen & Diseth, 2016; Pluess, Boniwell, Hefferon, & Tunariu, 2017; Smolewska et al., 2006; Sobocko & Zelenski, 2015) personality dimensions and mental health. In a sample of University of Mohaghegh Ardabili students. One hundred and eighty students were included in this study. All participants were asked to complete the highly sensitive person scale, NEO-five factor inventory and general health questionnaire. Analysis of the data involved both descriptive and inferential statistics including means, standard deviations, Pearson's correlation coefficients and regression analysis. The results revealed that ease of excitation was positively correlated to neuroticism and mental health (physical problems, anxiety, disorder in social functioning and depression, it was found that both EOE and LST have a positive relationship with neuroticism. It was also found that both components are negatively linked to extraversion. However, these relationships were generally weaker and less consistent in various research than those with neuroticism. In one

scientific study (in the group of 15-19 years old), the EOE was inversely proportional to conscientiousness (Pluess et al., 2017). One study (in the group of students of the first-cycle studies) found that both EOE and LST are negatively linked to openness to experience (Lionetti et al., 2018), while another study in a more diverse adult sample showed a weak positive relationship with LST (Bridges & Schendan, 2019). It was also stated that the AES is consistently positive in terms of openness to experience (Ahadi and Basharpour, 2010; Lionetti et al., 2018; Listou Grimen and Diseth, 2016; Smolewska et al., 2006; Sobocko and Zelensky, 2015), with conscientiousness (Ahadi and Basharpour, 2010; Pluess et al., 2017; Sobocko and Zelenski, 2015), as well as with neurotism (Ahadi and Basharpour, 2010; Lionetti et al., 2018). In most of the research, none of the SPS elements were found to be related to agreeableness (exceptions are 12-item-scale research). The question is whether the SPS reflects a more fundamental trait of temperament or a meta-personal trait of environmental sensitivity.

Summary

Identifying so-called “*high sensitivity*” is not an easy task. Although the concepts underlying the diverse sensitivity to stimuli among humans have developed significantly in recent years, the tools for trait measuring still do not provide a clear answer as to its structure and how it is measured. This is due to the fact that, among other things, it is difficult to capture. with a self-description tool, what forms the basis for the phenomenon, i.e. perception and processing. What we observe at the level of behaviour is often a manifestation of an individual’s adaptation to the environment. In addition, there are many difficulties in conceptualizing and defining the trait itself (the question already mentioned whether the SPS reflects a fundamental trait of temperament or a meta-personal trait of environmental sensitivity). Thirdly, the very way in which the trait of sensory processing sensitivity is manifested varies over the life cycle. This demonstrates the importance and the need for further analysis in this area. As already mentioned, so-called *highly sensitive people* process information and environmental stimuli further than others, and due to, among other things, the emotional reactivity and intensity of the stimuli they experience, their behaviour may be classified as dysfunctional. However, it should be stressed that recent studies do not include *high sensitivity* as disorders. However, they point to the crucial importance of the quality of the development environment. The increase in SPS does not lead to difficulties in communication or socialization, nor to weaker coordination or disintegration in response to sensory signals.

Environmental sensitivity concepts draw many researchers’ attention, and the increasing number of scientific articles on the subject itself but also on psychometric tools produced to measure it, indicates its theoretical value. Sensory processing sensitivity has also become a popular concept in pop culture, which points to, among other things, the application value of the concept, but does not always facilitate research in this area.



Revision questions

1. What traits and behaviours of individuals may indicate a high degree of sensory processing sensitivity?
2. How much sensitivity can be demonstrated in the social sphere of functioning?
3. What difficulties do researchers encounter in measuring sensory processing sensitivity and environmental sensitivity?
4. What behaviour can indicate the depth of processing, emotional reactivity, overreaction to stimuli and aesthetic sensitivity in children?
5. What tools have been developed to measure sensitivity?
6. Is sensory processing sensitivity a single or multifactor construct? Explain
7. Which factors are most frequently mentioned in the HSP and HSC scale scientific studies?
8. Give differences between sensory processing sensitivity and neurotism
9. List temperament and personality traits that are most common to the SPS

Bibliography

- Acevedo, B., Aron, E., Pospos, S., & Jessen, D. (2018). The functional highly sensitive brain: A review of the brain circuits underlying sensory processing sensitivity and seemingly related disorders. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 373(1744). <https://doi.org/10.1098/rstb.2017.0161>
- Acevedo, B. P., Aron, E. N., Aron, A., Sangster, M. D., Collins, N., & Brown, L. L. (2014). The highly sensitive brain: An fMRI study of sensory processing sensitivity and response to others' emotions. *Brain and Behavior*, 4(4), 580–594. <https://doi.org/10.1002/brb3.242>
- Acevedo, B. P., Jagiellowicz, J., Aron, E. N., Marhenke, R., & Aron, A. (2017). Sensory Processing Sensitivity and Childhood Quality'S Effects on Neural Responses To Emotional Stimuli. *Clinical Neuropsychiatry*, 14(6), 359–373.
- Ahadi, B., & Basharpour, S. (2010). Relationship between sensory processing sensitivity, personality dimensions and mental health. *Journal of Applied Sciences*, 10(7), 570–574. <https://doi.org/10.3923/jas.2010.570.574>
- Amiri, S., & Navab, A. G. (2019). Emotion regulation, brain behavioural systems, and sensory sensitivity in sociocultural attitudes towards appearance in adolescents. *Neuropsychiatria i Neuropsychologia*, 14(1–2), 32–38. <https://doi.org/10.5114/nan.2019.87726>
- Aron, E. N. (2002). *The Highly Sensitive Child: Helping Our Children Thrive When The World Overwhelms Them*. New York City: Harmony.
- Aron, E. N. (2013). *The Highly Sensitive Person*. Citadel. Retrieved from <https://www.amazon.com/Highly-Sensitive-Person-Elaine-Aron-ebook/dp/B00GT1YES8>
- Aron, E. N., & Aron, A. (1997). Sensory-Processing Sensitivity and Its Relation to Introversion and Emotionality. *Journal of Personality and Social Psychology*, 73(2), 345–368. <https://doi.org/10.1037/0022-3514.73.2.345>
- Aron, E. N., Aron, A., & Jagiellowicz, J. (2012). Sensory Processing Sensitivity: A Review in the Light of the Evolution of Biological Responsivity. *Personality and Social Psychology Review*, 16(3), 262–282. <https://doi.org/10.1177/1088868311434213>
- Assary, E., Zavos, H. M. S., Krapohl, E., Keers, R., & Pluess, M. (2020). Genetic architecture of Environmental Sensitivity reflects multiple heritable components : a twin study with adolescents. *Molecular Psychiatry*. <https://doi.org/10.1038/s41380-020-0783-8>
- Baryła-Matejczuk, M., Artymiak, M., Ferrer-Cascales, R., Albaladejo-Blázquez, N., Ruiz-Robledillo, N., Sánchez-SanSegundo, M., ... Betancort, M. (2021). *Questionnaire on Sensory Processing Sensitivity in Children. Manual on How to Apply, Correct and Interpret the Questionnaire*. (U. D'Alacant, Ed.). Alicante. Retrieved from <http://hdl.handle.net/10045/120370>
- Baryła-Matejczuk, Monika, Kata, G., & Poleszak, W. (2022). Environmental sensitivity in young adolescents : The identification of sensitivity groups in a Polish sample. *PLoS ONE*, 17(7), e0271571. <https://doi.org/10.1371/journal.pone.0271571>

- Baryła-Matejczuk, Monika, Poleszak, W., & Porzak, R. (2021). Short Polish version of the Highly Sensitive Person Scale – exploring its multidimensional structure in a sample of emerging adults. *Current Issues in Personality Psychology*. <https://doi.org/10.5114/cipp.2021.107339>
- Baryła-Matejczuk, Monika, Porzak, R., & Poleszak, W. (2022). HSPS-10—Short Version of the Highly Sensitive Person Scale for Students Aged 12–25 Years. *International Journal of Environmental Research and Public Health*, 19(23), 15775. <https://doi.org/10.3390/ijerph192315775>
- Bas, S., Kaandorp, M., de Klejin, Z., Braaksma, W., Bakx, A., & Greven, C. (2021). Experiences of adults high in the personality trait sensory processing sensitivity: A qualitative study. *Journal of Clinical Medicine*, 10(21), 4912. <https://doi.org/10.3390/jcm10214912>
- Belsky, J., & Pluess, M. (2009). Beyond Diathesis Stress : Differential Susceptibility to Environmental Influences. *Psychological Bulletin*, 135(6), 885–908. <https://doi.org/10.1037/a0017376>
- Booth, C., Standage, H., & Fox, E. (2015). Sensory-processing sensitivity moderates the association between childhood experiences and adult life satisfaction. *Personality and Individual Differences*, 87(December), 24–29. <https://doi.org/10.1016/j.paid.2015.07.020>
- Boterberg, S., & Warreyn, P. (2016). Making sense of it all: The impact of sensory processing sensitivity on daily functioning of children. *Personality and Individual Differences*, 92, 80–86. <https://doi.org/10.1016/j.paid.2015.12.022>
- Boyce, W. T., & Ellis, B. J. (2005). Biological sensitivity to context : I . An evolutionary – developmental theory of the origins and functions of stress reactivity. *Development and Psychopathology*, 17(2), 271–301. <https://doi.org/10.1017/s0954579405050145>
- Bridges, D., & Schendan, H. E. (2019). The sensitive, open creator. *Personality and Individual Differences*, 142, 179–185. <https://doi.org/10.1016/j.paid.2018.09.016>
- Buss, A. H., & Plomin, R. (1984). *Temperament: Early Developing Personality Traits*. Hillsdale, NJ.: Erlbaum.
- Chacón, A., Pérez-Chacón, M., Borda-Mas, M., Averages-Navarro, M. L., & López-Jiménez, A. M. (2021). Cross-Cultural Adaptation and Validation of the Highly Sensitive Person Scale to the Adult Spanish Population (HSPS-S). *Psychology Research and Behavior Management*, Volume 14, 1041–1052. <https://doi.org/10.2147/PRBM.S321277>
- Costa-López, B., Ruiz-Robledillo, N., Albaladejo-Blázquez, N., Baryła-Matejczuk, M., & Ferrer-Cascales, R. (2022). Psychometric Properties of the Spanish Version of the Highly Sensitive Child Scale: The Parent Version. *International Journal of Environmental Research and Public Health*, 19(5), 3101. <https://doi.org/10.3390/ijerph19053101>
- Craik, F. M., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior*, 11, 671–684.

- Dyson, M. W., Olino, T., Durbin, C., Goldsmith, H., & Klein, D. (2012). The structure of temperament in preschoolers: a two-stage factor analytic approach. *Emotion, 12*(1), 44–57. <https://doi.org/10.1037/a0025023>
- Eisenberg, N., Spinrad, T., & Eggum, N. (2010). Emotion-Related Self-Regulation and Its Relation to Children's Maladjustment. *Annual Review of Clinical Psychology, 6*(1), 495–525. <https://doi.org/10.1146/annurev.clinpsy.121208.131208>
- Ellis, B. J., Boyce, W. T., Belsky, J., Bakermans-Kranenburg, M. J., & Van Ijzendoorn, M. H. (2011). Differential susceptibility to the environment: An evolutionary-neurodevelopmental theory. *Development and Psychopathology, 23*(1), 7–28. <https://doi.org/10.1017/S0954579410000611>
- Ellis, B. J., Essex, M. J., & Boyce, W. T. (2005). Biological sensitivity to context : II. Empirical explorations of an evolutionary–developmental theory. *Development and Psychopathology, 17*, 303–328. <https://doi.org/10.1017/S0954579405050157>
- Ershova, R. V., Yarmotz, E. V., Koryagina, T. M., Semeniak, I. V., Shlyakhta, D. A., & Tarnow, E. (2018). A psychometric evaluation of the highly sensitive person scale: The components of sensory-processing sensitivity. *Electronic Journal of General Medicine, 15*(6). <https://doi.org/10.29333/ejgm/100634>
- Evans, D. E., & Rothbart, M. K. (2008). Temperamental sensitivity: Two constructs or one? *Personality and Individual Differences, 44*(1), 108–118. <https://doi.org/10.1016/j.paid.2007.07.016>
- Eysenck, H. J. (1970). *The structure of human personality*. London: Methuen.
- Gasiul, H. (2012). *Psychologia osobowości. Nurty, teorie, koncepcje*. Warszawa: Difin SA.
- Goldberg, A., Ebraheem, Z., Freiberg, C., Ferarro, R., Chai, S., & Gottfried, O. D. (2018). Sweet and Sensitive: Sensory Processing Sensitivity and Type 1 Diabetes. *Journal of Pediatric Nursing, 38*, e35–e38. <https://doi.org/10.1016/j.pedn.2017.10.015>
- Gray, J. A. (1982). *The Neuropsychology of Anxiety: an Enquiry Into The functions of the Septo-hippocampal System*. New York: Oxford University Press.
- Gray, J. A., & McNaughton, N. (2000). *The Neuropsychology of Anxiety: an Enquiry Into the Functions of the Septo-hippocampal System, 2nd*. Oxford: Oxford University Press.
- Greven, C. U., Lionetti, F., Booth, C., Aron, E. N., Fox, E., Schendan, H. E., ... Homburg, J. (2019). Sensory Processing Sensitivity in the context of Environmental Sensitivity: a critical review and development of research agenda. *Neuroscience and Biobehavioral Reviews, 98*(January), 287–305. <https://doi.org/10.1016/j.neubiorev.2019.01.009>
- Grimen, H. L., & Diseth, Å. (2016). Sensory Processing Sensitivity in the context of Environmental Sensitivity: a critical review and development of research agenda. *Comprehensive Psychology, 5*, 216522281666007. <https://doi.org/10.1177/2165222816660077>
- Hellwig, S., & Roth, M. (2021). Conceptual ambiguities and measurement issues in sensory processing sensitivity. *Journal of Research in Personality, 93*, 104–130. <https://doi.org/10.1016/j.jrp.2021.104130>

- Hofmann, S. G., & Bitran, S. (2007). Sensory-processing sensitivity in social anxiety disorder: Relationship to harm avoidance and diagnostic subtypes. *Journal of Anxiety Disorders*, 21(7), 944–954.
- Hornowska, E., Brzezińska, A. I., Appelt, K., & Kaliszewska-Czeremska, K. (2014). *Rola środowiska w rozwoju małego dziecka – metody badania*. Warszawa: Wydawnictwo Naukowe Scholar Sp. z o. o.
- Jagiellowicz, J., Xu, X., Aron, A., Aron, E., Cao, G., Feng, T., & Weng, X. (2011). The trait of sensory processing sensitivity and neural responses to changes in visual scenes. *Social Cognitive and Affective Neuroscience*, 6(1), 38–47. <https://doi.org/10.1093/scan/nsq001>
- Kagan, J. (1994). On the nature of emotion. *Monographs of the Society for Research in Child Development*, 59(2–3), 7–24. <https://doi.org/10.2307/1166136>
- Keers, R., & Pluess, M. (2017). Childhood quality influences genetic sensitivity to environmental influences across adulthood: A life-course Gene × Environment interaction study. *Development and Psychopathology*, 29(5). <https://doi.org/10.1017/S0954579417001493>
- Keresteš, G., Mikac, U., & Tomas, J. (2021). Psychometric Properties of the Highly Sensitive Child Scale in Samples of Croatian Children and Adolescents. *Psychological Topics*, 30(2), 351–370. <https://doi.org/10.31820/pt.30.2.11>
- Khodarahimi, S., Mirderkvand, F., & Amraei, K. (2021). Negative affectivity, sensory processing hypersensitivity, sleep quality and dreams: A conceptual model for generalised anxiety disorder in adults. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues*. <https://doi.org/10.1007/s12144-021-01428-w>
- Kibe, C., & Hirano, M. (2019). Development of the Japanese Version of Highly Sensitive Child Scale for Adolescence (HSCS-A). *The Japanese Journal of Personality*, 28(2), 108–118. <https://doi.org/10.2132/personality.28.2.1>
- Kibe, C., Suzuki, M., Hirano, M., & Boniwell, I. (2020). Sensory processing sensitivity and culturally modified resilience education: Differential susceptibility in Japanese adolescents. *PLoS ONE*, 15(9), e0239002. <https://doi.org/10.1371/journal.pone.0239002>
- Klages, W. (1978). *Der sensible Mensch : Psychologie, Psychopathologie, Therapie (The Sensitive Human: Psychology, Psychopathology, Therapy) (in German)* (1st ed.). Stuttgart, Germany: Enke: Enke.
- Konrad, S., & Herzberg, P. Y. (2017). Psychometric Properties and Validation of a German High Sensitive Person Scale (HSPS-G). *European Journal of Psychological Assessment*, 35(3). <https://doi.org/10.1027/1015-5759/a000411>
- Lionetti, F., Pastore, M., Moscardino, U., Nocentini, A., Pluess, K., & Pluess, M. (2019). Sensory Processing Sensitivity and its association with personality traits and affect: A meta-analysis. *Journal of Research in Personality*, 81. <https://doi.org/10.1016/j.jrp.2019.05.013>

