

Parenting Impacts Highly Sensitive Children and Adolescents' Mental Well-being: An Intergenerational Perspective

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Abstract. Highly sensitive person (HSP) is a newly proposed construct related to high level of sensory processing sensitivity (SPS). Highly sensitive individuals are more strongly influenced by environment, showing more plasticity under positive or negative circumstances. While parenting has been found to predict offspring's mental health, factors like personality and temperament are also thought to be moderating the relation between parenting and offspring's outcomes. This paper focused on highly sensitive children and adolescents, and aimed to review researchers' findings about the impact of parenting on their mental well-being, connecting findings from different fields. After introducing conceptual backgrounds, it is concluded that highly sensitive children and adolescents are particularly susceptible to adverse parenting and might have poor mental health. If they are in positive parental environment, better developmental outcomes are also expected. In the mechanism section, this paper synthesized the gene-environment interaction to further explain existing research results. This paper also speculated the intergenerational influence of parenting on highly sensitive children and adolescents. Comprehending the way parenting impacts highly sensitive children and adolescents' mental health is critical for further investigation and application to reduce negative impact on their mental well-being.

Keywords: Highly sensitive person (HSP); Sensory processing sensitivity (SPS); Parenting styles; Children and adolescents' mental well-being.

1. Introduction

Highly sensitive person (HSP) is a rather new construct, proposed by Aron [1] as a subset of individuals with high level of sensory processing sensitivity (SPS). SPS is a heritable personality trait depicting sensitivity to external and internal sensory stimulation. In return, high level of SPS is indicative of HSP. Accordingly, HSP is a group of individuals that are particularly reactive and sensitive to environmental cues, prone to sensory overload, having deep and complex cognitive process [1, 2]. While HSP and SPS were proposed in the end of last century, several concepts similar to SPS has been investigated by researchers in different fields long before and studies are resourceful. For instance, reactivity in temperament, differential susceptibility, physiological reactivity, environmental sensitivity, etc. Parenting could be generally depicted in two dimensions: parental support and parental control. These two dimensions together depict parenting style, which was found to predict developmental outcomes in offspring [3].

Investigating parenting's impact on highly sensitive children and adolescents is meaningful for the following reasons. Firstly, it's found that HSP are more susceptible to environmental factors and tend to develop internalizing problems [2], which also applies for those in early life stages. As a result, focusing on highly sensitive children and adolescents' difficulties and mental needs may be particularly helpful. Secondly, childhood and puberty are two critical periods in terms of physical, psychological and social development. They could have life-long impact on children's personality, mental health, attachment style, etc. This is also a challenging phase for parents, especially for those who themselves are sensitive and susceptible to environmental cues. Thus, understanding the current topic may be useful for intervention and adjustment in parental behavior to have optimal outcome for their children and adolescents, and go through this period smoother. Thirdly, children and adolescents' trait and mental habits are dynamic depending on environment and especially plastic in intimate relationships. Children and adolescents have to spend plenty of time at home and in intimate relationship with their parents. So parenting is a significant and influential component among

environmental factors in this period. The current paper might help to better understand the causes of mental health problems, mental habits and personality.

Multiple studies have found that adverse parenting has especially negative impact on highly sensitive children and adolescents, predicting poor mental well-being [2]. Though this relation has been identified generally, their interpretation paused at the level of physiological feature, which is fairly brief and superficial for a deeper understanding. Since HSP and SPS are new constructs that were referred to by other concepts in previous studies, relevant findings scattered in different fields and such review is needed to integrate them. Thus, this paper aims to complement the gap by composing relevant findings to summarize the relation between parenting and highly sensitive children, explain the underlying mechanism, as well as to speculate the impact in an intergenerational perspective. This review is started with core concepts including HSP and SPS, then focus on the subject highly sensitive children and adolescents. Parenting and its relation with mental well-being is introduced next, followed by the major question, how parenting impact highly sensitive children and adolescents' mental well-being. The process is then interpreted in a gene-environment interaction level. In the next section, evidences are synthesized to support the intergenerational process of the impact. By the end of this article, limitation and future directions are concluded to support future research on relevant topic.

2. Highly Sensitive Children and Adolescents

2.1 Children and Adolescents

In the current paper, children and adolescents refers to individuals in the period between infancy and adulthood, covering the age range from 2 to 19. In this transitional phase, physical and psychological changes occur, cognitive functions and identity develop, issues of emotional separation from parents appear [4]. These could cause difficulty in their relationship with parents. As a result, parents adopt certain parenting style as coping strategies, influencing children and adolescents' behavior and mental well-being in return.

