

## Sensory Issues in Autism Are Recognised But...

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Unusual responses to sensory stimuli were noticed from the very beginning of the ‘official history’ of autism. Both Kanner (1943) and Asperger (1944) described bizarre reactions of their patients to sound, touch, sights, taste and smell. Creak (1961) included unusual sensory perceptual experiences in the list of core symptoms of autism. Rimland (1964) emphasised the importance of exploring perceptual abilities of autistic children. Ornitz (1969; 1989) described disorders of perception common in autism and extended the notion of a disorder of sensory processing to the notion of sensory and information processing. Delacato (1974) suggested that autism is caused by a brain injury that affects one or more of the sensory channels, which makes brains of autistic children perceive inputs from the outside world differently from non-injured brains. It was hypothesised that unusual sensory experiences were a primary characteristic feature of autism able to account for the basic symptoms of the condition, considered to be essential in the current diagnostic classifications. Thus, abnormal perceptions might give rise to high levels of anxiety, this in turn results in obsessive or compulsive behaviours, social and communication problems, thus making the more commonly accepted criteria, in fact, secondary developmental problems (Delacato 1974).

This pioneering work was neglected for many years. It could be accounted for by the fact that ‘unusual responses to sensory stimuli’ have not been included into official diagnostic descriptions of autism. At best, they were mentioned as ‘secondary characteristics, which are common but *not* essential for diagnosis’. (1)

Though, the syndrome of autism is far too complex a phenomenon to be explained by differences in sensory experiences, sensory perceptual problems do play an important role in autism, and the sensory perceptual theory is worth investigating further.

It was suggested (Ornitz 1969; 1974) that autism may be identified in young children if we look at very specific and easily described behaviours caused by sensory perceptual differences – unusual responses to sensory stimuli. It was noticed that before the age of six, these behaviours were observed with almost the same frequencies as behaviours related to social and communication impairments (Ornitz 1983; 1985 Volkmar et al. 1986).

As sensory perceptual behaviours (“sensorisms”) are not included in diagnostic classification, few empirical studies of sensory difficulties in young autistic children have yet been conducted. There is some evidence from recent research, though, that does indicate that sensory perceptual differences may be among the first signs of autism in young children. (2)

A few years ago, it was possible to start any article on sensory problems in autism with something like this: “sensory perceptual difficulties of autistic people have been ignored”. At present, however, we witness an explosion of articles, books and presentations devoted to this issue. Sensory perception in autism has become a popular subject again, and the sensory perceptual theory of autism is taking shape, incorporating findings from other related fields and producing a framework for studying sensory perceptual differences in autism and their impact not only on behaviours, but also language, cognition and social impairments of individuals with ASDs. What hinders this development, however, is oversimplification of sensory problems in autism by some researchers, reducing them to hypersensitivities. If it

were as simple as that, does it mean that if we identify the hypersensitivities of each individual and adjust the environment /or desensitise him to disturbing stimuli, we would solve all the problems? A short answer is No. Hypersensitivities may merely be the consequences of other sensory perceptual differences, which may include the inability to filter sensory information, monoprocessing, delayed processing and others.

The support of this theory comes from the works by autistic individuals who are willing to share their experiences and identify the main difficulties they face. Thus, characteristics of autism defined as secondary in mainstream research literature seem to be primary for many autistic people. Such features, for example, as unusual responses to sensory stimuli, are often seen as the core description of autism. Besides, from the autistic perspective, these responses are normal (not ‘unusual’ or ‘bizarre’) because they are caused by different sensory perceptual processing.

Many autistic authors consider autism as largely a condition relating to sensory processing (e.g., Gerland 1997; Grandin 1996; Hale 1998; O’Neill 1999; Williams 1992) and suggest that the true deep-rooted cause of all social and communicative problems is of a sensory-perceptual nature (see, for example, VanDalen 1995; Morris 1999). They identify the problems they experience as differences/disturbances in their sensory perception and information processing. Temple Grandin (1996) puts forward a hypothesis that there is a continuum of sensory processing problems for most autistic people, which goes from fractured disjointed images at one end to a slight abnormality at the other.