- Lionetti, F., Pluess, M., Aron, E., Aron, A., & Klein, D. (2019). Observer-rated environmental sensitivity moderates children's response to parenting quality in early childhood. *Developmental Psychology*, *55*(11), 2389–2402. <https://doi.org/10.1037/dev0000795>
- Lionetti, Francesca. (2020). Assessment of sensory processing sensitivity across the lifespan. In *The highly sensitive brain. Research, assessment, and treatment of sensory processing sensitivity* (p. 205). London: Elsevier Inc.
- Lionetti, Francesca, Aron, A., Aron, E. N., Burns, G. L., Jagiellowicz, J., & Pluess, M. (2018). Dandelions, tulips and orchids: Evidence for the existence of low-sensitive, medium-sensitive and high-sensitive individuals. *Translational Psychiatry*, *8*(1), 24. <https://doi.org/10.1038/s41398-017-0090-6>
- Liss, M., Mailloux, J., & Erchull, M. J. (2008). The relationships between sensory processing sensitivity, alexithymia, autism, depression, and anxiety. *Personality and Individual Differences*, *45*(3), 255–259. <https://doi.org/10.1016/j.paid.2008.04.009>
- Liss, M., Timmel, L., Baxley, K., & Killingsworth, P. (2005). Sensory processing sensitivity and its relation to parental bonding, anxiety, and depression. *Personality and Individual Differences*, *39*(8), 1429–1439. <https://doi.org/10.1016/j.paid.2005.05.007>
- Little, L. M., Dean, E., Tomchek, S. D., & Dunn, W. (2017). Classifying sensory profiles of children in the general population. *Child: Care, Health and Development*, *43*(1), 81–88. <https://doi.org/10.1111/cch.12391>
- May, A. K., Norris, S. A., Richter, L. M., & Pitman, M. M. (2020). A psychometric evaluation of the Highly Sensitive Person Scale in ethnically and culturally heterogeneous South African samples. *Current Psychology*.
- McCrae, R. R., & Costa, P. T. (1996). Toward a new generation of personality theories: Theoretical contexts for the Five-Factor Model. In J. S. Wiggins (Ed.), *The Five-Factor Model of personality: Theoretical perspectives* (pp. 51–87). New York: Guilford Press.
- Meyer, B., Ajchenbrenner, M., & Bowles, D. P. (2005). Sensory Sensitivity, Attachment Experiences, and Rejection Responses Among Adults with Borderline and Avoidant Features. *Journal of Personality Disorders*, *19*(6), 641–658. <https://doi.org/10.1521/pedi.2005.19.6.641>
- Montoya-Pérez, K. S., Ortega, J. I. M., Montes-Delgado, R., Padrós-Blázquez, F., Chiapas, J. M. de la R., & Montoya-Pérez, R. (2019). Psychometric properties of the highly sensitive person scale in Mexican population. *Psychology Research and Behavior Management*, *12*. <https://doi.org/10.2147/PRBM.S224808>
- Neal, J. A., Edelman, R. J., & Glachan, M. (2002). Behavioural inhibition and symptoms of anxiety and depression: Is there a specific relationship with social phobia? *The British Journal of Clinical Psychology*, *41*(4), 361–374.

- Nocentini, A., Menesini, E., & Pluess, M. (2018). The Personality Trait of Environmental Sensitivity Predicts Children's Positive Response to School-Based Anti-bullying Intervention. *Clinical Psychological Science*, 6(6), 848–859. <https://doi.org/10.1177/2167702618782194>
- Pluess, M. (2015). Individual Differences in Environmental Sensitivity. *Child Development Perspectives*, 9(3), 138–143. <https://doi.org/10.1111/cdep.12120>
- Pluess, M. (2017). Individual Differences in Environmental Sensitivity, (October). <https://doi.org/10.1111/cdep.12120>
- Pluess, M., Assary, E., Lionetti, F., Lester, K. J., Krapohl, E., Aron, E. N., & Aron, A. (2018). Environmental sensitivity in children: Development of the highly sensitive child scale and identification of sensitivity groups. *Developmental Psychology*, 54(1), 51–70. <https://doi.org/10.1037/dev0000406>
- Pluess, M., & Belsky, J. (2010). Differential susceptibility to parenting and quality child care. *Developmental Psychology*, 46(2), 379–390. <https://doi.org/10.1037/a0015203>
- Pluess, M., & Belsky, J. (2013). Vantage sensitivity: Individual differences in response to positive experiences. *Psychological Bulletin*, 139(4), 901–916. <https://doi.org/10.1037/a0030196>
- Pluess, M., & Boniwell, I. (2015). Sensory-Processing Sensitivity predicts treatment response to a school-based depression prevention program: Evidence of Vantage Sensitivity. *Personality and Individual Differences*, 82, 40–45. <https://doi.org/10.1016/j.paid.2015.03.011>
- Pluess, M., Boniwell, I., Hefferon, K., & Tunariu, A. (2017). Preliminary evaluation of a school-based resilience-promoting intervention in a high-risk population: Application of an exploratory two-cohort treatment/control design. *PLoS ONE*, 12(5). <https://doi.org/10.1371/journal.pone.0177191>
- Rinn, A. N., Mullet, D. R., Jett, N., & Nyikos, T. (2018). Sensory Processing Sensitivity Among High-Ability Individuals: A Psychometric Evaluation of the Highly Sensitive Person Scale. *Roeper Review*, 40(3). <https://doi.org/10.1080/02783193.2018.1466840>
- Rothbart, M. K. (1986). Longitudinal observation of infant temperament. *Developmental Psychology*, 22(3), 356–365. <https://doi.org/10.1037/0012-1649.22.3.356>
- Rothbart, M. K. (2011). *Becoming who we are: Temperament and personality in development*. New York: The Guilford Press.
- Rothbart, M. K., & Derryberry, D. (1981). Development of Individual Difference in Temperament. In M. E. Lamb & A. L. Brown (Eds.), *Advances in Developmental Psychology* (pp. 37–86). Hillsdale, NJ.: Lawrence Erlbaum Associates.
- Şengül-İnal, G., Kirimer-Aydinli, F., & Sümer, N. (2018). The Role of Attachment Insecurity and Big Five Traits on Sensory Processing Sensitivity. *The Journal of Psychology*, 152(7), 497–514. <https://doi.org/10.1080/00223980.2018.1482255>
- Şengül-İnal, G., & Sümer, N. (2020). Exploring the Multidimensional Structure of Sensory Processing Sensitivity in Turkish Samples. *Current Psychology*, 39(1), 194–206. <https://doi.org/10.1007/s12144-017-9751-0>

- Slagt, M., Semon, J., Aken, M. A. G. Van, & Ellis, B. J. (2017). Children ' s differential susceptibility to parenting : An experimental test of “ for better and for worse ”. *Journal of Experimental Child Psychology*, 154, 78–97. <https://doi.org/10.1016/j.jecp.2016.10.004>
- Smolewska, K. A., McCabe, S. B., & Woody, E. Z. (2006). A psychometric evaluation of the Highly Sensitive Person Scale: The components of sensory-processing sensitivity and their relation to the BIS/BAS and “Big Five.” *Personality and Individual Differences*, 40(6), 1269–1279. <https://doi.org/10.1016/j.paid.2005.09.022>
- Sobocko, K., & Zelenski, J. M. (2015). Trait sensory-processing sensitivity and subjective well-being: Distinctive associations for different aspects of sensitivity. *Personality and Individual Differences*, 83, 44–49. <https://doi.org/10.1016/j.paid.2015.03.045>
- Strelau, J. (2006). *Psychologia różnic indywidualnych*. Warszawa: Wydawnictwo Naukowe Scholar Sp. z o. o.
- Strus, W., & Ciecuch, J. (2014). POZA WIELKĄ PIĄTKĘ – PRZEGLĄD NOWYCH MODELI STRUKTURY OSOBOWOŚCI. *Polskie Forum Psychologiczne*, 19(1), 17–49.
- Tillmann, T., Bertrams, A., El Matany, K., & Lionetti, F. (2021). Replication of the existence of three sensitivity groups in a sample of German adolescents. *European Journal of Developmental Psychology*, 18(1), 131–143. <https://doi.org/10.1080/17405629.2020.1763791>
- Tillmann, T., El Matany, K., & Duttweiler, H. (2018). Measuring Environmental Sensitivity in Educational Contexts: A Validation Study With German-Speaking Students. *Journal of Educational and Developmental Psychology*, 8(2), 17. <https://doi.org/10.5539/jedp.v8n2p17>
- Weyn, S., Van Leeuwen, K., Pluess, M., Lionetti, F., Goossens, L., Bosmans, G., ... Bijttebier, P. (2021). Improving the Measurement of Environmental Sensitivity in Children and Adolescents: The Highly Sensitive Child Scale–21 Item Version. *Assessment*. <https://doi.org/10.1177/1073191120983894>
- Weyn, S., Van Leeuwen, K., Pluess, M., Lionetti, F., Greven, C. U., Goossens, L., ... Bijttebier, P. (2019). Psychometric properties of the Highly Sensitive Child scale across developmental stage, gender, and country. *Current Psychology*. <https://doi.org/10.1007/s12144-019-00254-5>
- Yano, K., & Oishi, K. (2021). Replication of the three sensitivity groups and investigation of their characteristics in Japanese samples. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues*. <https://doi.org/10.1007/s12144-021-01537-6>
- Pórarinsdóttir, Þ. . (2018). *Psychometric Properties of the Highly Sensitive Person Scale and Its Relationship to the Big Five Personality Traits in a Sample of Icelandic University Students*. University of Reykjavik.

CHAPTER 3

EDUCATION AND PREVENTION IN THE CONTEXT OF HIGHLY SENSITIVE PEOPLE

Wiesław Poleszak

Faculty of Human Sciences, Institute of Psychology, WSEI University, Lublin, Poland, ORCID: 0000-0002-5253-0789, e-mail: wieslaw.poleszak@wsei.lublin.pl

Abstract

High sensitivity studies show that such a trait found in a child can be either a positive resource or a source of numerous problems. The child's educational environment determines its future life. Whenever a young person receives positive educational support, high sensitivity can lead to additional competences, such as greater maturity, empathy or the ability to help others. On the other hand, in an unfriendly educational environment (e.g. in the form of non-constructive educational styles), high sensitivity becomes a risk factor. It can lead, among other things, to rumination, anxious attitudes or difficulties in establishing relationships and building a position in a group. At this stage, a preventive intervention seems necessary. Due to great importance of this support for the development of highly sensitive children, education and prevention activities should be of high quality and based on sound and professional knowledge. Hence, in this chapter, the reader will acquire some basic knowledge of the essence of education and prevention, and what the relationship between these two is. Elements of knowledge on the functioning of highly sensitive people and potential developmental difficulties are also presented. This background has been accompanied by proposals for educational and preventive actions, taking into account the levels of difficulty of highly sensitive children and young people. The content presented is intended to support specialists in the field in providing professional support to highly sensitive children and young people in order to avoid mental health problems as well as creating their potential to develop in a broad sense.

Key words: Prevention, highly sensitive people, prevention strategies, risk factors, protective factors

After reading this chapter you will:

- know what education and prevention is and how to use these two to support highly sensitive people
- become familiar with the levels of prevention and learn how to use them to make preventive support more effective
- be able to exchange and characterize different prevention strategies used in prevention programmes
- know what protective and risk factors are as well as becoming acquainted with those which are important to support and develop highly sensitive people
- find proposals for action to support children and young people in dealing with the difficulties which stem from high sensitivity and the process of upbringing in an unfriendly environment

3.1 Compendium of knowledge on prevention – essence, models and impact strategies



You have certainly been confronted with the concept of prevention. What do you associate it with? How would you define it?

In a common and narrow sense, prevention is referred to as deterring some kind of negative behaviour or preventing health loss. A broader approach to prevention implies conscious and intentional action to reduce the occurrence of problem situations in human life. Prevention in this sense can be applied to many areas of everyday life, such as road traffic problems, the emergence of diseases, addictions and many other adverse social phenomena. However, this compilation will focus mainly on the prevention of problems caused by dysfunctional ways of meeting needs and inappropriate ways of adapting to the environment by highly sensitive people. In other words, this chapter will present ways to support sensitive people in addressing the problems that arise from the interaction of personal traits of sensitive people and their surroundings.

3.1.1 Two approaches to the understanding of problem behaviour prevention

While defining problem behaviour prevention, two approaches can generally be distinguished. The first one is focused on the effects of negative behaviour or health loss. According to this view, *prevention is understood as deliberate action to prevent problems (disorders, diseases, dysfunctions) before they occur* (Ostaszewski, 2016, p. 101).

According to the type of problem behaviours, we can distinguish:

- prevention of addiction (aimed at reducing the use or abuse of psychoactive substances and preventing multiple health and social disorders);
- prevention of behavioural problems (abuse of electronic media, gambling, or relationship violence or cyberbullying, etc.),
- prevention of mental problems and disorders (affective disorders and other mental diseases and behavioural problems).

Support for highly sensitive people will rather focus on the area of prevention of psychosocial problems and protection against mental disorders (cf. Liss, Mailloux, Erchull, 2008; Liss, Timmel, et al., 2005). Of course, this does not preclude highly sensitive people from seeking solutions to their problems (due to the temperament and personality conditions) in the use of psychoactive substances and problematic behaviour.

Every human being is at a certain pace in the successive stages of development. In each of these stages, development tasks are embedded, i.e. some kind of competences that each of us needs to acquire in order to be able to meet the challenges we face in our lives. Therefore, the second definition of prevention focuses on the process of supporting young people in their development tasks and meeting their development needs. It defines prevention as the process of helping a young person to cope with challenges that threaten normal development and healthy life by reducing and eliminating the factors that disrupt the development and healthy lifestyle, and to initiate and enrich the factors facilitating the development and healthy life (Gaś, 2006).

Which of the above-mentioned approaches to understanding prevention is more relevant to you and why?



The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA, 2011) defines prevention in a similar way. According to the EMCDDA, the essence of prevention is to help young people change behaviour, acquire skills and improve their functioning in different spheres, such as social standards, interactions with peers, standard of living or their own personality traits (EMCDDA, 2011, p. 31).

Two more important issues are linked to prevention, namely health education and promotion. Health promotion is about strengthening individual skills and lifestyles that foster health protection and health-enhancing environments (Wojnarowska, 2010). On the other hand, education and prevention are two inter-linked processes, one resulting from the other, especially if prevention is understood as an intervention in ineffective education (see Fig. 1).

We define upbringing as child support for development aimed at achieving full maturity in four spheres of life, namely (Gaś, 2006; Poleszak, 2015):

- physical – linked not only to natural physical development processes, but also to the acquisition of knowledge and skills necessary for leading a healthy lifestyle;
- mental – oriented towards self-responsibility and the responsibility for the attitude towards the world,

- social – by acquiring the skills to properly fulfil their social roles and systematically prepare to take on new roles (related to the life cycle);
- spiritual (axiological) – above all, having a constructive and stable system of values and a sense of existence.

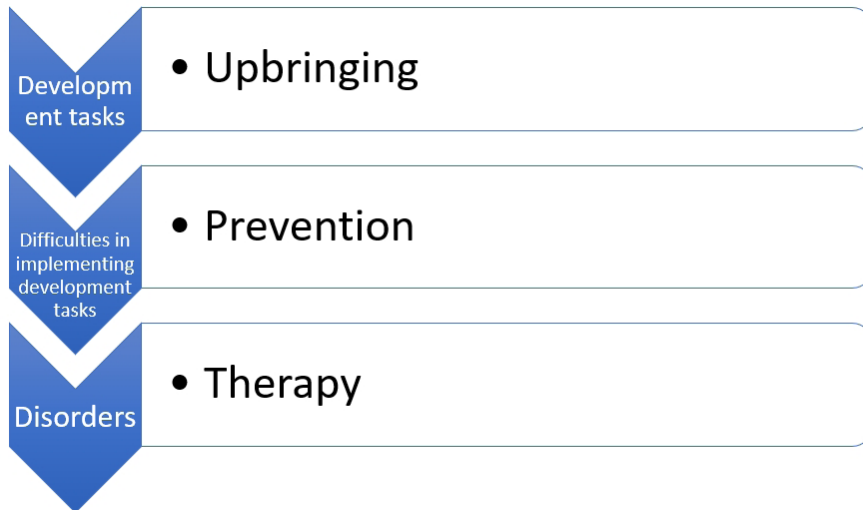


Figure 3.1. Relationship between education, prevention and therapy.

In view of the above, education and prevention are two distinct processes with separate objectives to pursue. They are closely interlinked, although education plays a supreme role as it determines the area and content for prevention, being a more stable and constant process over time. Education makes sense of prevention, which in turn creates the conditions for the smooth implementation of the educational process. As shown by numerous studies, the conditions in which a child is raised (both in the family and in the school environment) are crucial for the child's development, and in the case of highly sensitive children, this is fundamental (Lionetti, Pluess, Aron, Aron, & Klein, 2019; Pluess, & Belsky, 2010; Slagt, Semon, Aken, Van, & Ellis, 2017).

Despite the distinct nature of the education and prevention processes described above, there is also a common area for them, namely the area of primary or universal prevention, which enriches educational activities with the preventive content. This can include a number of actions focusing on health promotion and life prolonging as well as preventing problems from emerging.