2.2 Highly Sensitive Children and Adolescents

2.2.1 Highly sensitive person

Sensory processing sensitivity (SPS) is an innate trait about environmental sensitivity that varies to different degrees in each person. It's featured with high awareness of environmental cues, strong emotional reaction, deep processing of information, etc. HSP is a group as a subset of people with high level of SPS. The proportion of HSP in the population is speculated as 25%. According to the original proposer of highly sensitive person (HSP) construct [1], HSP is related to individual's level of emotional and sensory sensitivity. HSP tends to perceive and process information broadly and deeply, and have stronger and deeper inner experience when being exposed to external and internal stimuli. To be specific, this could be manifested as being sensitive to pain, hunger, caffeine, art, being observed, subtle changes, people's moods, violence in media platform, and other kinds of sensory input, etc. HSP was found to be susceptible to internalizing problems. They also have strengths such as creativity, aesthetic appreciation, meaningful interpersonal relationship and rich inner life [1, 2]. While HSP may be more sensitive to adverse effects from negative environment, they also benefit more from positive environment [5].

Highly Sensitive Person Scale (HSPS), a Likert type self-report scale, is commonly used to measure individuals' level of SPS [1]. It was further adapted into a variant, Highly Sensitive Child scale (HSC-21), to better measure children and adolescents' sensitivity to environmental impact [6].

2.2.2 Highly sensitive children and adolescents

HSP is genetically based and present at birth, which means this trait is rooted and manifested from infancy, childhood, puberty to adulthood [1]. Children and adolescents' difference in sensitivity to environment has been investigated [6]. This demonstrates that traits of HSP do appear in children and

adolescents. In this paper, this group of HSP are referred to as highly sensitive children and adolescents.

Just like any HSP, highly sensitive children and adolescents show stronger response to environmental cues such as parenting and stressful life events. Studies found that HSP are more susceptible to distress or negative affect. Highly sensitive children and adolescents show more plasticity depending on environment. They have better developmental outcomes in positive environment, and worse developmental outcomes in adverse environment [5].

3. Parenting's Impact on Highly Sensitive Children and Adolescents

3.1 Parenting and Its Relation to Mental Well-being

Researchers concluded two major dimensions of parenting style as parental responsiveness and parental demandingness, or parental support and parental control [7]. Parental support or responsiveness involves the actions and expressions of encouragement, company, love and affection. Parental control or demandingness involves actions representing over-controlling parenting style, such as supervision, monitoring, harsh discipline and strict control. These two dimensions interact with each other to depict parenting style and influence children's well-being. Among four identified parenting styles, authoritative parenting style, high in both responsiveness and demandingness, is linked to optimal outcome for children and adolescents. For example, better performance in aspects of social competence such as autonomy and self-esteem, as well as better mental well-being. In comparison, authoritarian parenting style, permissive parenting style and neglectful parenting style predict unwanted developmental outcomes [3].

Studies found that certain parenting style may predispose children and adolescents to poor mental health. To be more specific, low level of over-protection and parental care is positively correlated with depression, anxiety as well as other mental health problems [8]. Moreover, the developmental outcome of children and adolescents is not one-sidedly influenced by parental environment, genetic factors including personality traits were found to interact with parenting style in predicting outcomes [9]. That is, children with differing personality traits may perceive the same parental behavior differently and represent different effect. Thus, it is speculated that SPS, a component of personality, also have this moderating role in the relation between parenting style and outcomes in children and adolescents.

3.2 Parenting's Impact on Highly Sensitive Children and Adolescents

Research found that parental behavior could lead to different development outcomes depending on children's differing personality traits [9]. Highly sensitive adolescents actively respond to environmental stimuli emotionally, and thus are more strongly influenced by parental environment [1]. Given the differential susceptibility model proposed by Belsky and Pluess [5], SPS acts as a susceptibility factor to enhance the impact HSP perceives from both negative and positive environmental cues. Thus, highly sensitive children and adolescents are more sensitive to both kinds of stimuli. As a result, they tend to develop better outcome under positive circumstances and develop worse outcome in negative environment [5].