However, not all autistic people make sensory perceptual issues the cornerstone of autism. One of the reasons is a different interpretation of sensory problems. The confusion may be caused by the common descriptions of sensory difficulties, limited to hypersensitivities – (overresponsiveness) and hyposensitivities (underresponsiveness). In this case, the statement ‘autism is not sensory difficulties’ is absolutely correct. Autism is about sensory *differences*, which are far more complicated than, for example, tactile defensiveness. Autism is about a different development of sensory perception that brings a different development of cognitive mechanisms. Visual thinking, for instance, which is quite common in autism, is the product of this development. While hypersensitivities and ‘defensiveness’ are by-products that should be addressed as soon as they have been detected.

There is a small group of autistic individuals (who have been recently diagnosed, or self-diagnosed) who reject anything negative about autism and aim to re-define autism as a superior condition in comparison to NT-ness. Very few people take them seriously. However, there is a very important point to take into account – not all the differences in perception are dysfunctional and sensory differences are not necessarily problems/difficulties. Some may be interpreted as strengths or even superabilities that can become ‘dysfunctional’ if not recognised by the outside world. No one can guess that their eyes, for example, pick up different signals from the light, shade, colour and movement (Blackman 2001).

Let us take two examples:

- 1). Some difficulties are caused by environmental factors. If a person is hypersensitive to fluorescent lights, his/her ‘dysfunction’ will be noticeable only in the rooms with fluorescent lighting. If it is accommodated, this particular ‘dysfunction’ would disappear.

2). Autistic people have some perceptual abilities that are superior to non-autistic people. The problem is, non-autistic people cannot appreciate them because they don't know these abilities exist! Imagine that you are unable to see the red colour, how could you appreciate the beauty of red roses? If the majority cannot see it, the ability to enjoy the 'redness' becomes useless and... dysfunctional (?).

The recognition of sensory perceptual differences (both strengths and weaknesses) is a new field and, unfortunately, many professionals are unaware about these issues, how to recognise them and what to do about them (Williams 1996).

The qualitative nature of sensory experience should be taken into account. Do people with autism experience sensations the way we do or are their experiences qualitatively different? If they are, what are these differences? Are they always dysfunctional or is the dysfunction 'environmentally-made'? For example:

"If you were being FOREVER forced (at times none too patiently) to do upsetting functions or at times acutely painful ones, just because everybody else does it with no discomfort, AND expects you to be the same; would that make you to be outgoing, and a party personality? *Or*, you turn away from your tormentors, acting as if you were uncomfortable or afraid or possibly frustrated with them?" (Morris 1999).

Bob Morris develops his argument further, showing that attempted use of different sensory perceptual mechanisms by a baby, *without* any help from a perceptive carer to sort out and deal with these differences (both problems and abilities) may aggravate the condition. The earlier the carer understands the differences and accommodate the person via the appropriate intervention, the more likely the individual will become a fully functional, but *significantly different (in talents and thinking)* (Morris 1999).

Autistic children learn very early in life to control their environment, and the amount of information coming in. The timing of the beginning of sensory problems can often explain the different routes of their cognitive, language, communication, social and emotional development.

For example, if the capacity to perceive and interpret information is impaired, no verbal conceptualisation is achieved spontaneously. In this case, the transition from what Donna Williams calls 'sensing' to interpretation and verbal development may be delayed. The developmental blocks (biochemical, metabolic, perceptual, cognitive, emotional, psychological) should be unblocked to free up development; this will bring the beginning of expression through social interaction and communication with others. A lot depends on how consistent and predictable sensory perceptions and information processing are, and how rewarding and comprehensive the new experiences are (Williams 1998).

The problem for many autistic people is that they do not realise that their sensory perceptual processing is different (for instance, Grandin 1996; Lawson 2001; McKean 1994; O'Neill 1999; Willey 1999). A typical thought they might have is:

"There is something wrong with me. I can't do things right. Everyone is mad at me. No matter how hard I try, something goes wrong. Other people can do things I can't. It must be my fault that I'm having so much trouble" (Spicer 1998).