3.1.2 Types of prevention activities identified according to the recipients

Two classifications of prevention activities can be found in the primary sources, taking into account either the intensification of problem behaviours (medical

model) or the susceptibility of target groups to threats (EMCDDA, 2011). Both classifications divide prevention activities into three levels, while introducing different nomenclatures and highlighting different aspects. In the medical model, emphasis is placed on the intensification of dysfunction or mental disorders. This division distinguishes between three levels of prevention activities (Gaś, 2006):

- 1) **primary prevention** is targeted at healthy people. Their aim is to support proper processes of physical, mental, social and spiritual development. These activities are designed to develop health-friendly habits, motivate health-enhancing behaviours and create conditions for healthy activity. They make it possible to maintain and develop health in the broadest sense. Prevention programmes at this level are based on commonly accepted developmental patterns (physical, mental, social and spiritual). The procedure for their design requires knowledge of human development needs, taking into account age, gender, social and professional roles, as well as social environment contexts;
- 2) **secondary prevention** is a *type of action targeting people with first manifestations of disorders (different in form and intensity). The aim is to create conditions in which, using self-activities and environmental interaction, it is possible to stop the development of disorders* and to return to an optimal level of functioning. Prevention programmes shall focus on limiting development and eliminating existing disturbances. These actions are based on reliable diagnosis of high-risk individuals and populations;
- 3) **tertiary prevention**, in turn, is a type of action aimed at people who have already been diagnosed with a somatic disease or social pathology. The aim is to provide support after or during the treatment process to return to a satisfactory and socially useful lifestyle. Prevention programmes support their recipients to find their place in the society and to rebuild relations with members of the local community. This level of prevention requires consideration of the conditions and mechanisms for social reintegration.

On the other hand, Mrazek and Haggerty (1994) introduce a different division of levels of prevention, assuming that prevention should be pre-emptive rather than corrective and therefore should be separated from treatment (cf. Ostaszewski, 2016). Consequently, the division adopted includes:

- 1) **universal prevention** – supporting all pupils and educators in their normal development and a healthy lifestyle and taking action aimed at reducing risky behaviours, regardless of their level of risk of using drugs and substances (abusive substances, psychotropic substances, narcotic replacement drugs, new psychoactive substances). It is targeted at the whole population, without identifying groups at risk.
- 2) **selective prevention** – supporting pupils and educators who, due to their family situation, environmental or biological circumstances, are more exposed to the development of risky behaviours. The key to identifying the recipients of preventive measures is susceptibility to threats.
- 3) **indicative prevention** – supporting pupils and educators who have been diagnosed with early symptoms of drug and substance abuse or other risky behav-

hours that have not been diagnosed as disorders or diseases requiring treatment. It is a group that has professionally diagnosed features that increase the risk of addiction or problem behaviours.

The latter has been adopted by practitioners and is used in legal documents regulating prevention activities. For this reason we will refer, in a further part of the compilation, to the levels highlighted by Mrazek and Haggerty (1994).

In the context of supporting highly sensitive people, they should be planned at all levels, although they will vary in terms of the content and prevention strategies applied (Baryła-Matejczuk, 2019; Baryła-Matejczuk, et al., 2020; Baryła-Matejczuk and Domańska, 2018).

3.1.3 Prevention strategies and types of prevention programmes

The distinction between levels of prevention makes it possible to adapt the type of content to the specific nature of the recipients, both in terms of content and intensity. By contrast, the division of prevention content into impact methods enables us to distinguish prevention strategies.

Ostaszewski (2016) divides prophylaxis strategies into two groups, namely leading and complementary strategies (see Table 1). The former, according to the author, have a solid theoretical basis and their positive results are confirmed by evaluation studies. On the other hand, the latter (supplementary strategies) are those that have a positive impact, but only when they are applied in conjunction with the leading strategies.

Table 3.1.

Types of prophylaxis strategies

Leading strategies	complementary strategies
Working with parents	Information transfer
Mentoring support	Alternatives
Developing life skills	Training on denial skills
Normative education	Peer education
Building relationships with school	
Intervention in risk groups	
Minimising health and social harmS	

Source: Ostaszewski, K. (2016). *Standardy profilaktyki*. Warszawa: Krajowe Biuro do Spraw Przeciwdziałania Narkomanii.

On the other hand, Gaś (2006) distinguishes six strategies which organize prevention content according to the type of impact. These include the following strategies:

- information,
- educational,
- alternative activities,
- intervention,
- environmental changes,
- amendments to the legal regulations.

Information strategy – its essence is to provide the recipients with reliable information about the nature of problematic behaviours or threats. Also, it is based on the assumption that the recipients should be made aware of the etiology of problem behaviours and their function. It is also important to equip the recipients of prevention activities with knowledge of how to avoid risk factors and to raise awareness of the prevention factors. The conditions for its effectiveness are as follows:

- supporting information transfer with current study results;
- adapting the form and content of the information to the recipients' perception;
- rationality of the message, along with explaining human behaviour mechanisms;
- credibility of those providing prevention content;
- prevention activities should respond to the needs of people to whom they are addressed.

This strategy is of particular importance when addressing the problem of *normative behaviour*, when many students engage in risky behaviour, mistakenly convinced of their universality. To a large extent, this is the result of a lack of reliable diagnosis, which is made available to young people. This is also due to the fact that many adult professionals are worried about the results of a school diagnosis. In this way, they contribute to the development of problematic behaviours in an unconscious way (Wyrick et al., 2001).

Educational strategy – aimed to equip the recipients of prevention activities with the ability to respond constructively to personal needs. These skills are oriented towards the effective use of personal potential and satisfactory functioning in relations with others. Within the framework of this strategy young people are, most often, taught to communicate, solve problems, take decisions, cope with stress and environmental pressures, but also how to manage leisure time. These capabilities are acquired through behavioural training and skill-building workshops. The effectiveness of the activities is determined by the possibility of translating the transferred content into the personal experience of the recipients of prevention activities (Wyrick et al., 2001). This can be achieved through meeting the following conditions:

- activities should respond to the needs of the participants;
- coherence and relevance of the programme content should be ensured;
- the coach should be professionally prepared;
- activities should take advantage of the group's dynamics in the learning process;
- work should be done with the use of active methods.

Alternative activities strategy – oriented towards the development of constructive interests and the teaching of free time management. These areas of activity of young people are intended to be an alternative to idleness, boredom, passivity and the resulting problem behaviours. Positive activity is the basis for building a sense of self-esteem and positive self-assessment, i.e. factors protecting against dysfunction (Wyrick et al., 2001). Factors that enhance the effectiveness of the strategy include:

- awareness of the developmental purpose of prevention activities;
- activity structuring taking the form of a programme;
- presence of a committed animator, competent in the field of prevention activities;
- proposals for activities relevant to children's and adolescents' interests;
- environment's support for prevention activities (accommodation, logistic and financial resources).

Intervention strategy – a set of activities aimed at helping people to cope with the problems they face. This assistance focuses on identifying the sources of difficulties and finding ways to address them. A key element of this kind of prevention activity is the establishment of an aid contact and its reliance on mutual trust, a smooth communication and the creation of an empathic relationship. The essence of an intervention is to respond to an individual's problem at an early stage. Otherwise, there is a risk of perpetuating destructive ways of resolving it (Wyrick et al., 2001).

The involvement of well-prepared peers may be significant support for the implementation of such prevention activities.

Environmental change strategy – this kind of prevention is based on the assumption that neither man nor school is an island. People are social beings and remain in continuous interaction. It is extremely difficult to raise a mature and constructive person in a dysfunctional or pathological environment. The aim of this strategy is therefore to introduce protective factors and reduce risk factors in the direct environment of children and adolescents (Wyrick et al., 2001). Its effectiveness will be determined by:

- promoting responsibility for the local environment;
- engaging institutions and organizations responsible for prevention in a given environment;
- establishing the cooperation of a interdisciplinary team working on prevention, and ensuring the cooperation quality;
- identifying and engaging environmental leaders.

Prevention strategy related to legislative changes – is a type of systemic action extended to legislative procedures, both the local and the state ones. This activities cover both the creation of rules and standards to support the proper development and reduce the threats to children and adolescents, as well as the building of groups of positive pressure. The aim is to obey the applicable legal regulation, to oppose the lobby that promotes psychoactive substances, to reveal dysfunctional mechanisms of social life, or to propose new legislative solutions (Wyrick et al., 2001).

The effectiveness of these prevention activities is based on the following prerequisites:

- courage and concern for the common good, i.e. future generations;
- civic awareness and respect for the law;
- identifying strong and independent social leaders and supporting their activities through the involvement of education and prevention institutions and organizations;
- reliable knowledge of the threats to children's and adolescents' development;
- engaging specialists representing different professional disciplines;
- obtaining financial resources to exchange the views of specialists at congresses, conferences, etc.

The more strategies we are able to use at the same time in a given programme, the higher results we may expect.

3.2 Need for support in the environment of highly sensitive people

In order to prepare effective support for highly sensitive people, the knowledge of three essential elements is crucial (Fig. 2), i.e. (cf. Baryła-Matejczuk, 2019):

- identification of highly sensitive people and the knowledge of the type and intensity of the problems they experience,
- theoretical explanation of the reasons for these difficulties and the identification of protective and risk factors in the working environment of highly sensitive people,
- identification of adaptation styles and ways to meet life and development needs.



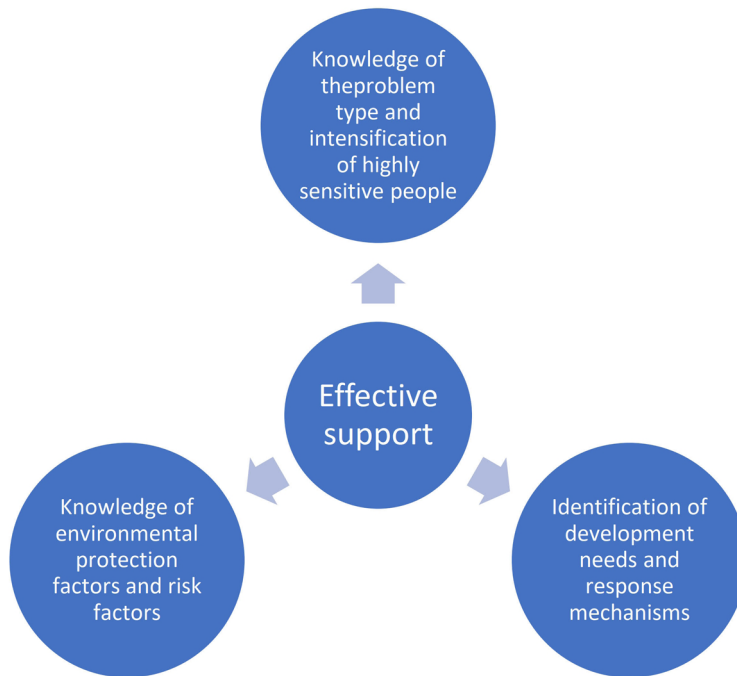


Figure 3.2. Key areas for planning and quality of support for highly sensitive people.



Have you ever been involved, in your educational career, in any activity or prevention programme? What prophylaxis strategies were used? What helped or made it more difficult for you to take up this activity?

3.2.1 Protection factors and risk factors – causes of development problems

High sensitivity diagnosis is dealt with in another part of the handbook (see: Chapter 2 Identification of high sensitivity). Here, protection factors and risk factors as well as management styles in the environment of highly sensitive people will be developed.

While developing areas for prevention activities related to problems of highly sensitive people, a reference should be made to the stress diathesis model developed by Belsky and Pluess (2009). It assumes that certain individuals, because of their 'sensitivity' in their internal structures (behaviour-temperamental, physiological or endofenotyping or genetic) are predisposed in a manner that is disproportionate to be adversely affected by environmental stress. This stressor can be a variety of risk factors – both traumatic experiences and unfavourable educational environment (Belsky and Pluess, 2009).

Protective factors should be understood as the individual traits and behaviours of pupils, the characteristics of the social environment and their mutual relations, the presence of which strengthens the pupil's overall health potential and increases their resilience to risk factors.

On the other hand, **risk factors** are defined as the individual personality traits and behaviour of pupils, the characteristics of the social environment and their mutual relations, which involve a high likelihood of risky behaviours that threaten their normal development, health, safety or social performance (*§6.3. and §6.4. REGULATION OF THE MINISTER OF EDUCATION of 18 August 2015*).

The above-mentioned protection factors and risk factors are divided into those related to the individual, family, peer group, school and local community (Gaś, 2006). Their list varies according to their development. The broadest list constitutes specific factors, distinguished from theoretical concepts (not always supported by studies). The second, smaller group are non-specific factors based on scientific studies.

Based on a literature review (Amemiya et al., 2020; Aron, 2002; Aron, 2013; Belsky and Pluess, 2009; Forest, 2006; Nocentini et al., 2018; Ostaszewski and Poleszak, 2019; Pluess and Boniwell, 2015), the following protective factors and risk factors in the environment of highly sensitive people can be distinguished.:

At an individual level:

RISK FACTORS	PROTECTIVE FACTORS
Low self-esteem	Meaning of life and aim of life
Shyness and withdrawal	Valuing one's own talents
Rumination	Social competencies
Inability to cope with stress	Social engagement
Overwhelmness/hyperactivity	Emotion management skills

At a family level:

RISK FACTORS	PROTECTIVE AGENTS
Chaotic family environment	Strong and positive family ties
Low educational effectiveness of parents	Parental control of children's behaviour
Lack of parental support	Clear rules of behaviour
Parental dysfunctional behaviour patterns	Parents' involvement in children's life
Parent disorder	Constructive parents' educational styles

At a peer group level:

RISK FACTORS	PROTECTIVE AGENTS
Feeling excluded or rejected from a peer group	Support from a group that prefers conventional values and principles of behaviour
Low level of social competences in the reference group	Positive social activity
Low level of social ties	Positive peer pressure
Dysfunctional peer environment	Positive peer control
Experience of peer-to-peer violence or rejection from a peer group	

At a school level:

RISK FACTORS	PROTECTIVE AGENTS
Negative emotional climate	Positive emotional climate
High level of educational stress	Personal relations between teachers and students
Weak ties with teachers and educators	Collaborating teachers
Shifting responsibility to the student	Interaction with parents
Low level of organizational culture	Supporting teacher

At a community and media level:

RISK FACTORS	PROTECTIVE AGENTS
Lack of institutional support in difficult situations	High level of competence to use social media
High pathology rates – feeling of threat	High level of knowledge and public awareness of high sensitivity
Weak ties between people in the local community	A wide range of interest development
Cyber violence	Constructive media activity

Knowledge and research on these factors is a key area of prevention activities. More environmental factors that support a highly sensitive person will increase their chances to fully implement them and avoid developmental problems and consequently health problems.

What protection and risk factors have accompanied your development? Consider your family home, school and studies.



3.2.2 High sensitivity versus selected functioning problems

As shown by numerous studies on high sensitivity (Aron, 2002; Aron, 2013), this personal trait can be considered either as a resource or as a risk factor depending on the environment in which a human develops. With a friendly environment, i.e. an understanding and supporting one, high sensitivity not only makes it possible to realize the individual's potential, but also enriches the social environment. At this point we can mention some kind of positive feedback. This is the most visible in group relationships, where, in a safe environment, highly sensitive people enjoy trust being themselves a source of support and assistance. This is due to, among the other things, their ability to observe, in-depth analysis and empathy in their relations with another person. Pluess and Boniwell's studies (2015) show that highly sensitive children react better and longer to intervention programmes. As a result, highly sensitive children are more responsive to all prevention activities. It is easier for them to achieve a positive change and its effects persist in the longer term. This is confirmed by the prevention programme "A, B, C... of sensitivity", developed to work with pre-school children (3-6 and 7-10 years old) by a team led by M. Baryła-Matejczuk (2021).

The functioning of highly sensitive persons can be compared to the sensitivity of the eye to light. In a sense, the greater the sensitivity to light, the more precise the image. However, too much light entering the eye causes glare or pain. The same is true of highly sensitive people, with too many news, incentives or overwhelmingness causing discomfort and even suffering. The eye is protected against excessive light in several ways, namely by narrowing the pupil, closing the eye lids, tightening the muscles, etc. A highly sensitive person must also be able to select the information they receive in order not to suffer from overwhelming incentives. In such a case, sensitivity will become a resource and not an obstacle to development.

The situation of highly sensitive people is different when they are to develop in a less favourable environment (see risk factors). An increasing number of studies on the functioning of highly sensitive people point to some tendencies to develop mental problems and disorders. These problems and disorders include, among the others:

- emotion and mood disorders, phobias, negative emotionality (Hoffman and Bitran, 2007; Jakobson and Rigby, 2021; Moreover et al., 2010).
- reacting to difficult situations by higher levels of stress. Highly sensitive people tend to feel overwhelmed and stimulated by negative events (Andresen et al., 2017; Aron et al., 2012; Brindle et al., 2015; Iimura, 2021;).
- increased emotional reactivity in difficult and surprising situations, which may lead to behavioural problems (Boterberg and Warreyn, 2016).
- depression – a correlation was also recognized between seasonal and affective disorder and high sensitivity (Brindle et al., 2015; Hjordt and Stenbæk, 2019).

High sensitivity is not only problem experiencing and an increased risk of selected mental disorders. These are also numerous resources, such as the study presented by Andresen et al. (2017). These authors have shown that, although highly sensitive people are strongly responsive to sensory incentives, they have also acquired the ability to control the intensity of new environmental stimuli, for example by regulating the strength and amount of social contacts. Undoubtedly, this should be interpreted as a valuable resource that helps to reduce stress (read more in chapter 1.1.1. Vantage Sensitivity theory).

3.3 Support for the implementation of development tasks at different stages of life

As already mentioned in Chapters 1 and 2, Aron (2013) distinguishes four aspects of high sensitivity as a personal trait. In order to say that a person is highly sensitive, all of them must occur. If a person lacks just one of them, then we cannot talk about high sensitivity. These include: depth of processing (D), overstimulation (O), emotional reactivity and empathy (E), subtle stimuli (S). The first letters of the above personality traits form the **acronym** DOES (Aron, 2013).

