

Borderline personality disorder and sensory processing impairment

Sensory processing disorder (SPD) is a term advocated by some occupational therapists to describe a range of problems that might be amenable to particular treatment strategies, and has mainly been applied within the fields of paediatrics and learning disability. In this article, the authors investigate whether there could be a common ground between borderline personality disorder (BPD) and SPD and describe an extension of the treatment strategies for SPD to those with BPD in their acute inpatient unit.

Borderline personality disorder (BPD) is characterised by pervasive difficulties with affect regulation, interpersonal relationships and mood states together with impulsivity and aggression (DSM-IV, ICD-10). People with BPD are high users of mental health services, and there is a high rate of destructive behaviours including deliberate self-harm, suicide attempts and abuse of drugs, alcohol and non-prescribed medication. People with BPD are also one of the groups at highest risk of completed suicide attempts with rates of between 8-10 per cent.¹

There has been much interest in the possibility that the forthcoming 5th Edition of DSM (DSM-V) may recognise a condition referred to as sensory processing disorder (SPD). SPD is a term currently used in occupational therapy practice to describe a group of three conditions: sensory modulation disorder, sensory discrimination disorder and sensory-based motor disorder.² Most, but not all, work in this area has been carried out in children, and is concerned with helping those who display over- or under-responsiveness to sensation, or who have particular motor skills disorders.

People with SPD misinterpret everyday sensory information, such as touch, sound and movement. This can lead to behavioural problems, difficulties with co-ordination, and

many other issues. The theoretical basis of treatment was developed by A. Jean Ayres³ and is described by Bundy *et al.*⁴ Such approaches, usually referred to as sensory processing or sensory integration therapy, are commonly used, for example, to help children with developmental coordination disorder (DCD), many of whom also have learning problems, as well as adults with learning disabilities. Children with DCD also often exhibit symptoms that come under the rubric of disorders of attention, motor control and perception (DAMP) as described by Gillberg,⁵ including attention deficit problems and features on the autism spectrum. Thus the concept of SPD, and its occupational therapy-led treatment approaches, has traditionally been limited mainly to paediatrics or to learning disability practice.

There are reasons to consider that SPD may also play a part in BPD. Both may show features of impulsivity, difficulty with affect regulation, and problems with arousal. The approaches generally regarded as best practice in treating BPD, such as cognitive and dialectical behaviour therapy, and work on social skill training, interpersonal effectiveness and mindfulness skills suggests that there could be processes misinterpreting day-to-day sensory information as in SPD.

Some studies have explored the longitudinal course of BPD and potential associations with other childhood disorders such as ADHD and autism.⁶ These reports have generally tried to examine the association historically rather than concurrently, and highlight a need for further research. To date, however, no studies of the possible overlap between BPD and SPD have been reported.

It would be appropriate at this point briefly to mention aetiological issues. It has been traditional to emphasise the importance of attachment problems and emotional trauma in the developmental period as key aetiological factors in BPD. Recently, a more biological approach has been proposed,⁷ but this should not be considered contradictory. There is now much interest in the effects of adverse experiences such as stress both in intra-uterine and postnatal life, on the development of the neuroendocrine axis, and subsequently on arousal and affect regulation.⁸ If there are more obviously biological as well as psychological consequences in later life, incorporating sensory processing into the therapeutic approach may be beneficial.

We could also speculate a possible link using neurobiological dimensions. Some evidence has been found of a lack of neural synchrony leading to emotional dysregulation in BPD clients.⁹ The medial prefrontal cortex (MPFC) provides the top-down feedback necessary for intentional behaviour and motivation by generating multiple options about the outcomes of particular choices. Subtlety of more abstract or 'secondary' emotional states is achieved by fine-tuning those options.¹⁰

Consistent with this view, MPFC lesions in childhood have been found to impair the regulation and interpretation of emotion necessary for the 'higher level' operations of empathy, pro-social behaviour and interper-

