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Experiences of participating in a group-based sensory modulation intervention for mental health service users

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ABSTRACT

Background: People with mental health issues often experience difficulties with sensory modulation affecting occupational engagement. Research conducted in inpatient units has shown positive effects of individual sensory modulation interventions, however, research on experiences of group-based interventions in outpatient units is limited. Hence, a group-based sensory modulation intervention was adapted and tested within Swedish mental health outpatient units.
Aim: To explore the experiences of participating in a group-based sensory modulation intervention for service users in mental health outpatient units.
Material and methods: This qualitative study involved interviews with 25 informants who had participated in the intervention. The interview data were analysed using reflexive thematic analysis.
Results: Synthesis of the interviews resulted in one overarching theme of *'Embodied awareness facilitates improved coping and sense of self'* organised into four themes: (1) *'Developing embodied awareness and strategies'*, (2) *'Taking control of everyday life'*, (3) *'Creating a stronger sense of self'*, and (4) *'From alienation to belonging'.*
Conclusion and significance: The informants experienced the intervention to provide new embodied coping strategies that had previously been neglected. This understanding may enrich occupational therapy practice in new ways to support service users' engagement in occupations.

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Mental illness; group intervention; occupational therapy; coping; recovery

Introduction

Human experience of self and the physical world is primarily through the senses and we are flooded with stimuli affecting how we engage in occupations in everyday life [1]. These sensory stimuli provide information about the environment (i.e. taste, sound, touch, smell, sight), as well as the position and movement of one's body in relation to the environment (i.e. vestibular input and proprioception). This information enables us to develop social roles and engage in meaningful occupations in everyday life [2]. The process of regulating and adapting to sensory stimuli can be referred to as sensory modulation (SM) [3]. SM occurs through a twofold process including neurophysiological processes within the central nervous system, as well as behavioural responses, which amplify or reduce the intensity, amount and type of stimuli experienced [3].

Research, including within occupational therapy, shows that people with mental health problems may experience difficulties with SM affecting occupational engagement [4,5]. For example, a systematic review by Baillard et al. [6] showed that living with diagnoses such as schizophrenia, anxiety disorders and post-traumatic stress disorder affects the ability to process sensory stimuli in an optimal manner. Hence, the process of SM is significantly affecting occupational engagement in everyday life for people with mental health problems. Research shows that this can result in the development of avoidance behaviour and isolation related to being overwhelmed by situations where

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noise, smells, visual input and social interaction are too intense [4,7]. Further, occupational challenges and difficulties with SM are associated with reduced emotional well-being [8].

SM interventions have been developed to assist the processing of sensory stimuli and management of emotional and physiological arousal. Since SM interventions are based in occupational therapy theory occupational therapists are well positioned to provide insight into SM interventions and to support occupational engagement in everyday life [3].SM interventions aim to increase service users' capacity for self-regulation of anxiety and the ability to cope with difficulties occurring in occupations in everyday life [9]. This involves the intentional use of the sensory characteristics of environments, objects and occupations to facilitate a 'just right' level of physiological and emotional arousal [3,9]. SM interventions are used within emergency mental health and inpatient units, with the most widely reported mode of delivery being the use of dedicated sensory rooms [10]. Other existing formats of SM interventions include using single items of sensory equipment or techniques, sensory kits and mobile carts and group programs [11,12]. A systematic review conducted by Haig et al. [11] indicated that the use of sensory rooms had effects on calming and decreasing aggression, with service users reporting feeling safer after using a sensory room. SM interventions are mostly delivered to individual service users and often include education on SM theory, exploration of sensory issues and preferences and the development of strategies for self-management of distress, arousal and agitation [9,13–15]. One small pilot study of a group-based SM intervention also showed decreased arousal [16]. Further, qualitative research showed that service users experienced SM interventions to support the management of psychiatric symptoms, including auditory hallucinations and suicidal thoughts, and generally improve emotional regulation in everyday life [17].

However, only a few qualitative studies have been reported from mental health outpatient services, showing experiences of decreased anxiety and improved occupational engagement in everyday life [18–20]. Although research is evolving regarding the experience of participating in SM interventions, findings of service users' voices are still scarce with regard to specific intervention formats and diverse mental health and national contexts.

