SENSORY MODULATION IN MENTAL HEALTH CLINICAL SETTINGS:
A REVIEW OF THE LITERATURE




Te Pou
o Te Whakaaro Nui

The NATIONAL CENTRE *of* MENTAL HEALTH RESEARCH, INFORMATION *and* WORKFORCE DEVELOPMENT

www.tepou.co.nz

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EXECUTIVE SUMMARY

Sensory modulation is a clinical intervention used to support distressed service users in mental health and addiction settings. In New Zealand, there is growing interest in sensory modulation as a way of reducing seclusion and restraint rates in acute inpatient units, and as a general quality of practice intervention across many mental health clinical areas.

This review of the literature has been designed to assist managers, funders and planners, clinicians and researchers to access the extant theoretical and research evidence for sensory modulation usage in mental health settings.
Although the research evidence, in particular, is relatively sparse, there is a small but useful literature that suggests the following.

- Sensory modulation is a useful intervention in a variety of therapeutic settings and can be successfully used by a range of mental health service users. For example, service users with varying diagnoses showed decreased self-harming behaviour, improved interpersonal skills, and a better ability to manage distress.

- The implementation of a positive, person-centred practice in mental health services is paramount for a successful reduction of seclusion and restraint. The literature suggests that sensory modulation may be useful in helping to decrease rates of seclusion and restraint. It is likely that, for change to occur, sensory modulation needs to be part of a range of strategies.

- There is no evidence showing any correlation between correct use of sensory modulation and negative outcomes.

- Certain barriers can exist that prevent a successful implementation of sensory intervention tools. These can be on an organisational, structural and individual level and need to be addressed in a thoughtful manner.

- Strong leadership, comprehensive staff training and prudent planning are key components for a successful implementation of sensory modulation rooms and other sensory-focused interventions.

- There is a need for further research, especially showing relationships between particular sensory modulation interventions and specific clinical outcomes that are positive for service users.

Taken together, the theoretical and research evidence indicates that sensory modulation is a promising mental health intervention. The early evidence (along with New Zealand and overseas anecdotal evidence) suggests that sensory modulation can be clinically useful and has a positive acceptance by service users. There is a small literature indicating that sensory modulation can reduce rates of seclusion or restraint. These studies are promising, but further research evidence is needed across a range of clinical settings to show efficacy in this area.

It is methodologically difficult to isolate sensory modulation's effect in reducing restraint and seclusion. However anecdotal evidence suggests that sensory modulation needs to be seen as one part of a range of clinical delivery that is aimed at producing practice based on principles of least restrictive practice.

It is vital then, that if sensory modulation is introduced in clinical settings, it is supported by standardised training and robust policy frameworks. Interventions should be evaluated for effectiveness, usability and acceptability to service users and clinicians, as these may vary between practice settings.

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INTRODUCTION

Sensory modulation is a clinical intervention that has a long history in a number of clinical settings. In New Zealand, sensory modulation has received a lot of interest from both district health boards (DHB) and non-government organisations (NGOs) as a way to possibly reduce seclusion and restraint, or as a more general quality of practice initiative that supports service users to manage distress.

Te Pou's work in sensory modulation has focussed on both increasing the evidence base for its effectiveness in acute mental health inpatient units, and supporting DHBs to develop training workshops to maximise the likelihood of a safe, effective and sustainable introduction in clinical practice settings.

This document brings together the accessible theoretical and research evidence for the use of sensory modulation. The purpose of this document is (1) to allow DHB and NGO managers, funders and planners, and clinicians an easily accessible summation of the extant knowledge around sensory modulation and (2) to summarise the current literature as a basis for advising on future sensory modulation research directions.

This literature review shows that:

1. Sensory modulation is a useful intervention in a variety of therapeutic settings and can be successfully used by a range of mental health service users. For example, service users with varying diagnoses showed decreased self-harming behaviour, improved interpersonal skills, and a better ability to manage distress.

2. The implementation of a positive, person-centred practice in mental health services is paramount for a successful reduction of seclusion and restraint. The literature suggests that sensory modulation may be useful in helping to decrease rates of seclusion and restraint. It is likely that, for change to occur, sensory modulation needs to be part of a range of strategies.

3. There is no evidence showing any correlation between correct use of sensory modulation and negative outcomes.

4. Certain barriers can exist that prevent a successful implementation of sensory intervention tools. These can be on an organisational, structural and individual level and need to be addressed in a thoughtful manner.

5. Strong leadership, comprehensive staff training and prudent planning are key components for a successful implementation of sensory modulation rooms and other sensory-focused interventions.

6. There is a need for further research, especially showing relationships between particular sensory modulation interventions and specific clinical outcomes that are positive for service users.

A shorter version of this document, *Sensory modulation in inpatient mental health: A summary of the evidence* (Te Pou, 2011) aimed at clinicians, is also available on the Te Pou website.

BACKGROUND

Sensory modulation is a clinical approach that is used to help service users who are distressed and agitated to regain a sense of calm byy using a range of sensory tools to moderate sensory input. In mental health settings, the use of sensory tools is guided by someone (often a clinician or a peer worker) who is trained in sensory modulation as a clinical intervention. In acute inpatient wards service users can use dedicated sensory modulation rooms (called sensory rooms) with sensory tools regularly or when distressed. Once in the sensory room service users choose from a variety of sensory tools for self-soothing. Examples of these tools include weighted blankets for the lap or shoulders that provide a sensation of pressure, massage chairs, audio-visual equipment that uses sound and colour to soothe or more everyday equipment such as rocking chairs, blankets or music.

Sensory modulation tools can also be used outside the sensory room. Service users can use sensory tools in almost any environment. There are many examples of clinicians coaching service users to use the tools in inpatient and community settings, as well as in service users' homes. Service users use sensory modulation techniques if feeling distressed in the community and use items such as music, blankets, aromas, or tactile tools in their own homes.