Highly sensitive children and adolescents are more possibly to have poor mental health in adverse parental environment. Researchers conducted retrospective research on psychology undergraduates [2]. Questionnaire studies were replicated across four groups of samples to assure reliability and results showed consistent pattern, providing evidence for moderation and causal direction. It's found that highly sensitive children and adolescents are particularly susceptible to adverse parental environment compared with non-sensitive peers. And HSP that experienced adverse childhood have greater possibility to develop negative affect (anxiety and depression) and shyness in adulthood because of this [2]. Similar research also found that HSPs who experienced negative parenting style such as low parental care are more likely to develop internalizing problems and mental health issues [10].

To be more specific, it's found that highly sensitive children and adolescents that were in lack of parental care tend to develop depression after entering adulthood, but the pattern might be slightly different for anxiety. It's impossible to identify this difference because the measure of depression and anxiety was combined, and over-protection and parental care wasn't analyzed respectively in the previous study [2]. Further investigation is required to figure out more specific relation.

Although HSP has been linked with mental health issues [1], in this paper, the relation between HSP and poor mental well-being can't be simplistically drawn considering parenting as an additional variable. The interaction between SPS and parenting suggest that whereas HSP are particularly sensitive to negative parenting, they are not inevitably predisposed to mental health issues unless in adverse parental environment.

4. Mechanism of the Impact

4.1 Inheritability of HSP and Interaction with Parental Environment

According to the Model of Sensory Processing, SPS is predicated on neurological threshold and behavioral response [11]. HSP have high level of SPS, inferring lower physiological thresholds of detecting subtle changes and processing information in the environment. Optimal level theories proposed the "optimal level" of stimuli that is individually different. People experience pleasure when faced with stimuli from low level to higher level, until reaching the "optimal level" point. Then when passing the "optimal level" point and experience over-stimulation, people feel distressed afterwards [12]. HSP have lower "optimal level" and experience pleasure and following distress at a relatively low level. Thus, HSP are easily alerted and could be overwhelmed by less amount of stimulation compared with non-sensitive person. High level of SPS is genetically based and located in neurological system. This inheritability was proven by findings that certain alleles are related to more plasticity in terms of interaction between environment and gene. This plasticity alleles also show cumulative effect. That is, children and adolescents carrying more plasticity alleles are more negatively affected by maternal negative emotions and adverse experience on mental well-being [13]. Recent gene-environment interaction studies focused on dopamine and serotonin genes, related to amygdala specifically. For they are linked to sensitivity to reward and punishment, as well as emotional sensitivity. 5-HTTLPR is a polymorphic region gene associated with serotonin transporter. 5-HTTLPR genotype interacts with childhood adversity to predict mental disorders. Two short alleles (SS) carriers show increase in amygdala's reactivity to emotional stimuli, and are thus more susceptible to adverse parenting, developing depression and anxiety. They also present better mental health in positive parenting context compared with a long and a short allele (SL) or two long alleles (LL) carriers [14].

Yet this biological basis only provides raw material for further development. Genetics interacts with parental environment to shape highly sensitive children and adolescents' developmental outcomes. In this paper, highly sensitive children and adolescents' SPS level interacts with parenting to impact their mental well-being. In terms of parenting, it is speculated that negative parenting style such as low parental care are usually linked with frequent criticism and unacceptance of their children. This could cause sense of insecurity, lower self-esteem and self-efficacy. Thus, children may be more exposed to threatening stimuli during the interaction with parents. As a result, they might have trouble in social adaptation and be predisposed to disordered functioning [15]. Evidence suggests that the impact of negative parenting might be even worse for highly sensitive children and adolescents. The trait of being highly sensitive overlaps with introversion and neuroticism [1], and is associated with high level of anxiety [2]. Introversion is also related to behavioral inhibition, presenting a contemplative cognitive style as well as the habit of reflecting prior to acting [16]. Anxious children may perceive parental harshness as threatening cues in their relationship with parents, causing internalizing problems [17]. Inhibited children may develop depression in adverse parental environment. Because parental discipline would elicit higher fear arousal in children with behavioral inhibition [18]. The same process might also apply for highly sensitive children. Parental rejection,

criticism, physical punishment or other types of discipline might be pronounced in highly sensitive children, causing more unwanted distress and fear arousal. That is, when experiencing harsh discipline, sensory input exceeds highly sensitive children's "optimal level" of stimuli, and thus they may experience over-arousal and the following negative feelings. Unfortunately, the intentional effect of parental discipline can't be realized, only causing negative impact on children's mental well-being. As a result, whereas the importance of using strict and harsh discipline has been emphasized to educate non-sensitive children and adolescents with higher threshold of fear arousal, the same strategy does not apply for highly sensitive children and adolescents with lower physiological threshold. Gentle and mild discipline is sufficient to educate highly sensitive children and adolescents, bringing less sensory input and appropriate amount of fear arousal to gain their compliance. In summary, it's demonstrated in specific interactive ways that highly sensitive children might experience more distress and mental health issues in the environment of harsh parenting.