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Original research

Borderline personality disorder

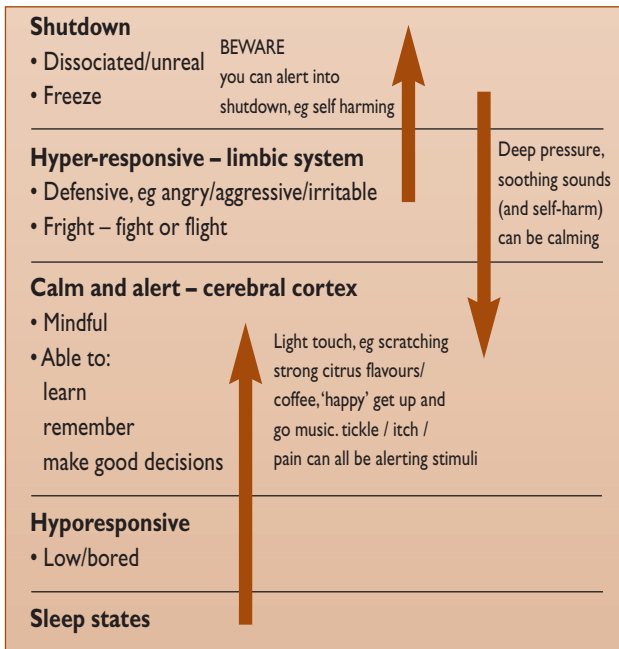


Figure 1. Sensory processing ladder, indicating levels of arousal. ©Kathryn Smith 2002; based on Ayres (1972),³ Williams and Shellenberger (1994),²⁰ and teaching by Bhreathnach (2001)²¹

sonal function in adulthood.¹¹ It has now been shown that adults with BPD have altered frontal networks and disturbed functioning of MPFC.¹² Sensory processing disorder as identified within autism also shows deficits in prefrontal activation. It is suspected that both disorders are associated with additional deficits in integration of posterior parietal networks.

BPD has a large ‘neurosensory’ component to it. Neuroimaging, electrophysiological and neuropsychological studies have shown parietal lobe deficits especially in areas of processing information¹³ and the ability to distinguish between relevant tasks and irrelevant information.^{14,15} This is similar to the pathogenesis of SPD, which has been identified as having deficits in frontal sequencing and parietal circuits that result in impaired sensorimotor integration.

Sensory processing therapy

Sensory integration therapy in disorders like autism is well defined. It is largely used in the field of paediatrics. Most of us unconsciously learn to combine our senses (sight, sound, smell, touch, taste, balance, body position in space) in order to make sense of our environment. Children with sensory deficits such as autism have trouble learning to do this. Sensory integration therapy is a type of occupational therapy that is specifically designed to stimulate and challenge all of the senses with the hope to integrate them better thus providing a better platform for interaction with the environment.

Sensory processing therapy looks at taking sensory integration therapy a step further. It aims to combine functional, cognitive and sensory elements. It provides adult clients with the opportunity to identify for themselves their areas of sensory deficit and draw up their own ‘self-prescriptions or diets’ to help them. Mental health disorder clients, especially BPD clients, have found this to their advantage. It has helped them assimilate their feelings, thoughts and senses better. This then provides them with a more robust platform to understand and participate in the world around them. It then has a knock-on effect of increasing their self-confidence, self-worth and self-esteem.

There is evidence to suggest that sensory integration therapy helps reduce self-harm in children. It is thought that integration of their senses allows them to participate in more creative and self-rewarding activities. Similarly, sensory processing therapy, along the lines of sensory integration therapy, allows BPD clients to constructively restructure their activities and reduces their frustration and anxieties in relation to their day-to-day engagements with the environment. This in turn reduces self-harming behaviour.

Subject	Diagnosis	Registration	Seeking	Avoiding	Sensitivity
1	schizophrenia	29	45	19	19
2	depression and anxiety	25	43	24	32
3	depression and anxiety	29	41	39	33
4	depression and anxiety	40	43	43	37
5	bereavement	46	38	53	37
6	schizophrenia	45	34	40	39
7	schizophrenia	36	31	34	40
8	eating disorder	40	38	52	41
9	schizophrenia	31	48	41	43
10	psychosis	47	28	44	48
11	BPD	32	49	46	49
12	BPD	44	42	50	51
13	BPD with psychosis	27	45	50	53
14	PD with depression	34	32	59	55
15	BPD	35	42	56	56
16	BPD	36	32	62	58
17	BPD	47	40	56	58
18	BPD	49	24	62	58
19	BPD	63	46	62	56
20	BPD	46	45	48	59

Table 1. Diagnosis and sensory domains of the 20 individuals in the study (maximum for each domain 75, minimum for each domain 15)