SEARCH STRATEGY

A search was undertaken on the databases Proquest Nursing and Allied Health, CINAHL, Ebsco Health Data-Bases, Med-line – via OVID, Scopus, Pych-info, using combinations of the terms "sensory modulation", "sensory room", "comfort room"and "weighted blanket" for English language articles. One article (Teitelbaum, Volpo, Paran, & Drumer, 2007) was only available in Hebrew. We were only able to sight the English abstract of this article, but considered the article worthy of including. We acknowledge that the absence of critique of the full content of the article is a possible limitation.

THE ORIGINS OF SENSORY MODULATION

EARLY BEGINNINGS

Very early attempts to transform care in mental hospital settings into being more humane can be tracked back to the UK in 1792 with the moral treatment movement. Four years later, Dr William Turke opened The York Retreat where care was based on fundamental Quaker principles of kindness, trust and respect (LeBel & Champagne, 2010). The treatment was free of physical punishment, no chains or manacles were used. Instead, the emphasis was placed on restoring service users' self-esteem and control while ensuring their physical comfort (ibid). Similarly, in 1839, Dr John Conolly eliminated mechanical restraint use at the Hanwell Insane Asylum in West London within four months by focussing on individualised treatment, emphasising spirituality, exercise and occupation, as well as providing good food, regular bathing and clean facilities (LeBel & Champagne, 2010). These examples are some of the first experiments with individual-centred care and laid the foundations for later efforts of moral treatment and non-restraint approaches. However, it still took another 100 years for the first legislation to be introduced that restricted the use of seclusion and restraint to a large extent in the State of Massachusetts, USA (ibid).

Today efforts continue to reduce the use of seclusion and restraint in mental health settings. Many countries are passing legislation and making efforts to change practice towards a more person-centred approach. One practice change is the introduction of sensory therapies and trauma-informed models of care. Such practices are promoted by a number of health organisations, including the National Association of State Mental Health Program Directors (NASMHPD, 2003), the Massachusetts Department of Mental Health (MDoMH, 2007) and the World Health Organization (WHO, 2007).

THE DEVELOPMENT OF SENSORY APPROACHES

> ***"The integration of sensations provides the foundation for good relations with people."***
> ***(Ayres 2005, 24).***

Sensory approaches first emerged in the 1960s and 1970s in the Netherlands and the United States. Multi-sensory therapy was developed in the Netherlands and first used in the field of learning disabilities and with older people (Baillon et al, 2002). The original term for multi-sensory interventions is 'snoezelen' (now a trademarked term), which is a combination of the Dutch words for 'to explore' and 'to relax'. The concept is based on the idea that people need sensory stimulation in order to optimally function (Reddon et al. 2004). Ad Verheul and his colleague Jan Hulsegge first introduced the concept at the De Hartenberg Centre in 1975 and later installed a permanent 'Snoezelen®' room (Hulsegge & Verheul, 1987).

'Snoezelen®' rooms were first developed as a leisure resource for people with severe and multiple disabilities for whom most recreational activities were unsuitable and who were often living in institutionalised care settings that provided little stimulation (Baillon et al, 2002). Conventional therapies for these clients were often unsuitable because they placed expectations on them that were potentially beyond their abilities. Service users with profound learning disabilities usually have little control and choice in many aspects of their lives. Multi-sensory therapy as provided in multi-sensory rooms is a way that allows individuals to experience a relaxing and stimulating environment that is failure-free because there is no expectation of performance or task orientation. The Snoezelen® room is a specially equipped room with high-tech installations that include music, light or fibre optic strands, calming image projections, vibration or bubbles tubes, and soothing smells (Teitelbaum et al. 2007). Here, individuals can choose, explore and enjoy the unpatterned visual, auditory, olfactory and tactile stimuli around them while feeling safe, relaxed and in control (Baillon et al., 2002). An important difference between Snoezelen® rooms and sensory rooms used in acute mental health settings is that the former tend to use high-tech equipment, while the latter tend to use more readily available equipment, much of which service users can later utilise in their own homes.

In the United States, occupational therapist and development psychologist Dr A. Jean Ayres first developed her theory of sensory integration when studying children's development (Watling 2006). Ayres defined sensory integration (SI) as the neurological process that organises and integrates sensations from the body through the sensory systems and enables the successful interaction with the environment (Sabarre, 2007). This promotes the development of skills within the environment, as well as socialisation and emotional well-being (Watling 2006).

Ayres' theory provides the basis on which later theorists have built. Today, the use of sensory approaches is no longer limited to paediatrics. Based on the recognition that "humans are sensory beings and sensation is inherent in all occupations" (Watling et al. 2006, 1), occupational therapists are now applying sensory approaches to a variety of client populations (Wilbarger & Murnan, 2006). For example, sensory approaches are now commonly used for adult learning disabilities, dementia care, children with special needs, maternity, and management of chronic pain, adult psychiatry, stroke and traumatic brain injury (Baillon et al., 2002).

THE THEORY OF SENSORY MODULATION

> ***"After individuals become aware of their preferences, they become better able to purposefully organize their environment, develop strategies necessary to respond to these preferences, and make the necessary environmental and personal sensory adaptations." (Champagne & Stromberg 2004, 37)***

The concept of sensory modulation describes the ability to regulate and organise one's responses to sensory input in a "graded and adaptive manner" (Miller et al. 2001, 57), which individuals normally do on an everyday basis. However service users with "trauma histories, mental illnesses, or addictions, or who have developed behaviour patterns, are sometimes unaware of their particular sensory needs or stress responses" (Champagne & Stromberg 2004, 38). Their ability to regulate their response to the sensory input they receive might be diminished and result in over- or under-reactions to certain stimuli. In mental health settings, sensory modulation may enable service users to develop more adaptive responses (Champagne 2003).