4.2 Negative Affectivity and Shyness

Though the majority of the aforementioned studies focused on susceptibility to parenting, Aron et al. noted negative affectivity and shyness specifically [2]. Negative affect usually traces back to early life and is strongly related to psychopathology. Thus, parenting is significant for highly sensitive children and adolescents' formation of traits and life-long mental well-being. It is suggested that positive affect tend to be related to current adaptation, while negative affect may be related to adaptation in early life. Individuals experienced adverse event may try to diminish distress through mental processing, such as repetitive thought about the event, and thus forming mental habits. Through repetitive reinforcement, corresponding relation become stronger and predisposition to negative affect and neuroticism is formed. Comparatively, positive experiences wouldn't cause trouble and discomfort, thus less attention and rehearsal are put upon them [15]. This may explain Aron's finding that only HSP that experienced adverse childhood environment are more likely to develop negative affect and shyness. Additionally, the essence of shyness is to withdraw from external stimuli in order to avoid sensory overload. Therefore, it could be regarded as a self-protection mechanism developed by highly sensitive children and adolescents, reflecting their maladjustment to negative parenting.

4.3 Intergenerational Transission

Given the inheritability of high SPS, it could be speculated that highly sensitive children and adolescents' parents might also be highly sensitive. Besides, parenting style is found to be transmissible across generations [19]. Thus, highly sensitive parents' parenting might make up the environment HSP grow up in, which is important in order to further understand the particularity of HSP's parental environment and the interaction in between.

It's found that parenting is particularly difficult for highly sensitive parents, and they tend to adopt authoritarian or permissive parenting styles [20]. Taken together research findings, this inclination to use authoritarian parenting among highly sensitive parents could be interpreted as follows. HSP usually score high in neuroticism, which is related to over-protective, intrusive and harsh parenting [21]. It's explained that coping with their own distress diminishes their capability to interact with children in a suitable manner. Additionally, while empathy makes them keen to notice and respond to children's slightest changes and needs, this sensory overload may also be overwhelming. As a consequence, highly sensitive parents may try to take everything under control in order to gain more certainty and predictability, reducing sensory input. That is, to adopt intrusive parenting style for self-protection [22]. HSP are also related to high level of attachment anxiety [23]. Thus, they are more easily distressed by threatening cues in their partner's behavior in intimate relationship, and the anxiety and insecurity make them occupied with their own attachment demands. As their attention is limited, when focused on threatening cues and their own emotional demands, it is harder to gain information about children' physical and emotional state, which is critical to appropriate social interaction [15]. In this case, highly sensitive parents tend to be distressed when faced with children's

needs, and decrease compassion and adopt authoritarian parenting in return [24]. Moreover, this habit of inappropriate social interaction between parents and children might result in greater chances for children to develop disordered functioning [15]. The opposite case is permissive parenting, letting children loose and staying away from them to reduce sensory input. In brief, though highly sensitive children and adolescents are particularly susceptible to negative parental environment, findings indicate that they're highly likely to experience adverse parenting unfortunately.

Longitudinal and retrospective studies have indicated the intergenerational continuity of both positive and negative parenting styles [19]. Thus, it could be speculated that after highly sensitive children and adolescents grow into adults and become parents themselves, they might probably repeat the negative parenting styles their highly sensitive parents adopted. Despite of this continuity, children's trait and other genetic factors may interact with received parenting and have different outcomes [9], which goes back to the aforementioned SPS's role in moderating the susceptibility to parenting. So far, a continuous loop is formed intergenerationally. That is, highly sensitive children grew up in adverse parental environment may develop mental health issues, and tend to adopt unsuitable parenting strategies when faced with their children. If their children are also highly sensitive, chances are greater that the highly sensitive children may also have poor mental well-being under such adverse parenting.