3.3.1 Personality traits of highly sensitive people and the need for support

The above-mentioned personality traits of highly sensitive people do not determine problems, on the contrary, they should be seen as their potential. Obviously, it will only materialize when highly sensitive people find themselves in a positive educational environment, school environment or working environment (e.g.: Lionetti, Pastore et al., 2019; Lionetti, Pluess et al. 2019).

The following chapter will present the outline of each personality trait of a highly sensitive person in two contexts. Namely, what problems could be caused by an unfavourable environment and what educational and prevention activities could be used to help highly sensitive people cope with them.

DEFINITION OF A CHARACTERISTIC	FUNCTIONING AND RECOMMENDATIONS FOR SUPPORT
Depth of processing	
<p>The depth of the processing refers to the amount of detailed information processed in relation to an object, information or stimulus.</p> <p>Craik (2002; (see. Baryła-Matejczuk, 2019) says that ‘Shallow processing’ is a recognition of the stimulus – paying attention to it. This is a process from focusing attention on the ‘surface’ features of an object, from its recognition to giving it a meaning, interpretation of the information, making reference to previous experiences and memory.</p> <p>Depth of processing is an attempt to capture the sense and meaning of a given experience, as opposed to a simple number of analyses made in connection with a given experience (Baryła-Matejczuk, 2021; Craik, 1973;).</p>	<p>The focus on detail and in-depth analysis of a negative experience or event may lead to excessive fixation and rumination, in particular when this situation is accompanied by negative emotionality. On the other hand, in order to deal effectively with the problem experienced, it needs to be seen in a broader context, where the depth of processing and the focus on detail can interfere. This is particularly the case in different types of crisis situations.</p> <p>Hence, in educational and prophylaxis activities, it is important to demonstrate, through talking, the wider context and to let the accumulated emotions out. As a result of the talk, a person given support should understand how the situation became difficult for them, without feeling guilty or even finding the meaning of the event for their development (positive side of the crisis experienced).</p>
Overstimulation	
<p>When a highly sensitive person is aware of what is happening inside them and around them, they process situations, actions and behaviours of others in a deeper and more careful way. As a result, they also develop this feeling of mental and physical tiredness faster than those who receive fewer incentives and information. Highly sensitive people notice everything new and think about it more intensively than their peers (Baryła-Matejczuk, 2021).</p>	<p>Overstimulation has far-reaching consequences for the functioning of an individual. It is not only a reaction with an increased level of stress, but also the use of mechanisms to deal with overwhelmness – withdrawal from a given activity, avoiding difficult relationships, or difficulties in adapting to a group.</p> <p>The recommended remedy action is the ability to protect against overstimulation, i.e. the ability to reduce the flow of further stimuli. By analogy with the eye, which protects itself against the inflow of too intense light narrows the pupil or closes the eyelid. In order to acquire these skills, it is crucial to know which stimuli and situations lead to overwhelmness.</p>

Emotional reactivity and empathy

Emotions provide information on what is happening inside and outside us. Thanks to them, we focus on what is particularly important to our body, what to remember, what to teach, what to pay special attention to, where to stop, what to avoid (Baryła-Matejczuk, 2021).

Highly sensitive children are also strongly responsive to emotions due to increased intensity of analysis, increased interest in the surrounding reality and greater tendency to observe (Aron et al., 2012).

Highly sensitive people are more responsive by emotions to both positive and negative stimuli from the environment.

Emotional reactivity and empathy gives highly sensitive people an advantage in understanding the nature of the problems, their causes and makes it easier to help others. However, a negative-affecting environment is also conducive to maintaining a negative valency of emotions. This may lead to a vicious circle: negative event – negative emotions – negative thoughts (of themselves or of the surroundings). A more highly characterized depth of processing may play a significant role in the process of being caught in a vicious circle.

It is crucial that highly sensitive people learn to manage their emotions effectively. This applies both to their ability to identify, name and express. Moreover, they should understand that emotions are meant to serve 'I' and not vice versa. However, the most important task is to learn to adapt the power of emotions to the situation (which is closely connected with other personality traits of highly sensitive people).

Subtle stimuli

Subtle stimuli is identified as raising awareness of details, subtle sounds, touch, smell and other delicate stimuli.

Highly sensitive people are those with exceptionally developed sensory organs. Subtle stimuli is supported by a higher level of thought and feeling, making it difficult to distinguish this personal characteristic from the depth of processing (Aron, 2013; Baryła-Matejczuk, 2021)

Subtle stimuli does not need to apply to all senses, but only to some selected ones. This can be reflected in the fact a highly sensitive person (Baryła-Matejczuk, 2021):

- pays attention to changes in the appearance of people or places, changes in the location of furniture;
- pays attention to the subtle smells through which they do not wish to participate in something (e.g. avoids a cellar due to its smell);
- pays attention to delicate sounds (e.g. birds singing), works of art;
- notices (and often reacts to) changes in the tone of voice, "glimpses", small gestures.

These behaviours may lead to a loss of focus, a lack of understanding from the environment, unjustified criticism or wrong educational reactions.

In this area of support, awareness of this personal characteristic in a highly sensitive person is crucial. In addition, acceptance

for the development of acceptance for this characteristic. Changing the approach to negative incentives by looking for their positive sides. It is also important to learn to gradually get used to negative incentives.

Do you see personality traits of highly sensitive people in yourself? What would you take care of in your life to create better conditions for development?



3.3.2 Educational environment and the proper development of highly sensitive people

The primary task of educators (both at a family and a school level) is to support a highly sensitive child or a young person in dealing with development tasks. Due to a limited length of the chapter, it is not possible to address each development task. Hence, the key stages of human life and development have been addressed.

The first and crucial stages of development of a highly sensitive child are the main challenges for its parents. These include first and foremost gaining knowledge of the issue analyzed. Without it, it is difficult to attribute specific reactions and behaviour of a child to a high degree of sensitivity. There is no doubt that it is easier for parents who are themselves highly sensitive (their child may be expected to become the same). This does not change the fact that we need to be prepared for the role of an educator, and this task starts with a reflection on ourselves. What competences important to support a highly sensitive child do I already have and which ones do I need to acquire or develop?

At this stage (infancy – 0-1 years and childhood – 2-3 years), it is essential for a child to feel safe and have trust in parents as those who can meet basic needs (Brzezińska, 2000). A parent's availability as well as the stability and repeatability of the educational environment are significant. Childhood is the time to build autonomy in basic aspects of one's own life (Brzezińska, 2000). The role of parents is to create conditions for learning autonomy and for acquiring a sense of empowerment in simple actions. Patience and supportive attitude of a parent and their assurance of love and of strong ties with the child are essential for the success of development tasks at this stage.

The next stage of development, based on the study by A. Brzezińska (2000), is adolescence (early 13–17 years and late 18–22 years). In psycho-social development, it is the time to shape purpose-driven orientation and initiative in action (Brzezińska, 2000). At this stage of development, setting boundaries in a skillful way, so as not to block children's activities and initiatives, is a key element. It is very important to give feedback on the child's behaviour in a positive way and to explain the role of the

prohibitions we introduce. Another equally important issue is consistence in obeying the rules we put in place. It is worth remembering that norms and principles are not only limitations but also boundaries that create a feeling of security.

School age (6-12 years) is an important period in a young person's life, as it is the time to develop abilities of how to perform tasks and responsibilities that will be fundamental to the assessment of your competences. It is also a learning time for social and emotional competences. Unfortunately, it is also an area to experience difficulties in interpersonal and social relations, including the risk of rejection or social exclusion. What parents and educators should take care of at school is to ensure a constructive peer group. This should be reflected in a positive emotional climate of class and school, a sense of support from teachers and educators, and a well-integrated class team.

The next stage of development, based on the study by A. Brzezińska (2000), is adolescence (early 13–17 years and late 18–22 years). It is a life stage that poses a major challenge and burden for a young person, especially for a highly sensitive person. It is a bridge between childhood and adulthood. The stage at which an individual builds a position in a group (see next paragraph), ultimately shapes their own sense of value and closes its identity. With such important and, at the same time complex development tasks, many things may go wrong. For the parent, it is an important challenge to move from authority to partnership that supports, not informs and moralizes. While working with a highly sensitive child, they should focus on valuing a child's successes (including minor ones and going beyond school education) as well as showcasing a wide range of achievements (it is important to shape the overall self-assessment and not just to focus on specific assessments). The second area for activity should be related to reflecting on and taking care of, on the side of parents, the quality and quantity of peer relations as an area for conversation and willingness to support rather than the area for control or imposition of them. For a young person, it is a time of struggle aimed at building a positive self-assessment and self-acceptance. In a hostile peer-to-peer environment and unfriendly teachers, a highly sensitive person may experience destructive stress that leads to mental problems and risky behaviours in the long term. Therefore, the key areas of support at this stage appear to be to implement interpersonal skills, to clarify the value system and to create the conditions for identifying strengths and building a sense of high self-esteem.

Adulthood, starting from the age of 23, is the time for adult social roles to be tested, i.e. developing mature and satisfactory relationships, confirming one's value through success in working environment and the need to achieve independence, including economic independence. The parent's role is limited to a supporting companion treading by the child's side at some emotional distance. The key areas of external support include selecting a partner with a similar level of sensitivity, learning to function in deep engagement and dealing with conflict situations and new social roles. The working environment is also important for highly sensitive people. The organizational culture of the workplace will determine mental well-being, productivity and professional development of a highly sensitive person.

Peer environment as a challenge for the development of highly sensitive people

When addressing the functioning of a child or a young person (also an adult), it is worth knowing that processes that develop dyad relationships (individual-to-individual) are completely different processes from those that occur in a group. It is a separate way of building a feeling of security that both requires trust in yourself and in other members of the group, and social competences. At the same time, this is an important development task, as the group allows the needs to be met while the relationship with the family is rebuilt. Finding a place in the group structure and gaining positive group experience will determine the quality of future integration into teams (educational teams or work teams). For highly sensitive people, this is a difficult task, as the environment of many people in a group is a source of overwhelming information itself. If we add personality traits of highly sensitive people – depth of processing or overstimulation – this poses a major challenge to them. Their previous experience, self-assessment and social skills are key to their ability to deal with it. The group process also involves group crises, which are difficult for highly sensitive people, as they quickly decipher various emotions and tensions that are difficult for them to tolerate. Hence, the most frequent group role adopted by highly sensitive people is an observer's role, and adaptation styles are withdrawal and avoidance. However, in a favourable environment, highly sensitive people play an important role in the collective process, as they ensure a positive emotional climate, recognize those in need of support and reach out to those in need. While working constructively within the groups (especially in assistance groups), they can demonstrate their ability to perceive deep group processes as well as a high level of empathy and assistance skills.

Prevention of problems in highly sensitive people

Based on the knowledge of prophylaxis levels (presented at the beginning of the chapter), the prevention content, taking into account different types of recipients, will be proposed in the subsequent chapters. The proposed activities also take into consideration the knowledge of the specific nature of highly sensitive people, potential developmental difficulties and environmental threats.

3.3.3 Prevention levels and the recommended content of prevention activities

Universal prevention is a type of impact, as the name suggests, aimed at a wide group of recipients, without indicating the risk of difficulties or developmental problems. By its nature, it can be classified as both education and prevention. In terms of high sensitivity at this level, promotion of professional, research-based knowledge of high sensitivity and the functioning of highly sensitive people should be recommended. The aim of this information strategy should be to raise awareness of the

existence of highly sensitive people, their resources and the specific nature of their functioning in a wide social group. Special emphasis should be placed on the significance of diversity in the society and the phenomenon of synergy created by people with different levels of sensitivity. Moreover, it is valuable to showcase the benefits of high sensitivity for individuals, groups and society. These measures should target both pupils and parents, and teachers at all stages of education. In order to reach out to employers of highly sensitive workers, an information campaign promoting the value of highly sensitive employees, but also the need to create optimal working conditions for them, would be recommendable.

The reader will find the necessary knowledge and materials on prevention activities of this nature in other chapters of this handbook.

Other prevention activities aimed at a wide group of recipients, and therefore universal, fall within the scope of the education strategy. These include, among the others.:

- Furnishing children and young people with broader social competences, as their high level will benefit both highly sensitive and less sensitive people. This need is justified by the limited time spent in direct peer-to-peer contact.
- Building a positive emotional climate in the family home, classroom and working environment. Such a climate is a universal protective factor (not only for highly sensitive people).
- Supporting children, adolescents and young people in developing constructive peer teams through integration, reintegration and teaching interpersonal skills.
- Creating conditions for children/students to build deep social ties, from a family to a class, and from friendship to marriage.
- Modelling constructive social behaviour, e.g. voluntary work. A commitment to offer assistance to others is an opportunity to build one's own agency, to raise self-esteem and develop ties with others.

Another type of prevention activities is **selective PREVENTION**. As mentioned above, its content is aimed at those who, due to their family situation, environmental or biological circumstances, are more exposed to the development of risky behaviours. What is extremely important here is the fact that the key criterion is not to be a highly sensitive person, as he or she does not necessarily need it. In order to qualify people for this type of prevention activities, they should be highly sensitive and raised in an unfavourable environment or go through traumatic experiences (being a victim of violence, having experience of being rejected or excluded from a peer group, etc.).

Difficult life experiences and lack of adequate support mean that many highly sensitive people develop dysfunctional behaviour in problem situations. We describe them as dysfunctional, as they apparently seem to resolve the problem, but in the long run they bring a loss and lead to even bigger problems, even disorders. Their function is to meet daily needs and not necessarily a long-term and constructive development. For example, difficult relationships within a group of peers may lead to withdrawal and isolation, which gives a feeling of calmness for a while, but in the future may result in avoiding contact with the group. This, in turn, can give rise

to loneliness, isolation and mood decline, and even depressive or nervous disorders in the future.

Therefore, at the level of selective prevention, the diagnosis of high sensitivity is highly recommendable as it can help to account for many life difficulties faced by the recipients of preventive activities. The diagnosis of their high sensitivity and access to information on the specific nature of response and functioning of highly sensitive people allows them to better understand themselves and distract from negative interpretations of their behaviours. Understanding these personal mechanisms of a response to difficult experiences is also an opportunity to learn new ways of dealing with difficult situations. Therefore, at this level of impact, within the framework of the **information** strategy, the following activities are recommendable:

- Lectures for parents and teachers who have contact with highly sensitive children in a family or in school (based on the assumption that there should be around 25-30 % in school) on the phenomenon of high sensitivity and the ways of working with highly sensitive children and young people.
- Information meetings for children and young people showing the strengths of being highly sensitive persons.

Within the **educational** strategy, the proposals should include:

- Psycho-educational workshops aimed at learning the ability to use high sensitivity for solving daily problems.
- Teaching how to develop skills to deal constructively with stress and physical, mental and social overwhelmness.
- Psycho-educational workshops aimed at identifying psychosocial difficulties resulting from high sensitivity.
- Teaching emotional management skills.
- Workshops on social competences and building up one's own position in a group.

Within the framework of the **alternative** strategy, it is important to:

- Identify resources and capabilities of highly sensitive people.
- Teach how to use high sensitivity for talent development.
- Create the conditions for talent development.
- Use resources and capabilities to build relationships with a group of people with similar interests.
- Create the conditions for fulfilling one's own potential and learning social skills through voluntary work and peer-to-peer assistance programmes.

Within the framework of the **intervention** strategy, it is necessary to:

- provide children and young people in crisis with educational and preventive support.
- build a positive social climate in the classroom and in school.

Within the framework of the **local community change** strategy, it is significant to:

- promote high sensitivity and awareness-raising.
- introduce and cultivate the tradition of celebrating the high sensitivity day.

Activities referred to as **INDICATED prevention** are the third type of prevention activities. They are aimed at people with early symptoms of risky problems and behaviours which have not been diagnosed as disorders or diseases requiring treatment. This increased risk should be confirmed by a professional diagnosis. In the area of support for highly sensitive people at this level, there is a shift of emphasis from high sensitivity to risky behaviours or mental problems. The area of support is predominant symptoms and problems. Sensitivity determines how to respond to them. Hence, we help highly sensitive people to discover the link between the problems they experience and their personality traits. The key areas of support should be:

- Monitoring and early identification of people experiencing crisis.
- Crisis intervention for people experiencing difficulties exceeding their personal resources.
- Providing psychological support to people who are sensitive and affected by long-term stress.
- Redirection to psychotherapeutic assistance where the prevention activities used have not brought the desired result.
- Providing them with broad social support.



Revision questions

1. Give a definition of upbringing.
2. How would you define the concept of prevention?
3. What is the relationship between education and prevention?
4. Name the main personality traits of a highly sensitive person.
5. What are the different levels of prophylaxis? Can you define them?
6. What are the prevention strategies and what are their characteristics?
7. What is a risk factor and a protective factor in prevention?
8. What protective factors and risk factors can be experienced by highly sensitive people?
9. What recommendations would you give in the prevention programme for highly sensitive people?