This approach is captured in the concept of 'sensory diet' that was coined by Wilbarger in 1984 (Champagne & Stromberg, 2004). The assumption is that everyone is modifying their sensory experiences automatically during the day to fit their specific sensory needs and complete the tasks at hand. For example, waking up and getting ready in the morning, staying alert during the day, relaxing in the evening, and calming down before bedtime are different sensory states that individuals seek often without consciously thinking about it. A 'sensory diet' can be specifically developed in regards to an individual's response to certain stimuli and help to manage arousal and/or relaxation.

The understanding of the orienting effects of different sensory stimuli for the needs of different service users is central to the development of individual 'sensory diets'. It is important to understand that individual responses to stimuli are not the same. What is soothing for one client might be alerting or even triggering for another. However, the aim is often to find alternatives to harmful self-stimulating behaviour such as self-injury or as a way to manage distress (Champagne & Stromberg 2004). The development of a 'sensory diet' can be part of an individual's crisis prevention plan in inpatient psychiatric units and help de-escalate service users in moments of crisis. Stromberg et al. (2004, 40) give an example of a woman with a history of self-harm who found the use of a weighted vest helpful in dealing with critical states. She called the vest a "bullet proof" vest in which she could not be harmed by others. The feeling of safety helped her to stay in control and avoid escalating to the point where seclusion/restraint would be used on her.

The theory behind sensory approaches is that they are innovative methods that go beyond traditional psychiatric treatment (Champagne & Stromberg, 2004). They are thought to be helpful for service users because they provide strategies to avoid or minimise crises, are supportive to the individual and promote self-organisation. As such they are situated in trauma-informed and recovery oriented models of care that favour collaboration over force.

SENSORY MODULATION IN MENTAL HEALTH SERVICES: THE THEORY

> ***"Sensory approaches strengthen the therapeutic relationship, promote collaboration and recovery, and are fully applicable across age groups, mental health settings, and consumer populations." (Champagne & Stromberg 2004, 42).***

The use of sensory rooms for people in acute mental health wards was pioneered in the United States by occupational therapist Tina Champagne in the early 2000s. Even though Snoezelen® and other sensory approaches had been used

earlier, the increased application to adult inpatient acute mental health and forensic settings was a relatively novel development (Champagne, 2003).

The creation of sensory rooms is connected to the movement within mental health services towards collaborative and individual-based care and away from restrictive measures. It is closely related to principles of trauma-informed care and positive recovery models that emphasise hope and personal strength rather than pathology (Huckshorn, 2004).

TRAUMA-INFORMED CARE AND SENSORY MODULATION

> ***"The effects of traumatic life events, characterized by subjectively perceived threats of harm, have begun to be clearly defined and linked to stress disorders, poor treatment outcomes and personal distress." (Huckshorn, 2004).***

Sensory approaches are closely related to trauma-informed care models that are recovery oriented. One principle of trauma-informed care assumes that all behaviour is meant to be adaptive, no matter how unusual it might be (MDoMH, 2007). Neuroscience tells us that our behaviour reflects our brain development which is shaped by attachment and environment (Shonkoff & Phillips 2000). Traumatic experiences can influence brain development in a negative way and are linked to the development of mental illnesses later in life (Champagne 2006, Champagne & Stromberg 2004; MDoMH, 2007). It is estimated that between 51per cent and 98 per cent of mental health service users have been significantly traumatised in the past (Champagne 2006; Mueser et al., 1998). The prevalence of trauma (i.e. exposure to physical, sexual or emotional abuse, or other forms of violence) is especially high among service users with severe mental illnesses (Champagne & Stromberg 2004). These harmful experiences might lead to the development of behavioural patterns that were useful survival strategies during the time of traumatisation but are perceived as maladaptive and no longer useful in daily life situations. The connection between traumatic experiences, neurological processes and behaviour needs to be considered when working with service users in mental health settings.

Trauma can manifest in different ways and symptoms of traumatic disorders are not always obviously related to the traumatic event(s) (MDoMH, 2007). Seemingly unadjusted behaviour can often be unravelled when the underlying 'trauma logic'[1] that informs the action is taken into account. Knowing what stimuli trigger stress responses is part of trauma-informed care and can be achieved by assessing service users' experiences of trauma upon admission (Champagne & Stromberg 2004). Subsequently, the development and use of clinical tools such as crisis intervention plans can help service users to work with clinicians to avoid and mitigate crises (MDoMH, 2007).

For service users, learning about their own sensory preferences and reactions to certain stimuli is empowering because they can develop useful strategies for dealing with perceivably stressful situations, activities and people

[1] "Trauma logic" is the learnt assumption that nothing good is going to happen and no one can be trusted (MDoMH 2007). It seems to be inevitable that something bad will happen and traumatised individuals will develop coping strategies that allow them to feel more in control over this inevitability. For example, seeking out explicitly sexual and dangerous situations as an adolescent can be a reenactment of sexual abuse during childhood. The adaptive purpose of this behavior is to control the timing and circumstances of the sexual exploitation that is thought to be bound to happen anyway.

(Brown 2001). This self-knowledge enables service users to exert more control over their environments in ensuring that those match their sensory preferences. Some mental health settings can evoke anxiety and negative reactions to service users with trauma histories because they might perceive the "often chaotic and complex treatment environments" (Champagne & Sayer 2003, 3) as unsafe. In these cases, retreating to a relaxing and safe environment as provided by the sensory room can have a calming effect for the client (Champagne 2006; Champagne & Sayer 2003).