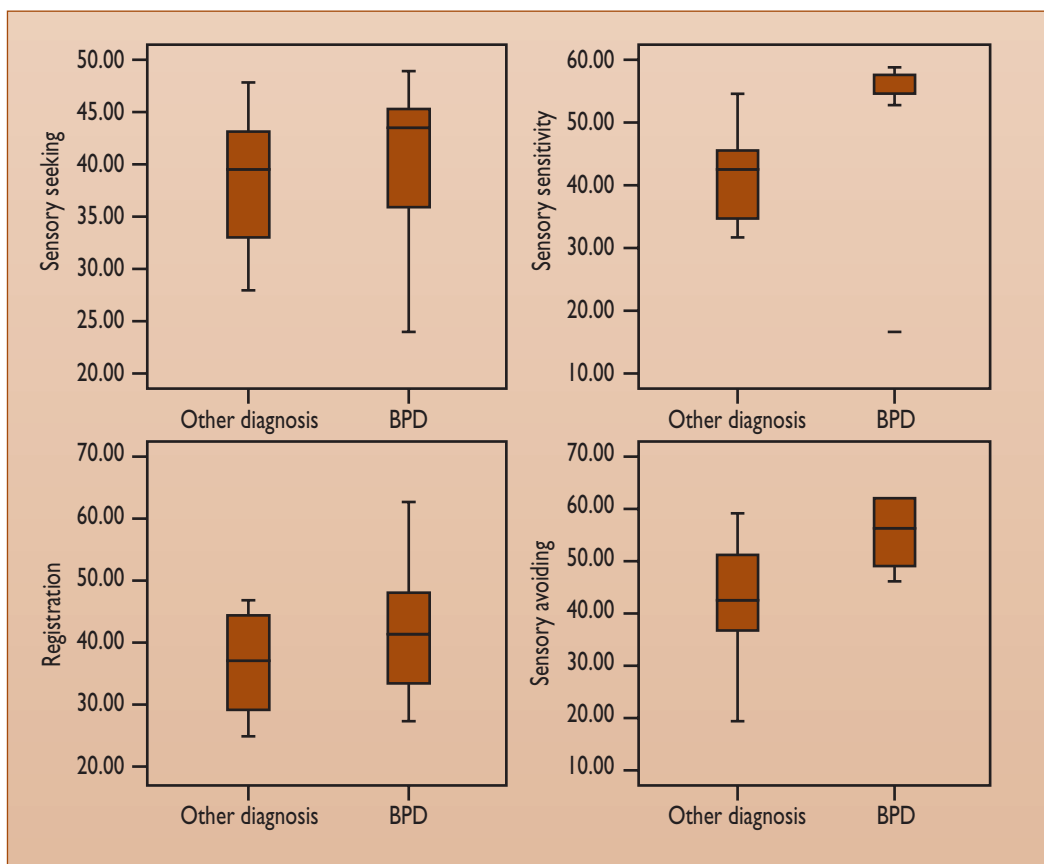


Figure 2. Summary bar plots showing the sensory profiles of the 20 individuals in the study, divided into two groups: on the right, those with the clinical diagnosis of BPD and on the left, all other clients (coloured bars: interquartile range; whiskers: highest/lowest values, excluding outliers; horizontal line across the bar: median)

Sensory processing therapy, as exemplified by the Be SMaRT™ Programme,¹⁶ involves firstly teaching the person about arousal and affect regulation, and carrying out a sensory profile assessment. The sensory choice checklist is used to identify various sensory experiences as being alerting or calming, and these are linked to a sensory processing ladder (see Figure 1).

For some patients who have problems with verbal descriptions or difficulties with discrimination of various emotions, a numeric scale may initially be substituted. Sensory experiences may be classified as ‘alerting-awakening’, *eg* teeth cleaning, ‘alerting-distressing’, *eg* hearing sudden noise, or ‘calming’, *eg* wrapping oneself tightly in a duvet, heavy physical exercise or walking. What

is alerting for one person may be calming for another, depending on individual arousal levels and sensory thresholds. This includes individualised ways of modifying, learning, assimilating and integrating sensory experiences to move between states that are ‘calming’, ‘alerting’, or ‘awakening’ to allow effective communication and social and emotional functioning.

Each person creates a personalised kit of items that they can use to be more effective in modulating and regulating their sensory response. They typically carry this with them, together with a self-written sensory prescription (self-formulation) indicating their sensory preferences and a range of intervention suggestions. This is used to communicate with other people, and

is useful in both social and professional circumstances (for more information on the Be SMaRT™ Programme, see Brown *et al*).¹⁶

An attempt to understand sensory integration therapy and sensory processing therapy could also be made from a neuronal level. It is considered that these therapies reinforce positive change in behaviour and mindfulness by altering the brain pathways by mechanisms of neuroplasticity, *ie* the capacity of neurones to adapt to a changed environment.¹⁷ According to Hebbian learning, presynaptic terminals change in numbers according to usage, and learning experiences strengthen existing neural connections.¹⁸ Thus sensory integration and sensory processing therapy, by their retraining programme for sensory interaction, could be facilitating positive neuronal and brain changes thus altering their cortical ‘map’ and allowing the client to develop at a neuronal level the competencies (or behaviours) required to cope in today’s world.