Bibliography

- Aron, E. N. (2002). *The Highly Sensitive Child: Helping Our Children Thrive When The World Overwhelms Them*. New York: Harmony.
- Aron, E. N. (2013). *The highly sensitive person: How to thrive when the world overwhelms you*. New York: Kensington Publishing Corp.
- Aron, E. N., Aron, A., Jagiellowicz, J. (2012). Sensory Processing Sensitivity: A Review in the Light of the Evolution of Biological Responsivity. *Personality and Social Psychology Review*, 16(3), 262–282. <https://doi.org/10.1177/1088868311434213>
- Amemiya, R., Takahashi, G., Rakwai, M., Isono, M., Sakairi, Y. (2020). Effects of yoga in a physical education course on attention control and mental health among graduate students with high sensory processing sensitivity. *Congent Psychology*, 7(1), 1778895. <https://doi.org/10.1080/23311908.2020.1778895>
- Baryła-Matejczuk, M. (2021). *Wspieranie rozwoju dzieci wysoko wrażliwych*. Warszawa: Ośrodek Rozwoju Edukacji.
- Baryła-Matejczuk, M. (2019). A model of support for highly sensitive children of preschool and early school age. W: A. I. Arcos-Romero, A. Álvarez-Muelas (red.), *Avances en Psicología Clínica* (s. 272–280). Granada: Asociación Española de Psicología Conductual (AEPC), Universidad de Granada.
- Baryła-Matejczuk M., (2021), Program profilaktyczny „A, B, C... wrażliwości”. Wspieranie w rozwoju dzieci wysoko wrażliwych w wieku przedszkolnym i w młodszym wieku szkolnym, <https://highlysensitive.eu/platforma/materialy-do-pracy-z-dziecmi/>
- Baryła-Matejczuk, M., Artymiak, M., Ferres-Cascales, R., Betancort, M. (2020). The Highly Sensitive Child as a challenge for education – introduction to the concept. *ISSUES IN EARLY EDUCATION*, 1(48), 51–62. <https://doi.org/10.26881/pwe.2020.48.05>
- Baryła-Matejczuk, M., Domańska, K. (2018). Profilaktyka wobec dzieci wysoko wrażliwych: postawy rodzicielskie matek dzieci o różnym poziomie emocjonalności. W: Z.B. Gaś (red.), *Profilaktyka w świecie zagubionych wartości* (s. 95-113). Lublin: Innovatio Press Wydawnictwo Naukowe Wyższej Szkoły Ekonomii i Innowacji.
- Belsky, J., Pluess, M. (2009). Beyond diathesis stress: Differential susceptibility to environmental influences. *Psychological Bulletin*, 135(6), 885908. <https://doi.org/10.1037/a0017376>
- Brzezińska, A. (2000). *Spółeczna psychologia rozwoju*. Warszawa: Wydawnictwo Naukowe SCHOLAR.
- Craik, F.I.M. (2002). Levels of processing: Past, present... and future? *Memory*, 10(5/6), 305-318. <https://doi.org/10.1080/09658210244000135>
- Drwal, R. (1993). Percepcja ważności i realizacji zadań rozwojowych przez dorastających. W: Z. Smoleńska (red.), *Badania nad rozwojem w okresie dorastania*. Warszawa: Instytut Psychologii PAN.

- European Monitoring Centre for Drugs and Drug Addiction (2011). *European drug prevention quality standards. A manual for prevention professionals*. Luxembourg: The Publication Office of the European Union
- Gaś, Z. B. (2006). *Profilaktyka w szkole*. Warszawa: Wydawnictwa Szkolne i Pedagogiczne.
- Lionetti, F., Pastore, M., Moscardino, U., Nocentini, A., Pluess, K., Pluess, M. (2019). Sensory Processing Sensitivity and its association with personality traits and affect: A meta-analysis. *Journal of Research in Personality*, 81, 138-152. <https://doi.org/10.1016/j.jrp.2019.05.013>
- Lionetti, F., Pluess, M., Aron, E., Aron, A., & Klein, D. (2019). Observer-rated environmental sensitivity moderates children's response to parenting quality in early childhood. *Developmental Psychology*, 55(11), 2389–2402. <https://doi.org/10.1037/dev0000795>
- Liss, M., Mailloux, J., Erchull, M. J. (2008). The relationships between sensory processing sensitivity, alexithymia, autism, depression, and anxiety. *Personality and Individual Differences*, 45(3), 255–259. <https://doi.org/10.1016/j.paid.2008.04.009>
- Liss, M., Timmel, L., Baxley, K., Killingsworth, P. (2005). Sensory processing sensitivity and its relation to parental bonding, anxiety, and depression. *Personality and Individual Differences*, 39(8), 1429–1439. <https://doi.org/10.1016/j.paid.2005.05.007>
- Mrazek, P. J., Haggerty, R. J. (red.). (1994). *Reducing Risks For Mental Disorders: Frontiers For Preventive Intervention Research*. National Academy Press.
- Nocentini, A., Manesini, E., Pluess, M. (2018). The Personality Trait of Environmental Sensitivity Predicts Children's Positive Response to School-Based Anti-bullying Intervention. *Clinical Psychological Science*, 6(6), 848-859. <https://doi.org/10.1177/2167702618782194>
- Szymańska, J., Okulicz-Kozaryn, K. (2016). Wartości, Wiedza i Warunki realizacji czyli 3xW dobrych praktyk w profilaktyce. W: K. Ostaszewski, K., K. Okulicz-Kozaryn, M. Sochocki, M. Sokołowska, J. Szymańska, *Jak zadbać o jakość w profilaktyce – System Rekomendacji Programów Profilaktycznych i Promocji Zdrowia Psychicznego*. Warszawa: Fundacja ETOH.
- Ostaszewski, K. (2016). Kompendium wiedzy o profilaktyce W: K. Ostaszewski, K. Okulicz-Kozaryn, M. Sochocki, M. Sokołowska, J. Szymańska, *Jak zadbać o jakość w profilaktyce – System Rekomendacji Programów Profilaktycznych i Promocji Zdrowia Psychicznego*. Warszawa: Fundacja ETOH.
- Ostaszewski, K. (2016). *Standardy profilaktyki*. Warszawa: Krajowe Biuro do Spraw Przeciwdziałania Narkomanii.
- Ostaszewski, K., Poleszak, W. (2019). Skuteczna profilaktyka stosowania substancji psychoaktywnych. W: R. Porzak (red.), *Profilaktyka w szkole. Stan i rekomendacje dla systemu oddziaływań profilaktycznych w Polsce* (s. 190-204). Lublin: Fundacja „Masz Szansę”.

- Pluess, M., & Belsky, J. (2010). Differential susceptibility to parenting and quality child care. *Developmental Psychology*, 46(2), 379–390. <https://doi.org/10.1037/a0015203>
- Pluess, M., Boniwell, I. (2015). Sensory-Processing Sensitivity predicts treatment response to a school-based depression prevention program: Evidence of Vantage Sensitivity. *Personality and Individual Differences*, 82, 40-45. <https://doi.org/10.1016/j.paid.2015.03.011>
- Poleszak, W., Porzak, R., Kata, G. (2019). Profilaktyka a rozwój osobowości uczniów w wieku 17-19 lat. W: R. Porzak (red.), *Profilaktyka w szkole. Stan i rekomendacje dla systemu oddziaływań profilaktycznych w Polsce* (s. 157-173). Lublin: Fundacja „Masz Szansę”.
- Poleszak, W. (2019). Rekomendowane kierunki działań profilaktycznych. W: M. Pawelec (red.), *Psychologia w zmieniającym się świecie*. Lublin: Innovatio Press Wydawnictwo Naukowe Wyższej Szkoły Ekonomii i Innowacji.
- Slagt, M., Semon, J., Aken, M. A. G. Van, & Ellis, B. J. (2017). Children's differential susceptibility to parenting : An experimental test of “ for better and for worse ”. *Journal of Experimental Child Psychology*, 154, 78–97. <https://doi.org/10.1016/j.jecp.2016.10.004>
- Takahashi, T., Kawashima, I., Nitta, Y., Kumano, H. (2020). Dispositional Mindfulness Mediates the Relationship Between Sensory- Processing Sensitivity and Trait Anxiety, Well-Being, and Psychosomatic Symptoms. *Psychological Reports*, 123(4), 1083-1098. <https://doi.org/10.1177/0033294119841848>
- Wu, X., Zhang, R., Li, X., Feng, T., Yan, N. (2021). The moderating role of sensory processing sensitivity in the link between stress and depression: A VBM study. *Neuropsychologia*, 150, 107704. <https://doi.org/10.1016/j.neuropsychologia.2020.107704>
- Wojnarowska, B. (2010). Czynniki warunkujące zdrowie i dbałość o zdrowie. W: B. Wojnarowska (red.), *Edukacja Zdrowotna. Podręcznik Akademicki*. Warszawa: Wydawnictwo Naukowe PWN.
- Wyrick, D., Wyrick, C. H., Bibeau, D. L., Fearnow-Kenney, M. (2001). Coverage of adolescent substance use prevention in state frameworks for health education. *Journal of School Health*, 71(9), 437-442. <https://doi.org/10.1111/j.1746-1561.2001.tb07320.x>

CHAPTER 4

EFFECTIVE METHODS TO SUPPORT HIGHLY SENSITIVE CHILDREN AND ADULTS

Rosario Ferrer-Cascales¹
Nicolás Ruiz-Robledillo²
Natalia Albaladejo-Blázquez³
Borja Costa-López⁴
Manuel Fernández-Alcántara⁵
María Rubio-Aparicio⁶
Manuel Lillo-Crespo⁷

¹ Faculty of Health Science, Department of Health Psychology, University of Alicante, Spain, ORCID: 0000-0001-6015-7454, e-mail: rosario.ferrer@ua.es

² Faculty of Health Science, Department of Health Psychology, University of Alicante, Spain, ORCID: 0000-0002-7522-5162, e-mail: nicolas.ruiz@ua.es

³ Faculty of Health Science, Department of Health Psychology, University of Alicante, Spain, ORCID: 0000-0002-9116-9092, e-mail: natalia.albaladejo@ua.es

⁴ Faculty of Health Science, Department of Health Psychology, University of Alicante, Spain, ORCID: 0000-0002-6658-768X, e-mail: borja.costa@ua.es

⁵ Faculty of Health Science, Department of Health Psychology, University of Alicante, Spain, ORCID: 0000-0002-3481-8156, e-mail: mfernandeza@ua.es

⁶ Faculty of Health Science, Department of Health Psychology, University of Alicante, Spain, ORCID: 0000-0002-2599-4246, e-mail: maria.rubio@ua.es

⁷ Faculty of Health Science, Department of Nursing, University of Alicante, Spain, ORCID: 0000-0003-2053-2808, e-mail: manuel.lillo@ua.es

Abstract

A significant number of studies have shown that highly sensitive individuals are predisposed to benefit more from psychological interventions. Additionally, a vast variety of individuals with high levels of sensory processing sensitivity tend to be easily stressed, apart from being disturbed in overstimulated environments.

Therefore, some interventions have taken that into consideration, and was developed with the aim to teach those individuals how to deal with their emotional disturbances. Interventions have made use of mindfulness and yoga techniques, or even school-based antibullying programs so far. Be that as it may, not only have researchers investigated the impact of interventions on highly sensitive children, but they have also put their mind to examining how adults high in sensory processing sensitivity may benefit from psychological interventions. It is of the utmost importance to fathom how those individuals may take advantage of psychological interventions, to utilize the most valuable aspects for them. The present chapter aimed to analyze the results of different psychological interventions received by highly sensitive individuals. Another goal of this chapter was to examine which type of interventions in health and education contexts were more beneficial to them so as to provide different useful methods with which to support them.

Keywords: sensory processing sensitivity, highly sensitive children, highly sensitive adults, health professionals, education professionals, intervention programs

After reading this chapter:

- you will discover the relevance of the application of the Vantage Sensitivity theory as a supportive model for working out with highly sensitive people.
- you will learn the emotional, interpersonal and cognitive strategies which can help highly sensitive people.
- you will understand some key points on how to adapt the school and work environment to benefit highly sensitive people.
- you will know the most important studies that have been conducted on the effectiveness of psychological interventions for highly sensitive people.

Introduction

Without a shred of doubt, environmental sensitivity does not only make reference towards individuals' sensitivity to adverse environmental conditions, but it also alludes to being much more sensitive to the positive ones (Greven et al., 2019). This is, in fact, what the Vantage Sensitivity theory represents, that is, the tendency of highly sensitive individuals to benefit themselves because of the thriving environmental conditions (Lionetti et al., 2019; Pluess & Belsky, 2013). Moreover, this idea is related to a concept which has been formulated and utilized recently, which is known as the "bright side" of susceptibility to the environment (Iimura, 2021). Undoubtedly, this entails that there is a "dark side" as well, which is in line with the fact that there are two sides of the same coin when it comes to environmental sensitivity (Iimura, 2021). While some individuals tend to be more negatively affected by the environment, there is the possibility as well that they could be positively influenced by it and its prosperous conditions (Greven & Homberg, 2020).

Given that the Vantage Sensitivity model refers to a heightened sensitivity towards advantages, in thriving environments to which individuals are exposed, the focus ought to be on such advantages (Pluess & Belsky, 2013). These could take the form of attachment security as a consequence of sensitive parenting, academic achievement derived from childcare characterized by a high quality, life satisfaction resulting from positive and thriving life events, or even a sense of efficacy after being involved in a psychotherapy process or an intervention program (Greven et al., 2019; Pluess & Belsky, 2013).

In fact, it is that help provided by intervention programs that is relevant for this chapter. It has been demonstrated that the trait of sensory processing sensitivity (SPS), which represents one of the models included in the environmental sensitivity meta-framework, does moderate the impact of psychological programs on mental health and behavior (Greven & Homberg, 2020). The different programs, both aimed at intervention or prevention, will be addressed throughout this chapter. However, the results obtained thanks to those programs are consistent with vantage sensitivity models, because in some way highly sensitive individuals have benefited themselves considerably from such interventions (Greven & Homberg, 2020).

Therefore, the “bright side” of environmental sensitivity will be tackled in this chapter. Apart from explaining the different programs applied to highly sensitive individuals and the psychological aspects within them, the results obtained due to their application will be mentioned as well. Such interventions could take the form of school-based psychological programs aimed at children and adolescents. They might also be resources such as yoga, dispositional mindfulness or physical exercise, aimed at both children or adults with high levels of environmental sensitivity. Additionally, the successful and adequate way to manage highly sensitive children and adults and how to support them will also be explained.

4.1 Psychological support methods for highly sensitive children and adults

It has been suggested by research that individuals who show high sensitivity to sensory stimuli are more likely to experience negative psychological symptoms, such as trait and state anxiety, depression and stress (Aron & Aron, 1997; Brindle et al., 2015). Despite this, highly sensitive individuals might not necessarily be predisposed to negative affect (Brindle et al., 2015). In other words, they are more likely to experience negative psychological symptoms in the context of a difficult home environment, in comparison to those individuals whose levels of sensory processing sensitivity are medium (Liss et al., 2005). For instance, one study found that stronger over-protection and low care from parents, and being highly sensitive were related to greater levels of anxiety and depression (Liss et al., 2005). From this investigation it was also found that highly sensitive children could be especially sensitive to uncaring parents.

Another study by Brindle et al. (2015) aimed to investigate whether there was a relationship between SPS, and negative affect mediated by emotional regulation processes. To do so, they used a sample of 157 adults (118 women) who responded to a questionnaire via internet. The results obtained showed a relationship between SPS and symptoms of depression, anxiety and stress. However, this relationship was partially mediated by an increased awareness of the emotion by the individual, the lack of access to emotional regulation strategies and the lack of acceptance towards the feeling of distress.

Therefore, from the Environmental Sensitivity approach, there is a susceptibility towards both positive and negative aspects in the environment (Pluess, 2015). That is the main reason why methods of support are of vital importance. What is more, from such a theoretical approach, despite highly sensitive individuals are likely to show negative outcomes when interacting to hostile environments, they can also benefit disproportionately from positive environmental conditions, which is why it makes a lot of sense to make use of several strategies in order to support children and adults (Greven & Homberg, 2020; Greven et al., 2019).

As for the support methods, it has not been examined whether any therapy can have a positive effect on highly sensitive people, since high sensitivity is not considered a disorder and each highly sensitive person is different and they may present different difficulties in their life experiences (Greven et al., 2019). Nevertheless, a meta-analysis found that cognitive-behavioral therapy (CBT) was associated with a significant reduction of externalizing symptoms in children who presented high levels of sensitivity (Battagliese et al., 2015). Moreover, that investigation also suggested that CBT could have a significant effect on social competence. Apart from that, CBT appeared to be also successful in order to improve the management of emotions in highly sensitive children (Beck et al., 2021).

Therefore, the following strategies which are addressed in the next subsections could be effective in supporting highly sensitive individuals. Their effectiveness has been demonstrated with other populations hence one might speculate that they are beneficial to them and to their well-being.

4.1.1 Emotional strategies

It must be noted that highly sensitive individuals perceive others' emotional expression more strongly, which entails that they are more empathetic to others' feelings and needs (Acevedo, 2020). In fact, those individuals are characterized by an increased emotional reactivity (Greven and Homberg, 2020). Specifically, they

are easily overstimulated because of having such a low sensory threshold (Aron et al., 2005; Iimura & Kibe, 2020).

Emotional regulation is a complex, interactive and multifaceted process which allows individuals to modify and monitor arousal and reactivity in order to engage in adaptive behavior (Beck et al., 2021).

One key aspect in order to regulate one's emotions is to achieve adequate emotion recognition and awareness (Beck et al., 2021). In order to do so, there are effective strategies which have been proved useful, such as utilizing numbers or colors on a feeling thermometer (Beck et al., 2021; Keluskar et al., 2021). By doing so, individuals are able to rate how intense their emotional experience is. Apart from rating the intensity of different emotions, individuals need to recognize them first. Therefore, a wheel's emotion can be used to achieve such an aim. To cite one example, the one proposed by Plutchik (2001) could benefit them when identifying which emotion they are feeling.