SENSORY MODULATION AND *LET'S GET REAL*

Let's get real is a quality framework (Ministry of Health, 2008) that takes a service user-centred approach to describe the essential skills, knowledge and attitudes for those who work in mental health and addiction services in New Zealand. Evidence is limited as yet for the use of sensory modulation in acute mental health. However, as a practice it reflects a service user-centred approach which is currently promoted as best practice in mental health and addiction services. The first skill in the framework, 'Working with service users', emphasises the need to engage meaningfully and work in partnership with those who use services. The early research evidence suggests that sensory modulation supports effective engagement and therapeutic relationships between clinicians and service users.

Proponents of sensory modulation argue that effective communication and relationship building are essential to successfully introducing sensory modulation rooms in hospitals (LeBel, 2005; D'Orio, 2007; Barton, 2009). Champagne (2008) has found the 'therapeutic use of self' to be the most important tool in sensory modulation practice including the elements of voice, approach, body language, body positioning and sincerity. These elements are part of creating and maintaining a 'therapeutic alliance' between the practitioner and the service user. Trust and authenticity go hand in hand.

Happell and Koehn (2010b) found that episodes of seclusion and restraint can have a negative impact on the relationship between service users and nurses because service users can feel re-traumatised and punished by these practices. On the other hand, some research suggests that sensory modulation may be helpful in building meaningful relationships between the clinician and the service user. This may be in part due to clinicians being able to proactively offer an intervention that is seen as affirming and therapeutic, where they are present to specifically learn about and support the service user preferences (Baillon, 2002; TePou, 2010).

As part of building a rapport with service users *Let's get real* requires clinicians to understand and be mindful of the effects of trauma and abuse on people's lives when practicing the principles of trauma-informed care. Trauma-informed care, as discussed in this document, is a key principle motivating the use of sensory modulation. A significant percentage of service users have substantial histories that involve trauma and certain environments can trigger fear and negative reactions in these individuals (Champagne and Stromberg 2004; Champagne 2006). Trauma assessments are therefore often part of sensory modulation practice and used in the design of sensory approaches. Personal safety forms also collect information that is trauma-informed, and therefore using personal safety forms is likely to be a useful clinical practice.

THE EFFECTIVENESS OF SENSORY ROOMS IN MENTAL HEALTH WARDS?

Research providing clinical confirmation of the benefits of sensory modulation in mental health wards remains sparse despite the plethora of anecdotal evidence that support its beneficial therapeutic effects. However, there is one United States-based study undertaken by Champagne and Sayer in 2003 that assessed whether the use of a sensory room could reduce perceived levels of distress for service users in a locked acute psychiatric unit in a small community hospital. Other research in this area includes a study by Teitelbaum et al. (2007) that looked at the effects of 'Snoezelen®' rooms in a closed psychiatric unit in Israel as well as the work of Knight et al. (2010) and Reddon et al. (2004). All four studies support the use of sensory approaches for these therapeutic settings.

Champagne and Sayer (2003) asked forty-seven service users in a locked acute psychiatric unit to self-rate their distress before and after using the sensory room. The sessions given in the sensory room varied in their content and also included education and training. Common treatment forms involved the general exploration and use of the environment in the room, self-soothing exercises, progressive relaxation exercises and deep breathing, distress tolerance activities, and sensorimotor training.

The results of the study were very positive and showed significant positive effects for service users of varied ages, diagnoses and levels of cognitive ability. Overall, the use of the sensory room and sensory-based treatment approaches by skilled staff induced a positive change in levels of distress for eighty-nine per cent of the participants. Ten per cent reported no change and only one per cent reported a negative change in self-perceived stress levels. Interestingly, the amount of change in perceived levels of stress was the greatest amongst individuals that reported the highest levels of stress before using the room. This indicates that the sensory room is a useful crisis intervention tool for service users in acute distress. Additionally, the number of restraints in the unit was reduced by forty per cent during the year of the study which further supports the use of sensory modulation in mental health wards. However, due to the limitations of the study, this decrease might not be solely caused by the sensory room.

Teitelbaum et al. (2007) reported similar results. Their study examined the effect of 'Snoezelen®' sessions on agitated service users in a closed psychiatric ward. Snoezelen® is a 'multisensory environmental intervention' that combines sensory integration theory with client-centred care. A Snoezelen® room is a high-tech multisensory environment that provides different stimuli such as music, light projections and pleasant smells designed to relax and engage the senses. They are comparable to sensory rooms but have often more specialised equipment such as lightened fibre optic strands and vibrating bubbles tubes. The findings showed that after 30 to 40 minutes of Snoezelen® distressed service users reported substantially lower levels of distress than prior to the sessions. The authors also observed that the participants appeared less agitated and displayed less aggressive and hostile behaviour. Similar to Champagne and Sayer's study (2003), the number of seclusion or restraint incidents occurring in the closed male section decreased since the introduction of the Snoezelen® interventions. This reduction was statistically significant when compared to the closed female section where Snoezelen® had not been used. Teitelbaum et al. (2007) conclude that Snoezelen® is a useful preventative measure and innovative alternative to seclusion and restraint. Its benefits include not only a calming effect for aroused service users but it also gives them a feeling of dignity, initiative and freedom of choice. Additionally, episodes of seclusion and restraint and their duration can be reduced with this intervention which has positive effects for service users and staff.

In a similar study, Reddon et al. (2004) examined the effectiveness of Snoezelen® multi-sensory stimulation treatment with 50 psychiatric service users and 50 hospital employees. The participation in a single 20-minute session had significant positive psychological effects on both groups. After the treatment, participants felt sleepy, passive, relaxed, calm and comfortable and reported to be more cheerful, focused, and optimistic than before.