It is no wonder that they are often unaware that they perceive the world differently from the other 99 per cent of the population because they have nothing to compare their perception with (Morris 1999). The first realisation of their differences usually comes in late teens or even later (Lawson 2001; Willey 1999). It may come as a kind of revelation, as well as a blessed relief, when they learn that their sensory problems are not the result of their weakness or lack of character. However, the problem is that people around them are often unaware of their different perceptions, and do not make any effort to accommodate and adjust to these differences:

"Suppose you are colorblind, and cannot distinguish between red and green. You are in a room with other people, all of whom have normal vision. No one – not even you – knows that you are colorblind. Everyone is handed a list of instructions. They are printed in red against a green background. Everyone except you knows exactly what to do. They cannot understand why you just sit there. The paper looks blank to you, and you cannot understand how the others know what to do. Think of how you would feel, especially if the others stared at you, or whispered, or laughed" (Spicer 1998).

As more educators, doctors and parents understand these differences, more children with autism will be helped from their terrible isolation and misunderstanding (which is tantamount to mistreatment) at younger ages (Grandin 1996). It *is* possible to help an autistic child develop his or her potential if the carers work *with* autism, not against it. (However, it does not mean to let the child run havoc because he/she is autistic and this is the way they behave. All children need guidance and supervision.) Besides, learning does not end in childhood. The autistic brain may develop at a much steeper rate than is otherwise expected, even to the point of almost catching up with its non-autistic counterpart (Hawthorne 2002). The environment may either speed up the development or hinder it. In order to help them, we need to know how senses of each individual work and what (voluntary or involuntary) strategies each individual has acquired to function in the environment.

Many autistic individuals seem to have sensory impairments in one or more of their senses. These impairments are different from blindness or deafness and are characterised by differences in perception.

The most common abilities/problems reported by autistic people are:

- *A difficulty to distinguish between foreground and background information (Gestalt perception) – Bogdashina 2003):*

There is much evidence that on a perceptual level many autistic individuals experience the difficulty of distinguishing between foreground and background sensory stimuli. They perceive everything without filtration and selection. This results in a paradoxical phenomenon: sensory information is received in infinite detail and *holistically* at the same time. It can be described as ‘gestalt perception’ – a perception of the whole scene as a single entity with all the details perceived (but not processed) simultaneously (Bogdashina 2003). Autistic people are bombarded with sensory stimuli. They are often unable to filter out information received through each of the senses. They may react to all this bombardment and confusion with certain physical movements which are generally known as stereotyped ‘autistic behaviours’ (Blackman 2001).

Each and every situation is unique. Even the slightest changes in their environment or routine may confuse and upset them. If any detail is changed, the whole scene (gestalt) is different, i.e., unfamiliar. For autistic children to recognise things, things must be exactly the same as they have already experienced. Only then will they know what to do with them (Williams 1996). If something goes differently, they do not know what to do – the gestalt of the situation is different. All this results in fear, stress and frustration. This may explain their dislike of changes and preference for routines (Bogdashina 2003).

On the conceptual level, gestalt perception leads to rigidity of thinking and lack of generalisation. Autistic children can perform in exactly the same situation with the exactly same prompts but fail to apply the skill if anything in the environment, routine or prompt has been even slightly changed. To feel safe, they create gestalt behaviours – rituals and routines. These behaviours bring reassurance and order in daily life, which is otherwise unpredictable and threatening. These rituals may seem long and complicated for outsiders. However, for an autistic person it is *one* act of meaningful experience, and if any part of it missing (for example, a person is prevented from completing a ritual) the whole experience becomes incomplete, unfamiliar and frightening, and the person has to start from the very beginning to get the meaning from the situation.

Autistic children may experience gestalt perception in any sensory modality. A person who experiences visual gestalt has great difficulty in separating a single detail of the scene from the whole picture (without this detail, the whole picture would be different). People with auditory gestalt perception seem to pick all the sounds with equal intensity. They often feel ‘drowned’ in the sea of background noise, and cannot isolate, for example, the words of the person they are talking to from other noises in the room: fans working, doors opening, somebody coughing, etc.

Gestalt perception can account for both strengths and weaknesses of autistic people’s perception. On the one hand, they seem to perceive more accurate information and a greater amount of it. On the other hand, this amount of unselected information cannot be processed simultaneously and may lead to sensory information overload.