5. Limitation and Future Directions

Firstly, since HSP and SPS are new constructs that appeared recently, relevant research are not sufficient and require further investigation. For instance, most of the research chose HSP, a general group, as subject, but rarely divide it into groups of different genders and ages, etc. As a result, gender differences in HSP are still controversial and need to be verified. Secondly, most of the studies measured SPS by self-reported scales, where social desirability bias may occur and the accuracy of the results needs consideration. Retrospective studies made subjects recall early life experience to measure their parenting environment. Longitudinal studies are rather rare, but significant to acquire precise information, and thus need to be carried out more. Thirdly, though findings indicate that HSP are more sensitive to both positive and negative environmental influence, most of the studies are focused on HSP's susceptibility to negative impact and problematic development outcomes. It's suggested that future research could tend to favor the positive impact in supportive environment by obtaining and separating the measurement of positive and negative effect. For example, some may be more susceptible to adverse environment, some may be more sensitive to positive environment, and some may be equally sensitive to both or none. Fourthly, integration of resources is expected, because there are various concepts proposed by researchers in different fields, identifying the same thing. Other than SPS, this also includes reactivity in temperament, physiological reactivity, differential susceptibility, etc. Thus, it's meaningful to compare and unify them, associating research findings on similar topics from different perspectives. Fifthly, the demonstration of specific interactive ways in the current paper is based on findings of indirect studies. Gene-environment interaction has been investigated on relevant topics such as interaction between child's temperament and parenting, but such research directly focused on highly sensitive children can't be found. Thus, the specific interactive pattern between SPS and parenting could be a future direction. Sixthly, similar concepts like introversion, shyness and inhibition need to be clearly defined and investigated. Similarities and differences are rather vague in relevant studies. Finally, based on relevant but indirect findings, this paper proposed the intergenerational loop of parenting's impact on highly sensitive children and adolescents. Longitudinal studies across generations are needed to further verify this speculation.

To further demonstrate the fifth point, a few points are worth mentioning. The above gene-environment interaction only provided a general interpretation based on findings selected from indirectly relevant studies. The interactive way between parenting and highly sensitive children might be more complicated considering its gender differences as well as the changeability and suitability (between parents and offspring) of SPS. Firstly, there might be gender differences in the interaction

between highly sensitive children and parenting. Studies found that boys and girls show mean differences in several aspects of the interaction. To be more specific, girls showed higher scores in effortful control and fear, while boys had higher scores in frustration [25]. Though mean differences are found between boys and girls, the existing evidence is not sufficient to find a consistent pattern in terms of gender differences to parenting impact. Secondly, SPS itself is plastic depending on the environment that individuals are in. It's found that children's SPS level stays in context of high and low levels of harshness, while reduces in moderate level of harshness [26]. That is, if faced with moderately harsh parental environment, children who are inherited to be highly sensitive might become less sensitive, and their reaction to parenting may change accordingly over time. SPS might be considered as changeable according to parenting in the interaction process, which could be groundbreaking and require further longitudinal studies to investigate the interactive process. Thirdly, it's suggested that mismatches between parents and children's "optimal levels" of stimuli may cause problems for both sides and require adaptations [16]. For instance, parents who are less sensitive may form a stimuli-seeking lifestyle, while their highly sensitive children may require a living environment with less stimulation and more certainty. Also, non-sensitive parents may adopt insensitive attitude and severe discipline, as well as fail to care for highly sensitive children's unexpressed feelings. This inconsistency may lead to sensory overload for the highly sensitive children and adolescents. As a consequence, parents' SPS level may also need attention when considering the components of parenting. In brief, further research is needed to find more complete and precise interactive patterns, to further understand its causal mechanism behind, as well as to investigate the possible influence in short-term and long-term.

6. Conclusion

This paper introduced conceptual backgrounds about highly sensitive person (HSP), sensory processing sensitivity (SPS) and parenting, then demonstrated parenting's impact on sensitive children and adolescents, as well as its underlying mechanism, and proposed the author's idea in an intergenerational perspective based on relevant findings. In conclusion, due to the gene-environment interaction, highly sensitive children and adolescents are more strongly influenced by parental environment compared with their non-sensitive peers. Thus, they show more plasticity in both positive and negative parenting context, having more extreme developmental outcomes. The key finding could be summarized as highly sensitive children and adolescents are more susceptible to adverse parenting, causing greater likelihood to have poor mental health. It is speculated that this impact is transmissible and continuous across generations to some extent. This review provides theoretical foundation and suggested directions for future research to refer to.

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