While an individualised approach to SM intervention may be important within emergency and inpatient mental health units where the foremost aim is to reduce agitated behaviour, there may be advantages of utilising a group format in less acute outpatient settings. Occupational therapists are skilled in facilitating group interventions in mental health units [21–23]. Earlier occupational therapy group interventions have shown benefits such as helping service users to feel understood and providing a reduced feeling of being alone and isolated [24,25], as well as providing informal peer support, in line with recovery-oriented practice [26]. SM interventions usually involve educative elements related to understanding general sensory theories, one's own sensory preferences and trying out new sensory strategies [14]. Therefore, a group format with exploration, discussion and the possibility of listening to peers talk about their sensory strategies could be advantageous, as shown in other educational programs [25]. However, while a group-based SM intervention in mental health outpatient services appears beneficial, the research within this area is limited [16] with no experimental studies or qualitative studies exploring the experiences of these types of interventions. Against this backdrop, an existing manualized and group-based SM intervention was adapted for service users within Swedish mental health outpatient units. This intervention is currently being tested within a larger randomised controlled trial (RCT) but there are few experiential studies of receiving SM interventions. Therefore, the aim of this qualitative study is to explore service users' experiences of participating in a group-based sensory modulation intervention within mental health outpatient units.

Materials and methods

To respond to the research aim, an inductive approach was employed using reflexive thematic analysis according to Braun and Clarke [27]. This method was chosen as it allowed for in-depth interpretations of service users' experience of the new intervention and insights into its potential impact. The reflexive approach to thematic analysis was theoretically influenced by critical realism, which relies on the understanding that experiences and meaning-making are dependent on different cultural and social contexts, which affect the experiences and interpretations of a phenomenon [27,28]. The current study is part of a larger RCT evaluating a group-based SM intervention, the findings of which will be published in future research. The current study is in accordance with the COnsolidated criteria for REporting Qualitative research Checklist (COREQ), to ensure comprehensive and detailed reporting of the research process [29].

Intervention

The following description of the intervention is presented according to the Template for Intervention Description and Replication (TIDerR) checklist [30]. The Sensory Awareness Program (SAP) stems from sensory modulation theory and practice and is an adapted version of the manualized American sensory group intervention, called the 'Sensory Connection Program' [31]. The SAP was an 11-week manual-based course program that offered an approach to managing the physiological arousal associated with anxiety through individualised sensory strategies. The aim of the intervention was to help service users recognise triggers in everyday life, understand their sensory profile, and use sensory strategies in difficult situations to decrease anxiety and increase engagement in everyday life.

The SAP was delivered face-to-face in group format, with a maximum of 8 service users in a mental health outpatient setting. The program started with one individual session for completing the sensory profile instrument, where service users had an opportunity to receive an introduction to SM and discuss their own sensory needs and preferences before entering the groups sessions [32]. The individual session was followed by 10 weeks of one group session, lasting 1.5–2 h per week. The sessions included psych-educative presentations and exercises to explore sensory strategies and tools, both during sessions and at home between the sessions. Examples of strategies included using headphones to decrease distress related to auditory input, a weighted blanket to decrease anxiety through deep pressure input or exercising to alert oneself through proprioceptive input. Setting individual goals related to distress management and strategies to manage everyday occupations was also a key element of the SAP. Group participants were given a manual with several worksheets and exercises, while course leaders were provided with an instructional manual to provide structure and consistency in the program delivery. The course leaders were occupational therapists, who worked with co-therapists (such as nurses, psychologists, social workers) from the teams at the outpatient units. The course leaders and co-therapists completed a 2-day training in the SAP method before delivering the program.

Informants

Inclusion criteria for entering the study were being an adult, experiencing moderate to severe anxiety and having a severe mental health problem (SMHP). The criteria of severe mental health problems (SMHP) used for entry into the study was not diagnosis-specific, rather it was based on the requirement that the person's psychiatric condition had lasted for at least two years and affected community functioning in accordance with Ruggeri et al. [33]. The exclusion criteria included being somatically and/or mentally acutely ill or having a cognitive impairment (intellectual disability or dementia). The informants were recruited to the intervention groups by the staff in the mental health outpatient units according to these criteria. The included informants had contact with the mental health outpatient units for a variety of time spanning from 1 year to 46 years, with the mean years of contact of 15 years. Demographic characteristics can be seen below (see Table 1).