Moreover, individuals, but mostly children, have to be able to manage and control anger (Beck et al., 2021). It has been suggested that managing anger is possible and effective when making use of emotional regulation strategies (Piasecka et al., 2018). As for other ways to achieve that objective, "time out" from the positive reinforcement might be of use (Keluskar et al., 2021). This is related to the identification of those social situations which could elicit emotional difficulties (Beck et al., 2021). Once they have been identified, an adequate and structured problem-solving technique could be utilized in order to reduce their negative consequences.

In fact, problem-solving strategies are a cognitive component which is quite useful (Knouse & Safren, 2010; Weibel et al., 2020). The main objective of having a structured problem-solving plan is to be able to face any type of difficult situation, apart from knowing how to solve tricky problems without experiencing a great deal of psychological discomfort. As a matter of fact, there is a problem-solving technique which is formed by five phases: general orientation of the problem, definition of the problem, generation of alternatives, decision making, and verification. Firstly, adopting an attitude to tackle the problem is crucial, as well as defining it and making it operative and measurable. Then, a brainstorm could help in proposing as many solutions as possible. Afterwards, the consequences, both positive and negative, of such solutions have to be acknowledged before making the final decision and evaluating its results (García et al., 2017).

4.1.2 Cognitive strategies

Undoubtedly, perceptions, expectations, interpretations, self-declarations, attributions, beliefs, assumptions and so on, could be mediators of problems. That is the reason why it is essential to take them into consideration (Olivares et al., 2013). Furthermore, highly sensitive individuals process sensory information in depth and more thoroughly (Aron et al., 2005; Greven & Homberg, 2020; Iimura & Kibe, 2020).

From the Cognitive Therapy perspective, it could be said that there are certain thoughts which contribute to maladaptive behavior, as well as intensifying emotions (Knouse & Safren, 2010). This entails that interventions ought to be aimed at teaching individuals to stop, reevaluate and modify such thoughts (Knouse & Safren, 2010). Apart from that, they should be taught about negative biases in thinking, as well as learning how to systematically monitor and reevaluate their thoughts (Knouse & Safren, 2010).

For instance, the Rational Emotive Behavior Therapy proposes something very similar (Ellis & Bernard, 1994). Specifically, it offers different steps when identifying and modifying automatic and intrusive thoughts. The first step is to acknowledge the actual event which has caused the individual to have that kind of thought. Afterwards, emotions elicited by such irrational thoughts need to be kept in mind. The next part of the process is to replace that thought with a rational one, and then analyze its consequences, which are bound to be rather positive. Regarding how to identify irrational thoughts, special attention needs to be paid to internal imperatives, such as messages formulated with “must” or “have to”, or even valuations expressed in absolute terms (Lega et al., 2017). Such absolute terms are as follows: everything, nothing, always, never, no one and so on.

It must not be forgotten that visual supports are of vital importance when working with children and adolescents, which is why they can be used to modify irrational thoughts (Keluskar et al., 2021). For instance, bearing in mind the child’s special interests, some cards could be created. There would be two types: the “extinction cards”, which would represent cognitive distortions, and the “evolution cards”, which would represent cognitive restructuring (Keluskar et al., 2021).

4.1.3 Interpersonal strategies

It has already been established that highly sensitive individuals possess certain needs in the emotional and cognitive spheres (Acevedo, 2020; Greven & Homberg, 2020; Iimura & Kibe, 2020). However, they also tend to be easily overstimulated in novel situations mostly. That novelty is what causes them to need more time to observe and what discourages them from acting and getting involved (Aron et al., 2005; Chavez et al., 2021; Greven & Homberg, 2020). At practice, among the most frequent consulting reasons of the highly sensitive people, relationship problems, rejection fear, shame, and shyness have been found as the ones which have a high level of difficulties to get to know new people. Highly sensitive people show more likely difficulties in ending a relationship, dragging them out, and they seem to usually need help to see these problems, especially when they need to exercise their rights (Acevedo, 2020). In particular, seeking techniques to avoid overstimulation (e.g. getting a friend to join them to meet new people), and to reduce shyness or fear of rejection may help them to feel secure with themselves (Aron et al., 2005).

Thus, social skills training and practicing social situations are of vital importance (Beck et al., 2021). That training is a cognitive-behavioral strategy whose aim

is to systematically teach an individual abilities and skills socially effective. The final goal of the training is to improve interpersonal competence in social situations (Caballo, 2006). However, it must be highlighted that highly sensitive people can usually show high social competences, and the support should be therefore focused on boosting them (Acevedo et al., 2018).

Within social skills, the following can be found: assertive skills and communication abilities. The former makes reference to one's ability to express directly and adequately to express one's emotions and thoughts, whether they are pleasant or unpleasant, in social and interpersonal events (Caballo, 2006).

In line with the social relationships, it is essential that HSP need to communicate and show their features in work contexts, since they actually tend to show themselves as creative, loyal, empathetic and accurate (Acevedo, 2020). It is possible that their work could be considered undervalued, and doing so, HSP need to learn how to be promoted and boast because of their achievements (Iimura & Kibe, 2020). Regarding adverse and overstimulated work contexts, it is known that they could probably decrease their performance, they therefore need to inform about the changes of the environment and adaptations which are required. Also, as they appear to be conscientious and perfectionist with work, it may be highly probable that they overwork, neglecting other life habits (Greven et al., 2019). According to previous research, psychotherapy should be focused on treating decision-making and emotional management in work contexts (Acevedo, 2020).

Moreover, in the context of social skills training, and specifically assertiveness, the focus is on learning to express and accept pleasant feelings (e.g., affection, admiration, pleasure, etc.) and unpleasant ones (e.g., displeasure, anger, etc.). It is also expected to learn how to express and listen to personal opinions, both positive and negatives, as well as being able to make a request (e.g., asking for information, apologizing, refusing social pressure, etc.), and defending one's rights (Caballo, 2006). Especially, for highly sensitive people, the psychotherapist has to provide them with strategies to successfully solve problems related to social relationships without managing others' emotions (Olivares et al., 2013).

As for communication abilities, what is rather essential are its elements. They can be expressive, receptive and interactive. The expressive elements allude to the things that are being said, how they are being said and how is our body posture and facial gestures. Concerning the receptive components, they are related to the attention paid to the emisor. As for the last component, the interactive one, it involves speaking turns (Olivares et al., 2013).

In the social skills training, the educative phase, which involves the explanation of the interpersonal behavior and the aspects which facilitate social incompetence, precedes the training phase in the therapeutic context. In this last phase, there is a training in socially adequate behaviors. Firstly, a problem in a social context is suggested, and the person has to navigate that situation in the way they know. Then, the maladaptive thoughts or presence of anxiety are analyzed, so as to see how they influence the behavior. Afterwards, the person receives precise instructions to improve

their behavior and is provided with an accurate demonstration of the behavior, which the person has to try to reproduce. In this process, the person receives feedback and is praised if done correctly. In addition to this, the person will need to practice and train in natural contexts, in order to generalize social skills (Pedrero, 2021).

4.1.4 Resilience as a forerunner of psychological strength in highly sensitive individuals

First and foremost, resilience can be defined as the ability to recover or bounce back from stress (Iimura, 2022). Another definition of that concept could be the dynamic process which allows individuals to display positive and adaptive resources in spite of adverse experiences (Kibe et al., 2020). Apart from that, resilience is considered to be a protective factor against traumatic stress and adversity (Chen & Bonanno, 2020; Smith et al., 2008). In fact, intervention programs which are based on cognitive behavioral therapy tend to be referred to as “resilience programs” (Kibe et al., 2020). The reason is quite clear, their aim is to enhance and improve individual protective factors which can prevent negative consequences derived from life challenges (Kibe et al., 2020). For instance, it has been found that resilience-based interventions and programs are effective in alleviating mental health issues (Kibe et al., 2020).

Iimura’s (2022) research examined whether the relationship between COVID-19-related stress and the personality trait of environmental sensitivity was mediated by resilience, and whether the latter variable acted as a protective factor by buffering that relationship. For this purpose, a cross-sectional questionnaire was given to 441 older adolescents and young adults (53.7% female) living in Japan. The results obtained through mediation analysis showed that the influence on environmental sensitivity of stress related to COVID-19 was buffered by resilience. However, in that research, highly sensitive participants showed low levels of resilience. Thus, one of the main conclusions is the importance of enhancing resilience when considering what strategies might benefit highly sensitive individuals.

As for the question of whether resilience can be improved, the answer is that it definitely can (Iimura, 2022). There are different investigations which have demonstrated that enhancing resilience by utilizing training and psychoeducation is useful to decrease psychopathology (Kibe et al., 2020; Pluess & Boniwell, 2015). Such intervention studies and the SPARK resilience program in which they are based will be discussed in the next section.

4.2 Managing highly sensitive children at school

Highly sensitive children possess certain needs as a result of that heightened sensitivity which are particularly relevant in a school context (Acherman, 2013; Baryła-Matejczuk et al., 2020; Tillmann, 2016). Apart from that, one of the biggest issues is the fact that depressive disorders during childhood and adolescence are rising in Western societies (Pluess & Boniwell, 2015). As for the symptoms of depression, they range from academic, social, motivational and physical health difficulties, affecting the functioning as well in different areas (Kibe et al., 2020; Pluess & Boniwell, 2015). Moreover, what also poses a threat for young people in Western and Eastern countries are other mental health issues, such as anxiety, stress, loneliness, and so on and so forth (Amemiya et al., 2020). Given that depression is strongly related to low self-efficacy and low self-esteem, it seems quite obvious to enhance and cultivate positive self-regard to prevent mental health issues and their consequences in the long term (Kibe et al., 2020).

That is particularly relevant to highly sensitive individuals, and above all to highly sensitive children and adolescents, given that some investigations have found moderate correlations between sensory processing sensitivity and alexithymia, perceived stress and depressive symptoms, (Andresen et al., 2017; Brindle et al., 2015; Jacobson & Rigby, 2021).

Even if the family is able to provide a context for fostering positive children and adolescent self-regard, the context of school can offer an ideal social opportunity by means of implementing evidence-based socio-emotional programs (Kibe et al., 2020). In fact, through the implementation of programs at school which promote adaptive coping skills, the prevention of depression in childhood can be achieved (Pluess & Boniwell, 2015). Focusing on vantage sensitivity, it has been shown that adolescents seem to benefit more from cognitive and behavioral interventions (Jagiellowicz et al., 2020).

4.2.1 How to deal with highly sensitive children in the classroom: the role of the education professionals

A series of studies examined the plasticity of child growth under different special childhood intervention programs (Park & Mackey, 2022; Weikart, 1998). Specifically, it proved that high-quality programs do in fact have an effect on the growth and development of children and on adulthood (Weikart, 1998). In spite of this, models whose methods are characterized by being highly directive and controlling are not appropriate to the development of the child, since they do not help them become healthy adults (Weikart, 1998). Rather than such models, it is more convenient to make use of those which are based on activities generated by the child and around their individual interests, given that this will have a long-term positive impact on adult behavior (Weikart, 1998). Such results indicate that children and adolescents' growth and development, whether they are highly sensitive or not, are influenced by programs at school.

Apart from that, school counselors alongside the teachers have to design an adequate and thorough plan of transitions. The main reason for this is the findings of one investigation whose aim was to examine the impact of school transition on highly sensitive students (Iimura & Kibe, 2020). Its results supported the Vantage Sensitivity model, which suggested that highly sensitive adolescents did in fact benefit disproportionately from a positive school transition. This meant that this model best described students' socioemotional adjustment across school transition. Another relevant finding is the fact that highly sensitive adolescents reported a stronger increase in their well-being owing to their school transition, whereas their low sensitive peers did not show such well-being improvement (Iimura & Kibe, 2020).

As for the needs of highly sensitive individuals, the findings of investigations indicate that most of them are perfectionists and prefer to work in a quiet working environment, where they are given direct individual instructions by their teachers (Acherman, 2013; Baryła-Matejczuk et al., 2020; Tillmann, 2016). Therefore, it makes a great deal of sense that they prefer structured and repetitive lessons, where there are rules and rituals. What is more, they would rather work on their own. Nevertheless, if working in a group is compulsory for the task, they prefer to do so in a group whose members are known by the highly sensitive child (Acherman, 2013; Baryła-Matejczuk et al., 2020; Tillmann, 2016). This is similar to their close relationships, provided that they prefer a small circle of friends, rather than a larger group. Apart from that, the physical conditions in the environment also play a crucial role. Therefore, too much color, light or noise ought to be avoided, given that highly sensitive individuals might be overstimulated by those elements. Another aspect which makes them uncomfortable is novelty, that is, unknown and new situations are a nuisance for them (Acherman, 2013; Baryła-Matejczuk et al., 2020; Tillmann, 2016).

Furthermore, highly sensitive children tend to be easily disturbed when least expected, apart from having a sense of security quite fragile (Baryła-Matejczuk & Artymiak, 2021). Therefore, teachers should pay attention carefully to the children's behavior and notice any subtle change that might indicate that something has disturbed them. Additionally, it would be advisable to gradually introduce any kind of changes, rather than implementing them all of the sudden. By the same token, educators ought to be careful with surprises, given that highly sensitive children tend to feel uncomfortable when having been surprised (Baryła-Matejczuk & Artymiak, 2021). This is also related to feeling safe, in which teachers should recognize what gives a child a sense of security in order to ensure it. For instance, if a new situation is taking place, the fact of keeping an object, such as a toy, near the child can give him/her a sense of security. All of these measures are useful for highly sensitive children to know what is going to happen in the short term (Baryła-Matejczuk & Artymiak, 2021).

Other strategies which could benefit teachers in their work to manage and help children with high levels of environmental sensitivity is the fact of answering their questions, even if their content is not relevant (Baryła-Matejczuk & Artymiak, 2021).

In other words, teachers ought to be patient when those children are trying to lower their levels of anxiety by asking questions which are already clear, at least for educators (Baryła-Matejczuk & Artymiak, 2021). Another key element which needs to be taken into consideration are emotions. Basically, one thing to be avoided with such children is pushing them to do things for which they are not ready. Therefore, it is of the utmost importance to respect their feelings (Baryła-Matejczuk & Artymiak, 2021). Apart from treating their emotions carefully and respectfully, they should also be encouraged to take risks, provided that sensitivity and courage are not two opposite nor incompatible variables (Baryła-Matejczuk & Artymiak, 2021).

Undoubtedly, children are diverse and while all of them share some characteristics, they differ from each other as well (Baryła-Matejczuk & Artymiak, 2021). That is the reason why teachers ought to allow them to show that diversity. Apart from that, educators should respect children's emotions and decisions, that is, if they feel like refusing to participate in an activity, it is better to leave them to it (Baryła-Matejczuk & Artymiak, 2021). Needless to say, highly sensitive children should feel free to express themselves when it comes to their feelings, thoughts, opinions, doubts, and worries. This is in line with rewarding children's initiative, that is, if they volunteer to express themselves and open up to others, they should be praised (Baryła-Matejczuk & Artymiak, 2021).

In fact, it is quite essential to provide teachers with knowledge about environmental sensitivity and what it means to be highly sensitive (Baryła-Matejczuk et al., 2020). According to this, it is rather useful to help teachers understand how highly sensitive children function and how much they differ from other children. Specifically, it is crucial for them to know what those children's needs are to support them to the maximum (Baryła-Matejczuk et al., 2020; Ferrer-Cascales et al., 2021).

4.2.2 School-based psychological intervention programs

As it has been discussed throughout this chapter, highly sensitive individuals tend to benefit more from psychological interventions. Additionally, another aspect which has been mentioned is the fact that environmental sensitivity is associated with stress-related problems (Greven et al., 2019). Therefore, intervention programs are particularly crucial for highly sensitive individuals, given how much advantage can be taken from them (Greven et al., 2019). Specifically, there are three studies which examined the effects of different programs on individuals with high levels of environmental sensitivity (Kibe et al., 2020; Nocentini et al., 2018; Pluess & Boniwell, 2015).

The aim of such investigations was to examine whether the environmental sensitivity feature moderated the effects of the environmental KiVa antibullying program, which concerns the organization of work of the entire educational institution. Regarding the KiVa treatment, it could be said that it is a systematic school-based multicomponent antibullying program, which is aimed at the whole school, and as well as individual children (Nocentini et al., 2018). Specifically, the KiVA program

includes 10 sessions which are taught by teachers and are targeted to every single student throughout the whole school year. Concerning the moderation effects, results showed that environmental sensitivity and gender significantly moderated intervention effects on internalizing symptoms and victimization (Nocentini et al., 2018). Moreover, highly sensitive boys benefited significantly more than the low sensitive boys, since the former showed a significant reduction in victimization as a consequence of the intervention. As for the girls, victimization decreased significantly for those whose levels of sensitivity were medium and high (Nocentini et al., 2018). This may be due to the objective of the program activities, which was to learn to empathize with the victim, recognizing the characteristics of the bullying situation and learning more adaptive coping strategies. This would enable the acquisition of skills related to emotional intelligence (such as empathy or perception of positive changes) in school context (Nocentini et al., 2018).