Knight et al. (2010) also highlighted the positive notion of individual choice that is inherent in multisensory-based therapies. Their study explored whether sensory interventions could successfully reduce acute psychiatric symptoms in general and geriatric populations. It also evaluated the effectiveness of both sensory-based and traditional models of intervention. The authors noted that "most individuals in the traditional intervention group chose one-on-one staff contact as an intervention (n = 14), and seven chose quiet time or a decrease in stimulation. Other interventions used less frequently included self-release lap belts and increased supervision. Those in the sensory intervention group most often chose music (n = 6), items that could be squeezed or manipulated (n = 6), rocking chairs (n = 4), visual activities (e.g. fish tanks, calming videos)" (p.22). For the comparison, a Brief Psychiatric Rating Scale (BPRS) with 18 symptoms of psychiatric disturbance was used to compare pre- and post-intervention scores of service users in an inpatient psychiatric unit. Interestingly, sensory-based and traditional interventions turned out to be equally effective in managing psychiatric symptoms. All individuals showed reduced symptoms within 30 minutes of initiating any nursing intervention.

The main benefit of sensory focused interventions over traditional interventions, however, lies in the empowerment of individuals in their management of symptoms when using sensory-based strategies. Enabling service users to better cope with complex illnesses/distress by finding ways to calm themselves and redirect attention from intellectually-based activity to a sensory one reduces the need of medication and sends an important positive message of recovery. It is also argued that giving service recipients some degree of control over their situation improves the safety of the therapeutic environment substantially because it helps to reduce the factors that can lead to incidents (NASMHPD, 2000). Here, trained skilful clinicians are needed, who know how to promote choices and modify interventions suitable to the person.

The above-mentioned studies provide clinical evidence for the effectiveness of sensory modulation. Overall, the literature is supportive of sensory interventions and recognises that they are at least as effective as traditional methods and better than no treatment (Sabarre, 2007).

Only one study (Cummings et al., 2010) has remained cautious in recommending sensory modulation as an intervention tool for selected high-risk service users who require the highest level of security and complex psychiatric services and are disproportionately often subjected to restrictive measure use. For these service users, sensory modulation was not found to be effective. Apart from this specific exception, however, the study supported the use of sensory modulation as a useful intervention for the majority of service users. This finding is in line with Baillon et al. (2010) who suggested that not all individuals like or benefit from multi-sensory therapy and that individual responses can vary on different occasions. Some service users might become more agitated or confused and reactions to different stimuli are not always straightforward. Like other therapeutic interventions, sensory modulation needs a skilled introduction but does not guarantee a positive response in every case.

Additionally, studies (Baillon, 2002; Te Pou, 2010) have reported that sensory therapy helps with the building of positive therapeutic relationships between service users and staff because the sessions enable an empowered and trusting encounter outside of the busy daily demands of the wards. This 'quality time' with a person is also thought to raise staff morale and to reduce staff burnout (Morrissey & Biela, 1997; Baillon, 2002). Overall, sensory interventions were shown to be effective methods that are helpful for individuals in inpatient psychiatric settings, provide useful alternatives to traditional interventions, and enhance the overall quality of mental health services.

A NEW ZEALAND EXAMPLE

After implementing sensory modulation only one year ago, an acute mental health ward is celebrating the interventions contribution to reducing the use of seclusion and restraint episodes. In a recent interview with one of the senior clinicians involved in implementing sensory modulation at the DHB, the intervention was described as an extremely valuable way of helping service users to feel calmer when they are experiencing distress or anxiety. Sensory modulation is being delivered predominantly in a dedicated sensory room located in the inpatient unit and utilises tools such as weighted blankets, aromatherapy, massage oils and lava lamps. The clinician describes a visible decrease in service users' level of arousal after being in the room after only a short period of time, and that being more relaxed enabled them to speak more openly with staff about the issues underlying their distress.

> *'You can see within in minutes if people are responding well, you see people physically calm down. And often they are people that may not have been able to communicate about too much because they've been so distressed or anxious. And then it's amazing, within a matter of minutes once they might have a weighted blanket on their lap or use some aromatherapy, and just be in the sensory room. And all of a sudden just start being relaxed enough to just talk about how they're feeling and what's going on and open up completely about things they may not have been able to share previously.'*

Since being introduced in 2010, sensory modulation is one of several strategies being successfully used by the DHB to reduce the frequency and duration of seclusion and restraint episodes. During the interview, the clinician illustrated her experience of using sensory modulation with one particular service user. The case involved a young male with a history of being physically and verbally abusive towards staff. The serious nature of these outbursts meant that seclusion was often seen as the only option; however his regular requests to stay in seclusion rather than return to his bedroom prompted staff to question whether he might be intentionally seeking out isolation. When a sensory profile assessment was conducted with the service user, it was revealed that he was strongly sensory avoidant, as he felt calmer in low stimulus environments and preferred being alone when he was feeling distressed. Armed with this information, the various tools offered in the sensory room were explored with the service user. It was quickly discovered that weighted blankets or a material wrap placed tightly around his body were effective ways of decreasing his arousal level. Consequently, the service user was given a wrap that he could put on and tighten as required around the ward as a way of self-regulating. What this achieved was a marked reduction in seclusion episodes for this individual, which counted toward the overall reduction in seclusion episodes across the whole ward. The clinician elaborated on this case by explaining:

> *'What we explored through doing that was when he is feeling distressed or having difficulties with his symptoms that he needs low stimulus and needs to be away from other people. So we used to use the sensory room and he responded really well to weighted blankets and wraps. Though he didn't like to be around other people he responded really well to deep pressure and low stimulus. That was a big turning point for him. We gave him wraps and you'd often see him, he'd be having his wraps on his shoulders for most of the day and every now and then you'd see him tighten it when needed. For him to be able to self-regulate like that was just fantastic - and for staff to be able to see that as well. So staff then noticed if he didn't have his wrap on him, because sometimes other clients quite liked it, so they would offer. If they ran out they would come and ask me 'we need another wrap' or 'we need some more blankets'.*

The significance of staff seeing the effectiveness of sensory modulation first hand has meant the intervention is now being regularly offered as a front-line treatment ahead of other methods such as PRN medication, seclusion or restraint. One of the strengths of sensory modulation is that it teaches transferable skills that service users can use on their own around the ward and even after they are discharged. The service user young man with the wrap is a case in point:

'And then he took that to his support accommodation to where he was living, and started using it there to the point where staff there have been asking about sensory modulation and wanting some training in it.'