Procedure

Purposive sampling [34] was used to recruit a rich and diverse group of informants from several of the intervention groups. They were selected from eight different completed intervention groups (with four to eight service users per group) from six different mental health units in the southern part of Sweden (three psychosis units, three general psychiatry units). To receive a further diverse range of informants the selection was made in different geographical areas, and they were selected according to variation within age, diagnosis and with different opinions of the intervention. The course leaders from the intervention groups recruited the informants by asking them after completion of the intervention if they wanted to be interviewed for this study. There were 25 people who agreed to participate in the study and all interviews were completed.

Data collection

Data collection involved one-on-one and face-to-face in-depth interviews [35] performed by the first author. The first author, who conducted the interviews had preconceptions of mental health units and SM

Table 1. Demographic characteristics of informants.

Characteristics	*N*
Sex: women/men/non-binary	19/5/1
Age: mean (min-max)	40 (24–64)
Psychiatric diagnosis	
Schizophrenia	10
Attention Deficit (Hyperactivity) Disorder (ADHD/ADD)	6
Depression	3
Bipolar disorder	3
Generalized Anxiety Disorder (GAD)	2
Panic syndrome	1

interventions after having worked as an occupational therapist in the field for several years. To be as open as possible to the informant's real experiences during the interviews, the first author had no knowledge of the details of the content of the intervention manual before the interviews.

The interviews took place between 1 day to 2 months after the intervention ended. The interviews lasted from 14 min up to 70 min with a mean of 45 min. Most interviews were held in the mental health outpatient units where the informants received the intervention, though two interviews were held in the setting of Lund University. The concept of information power was used to determine when to end the data collection, specifically a broad aim, the novelty of the intervention and the variation in the quality of dialogue resulted in the decision to interview up to 25 service users [27,36].

An interview guide, specifically developed for the current study was used to guide the data collection. The informants were asked open-ended questions, such as: 'You have participated in a course about sensory modulation – Can you tell me about your general experience of participating in the intervention?', 'Can you describe in more detail what the intervention has been like for you?', 'Were there any aspects of this intervention that were particularly important to you?', 'What have been the positive and/or negative effects for you of participating in the intervention?'. To gain deeper information about the participant's experiences of the intervention, the interviewer asked probing questions for example: 'How did that feel?', 'Can you say more about that?', 'How would you describe it?', 'Can you give examples?', 'You said something about…can you elaborate on that?'. The interviews were audiotaped and transcribed verbatim.

Data analysis

The transcribed interviews were analysed using a reflexive thematic analysis and the analytical orientation was experiential due to the nature of this study with the overall aim of understanding the service users' experiences of the intervention [27].

The first phase of analysis started after all interviews were completed, through familiarisation with the data. The first author (KF) read the interviews several times and made brief notes about initial analytical ideas. In the second phase, the focus was systematic reading of the data where text units were labelled with codes that were meaningful according to the research question. We used digitally assisted coding by using the commenting feature of the Microsoft Word document. The coded text units were then read several times and the codes were revised. The last author (EA) read and coded four of the transcribed interviews in parallel with the first author. The fourth author (UB) also read and coded one of the transcribed interviews. In the third phase, the coded text units were printed out to work with the construction of the initial themes in a creative paper-based manner visualising the concepts. The process of constructing initial themes included analysing and interpreting the coded text units and looking for shared patterns of meaning. This resulted in the construction of ten initial themes. In the fourth phase, the initial themes were further revised in an interpretive analysis process and four themes and thirteen subthemes were constructed. The final fifth and sixth (writing) phases of analysis included further refining the themes and subthemes. This was done by all five authors in a collaborative interpretative process back and forth resulting in the construction of four themes with ten subthemes and a conceptualising overarching theme [27].

Ethical considerations

The study was approved by the local Research Ethics Committee, with Dnr number; 2017/43. The informants in the study received an overview and a written consent form from the course leader of the group intervention to sign prior to the interview. The informants in the study were informed that the participation was confidential, voluntary and that they could withdraw from the study without explanation at any time.

Findings

Overall, the informants reported that the intervention was beneficial, with the conceptualising overarching theme; '*Embodied awareness facilitates improved coping and sense of self*'. Within this overarching theme, there were four themes; *'Developing embodied awareness and strategies', 'Taking control of everyday life', 'Creating a stronger sense of self'* and *'From alienation to belonging*' with related subthemes (see Table 2).