- *Fragmented perception*

When too much information needs to be processed simultaneously, very often people with autism are not able to break down the whole picture into meaningful units and so they process only those bits which happen to get their attention (Bogdashina 2003; 2004). For example, where non-autistic individuals see a room, an autistic person sees a door handle, a leg of the table, or a ball under the chair. As autistic children perceive their surroundings and people they encounter in ‘bits and pieces’, they store their individual (and idiosyncratic – a from the non-autistic point of view) impressions of their experiences, which they use later to recognise and define places, things and people. It seems as though autistic people react on parts of the objects as being complete entities in themselves (VanDalen 1995). They use these unconventional definitions of places, things and people to function in their environment. As these definitions differ from non-autistic ones, the carers find the behaviours of their child incomprehensible.

In the context of fragmentation and gestalt perception we should mention a role of attention and how attentional mechanism work in autism. Differences in attentional functioning may be central to many social and cognitive deficits in persons with autism, as efficient attending

is essential to the development of all aspects of functioning. Sensory issues and attentional issues are closely connected and are most likely to be both real and primary. In some cases, one may help to cause the other (Blackburn 1999).

The inability to filter out the information (gestalt perception) and to distribute different amounts of attention may result in increased distraction and overload. Involuntary responses to irrelevant stimuli (fragmentation) interfere with the processing of relevant information. Without efficient filtering and selectivity of attention the child cannot make sense of the environment.

Autistic children are often unable to divide their attention between the object they want and the person from whom they are supposed to ask for it because for many of them shifting attention from one stimulus to the other is a relatively slow process. Another common attentional problem in autism is the failure of autistic children to establish and maintain joint attention, i.e., the ability to attend to the same stimuli as another person. That leads to failure to share experiences. This, in turn, results in the failure to comprehend the meaning of the interaction and hinder social and cultural development. However, overselectivity and narrow attentional focus may be seen not as a deficit but rather one of attentional difference (Lawson 2001).

- *Delayed processing*

As a consequence of fragmented perception autistic people may experience delayed processing. Perception by parts requires more time and effort to interpret what is going on with or around them. It may appear as though they do not feel pain, do not want help, do not know what they are saying, do not listen or do not want. However, by the time some of these sensations are processed and understood, they may be several minutes, one day, a week, a month, even a year away from the context in which the experiences happened (Williams 1996).

- *Hypersensitivity*

Hypersensitivity to sensory stimuli is very common in autism. Their senses may be too acute and be disturbed by stimuli that do not bother non-autistic individuals. For example, certain things they touch may hurt their hands (McKean 1999). They may dislike places with many different noises or lights (e.g., Grandin 1996; Lawson 2001). The fear of certain sounds that hurt their ears may be the cause of many 'challenging behaviours' and meltdowns. Many 'bad behaviours' are triggered due to anticipation of being subjected to a painful stimulus (Grandin 1996).

- *Hyposensitivity*

Sometimes their senses may become dull to the point that they cannot clearly see or hear the world around them or even feel their own body (Hawthorne 2002; Mukhopadhyay 2000). To stimulate their senses and get at least some meaning of what is going on they may wave their hands around, or rock, or make strange noises.

- *Inconsistency of perception (fluctuation)*

Autistic people may be tossed in a sensory maelstrom, so that the sensations may be unbearable one minute and yet completely unfelt the next (Blackman 2001). Fluctuation of the 'volume' of their perception is quite common in autism. The inconsistency of perceiving

information, when the sensations (hence the interpretation of what is going on) are changing day to day, hour to hour, sometimes even minute to minute (McKean 1999) does not help the learning of social and emotional cues from people.

- *Sensory overload*

These and other sensory-perceptual inconsistencies and differences bring sensory overload in situations that would not bother other people. The vulnerability to information overload is one of the distinctive features of autistic individuals, which often goes unnoticed by their non-autistic communicative partners.

If they continue to process all the information coming in, despite their inability to keep up with it, overload sets in. This eventually brings anxiety, confusion, frustration and stress which, in turn, leads to challenging behaviours. Is it surprising that they may lack any interest in being involved in the outside world if the unmodulated and often distorted sensory input overwhelms them and the flood of unwanted information continually assaults their senses (Hawthorne 2002)?