THE EFFECTIVENESS OF SAFETY TOOLS AND SENSORY INTERVENTIONS OUTSIDE OF SENSORY ROOMS

Safety tools take the form of a brief questionnaire that clinicians complete with service users to determine the latter's stress triggers and warning signs. One study (Lee, Cox, Whitecross, Williams, Hollander, & Yitzchak, 2010) examined the effectiveness of sensory tools when used outside of sensory rooms. The results indicated a decrease in seclusion use for service users who had previously had a high level of previous seclusion. Similarly clinicians found that the tool assisted in managing potentially aggressive service users and most (76 per cent) said it should be incorporated into routine unit practice.

From the safety tool assessment came clinical interventions to help service users gain a sense of calmness when distressed. Service users reported the most common calming strategies as playing and listening to music. Other helpful interventions included art making, shower, weighted blanket, aromatherapy, taste such as chocolate and coffee. Exercise (walking, basketball) and self-soothing strategies (meditation, breathing) were also important as was spending time talking to and being calmed by staff. The authors noted that "the capacity for staff to spend time engaging therapeutically with service users is therefore critical to assist in identifying and intervening early with potentially aggressive service users … to break the cycle of escalating aggression in a way that is consistent with service users' preferences" (pp. 88-89).

WEIGHTED BLANKETS

Weighted blankets are often an integral part of sensory modulation interventions in mental health settings. They are used both independently and as a tool in sensory rooms (Champagne 2010b; Cummings et al 2010; Dorman 2009; Knight et al 2010; Le Bel and Champagne 2010; Lee, and Cox, et al. 2010; MacDaniel 2009; Reichow et al 2009; Te Pou 2008a; Te Pou 2008b; Vanelle 2009).

The therapeutic use of the weight has been utilised and explored by occupational and physical therapists (rehabilitation professionals) for many years. Occupational therapists using a sensory integrative approach first utilised and promoted the use of weighted vests and weighted blankets with children and adolescents with learning disabilities and pervasive developmental disorders (Champagne and Mullen et al 2007). The use of weighted blankets has been increasingly employed in acute mental health care settings for crisis intervention, preparatory purposes, and as a purposeful activity, which appears to help the individual nurture, soothe, and care for themselves (Mullen and

Champagne et al 2008). The goal is for the blanket to facilitate moving into and being in the lying down or seated position (Champagne and Mullen et al 2007). When used in this way it is considered a sensory modulation treatment tool aiding in the stabilization and recovery process (Mullen and Champagne et al 2008).

Until recently there has been no published research on the safety or effectiveness of the therapeutic use of the weighted blanket. However, anecdotal accounts have repeatedly suggested that when used in an individualised manner, the weighted blanket appears to facilitate the ability to feel safe, comforted, and grounded in the world (Mullen and Champagne et al 2008). In addition, there has been a growing body of research supporting the use of deep pressure stimulation , 'a form of touch pressure applied to the body providing the feeling of a firm hug, holding, swaddling, or massage' (Moore and Henry 2002, p. 67), for a variety of therapeutic purposes. One of the qualities offered by the weighted blanket is deep pressure stimulation.

Two recent collaborative research studies conducted into the efficacy of weighted blankets as a sensory modality have made results available (Champagne and Mullen et al 2007; Mullen and Champagne et al 2008). In both studies guidelines were followed to ensure that the use of the blanket was self-controlled and not forced (Champagne and Mullen et al 2007). A literature review of inter-disciplinary research was conducted before this research began to identify potential safety considerations and the varied goals identified for the use weighted and pressurised garments (Parr & Champagne, cited in Champagne and Mullen et al 2007). Some of these considerations included diagnostic considerations; trauma history; respiratory precautions; cardiac/circulatory precautions; vital signs influence; skin integrity including open wounds or fragile skin; any lifting precautions and orthopaedic considerations including broken or fractured bones (Champagne and Mullen et al 2007).

The first study (Mullen and Champagne et al 2008) explored the safety and effectiveness of the use of a 30lb weighted blanket on 32 adults in a heterogeneous, non-hospitalised volunteer sample. The results showed that when used in a lying down position, the weighted blanket is safe when measured by vital sign metrics. Data demonstrating effectiveness showed that 33 per cent of participants experienced a lowering in electro-dermal activity; 63 per cent reported lower anxiety after use and 78 per cent preferred the weighted blanket as a calming modality.

A second study was completed at an acute inpatient behavioural unit of 30 volunteer adult participants. This study found that the weighted blankets are safe to use in the adult population from vital sign measures used. Data showed that 43 per cent of participants had a significant reduction in skin conductance with the 30lb blanket as compared to not using the blanket. Fifty one per cent reported a reduction in anxiety after using the blanket and 77 per cent reported a preference for the weighted blanket when using a self-determined amount of weight. None of the participants in this second study required the use of restraint or seclusion throughout admission. Several participants had a history of restraint during previous admissions. In both studies, weighted blankets were found to be warm, comforting, relaxing and calming to many of the participants (Champagne and Mullen et al 2007).

In addition to this research, recent doctoral research has been completed on competency training in the use of weighted blankets (Champagne 2010b); and design of therapeutic devices (including weighted blankets) for people with mental illness and pervasive developmental disorders that incorporates ongoing research into the efficacy of these devices (Mullen 2009).