The informants also reported some constructive feedback, mostly related to the delivery and format of the intervention, such as too many hand-outs, having more or fewer sessions, not having the optimal timing for receiving the intervention and thoughts on the group size. As the focus of this paper is on the deeper experience of the intervention, the implementation of the intervention will not be further analysed in this

Table 2. Overview of overarching theme, themes and subthemes.

Embodied awareness facilitates improved coping and sense of self			
Developing embodied awareness and strategies	Taking control of everyday life	Creating a stronger sense of self	From alienation to belonging
Building bodily awareness Embodied learning through doing Applying a practical 'toolbox'	Moving from passive to active strategies Coping with psychiatric symptoms Planning everyday occupations according to sensory preferences	Accepting myself Expressing and asserting my needs	Daring to open up in a safe space Developing validating and supportive relationships

paper. It will be reported in future research, which will evaluate the implementation process of the intervention within the larger RCT project.

The themes and subthemes are presented in the text below with quotes from the informants.

Developing embodied awareness and strategies

The informants' experiences reflected an increased bodily awareness through learning and trying out new strategies. Within this theme three subthemes were constructed; *'Building bodily awareness', 'Embodied learning through doing'* and *'Applying a practical 'toolbox'.*

Building bodily awareness

The informants expressed that they built up an understanding of sensory systems in general, but also a more specific awareness of their own embodied sensory experiences and needs in terms of sensory triggers, preferences, and strategies. The informants described a development of a larger repertoire of strategies which made it easier for them to be able to choose an optimal strategy according to their individual needs in a specific situation.

> What I did not realize before is that sometimes I do not need something calming to calm down and get rid of the anxiety. Instead, I need something to wake me up a bit and thus become calmer, free from anxiety./Informant 5

An increased embodied awareness and understanding of sensory systems seemed to help the informants achieve an optimal arousal level for occupational engagement. This awareness helped them to shift between different occupations. The informants further reported it became easier to ground themselves in their body and the immediate environment, preventing them becoming so easily overwhelmed by anxiety:

> …before [the group intervention], I just went ahead and then I got really shocked at how overwhelming everything is and then I would just sit and cry in the end, because I do not know where to go. But now… well, that's probably what I have learned, that I have learned to ground myself a little more./Informant 3

Most informants described that the understanding of sensory processing and embodied awareness was an important part of being able to handle anxiety filled situations. However, some informants thought that it was confronting to be faced with how much life was potentially anxiety-filled, as increased bodily awareness led to insights into how much their anxiety was triggered in everyday occupations.

Embodied learning through doing

Learning which sensory strategies supported well-being was mostly achieved through the actual 'doing' of exercises throughout the intervention. This was seen when the informants tried different sensory tools and strategies during course sessions, but the learning significantly increased when the informants extended the strategies to their occupations in everyday life. For example, one informant used sensory strategies to be able to sit quietly on the couch when wanting to watch an entire film.

> I've actually arranged a bowl that I have in the TV room and there I have ten different ones like this… well, what do you call… stress… not toys, but different ones for the hands, that you can squeeze and feel in your hand./Informant 25

This active 'doing' and trying out strategies and aids was reported as central to making the sensory theories and strategies concrete and understandable for the informants. It facilitated the embodiment of knowledge and the ability to be attuned to their present state, including the calming effects of specific sensory strategies.

> I was given tools to learn and build up a sense of security, and a calmness in myself, and I can't explain today…how it happened… but I have an example…I can go shopping now and I don't get agitated./Informant 3

Applying a practical 'toolbox'

The informants expressed that after the intervention they were enriched with a helpful sensory "toolbox" to apply in everyday life. The "toolbox" could include both physical sensory aids, such as a fidget spinner or a stress ball, but could also include tool-less

techniques such as abdominal breathing and other bodily-directed strategies to use in anxiety provoking situations, such as leaving home.

> And then you could just put it in your bag and take it with you, in case you had to leave the house, and you could just open it [calming scent in a bottle] and smell it./Informant 8

The informants expressed that strategies and tools were easy to access and apply even in moments of high anxiety. The practical and bodily focus of the intervention was a crucial element for applying the informant's new awareness and skills into action. The informants expressed that the intervention 'toolbox' of actual things and mindsets created a form of inner safety because they felt that the tools were always with them and ready to be applied in different occupations when needed. For some, the intervention was in this way different to many talking therapies.