The other two studies utilized the SPARK resilience program (Kibe et al., 2020; Pluess & Boniwell, 2015). It is a program based on cognitive-behavioral therapy (CBT) components and positive psychology concepts (e.g., post-traumatic growth, resilience), and incorporates findings derived from resilience studies. The aim is to foster protective factors (e.g., self-efficacy, self-regulation skills, self-esteem) in order to promote individual resilience and associated skills, as well as preventing depression (Kibe et al., 2020; Pluess & Boniwell, 2015). It must be pointed out that the program has 12 sessions, whose duration is 60 minutes, and are delivered throughout 3-4 months. Furthermore, the program is delivered by school teachers who previously have been trained thoroughly by psychologists, apart from having been provided with every required teaching material (e.g., DVDs with presentation slides and videos, workbooks to involve children, teacher's guidebook with information in detail for each session) (Kibe et al., 2020; Pluess & Boniwell, 2015).

One of the investigations made use of the SPARK resilience program aiming it at Japanese students ranging from 15 to 16 years old (Kibe et al., 2020). Its results indicated that thanks to the intervention, which was effective, students' overall self-efficacy was improved. Another finding was that highly sensitive students, who had scored significantly lower in well-being at baseline, responded more positively to the program. In fact, they had a greater promotion of self-esteem and reduction in depression (Kibe et al., 2020).

As for the other study which also utilized the SPARK resilience program, its aim was at students who were ethnically diverse, given that Asian, African/Caribbean, Caucasian, and Middle Eastern individuals were part of its sample (Pluess & Boniwell, 2015). Regarding the participants' age, the average was 11 years old. In addition to this, it must be noted that all participants were female and that the assessment was carried out at pre and post intervention, as well as 6 and 12 months afterwards (Pluess & Boniwell, 2015). As for its results, the intervention was significantly and positively effective in highly sensitive girls, whereas it did not have such an effect for low sensitive girls. Despite the fact that there was no difference between low and highly sensitive girls in their depression scores at baseline, the latter had significantly lower scores

on that measure at the 6- and 12-months follow-up assessments (Pluess & Boniwell, 2015). Apart from that, when comparing the low and high sensitivity groups to the control cohort at the 12-months follow-up evaluation, the highly sensitive group had significantly lower scores on depression than the control cohort. Nevertheless, the low sensitive group and the control cohort did not differ whatsoever in depression scores at the same time (Pluess & Boniwell, 2015). The effects of this program might be explained by the deep processing of people with high levels of sensitivity, since they are able to carry on processing what they learn during the intervention, even if they have finished it. Thanks to this, HSP could improve the way they internalize the coping strategies they have learnt (Pluess & Boniwell, 2015).

The effectivity of these programs may be because of the neurosensitivity of the highly sensitive people, which allows to manage cognitive and emotional processes deeply (Pluess & Belsky, 2013; 2015). Furthermore, as previous research studies have pointed out, depending on the level of sensitivity, it exists a great variety of responsivity to both adverse and supportive environments (Pluess, 2017). Thus, recent scientific articles have stated that highly sensitive people could take advantage of psychological contexts as they may be considered as supportive environments (de Villiers et al., 2018).

After reviewing the results of the studies described above, it can be stated that highly sensitive individuals are influenced by the environment, and they might benefit from psychological strategies. How do you think the understanding of this personality trait can be clinically relevance?



4.3 Improvements of psychological well-being in highly sensitive children and adults through health and education supportive methods

It goes without saying that the different school interventions in which highly sensitive people have taken part have been successful (Kibe et al., 2020; Pluess & Boniwell, 2015; Nocentini et al., 2018). To cite one example, both highly sensitive boys and girls who participated in the KiVa antibullying program showed a significant reduction in the levels of victimization (Nocentini et al., 2018). Moreover, highly sensitive adolescents who took part in the SPARK resilience program benefited as well from it, given that their levels of depression were reduced, and their self-esteem was promoted (Kibe et al., 2020). As for the highly sensitive girls who also received the same resilience program in another investigation, their levels of depression decreased significantly (Pluess & Boniwell, 2015).

Apart from school-based psychological programs, there are other types of interventions which will be addressed in this section. Those interventions were utilized in highly sensitive people, and range from yoga courses to mindfulness resources,

and even physical exercise (Amemiya et al., 2020; Bakker & Moulding, 2012; Soons et al., 2010; Takahashi et al., 2020; Yano & Oishi, 2018). Even though some studies have been conducted on mental health problems associated with SPS and their mediating factors, so far it is not clear how to support highly sensitive individuals (Amemiya et al., 2020). What the findings among research studies have consistently stated is that the strong impact of environmental conditions on highly sensitive people may explain why high SPS individuals could report different health and social outcomes (for better or for worse) (Belsky et al., 2007; Belsky & Pluess, 2009; Booth et al., 2015). It has been suggested that in order for them to be helped and supported, one way to do so could be making use of a behavioral and/or cognitive approach (Amemiya et al., 2020). Differences between prevention and intervention activities, and some examples and strategies, which have been carried out so far, are also explained in Chapter 3.

Since physical exercise can improve mental health and given that highly sensitive individuals could possess a higher risk of mental issues, one investigation examined the relationships between physical exercise, SPS and depression (Yano & Oishi, 2018). The results indicated that Ease of Excitation (EOE) and Low Sensory threshold (LST), were positively related to depressive tendencies, which were in fact moderated when increasing the frequency of physical exercise.

In other words, physical exercise could moderate the relationship between depressive symptoms and the dimensions of sensory processing sensitivity, such as LST and EOE. This finding may be the habituation to internal and external stimuli, since participants who practice physical exercise frequently can be exposed to strong stimuli (noises, physical contact, muscular tension and a high level of heart frequency) (Yano & Oishi, 2018). Aron (1996) suggested that environmental factors could decrease the level of SPS. Moreover, as previous studies have stated, it is known that individuals get used to adapt to environmental stimuli in which they live (Foa & Kozak, 1986). As a result, it is supposed that the frequent practice of physical activity raises the threshold of sensory processing due to the habituation (Yano & Oishi, 2018).

As for Aesthetic Sensitivity (AES), it was negatively related to depressive tendencies (Yano & Oishi, 2018). On the other hand, it has been suggested that AES represents a positive feature of SPS, since it seems not to be related to depressive symptoms. However, recent researchers have indicated the positive association of the AES with the coherence sense (Evers et al., 2008; Liss et al., 2008). Therefore, AES could imply low depressive tendencies (Yano & Oishi, 2018).

Moreover, it has been suggested that psychosomatic techniques, such as meditation or yoga, are effective for regulating mental health among highly sensitive individuals (Amemiya et al., 2020). Therefore, one article studied the impact of practicing yoga on attention control and mood states among highly sensitive graduate students, in the context of physical education (Amemiya et al., 2020). The participants purposefully chose a yoga course in physical education, which consisted of a pair of 2-hour lectures per week, every other week. As for its results, before

the course, highly sensitive participants had higher negative mood states and lower attention control (Amemiya et al., 2020). Despite having observed a significant improvement in scores, differences between the highly and low sensitive groups after the yoga course were not statistically significant. Having said that, there was a positive correlation between SPS and attention control, and a negative one between mood states and variation in attention control (Amemiya et al., 2020). Taking it all into consideration, from these results it could be implied that the yoga course promoted attention control and improved mood states for those whose levels of SPS were high (Amemiya et al., 2020).

The findings of this study could be explained by different reasons. First, presenting high levels of sensitivity may imply a greater likelihood related to the manifestations of mental health problems (Amemiva et al., 2020). Therefore, according to previous research studies, physical exercise may influence on the modulation of mental health (Amemiva et al., 2020). Second, it is known that yoga supposes an exercise of low intensity, which includes meditation and rest, and it appears to be also a self-regulation of the mood technique (Amimeva et al., 2020). Third, participants of this study, learnt how to apply these strategies of physical exercise and they carried on using on their own. This fact allowed them to practice being less affected by environmental factors (Amimeva et al., 2020).

Regarding other resources, mindfulness is a key element of the so-called “third-wave” therapies such as Acceptance and Commitment Therapy (ACT), and Dialectic Behavior Therapy (Bakker & Moulding, 2012). Currently, mindfulness is broadly referred to as an awareness of and enhanced attention to present experience, step by step, and in an accepting and opening way (Bakker & Moulding, 2012). Another definition of the same concept is the awareness that emerges thanks to paying attention purposefully, in the present moment, and without judging the experience which is taking place (Takahashi et al. 2019). As a matter of fact, dispositional mindfulness is correlated positively with well-being and negatively with depression, anxiety and psychosomatic symptoms (Takahashi et al. 2019).

One investigation examined the relationships between SPS, mindfulness and acceptance, and negative affect (Bakker & Moulding, 2012). Its results indicated that higher levels of SPS were associated with higher levels of anxiety, depression and stress. In spite of that, there was a moderation effect, provided that SPS only was associated with anxiety when levels of mindfulness and acceptance were low. In addition to this, such a relationship was not significant at all when levels of mindfulness and acceptance were high (Bakker & Moulding, 2012). The association between anxiety or stress and environmental stimuli may be explained by the perseverance of looking for a meaning around the environmental information. As a result, cognitive anxiety related to the past and the future could appear (Siegel, 2007). As mindfulness works changing this anxious tendency of rumination, the influence of SPS on anxiety would decrease through this technique (Brown & Ryan, 2003). Despite the results that previous research studies have stated about the benefits of mindfulness in highly sensitive people, reducing the levels of anxiety and stress, acceptance

strategies could be supportive to be aware of the environmental stimuli (Bakker & Moulding, 2012). The fact that acceptance techniques can tend to reduce the levels of anxiety in highly sensitive people, authors have suggested that experience avoidance may result in the disengagement of the anxious thoughts, feelings and sensations associated with the environment (Bakker & Moulding, 2012).

Another investigation, which had a similar aim to the aforementioned one, examined whether dispositional mindfulness could mediate the relationship between SPS and well-being, trait anxiety, and psychosomatic symptoms (Takahashi et al. 2019). Its results suggested that the four facets of mindfulness (non-judging, non-reactivity, acting with awareness, and describing) partially mediated the effect of two sub-factors of SPS (EOE, LST) on trait anxiety (Takahashi et al. 2019). Moreover, describing, acting with awareness, and non-reactivity partially mediated the effect of LST on well-being, and fully mediated the effect of EOE. As for other results, acting with awareness and non-judging partially mediated the effect of LST and EOE on psychosomatic symptoms (Takahashi et al. 2019). On the whole, it was proved that the improvement of dispositional mindfulness could be effective for the physical and psychological problems of highly sensitive people (Takahashi et al. 2019).

Giving an explanation for these results, EOE could be related to high levels of activation and arousal, since this dimension of the high sensitivity have presented positive correlations with anxiety (Ahadi & Basharpour, 2010; Liss et al., 2008). It is possible therefore that the enhanced arousal caused by EOE deprives people with high levels of EOE of mindfulness for awareness and describing experience with a nonreactive attitude, which in turn leads to low well-being (Takahashi et al. 2019).

Similar to the two above-mentioned articles, another investigation examined the impact from a psychological point of view of the Mindfulness-Based Stress Reduction program (MBSR) on a sample of highly sensitive individuals (Soons et al., 2010). Concerning that intervention, it must be noted that it consisted of eight sessions of two and a half hours, which were delivered throughout eight weeks. Apart from this, participants had to commit themselves to devote time, 45 minutes per day, for six days a week, in which they had to do the program exercises (Soons et al., 2010). The MBSR program aimed to teach participants to be mainly oriented to the present moment experience with an attention characterized by being open and non-judgmental. Right after the eight-week program, as well as four weeks later, highly sensitive participants suffered less from stress and appeared to have lower levels of social anxiety (Soons et al., 2010). Furthermore, their scores for personal growth initiative, mindfulness, emotional empathy, self-transcendence and self-acceptance were significantly higher. Broadly speaking, the MBSR program might be useful as an additional element in therapies for highly sensitive individuals (Soons et al., 2010). The effectiveness of other approaches in providing help, therapy and support cannot be ruled out. The approach related to Emotional Focused Therapy may also prove promising, however, currently there are no studies on the importance and effectiveness in the context of high sensitivity.



Remember

- The Vantage Sensitivity concept makes reference to a strengthened sensitivity towards thriving conditions in the environment.
- Some methods of support, such as the Cognitive-Behavioral or the Rational Emotive Behavior therapies have suggested a positive impact on highly sensitive individuals.
- Emotional regulation, anger management and problem-solving strategies are emotional strategies which could help highly sensitive individuals.
- Identifying and modifying automatic and intrusive thoughts are cognitive strategies that might be of use for individuals high in environmental sensitivity.
- Interpersonal strategies, such as social skills training, may help highly sensitive individuals manage challenging social situations.
- Highly sensitive children prefer to work on their own in a quiet work environment, to be given direct instructions, and structured and repetitive lessons.
- Individuals with high levels of environmental sensitivity tend to benefit more from psychological interventions than their non-highly sensitive peers.
- The KiVa antibullying program and the SPARK resilience program could have a positive impact on self-esteem and self-efficacy, improving coping strategies and reducing victimization in highly sensitive children and adolescents.
- Mindfulness, meditation or yoga are also beneficial for people high in environmental sensitivity.

Summary

Taking into consideration everything that has been mentioned throughout this chapter, it can be said that highly sensitive individuals are influenced by the environment due to their heightened sensitivity. Without a shred of doubt, there is a “bright side” of environmental sensitivity, provided that they tend to be more positively influenced by thriving conditions in the environment. That is the main reason why different strategies and interventions are of vital importance, because a great deal of advantage can be taken from them.

Needless to say, the different intervention programs aimed at students have been much more than successful. There is mounting evidence to support that statement. To cite one example, the SPARK resilience program managed to reduce levels of depression and increase self-esteem in a sample of highly sensitive children. In fact, such results were obtained thanks to their strengthened sensitivity, given that the low sensitive group did not show a significant reduction in depression scores (Kibe et al., 2020; Pluess & Boniwell, 2015). This suggests that they are more positively influenced by prosperous conditions.

It is important to understand High Sensitivity as a personality trait, since it can imply an increased likelihood for people to develop some psychological problems (especially if the person is brought up in an unfavorable environment), but also it allows them benefits in supportive contexts. Therefore, the goal of working with highly sensitive people should not be to eliminate or change this trait, but rather to understand it in order to learn how to better adapt to the environment and enhance the advantages it can provide.

Understanding this trait may be clinically relevant, since it would allow: 1) to perform a more accurate and adapted therapeutic process; 2) to make the person not feel “different from the rest”; 3) to reinforce the therapeutic relationship by making them feel more understood; and 4) to show the advantages of this personality trait and enhance their best qualities.

Following the recommendations of Aron et al. (2010), a step-by-step approach in therapy should be maintained in order to avoid overloading the patient cognitively and/or emotionally. In fact, sensitivity to criticism and low self-esteem are very often observed in highly sensitive people, so it is essential to work on shame in counseling, especially when dealing with their “failures”. It is therefore recommended to frequently emphasize the benefits of this trait, with the aim of helping them to face reality with confidence, to look for new opportunities and to make decisions based on their personal needs.

Previous literature has suggested that it is essential to carefully consider the rhythm of work in consultation with highly sensitive people in order to prevent them from feeling overwhelmed and reaching an optimal level of arousal. These people seem to tend to become overwhelmed more easily, so it is important for the therapist to teach how to manage these emotions and increase the regulation skills. Highly sensitive people appear to often spend a great deal of time thinking about

the sessions. In fact, if they have been very overwhelming, they may feel ashamed of their strong feelings. Thus, the practitioner should take advantage of this time to generate a climate of trust, to deal with it and with emotions (Aron et al, 2010).

Nevertheless, there is little evidence on the effect that cognitive-behavioral therapy can have on highly sensitive individuals. Thus, future research should make use of experimental and longitudinal studies in which that effect is examined. As a matter of fact, it ought to be studied as well how different strategies (e.g., emotional, cognitive, interpersonal) based on that type of therapy can positively influence highly sensitive individuals. It is of the utmost importance to have reliable information which has been obtained systematically on this issue. The main reason is that this information can help teachers in their work of managing children who can be categorized as highly sensitive. Not only will this broaden the knowledge that teachers have on the needs of such individuals, but it will also improve the way highly sensitive children are being educated at school.

In relation to the school context, transitions are a key element. In fact, the perceptions that students have of changes in the environment, such as the quality of the school environment or social support, tend to decrease. This entails that both academic and socioemotional adjustment are rather poor (Iimura & Kibe, 2020). Therefore, there are two aspects which need to be taken into account. The first one involves knowing the highly sensitive children's needs and requirements resulting from their heightened sensitivity, because this will help teachers in their work of education. The second one has to do with an adequate transition plan coordinated by both teachers and school counselors. These two elements are likely to improve highly sensitive children's experience at school.

Moreover, highly sensitive individuals' well-being does not only matter when they are young and attending school or high school. It is also crucial to pay attention to it throughout the entire life cycle. Given that they are more likely to suffer from depression, anxiety or stress under rough and severe environmental conditions, a series of methods of support need to be developed. The aim of those methods would be to improve their well-being and to prevent such negative consequences from happening. Additionally, the methods that already exist could be utilized, as long as their effects on highly sensitive people are tested in a randomized controlled trial. By doing so, empirical evidence can be obtained, hence it could be possible to improve their quality of life in the long term, as well as taking advantage from such high levels of environmental sensitivity.



Revision questions

Read the following statements related to the chapter and guess if they are True or False. Then, justify your response if needed.