IMPLEMENTING SENSORY ROOMS IN MENTAL HEALTH WARDS

> ***"The … initiative to decrease the use of seclusion and restraint in inpatient psychiatric programs requires exploration and implementation of a range of innovative interventions." (Champagne & Stromberg 2004, 42).***

Despite the reported positives of sensory therapy and the growing interest in its use in mental health wards, some barriers continue to exist that seem to prevent a wider adoption of sensory rooms as a standard feature of mental health services. In the following section, examples, challenges and possible strategies for the introduction of sensory rooms will be discussed.

CHALLENGES AND PRACTICAL CONSIDERATIONS

There are some practical concerns that need to be taken into consideration when introducing a sensory room. It often requires a change of culture within the organisation and the adoption of trauma-informed care principles throughout the whole service delivery system (NASMHPD 2006). This requires strong leadership and the formulation of a clear vision and implementation strategy. The NASMHPD (2006) suggested six core strategies that are useful for the reduction of seclusion and restraint and also help to implement principles of trauma informed care. These include:

- leadership towards organisational change
- use of data to inform practice
- workforce development
- use of seclusion and restraint prevention tools
- consumer roles in inpatient settings
- thorough debriefing.

Within this framework, sensory rooms are seen as a primary seclusion and restraint prevention tool (Huckshorn, 2005).

One of the main often-reported barriers to changes of culture and practice are concerns about safety raised by staff when the shift away from seclusion/restraint and towards sensory rooms is suggested (Cummings et al. 2010). These issues need to be taken seriously and can be addressed in various ways. In particular, staff need to be introduced to the principles of trauma informed care and receive training in alternative forms of crisis intervention such as communication and de-escalation techniques (Huckshorn, 2005). An example of this will be discussed in the success story below. Providing effective alternatives to seclusion and restraint and gaining staff support is crucial for the success of any seclusion and restraint reduction efforts and can be achieved through positive means. For example, collecting data on facility usage in the unit and using it non-punitively in order to inform practice and formulate goals is a useful first step to facilitate change in the desired direction (Huckshorn, 2005).

Training staff in treatment activities that offer choices to the service users, build living skills and provide individualised recovery plans are further central strategies that help to change practice (ibid). Seclusion and restraint prevention tools include a wide array of measures such as assessment for factors associated with a high chance of risk-related behaviours, obtaining histories of seclusion and restraint, trauma assessment, identification of persons with high risk factors of injury or death, de-escalation surveys and safety plans and the use of person-first language (Huckshorn, 2005). Environmental changes that include comfort and sensory rooms and other sensory modulation experiences designed to work with service users to learn emotional coping skills are considered to be crucial adjustments on the way to a coercion-free service (ibid).

These suggested strategies relate to the organisational apparatus of the service provider. However, there are also practical considerations that relate to the implementation and use of the sensory rooms themselves. The planning and equipping of the sensory room must be undertaken in regards to the needs of the service user group for whom it is designed and carefully planned (Baillon et al., 2002). For example, health and safety issues remain a priority and that staff receive proper training in the use of the equipment and the management of the sessions. Limited availability of staff, the location of the room in relation to the care environment, and uncertainty about which service users are most likely to benefit from this intervention can create problems for the effective use of the room (ibid).

Other barriers to implementation can include the level of training education provided to staff, time constraints that limit clinicians ability to engage therapeutically with service users, and an absence of clear processes about accessing sensory resources. For example, resources were locked in the office of allied health clinicians making access difficult and there was no tracking system to ensure sensory resources were returned (Lee et al., 2010).

Te Pou (2010) conducted a pilot study that focused on the implementation of sensory rooms in three open adult units and one family/child and adolescent unit in New Zealand. Two adult units and one family/child unit were used as controls. In preparation of the study, 200 inpatient clinicians were given a 4-hour training module in the theory and practice of sensory modulation as a tool of crisis intervention and were introduced to the study protocol. Despite this training, the presence of the sensory room was at first perceived as very awkward by the clinicians and several barriers to implementation were identified in interviews and focus groups.

- Sensory modulation was initially developed in cognitive and behavioural science for people who are diagnosed with intellectual impairment and developmental delays. The application of this intervention to service users who experience mental distress seemed at first strange to nursing staff that are trained in mental health. However, this initial barrier could be ameliorated by the demonstrated positive effects of sensory modulation with service users who experience distress.

- A second issue that made the use of the sensory room difficult was the perceived burden of nurses 'being off the floor' for 15-20 minutes when facilitating a session in the sensory room.

- Clinicians needed some time to get used to the concept and procedure of sensory modulation until they built up the confidence to use this intervention with distressed service users.

- The location of the sensory rooms also had an impact on the ways in which they were used. Since they were situated in the open wards rather than in closed units where the seclusion rooms are located, the sensory rooms were either not easily accessible by clinicians in the high dependency units or not needed by the service users in the open wards. As a result of this, they were often used as 'just another lounge' (Te Pou 2010).

From these findings, the following recommendations were derived.

- Clinicians were most confident in using the room when service users showed earliest signs of distress. Staff may thus need additional training to use this intervention when service users are most upset.
- The sensory room needs 24 hours supervised access, with designated people to unlock it. This ensures the proper use of the room and prevents the misuse of the equipment for purposes other than sensory modulation, which could potentially be harmful to service users.