Consciously or unconsciously, they develop their own perceptual styles, in order to cope with unreliable and often painful perception. These styles may be seen as defensive strategies and voluntary or involuntary adaptations and compensations which the person with autism acquires very early in life. As each person's perceptual problems and environments in which they are situated are unique, these adaptations and compensations are very individual. The most common perceptual styles in autism are:

- monoprocessing (Williams 1996)
- peripheral perception.

#### *Monoprocessing*

To limit the amount of information and avoid distortions, fragmentation and overload, autistic people may use one sensory channel at a time, while the rest of the senses are on hold. It brings certain restriction in their perception but helps to make sense of information in at least one sensory modality. Later they learn to switch channels and, though not simultaneously through all the senses, they may still get some meaning of an object, event or situation. For example, the child uses his vision and sees every minute detail with the vibrant and perhaps radiantly brilliant colours, but he loses track of his other senses, so he does not make much sense of the sounds in the background, loses the feel of touch and body awareness (O'Neill 1999).

#### *Peripheral perception*

Another strategy to avoid overload and get meaning from the outside world is peripheral perception. They can often understand things better if they attend to them indirectly, by looking out of the corner of their eyes (O'Neill 1999) or listening peripherally. In this case, it is a kind of indirectly confrontational approach in contrast to a 'normal' directly confrontational one (Williams 1996). The same is true of other senses if they are hypersensitive: the indirect perception of smell, taste or touch are often defensive strategies to avoid overload.

#### *System shutdowns*

Too much sensory overload may result in system shutdown(s). When the person cannot cope with sensory information, he may shut down some or even all sensory channels. Many autistic children are suspected to be deaf, as they do not react to any (even very loud) sounds. Their hearing, however, is often very acute, but they learn to ‘switch it off’ when they experience overload and cannot cope with the rate of incoming information. To shutdown the painful channel(s) they may engage in stereotypic behaviours, or deliberately distract themselves through other channels (for example, touching objects to switch off their vision or hearing) or to withdraw altogether. If this strategy is mastered early in life, they are often reluctant to switch the channels back on again in the fear of painful bombardment of unmodulated, unfiltered stimuli. It leads to self-imposed sensory deprivation that, if not addressed, may lead to irreversible hindrance of development (Bogdashina 2005). In shutting down their sensory systems, they may not receive the stimulation that is required for normal development. Temple Grandin (1996) hypothesises that possibly there are secondary central nervous system abnormalities which happen as a result of the autistic child’s avoidance of input. The initial sensory processing abnormalities with which the child is born cause the initial avoidance. However, the limbic system, which may also have abnormalities is not mature until the child is two years old. The possibility of secondary damage to the CNS may account for why young children in early intervention education programmes have better prognosis than children who do not receive special treatment (Grandin 1996). (3)

Bearing in mind the differences in their perceptions, cognitive mechanisms and adaptive strategies they acquire, their so-called ‘bizarre responses to sensory stimuli’ are ‘normal’ (from their perspective). As non-autistic people cannot see these differences, they do not understand the autistic reaction to often unpleasant or painful stimuli. Stereotyped behaviours are seen by many autistic people as their compensatory strategies to regulate their sensory systems and cope with sensory overload. Unlike the most recent trend to interpret stereotypies as attempts to communicate, it is not always necessarily so. Some do these sorts of things out of frustration caused by being unable to communicate. However, there may be other reasons for stimming, different for each individual and for different situations (Blackburn 1999). Self-stimulatory behaviours may serve several purposes and one and the same behaviour may have different underlying causes. Some examples of different functions of stimming are:

- *defensive*: in order to reduce the pain caused by hypersensitivities or sensory overload;
- *self-stimulatory*: to improve the input in the case of hyposensitivity;
- *compensatory*: to interpret the environment in the case of unreliable sensory information (e.g., fragmentation, distortions)
- *out of frustration*;
- *just pleasurable experiences* that help to withdraw from a confusing and/or overwhelming environment.