Our research

Sensory profiles of people with personality disorders

The sensory profile¹⁹ was used to assess a continuous set of 20 individuals (with a range of mental health diagnoses), referred for occupational therapy in our acute inpatient unit. This standardised self-report tool measures four sensory domains, *ie* registration, seeking, avoiding and sensitivity. Each sensory domain has a unique score, which indicates broadly a standard deviation from the normative population scores, as identified by the scale. A clinical review of the diagnoses against the sensory profiles highlighted the fact that clients with a clinical diagnosis of BPD polarised to a subset of both sensory-sensitive and sensory-avoiding (see Figure 2), and these findings are significant when comparing

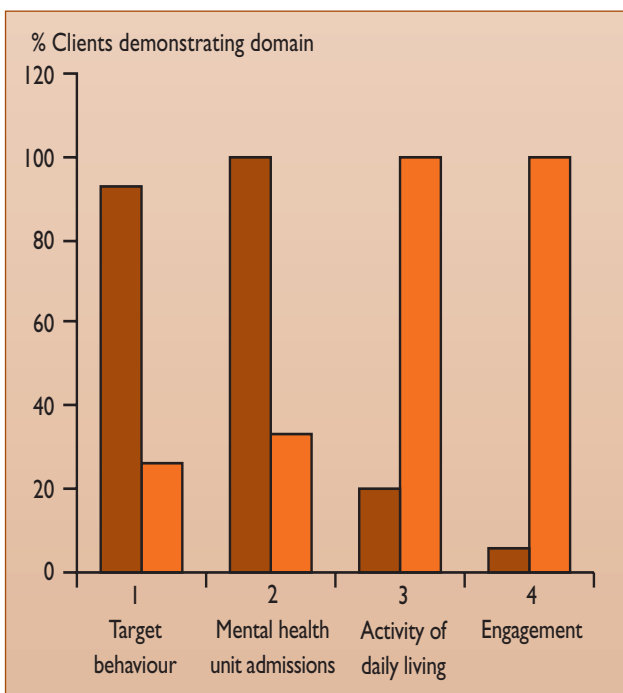


Figure 3. Changes in the 20 individuals pre (brown bars) and post (orange bars) sensory processing therapy (Be SMART™ programme) with regard to outcome domains of behaviour, admissions, activity and engagement

those with BPD to those with other mental health diagnoses. It can be seen in Table 1 that the two individuals with diagnoses of non-BPD personality disorders had profiles similar to the BPD group.

Anecdotal evidence of efficacy

A preliminary audit of the experiences of 16 individuals in our study with diagnoses of personality disorders found that all reported a subjective feeling of being more in control, and not becoming overwhelmed and dissociated during sensory processing therapy sessions. They demonstrated improved understanding and use of personal space and ability to deal more effectively with fluctuating levels of arousal. Of those with a history of frequent inpatient admissions, all showed a reduction in the number of bed-days utilised, in one case dropping from 240 days in the year before treatment to just two days in the year after treatment.

One commented 'When I use the

sensory strategies, I don't phase out of the sessions like I used to'. This was associated with a tangible decrease in a variety of negative behaviours such as self-harm and use of illegal substances and alcohol, and reliance on tranquilising medication. There was reduced use of crisis services including mental health, reduced accident and emergency department attendances and other emergency service contacts, and a reduction in the human resources required for enhanced observations and therapeutic management of aggression and violence. Besides the subjects' self-reports, the therapists and professionals involved considered them to show improvements in interpersonal skills and their ability to manage distress, and overall engagement with therapy, learning and work opportunities.

Figure 3 summarises the changes seen in the 20 individuals in the study pre and post sensory processing therapy. It can be seen that there was a reduction in target behaviour, usually self-harm, a decrease in admissions to mental health units, a large increase in activity of daily living and a large increase in engagement socially and with professionals for therapy.

Conclusion

People with BPD may show features of SPD, especially in sensory-sensitive and sensory-avoiding domains. They share common neurobiological and functional roots. Sensory processing therapy, individually applied, may be beneficial in improving symptoms, and reducing dependence on acute services.

A sensory processing approach can be incorporated and integrated into programmes and inform other modes of therapy including the creative arts psychotherapies (art, music and dance movement) and dialectical and cognitive behavioural therapies. The possibility of adapta-

tion of work environments from a sensory perspective for those who might benefit from it is being explored. There is a need for a controlled study of SPD in people with BPD, and for a controlled trial investigating sensory processing in BPD.

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