SENSORY MODULATION IN COMMUNITY SETTINGS

There is limited evidence for the use of sensory modulation in community-based residential settings. However, two studies can be cited which offer some confirmation that sensory approaches are useful in this particular surrounding. Dorman et al. (2009) conducted a pilot programme with teenagers in a residential treatment centre that serves 11- to 18-year-old girls with varied diagnoses, including learning disabilities, Asperger syndrome, bipolar disorder, borderline personality disorder etc. as well as histories of abuse and violent experiences. The aim of the programme was to integrate sensory education and tools into the equipment of the centre. At the beginning, two phases of needs assessment for staff and residents were conducted in which the focus of the programme was established. Staff members expressed an interest in using sensory approaches in order to better manage negative behaviours and emotional outbursts of the residents. Correspondingly, many residents indicated having difficulty managing their anger or calming themselves. Based on these findings, three sessions using sensory modulation were organised. The sessions included education about the body in regards to sensation, the construction of weighted blankets and other sensory tools and ensuring staff and residents knew how to use the sensory space created. Overall, the programme was run successfully but no follow-up analysis of the long-term effects was done.

The development of the programme, however, was based on the findings of Lindley and McDaniel (2005) who studied the effectiveness of a sensory room for the residents of a treatment facility for adolescents with dual mental health diagnoses. The facility accommodated 144 teenagers, aged between 12 and 18 years. The residents also had permanent access to a mobile sensory suitcase that was set up in the lounge and could be used within sight of staff members. The teenagers were encouraged to use the sensory room when they felt agitated or overstimulated and they could experiment with the sensory tools in the suitcase to find out what was soothing for them.

The study found positive effects of these sensory interventions. Upon admission, about eighty per cent of the teenagers demonstrated sensory processing difficulties based on the Adolescent/Adult Sensory Profile. After using the room and items in the sensory box (a transportable box that holds sensory tools), eighty-four per cent of the residents reported improvement in adaptive functioning, including alertness and motor skills. This was measured using a pre-test/post-test self-report questionnaire. Further functional improvements included a decrease in the frequency of requested PRN medications, less time spent in S/R and less frequent self-regulating behaviour such as chewing on household items like the remote control (Lindley and McDaniel 2005).

Even though the research is limited and sometimes methodologically problematic, reported benefits of sensory interventions for service users in community-based settings are similar to those in the inpatient units. Service users with varying diagnoses showed decreased self-stimulating behaviour, improved interpersonal skills, and a better ability to manage distress.

IMPLEMENTING SENSORY MODULATION IN COMMUNITY-BASED CARE SETTINGS

The available literature does not mention any particular challenges to the implementation of sensory approaches for this specific setting. The challenges are assumed to be similar to those in the mental health wards. However there is anecdotal evidence that sensory rooms are being established in some New Zealand community mental health centres.

SUMMARY

Based on this literature overview, the following key points can be highlighted.

- Although the current research evidence is somewhat sparse, the emerging literature suggests sensory modulation is a useful intervention in a variety of therapeutic settings and can be successfully applied for a range of mental health service users. For example, service users with varying diagnoses showed improved self-soothing behaviours, improved interpersonal skills and a better ability to manage distress.
- The implementation of a positive, person-centred practice in mental health services is paramount for a successful reduction of seclusion and restraint and better outcomes for service users. The literature suggests that sensory modulation may be one intervention in efforts to reduce the use of seclusion and restraint. It is likely that, for change to occur, sensory modulation needs to be part of a range of strategies.
- There is no evidence showing any correlation between correct use of sensory modulation and negative outcomes.
- Certain barriers can exist that prevent a successful implementation of sensory intervention tools. These can be on an organisational, structural and individual level and need to be addressed in a thoughtful manner.
- Strong leadership, comprehensive staff training, prudent planning, and clear guiding frameworks are key components for a successful implementation of sensory modulation rooms and sensory interventions generally.

CONCLUSION

The evidence presented in this review of literature indicates there is a small but positive body of literatures that points to sensory modulation being a promising intervention in mental health services. There are few studies that show whether sensory modulation can reduce seclusion and restraint. While further evidence in this area would be helpful, methodological difficulties may prohibit the production of such knowledge in the near future.

The anecdotal evidence from New Zealand and overseas suggests that sensory modulation may be best seen as a potentially useful intervention that sits within a range of other service approaches attempting to promote positive milieus, improve therapeutic alliances by clinicians, and promote service users' choice. Such approaches would be consistent with recommendations made in literature identified in this report.

Like all clinical interventions, consideration must be given to the probable clinical benefits (especially benefits to service users) versus potential risks, and financial and other costs. The weight of the evidence, such as it is, suggests that sensory modulation is a promising intervention with risks easily mitigated by good clinical intervention strategies. The costs of introducing and sustaining sensory modulation are not shown in the literature.

Te Pou's recommendation is that sensory modulation be seen as a very promising intervention as one part of a range of clinical delivery options aiming to produce practice based on principles of recovery and the strengths of service users. It is vital that sensory modulation is supported by standardised training and robust policy frameworks, and be evaluated for effectiveness within individual DHBs or NGOs. Evaluation should consider changes to historical practices of seclusion and restraint, and should address acceptability to service users and clinicians, and where possible, a cost-benefit analysis.

Although small, the existing literature suggests that sensory modulation has the potential to fit well with existing best clinician practice, be very acceptable to service users, and have positive outcomes.

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AUCKLAND
Level 2, 8 Nugent Street (B), Grafton
PO Box 108-244, Symonds Street
Auckland 1150, NEW ZEALAND
T +64 (9) 373 2125 F +64 (9) 373 2127

HAMILTON
293 Grey Street, Hamilton East
PO Box 219, Waikato Mail Centre
Hamilton 3240, NEW ZEALAND
T +64 (7) 857 1202 F +64 (7) 857 1297

WELLINGTON
Level 3, 147 Tory Street
PO Box 6169, Marion Square
Wellington 6141, NEW ZEALAND
T +64 (4) 237 6424 F +64 (4) 238 2016

CHRISTCHURCH
21 Birmingham Drive, Middleton
PO Box 22105, High Street,
Christchurch 8142, NEW ZEALAND
T +64 (3) 339 3782 F +64 (3) 339 3783

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o Te Whakaaro Nui