When self-stimulatory behaviours are caused by differences in perception and serve as compensatory tools, it is wise to encourage these behaviours (stimms) when they do not result in embarrassment for the autistic individual, or when they do not prevent them from learning. Engaging the child in more sociably acceptable sensory stimulating behaviour such



as swinging on swings or spinning on merry-go-round can help the child gain sensory stimulating information without engaging in less acceptable behaviours. The parent or teacher can use these early 'sensory' sessions to build rapport with the child (Joan and Rich 1999). However, one of the difficulties in interpreting the person's behaviour caused by sensory processing differences, is our own 'normal' sensory function. We have to train ourselves to perceive and understand the world from the individual's perspective. Only then will we join the person 'on his/her territory', in his/her perceptual world. Many autistic children who are considered 'low-functioning' could develop and lead happy and more independent lives if their compensatory strategies were understood, fostered, developed and refined (Williams 1996).

Differences in perception lead to development of different abilities and thinking styles, which are often not taken into account by those who live/work with them.

No two autistic individuals appear to have the exactly same patterns of sensory experience. It is crucial to understand how the qualitative differences of sensory perception associated with autism affect each particular child. The unique characteristics of each person will require unique individual strategies, techniques and environmental adjustments to be implemented – what works for one individual may not only be painful but also harmful for the other. We often do not understand the autistic perspective, the problems they experience and the efforts they make to function meaningfully in the environment. And sometimes our 'treatment' does more harm than good. Teachers and other professionals who work with autistic people need to recognise sensory differences in autism in order to select appropriate methods to work with each individual and adjust the environment to each person's needs.

#### Notes:

(1) Strangely enough, however, when autism is identified in people of the past by analysing the available medical records, the 'sensory symptoms' are described to make the case. For example, a widely recognised case of Victor, the wild boy of Aveyron (the end of 18<sup>th</sup>-the beginning of 19<sup>th</sup> centuries) is full of 'sensory evidence'. Below is just one example out of many:

"The shrillest cries, the most harmonious sounds make no impression on his ear. He shows no awareness of noises made next to him; but if a cupboard that contains his favourite food is opened, if walnuts, to which he is very partial, are cracked behind him, he will turn around to seize them" (Lane 1976 cited in Frith 2003, p.39).

(2) Based on retrospective home video studies the research has revealed that overall, the autistic children showed problems in sensory attention and arousal; they oriented less to visual information in their environments; they put objects in their mouths more often; they needed more cues before they look when someone calls their names; and they pull away from social touch more than other groups of children: normally developing children and children with developmental disabilities other than autism (Baranek 1999). Other 'sensory symptoms' that are more commonly seen in infants with autism than in normally-developing babies or infants with other developmental disorders include lack of responsiveness to certain sounds, hypersensitivity to certain foods, and insensitivities to pain (Hoshino et al. 1982); atypical interest in visual stimuli, overexcitement when tickled, unusual visual behaviours, play limited to hard objects (Dahlgren and Gillberg 1989; Gillberg et al. 1990); unusual reactions to vestibular tasks (Gepner et al. 1995; Kohen-Raz et al. 1992); hand-finger mannerisms, whole body mannerisms other than rocking, and unusual sensory interests (Le Couteur et al. 1989; Lord et al. 1994); watching hands and fingers, and arm flapping (Volkmar et al. 1986); stereotypic behaviours, under- and overreaction to auditory stimuli, unusual postures, and unstable visual attention. The autistic 'sensory symptoms' observed during the first years seem to persist into the second year of life (Adrien et al. 1992; 1993). Autistic toddlers and pre-school children display atypical sensorimotor behaviours (including both heightened sensitivities or reduced responsiveness across sensory modalities, and motility disturbances such as stereotypies) at some point of their

development (Ermer and Dunn 1998; Kientz and Dunn 1997; Rapin 1996). Numerous individual differences, indicating possible subtypes based on different patterns of sensory perceptual problems have been reported (Greenspan and Wielder 1997; Stone and Hogan 1993).

(3) For more detailed description and discussion of sensory experiences and perceptual styles see

[http://www.amazon.com/Sensory-Perceptual-Issues-Asperger-Syndrome/dp/1843101661/ref=sr\\_1\\_3?ie=UTF8&s=books&qid=1198010190&sr=1-3](http://www.amazon.com/Sensory-Perceptual-Issues-Asperger-Syndrome/dp/1843101661/ref=sr_1_3?ie=UTF8&s=books&qid=1198010190&sr=1-3)

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