1. The environmental sensitivity only refers to sensitivity to adverse situations.
2. The overprotection and the scarce of parenting attention to highly sensitive children are related to high levels of anxiety and depression.
3. Cognitive-behavioral therapy has been associated with a significant reduction of externalizing symptoms in highly sensitive children.
4. Highly sensitive people present a decreased emotional reactivity, since they are easily overstimulated due to their high sensory threshold.
5. Highly sensitive individuals better perceive the intensity of the emotional expression of the others, becoming more empathetic with their feelings and needs.
6. From the Cognitive Therapy, interventions could be focused on teaching the thinking negative biases to learn how to control, evaluate and modify these thoughts.
7. Highly sensitive people tend to easily create relationships, since they do not identify themselves with shyness when getting to know people and they are not scared of the neglect. They rarely have social relationship problems.
8. Despite the opportunity to increase the resilience through the psychoeducation, it does not seem to be a useful strategy for dealing with psychopathology.
9. It has been observed a moderate relationship between sensory processing sensitivity,

alexithymia, perceived stress and depressive symptoms in children and adolescents.

10. We should provide highly sensitive children and adolescents with a disorganized environment, without rules, new activities and many tasks. They can therefore face to difficult situations and to get used to overstimulation.
11. Highly sensitive people appear to more likely benefit from psychological support since they carry on processing the information once it ends.
12. Mindfulness does not work as a psychological technique in highly sensitive people.



Correct answers of the True/False exercise

1. False. Environmental sensitivity refers both adverse and support environmental conditions.
2. True.
3. True.
4. False. Highly sensitive people present a decreased emotional reactivity, since they are easily overstimulated due to their high sensory threshold.
5. True.
6. True.
7. False. Highly sensitive people are different from each other, and they can therefore experience different problems when trying to bound social relationships. It usually depends on the environmental they are involved.
8. False. Resilience has demonstrated to be a protective factor for mental health issues.
9. True.
10. False. We should provide highly sensitive children and adolescents with organized and support environments.
11. True.
12. False. It has proved that the improvement of dispositional mindfulness could be effective for the physical and psychological problems of highly sensitive people.

Bibliography

- Acevedo, B. P. (2020). The basics of sensory processing sensitivity. In B. P. Acevedo (Ed.), *The highly sensitive brain: Research, assessment, and treatment of sensory processing sensitivity* (pp. 1–15). <https://doi.org/10.1016/B978-0-12-818251-2.00001-1>
- Acevedo, B. P., Aron, E. N., & Aron, A. (2018). *Novel perspectives on sensory processing sensitivity*. In San Francisco, CA, USA: Association for Psychological Science Convention.
- Achermann, E. M. (2013). Unterrichtsqualitätsaus der Sichthochsensitiver Menschen [Unpublished master's thesis, Internationale Hochschule für Heilpädagogik].
- Ahadi, B., & Basharpour, S. (2010). Relationship between sensory processing sensitivity, personality dimensions and mental health. *Journal of Applied Sciences*, 10(7), 570-574.
- Amemiya, R., Takahashi, G., Rakwai, M., Isono, M., & Sakairi, Y. (2020). Effects of yoga in a physical education course on attention control and mental health among graduate students with high sensory processing sensitivity. *Congent Psychology*, 7(1), 1778895. <https://doi.org/10.1080/23311908.2020.1778895>
- Andresen, M., Goldmann, P., & Volodina, A. (2017). Do overwhelmed expatriates intend to leave? The effects of sensory processing sensitivity, stress, and social capital on expatriates' turnover intention. *European Management Review*, 15(3), 315-328. <https://doi.org/10.1111/emre.12120>
- Aron, E. N., & Aron, A. (1997). Sensory-processing sensitivity and its relation to introversion and emotionality. *Journal of personality and social psychology*, 73(2), 345–368. <https://doi.org/10.1037//0022-3514.73.2.345>
- Aron, E. N., Aron, A., & Davies, K. M. (2005). Adult shyness: the interaction of temperamental sensitivity and an adverse childhood environment. *Personality and Social Psychology Bulletin*, 31(2), 181-197. <https://doi.org/10.1177/0146167204271419>
- Aron, A., Ketay, S., Hedden, T., Aron, E. N., Rose Markus, H., & Gabrieli, J. D. (2010). Temperament trait of sensory processing sensitivity moderates cultural differences in neural response. *Social cognitive and affective neuroscience*, 5(2-3), 219-226.
- Bakker, K., & Moulding, R. (2012). Sensory-Processing Sensitivity, dispositional mindfulness and negative psychological symptoms. *Personality and Individual Differences*, 53(3), 341-346. <https://doi.org/10.1016/j.paid.2012.04.006>
- Baryła-Matejczuk, M., & Artymiak, M. (2021). Education and support for educators and teachers of highly sensitive children. In M. Baryła-Matejczuk, M. Fabiani, and R. Ferrer-Cascales (Eds.), *Supporting the development of highly sensitive children* (pp. 25-42).

- Battagliese, G., Caccetta, M., Luppino, O. I., Baglioni, C., Cardi, V., Mancini, F., & Buonanno, C. (2015). Cognitive-behavioral therapy for externalizing disorders: A meta-analysis of treatment effectiveness. *Behaviour research and therapy*, 75, 60–71. <https://doi.org/10.1016/j.brat.2015.10.008>
- Beck, K. B., Conner, C. M., Breitenfeldt, K. E., Northrup, J. B., White, S. W., & Maze-fsky, C. A. (2020). Assessment and Treatment of Emotion Regulation Impairment in Autism Spectrum Disorder Across the Life Span: Current State of the Science and Future Directions. *Child and adolescent psychiatric clinics of North America*, 29(3), 527–542. <https://doi.org/10.1016/j.chc.2020.02.003>
- Belsky, J., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2007). For better and for worse: Differential susceptibility to environmental influences. *Current directions in psychological science*, 16(6), 300-304.
- Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: differential susceptibility to environmental influences. *Psychological bulletin*, 135(6), 885.
- Booth, C., Standage, H., & Fox, E. (2015). Sensory-processing sensitivity moderates the association between childhood experiences and adult life satisfaction. *Personality and individual differences*, 87, 24-29.
- Chen, S., & Bonanno, G. A. (2020). Psychological adjustment during the global outbreak of COVID-19: A resilience perspective. *Psychological Trauma Theory Research Practice and Policy*, 12, S51–S54. <https://doi.org/10.1037/tra0000685>
- Brindle, K., Moulding, R., Bakker, K., & Nedeljkovic, M. (2015). Is the relationship between sensory-processing sensitivity and negative affect mediated by emotional regulation? *Australian Journal of Psychology*, 67(4), 214-221. <https://doi.org/10.1111/ajpy.12084>
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of personality and social psychology*, 84(4), 822.
- Caballo, V. (2006). *Manual de Evaluación y Entrenamiento de Las Habilidades Sociales*. Siglo XXI Ediciones.
- Chavez, C., De Pauw, S., Van IJzendoorn, M. H., De Maat, D. A., Kok, R., & Prinzie, P. (2021). No differential susceptibility or diathesis stress to parenting in early adolescence: personality facets predicting behaviour problems. *Personality and Individual Differences*, 170(1), 110406. <https://doi.org/10.1016/j.paid.2020.110406>
- de Villiers, B., Lionetti, F., & Pluess, M. (2018). Vantage sensitivity: a framework for individual differences in response to psychological intervention. *Social psychiatry and psychiatric epidemiology*, 53(6), 545-554.
- Ellis, A. & Bernad, M. (1994). *Reason and Emotion in Psychotherapy: Revised and updated*. Birch Lane.

- Ferrer-Cascales, R., Ruiz-Robledillo, N., Albaladejo-Blázquez, N., Sánchez-Sanse-gundo, M., Fernández-Alcántara, M., Rubio-Aparicio, M., & Costa-López, B. Sensibilidad del procesamiento sensorial. Identificación de la alta sensibilidad en M. Baryła-Matejczuk, M. Fabiani, & R. Ferrer-Cascales (Ed.), *Apoyando el desarrollo de niños altamente sensibles*. E-ISBN: 978-83-66159-72-3.
- García, M. I. D., Fernández, M. Á. R., & Crespo, A. V. (2017). *Manual de técnicas y terapias cognitivo conductuales*. Desclee de Brouwer.
- Greven, C. U., & Homberg, J. R. (2020). Sensory processing sensitivity— For better or for worse? Theory, evidence, and societal implications. In B. P. Acevedo (Ed.), *The Highly Sensitive Brain. Research, Assessment, and Treatment of Sensory Processing Sensitivity* (pp. 51-74). <https://doi.org/10.1016/C2018-0-03130-8>
- Greven, C. U., Lionetti, F., Booth, C., Aron, E. N., Fox, E., Schendan, H. E., Pluess, M., Bruining, H., Acevedo, B., Bijttebier, P., & Homberg, J. (2019). Sensory Processing Sensitivity in the context of Environmental Sensitivity: a critical review and development of research agenda. *Neuroscience and biobehavioral reviews*, 98, 287-305. <https://doi.org/10.1016/j.neubiorev.2019.01.009>
- Iimura, S., & Kibe, C. (2020). Highly sensitive adolescent benefits in positive school transitions: evidence for vantage sensitivity in japanese high-schoolers. *Developmental Psychology*, 56(8), 1565-1581.
- Iimura S. (2021). Highly sensitive adolescents: The relationship between weekly life events and weekly socioemotional well-being. *British journal of psychology (London, England: 1953)*, 112(4), 1103-1129. <https://doi.org/10.1111/bjop.12505>
- Iimura S. (2022). Sensory-processing sensitivity and COVID-19 stress in a young population: The mediating role of resilience. *Personality and individual differences*, 184, 111183. <https://doi.org/10.1016/j.paid.2021.111183>
- Jagiellowicz, J., Zarinafsar, S., & Acevedo, B. (2020). Health and social outcomes in highly sensitive persons. In B. P. Acevedo (Ed.), *The Highly Sensitive Brain. Research, Assessment, and Treatment of Sensory Processing Sensitivity* (pp. 51-74). <https://doi.org/10.1016/B978-0-12-818251-2.00004-7>
- Jakobson, L. S., & Rigby, S. N. (2021). Alexithymia and Sensory Processing Sensitivity: Areas of Overlap and Links to Sensory Processing Styles. *Frontiers in psychology*, 12, 583786. <https://doi.org/10.3389/fpsyg.2021.583786>
- Keluskar, J., Reicher, D., Gorecki, A., Mazefsky, C., & Crowell, J. A. (2021). Understanding, Assessing, and Intervening with Emotion Dysregulation in Autism Spectrum Disorder: A Developmental Perspective. *Child and adolescent psychiatric clinics of North America*, 30(2), 335-348. <https://doi.org/10.1016/j.chc.2020.10.013>
- Kibe, C., Suzuki, M., Hirano, M., & Boniwell, I. (2020). Sensory processing sensitivity and culturally modified resilience education: Differential susceptibility in Japanese adolescents. *PloS one*, 15(9), e0239002. <https://doi.org/10.1371/journal.pone.0239002>

- Knouse, L. E., & Safren, S. A. (2010). Current status of cognitive behavioral therapy for adult attention-deficit hyperactivity disorder. *The Psychiatric clinics of North America*, 33(3), 497–509. <https://doi.org/10.1016/j.psc.2010.04.001>
- Lega, L., Calvo, M., & Sorribes, F. (2017). *Terapia racional emotiva conductual: una versión teórico-práctica actualizada*. Paidós.
- Lionetti, F., Aron, E. N., Aron, A., Klein, D. N., & Pluess, M. (2019). Observer-rated environmental sensitivity moderates children's response to parenting quality in early childhood. *Developmental Psychology*, 55(11), 2389-2402. <https://doi.org/10.1037/dev0000795>
- Liss, M., Mailloux, J., & Erchull, M. J. (2008). The relationships between sensory processing sensitivity, alexithymia, autism, depression, and anxiety. *Personality and Individual Differences*, 45(3), 255-259. <https://doi.org/10.1016/j.paid.2008.04.009>
- Liss, M., Timmel, L., Baxley, K., & Killingsworth, P. (2005). Sensory processing sensitivity and its relation to parental bonding, anxiety, and depression. *Personality and Individual Differences*, 39(8), 1429-1439. <https://doi.org/10.1016/j.paid.2005.05.007>
- Nocentini, A., Manesini, E., & Pluess, M. (2018). The Personality Trait of Environmental Sensitivity Predicts Children's Positive Response to School-Based Anti-bullying Intervention. *Clinical Psychological Science*, 6(6), 848-859. <https://doi.org/10.1177/2167702618782194>
- Olivares, J., Macià, D., Rosa, A. I., & Olivares-Olivares, P. J. (2013). *Intervención psicológica. Estrategias, técnicas y tratamientos*. Pirámide.
- Park, A. T., & Mackey, A. P. (2022). Do younger children benefit more from cognitive and academic interventions? How training studies can provide insights into developmental changes in plasticity. *Mind, Brain, and Education*, 16(1), 24-35.
- Pedrero, E. F. (2021). *Manual de tratamientos psicológicos: adultos*. Pirámide.
- Piasecka, J., Bertschinger, E. J., Tudor, M. E., & Sukhodolsky, D. G. (2018). Assessing and treating emotion dysregulation and anger management. In J. F. McGuire, T. K. Murphy, J. Piacentini, & E. A. Storch (Eds.), *The Clinician's Guide to Treatment and Management of Youth with Tourette Syndrome and Tic Disorders* (pp. 255-277).
- Pluess, M. (2015). Individual differences in Environmental Sensitivity. *Child development perspectives*, 9(3), 138-143. <https://doi.org/10.1111/cdep.12120>
- Pluess, M., & Belsky, J. (2013). Vantage sensitivity: individual differences in response to positive experiences. *Psychological bulletin*, 139(4), 901–916. <https://doi.org/10.1037/a0030196>
- Pluess, M., & Boniwell, I. (2015). Sensory-Processing Sensitivity predicts treatment response to a school-based depression prevention program: Evidence of Vantage Sensitivity. *Personality and Individual Differences*, 82, 40-45. <https://doi.org/10.1016/j.paid.2015.03.011>

- Siegel, D. J. (2007). Mindfulness training and neural integration: Differentiation of distinct streams of awareness and the cultivation of well-being. *Social cognitive and affective neuroscience*, 2(4), 259-263.
- Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: assessing the ability to bounce back. *International Journal of Behavioral Medicine*, 15(3), 194–200. <https://doi.org/10.1080/10705500802222972>.
- Soons, I., Brouwers, A., & Tomic, W. (2010). An experimental study of the psychological impact of a Mindfulness-Based Stress Reduction Program on highly sensitive persons. *Europe's Journal of Psychology*, 6(4), 148-169. <https://doi.org/10.5964/ejop.v6i4.228>
- Takahashi, T., Kawashima, I., Nitta, Y., & Kumano, H. (2020). Dispositional Mindfulness Mediates the Relationship Between Sensory-Processing Sensitivity and Trait Anxiety, Well-Being, and Psychosomatic Symptoms. *Psychological reports*, 123(4), 1083–1098. <https://doi.org/10.1177/0033294119841848>
- Tillmann, T. (2016), The Role of Sensory-Processing Sensitivity in Educational Contexts: A validation study. [Unpublished master's thesis. Ludwig-Maximilians-Universität].
- Weibel, S., Menard, O., Ionita, A., Boumendjel, M., Cabelguen, C., Kraemer, C., Micoulaud-Franchi, J. A., Bioulac, S., Perroud, N., Sauvaget, A., Carton, L., Gachet, M., & Lopez, R. (2020). Practical considerations for the evaluation and management of Attention Deficit Hyperactivity Disorder (ADHD) in adults. *L'Encephale*, 46(1), 30–40. <https://doi.org/10.1016/j.encep.2019.06.005>
- Weikart D. P. (1998). Changing early childhood development through educational intervention. *Preventive medicine*, 27(2), 233–237. <https://doi.org/10.1006/pmed.1998.0280>
- Yano, K., & Oishi, K. (2018). The relationships among daily exercise, sensory-processing sensitivity, and depressive tendency in Japanese university students. *Personality and Individual Differences*, 127, 49–53. <https://doi.org/10.1016/j.paid.2018.01.047>



HS module

Innovative Module
in Human Sciences

Living in times of excessive stimuli, Highly Sensitive People may react 'inadequately' and may be penalised or discriminated against for this inadequacy. They are attributed inattentiveness, impolite behaviour as well as intentional aggression, or treated as weak, unreliable, unsociable and shy. HSP may have difficulties in regulating emotions or expressing them appropriate to the occasion or circumstances. This description, which is insufficient to describe the phenomenon and at the same time too lengthy, shows the complexity and validity of the issue addressed in the handbook for review purposes. It also explains why this issue must be addressed: first of all, it is due to the theoretical background as the handbook is a source of well-structured information that will make it easier for the student to become familiar with the construct and the results of the most recent research in this field. The second reason is pragmatic. The handbook has been developed in such a way that makes it possible to prepare for identification and research on the phenomenon of high sensitivity.

Prof. Katarzyna Markiewicz, WSEI University, Lublin (WSEI)

This is a needed publication, especially in the context of data on the excess of mental health problems among the young population. The search for the specificity of such problems in a specific subgroup is absolutely necessary, especially in the context of matching the needs of broadly understood support.

Prof. Jacek Pyżalski, Adam Mickiewicz University, Poznań (UAM)

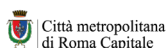
Innovatio Press Publishing House
WSEI University

4 Projektowa Street, 20-209 Lublin, POLAND
phone: +48 81 749 17 77
www.wsei.lublin.pl



Akademia WSEI
WYDAWNICTWO NAUKOWE
INNOVATIO PRESS

ELECTRONIC ISBN: 978-83-67550-04-8



Co-funded by the
Erasmus+ Programme
of the European Union

This publication has been funded with the support from the European Commission (project no: 2020-1-PL01-KA203-082261). This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.