> And this is very concrete. And that's great…many other things are so abstract… when you go to therapy, for example. Then you talk a lot, about the emotions and a lot about how to think… and I already know…[laughter]…how to think, but I can't… And that's why this fits so well, because it was a distracting tactic./Informant 22

Taking control in everyday life

After attending the intervention, the informants expressed an increased sense of control and increased ability to plan and manage occupations in everyday life. Within this theme three subthemes were constructed; *'Moving from passive to active strategies', 'Coping with psychiatric symptoms'* and *'Planning everyday occupations according to sensory preferences'.*

Moving from passive to active strategies

Several of the informants had existing sensory strategies, which they used instinctively prior to completing the intervention, such as wearing headphones on the bus to limit stressful auditory input. However, they had not realised that these sensory strategies could be used more consciously to meet their sensory needs across occupations in everyday life. This insight allowed a shift towards a more active and intentional application of sensory strategies and tools.

> … I've done it [used sensory strategies] before, without thinking about it. And now it becomes more of a conscious act… then it's easier to grasp it…I think it becomes more manageable… now if I have a huge anxiety attack… can I think of something else? Can I do something else?/Informant 9

Furthermore, after participating in the intervention, the informants expressed a variation in the way they used sensory strategies. Some informants used sensory strategies mainly for calming while some were more in need of alerting sensory strategies in order to participate in social occupations, such as meeting with friends. Examples of existing strategies that informants reported to be more useful following the intervention included listening to music or using objects in their everyday surroundings to enhance feelings of safety.

> I have used my pillow and held it against my stomach… if I've been afraid of something, and it feels safe. I only use the pillow when I've had unreal experiences. Then it helps to press… I tried that before the group too…But I think I got closer to my psyche after the group… And it became a stronger help [the pillow] after the group./Informant 21

Coping with psychiatric symptoms

Regardless of diagnosis, the informants described having better abilities to endure and to cope with psychiatric symptoms, such as anxiety and auditory hallucinations, after attending the intervention. The informants reported a difference in how they experienced their psychiatric symptoms and how they could cope with them during everyday occupations. This positively affected occupational engagement, such as being able to take the bus in the city or entering new physical spaces in the community they had not visited for years. Informants also reported that while other treatments had failed to desensitise them to anxiety provoking situations and sensations, the sensory intervention helped them cope with these triggers.

> I'm trying to get out more and do activities outside the home. For many years now, I've not been able to do so many activities…But, now on Saturday, I've decided to go shopping for clothes and to get some coffee in the shopping mall. I'll start with that and I'll see how it feels first. It [the intervention] has made me braver./Informant 21

The informants also reported severe symptoms like paranoid beliefs and auditory hallucinations were easier to endure and cope with using different sensory tools and strategies.

> When I'm on the bus, for example, and the rats get going [hallucinations], I can kind of think back and get that feeling again. Strength. …They just stay behind, they never disappear, but they become calmer. I become more me… it doesn't feel quite right, but it feels much better, because I know that I have that tool, I grab it and I think myself into it./Informant 19

The intervention seemed to facilitate new insights into psychotic symptoms and how to manage them through distraction, soothing or grounding in the present. The informants described that as they became more aware of different sensory triggers they could 'step out of their symptoms' as a form of coping strategy. This seemed to reduce the intensity and impact of the symptoms.

> If you understand how you work, you get a side process in the brain……you don't get so stuck in the reactions [psychosis]. You can get a little outside. The reactions may still be there, but you have some… comforting activities on the side./Informant 23

Planning everyday occupations according to sensory preferences

Following the intervention, the informants reported changes in how they planned their occupations and lived everyday life according to their sensory needs, triggers, and preferences. The new knowledge made it possible to better plan for reducing or being prepared for anxiety-filled or stressful occupations, such as paying bills. This planning could be done in advance according to the informants' own specific sensory preferences.

> I have come into more contact with my own feelings…it becomes so concrete… and these [sensory triggers] are things that I actually react to in everyday life. And it's something that I haven't thought about or even considered trying to identify either. Until now. And it is very helpful in combination with exhaustion… so my aim now is… that I can feel before… it starts to get too much…/Informant 6

The informants further expressed that they felt safer after the intervention since they could use their sensory strategies to be prepared before attending important occupations. Being less dependent on family and significant others was also reported in the informants' stories.

> …In the past I had written [in my crisis plan]…call mum, or something like that [laughter]… I mean it's great that I can have friends and family to talk to, but just being able to take care of it myself, makes me feel more confident that I can cope, sort of stand on my own two feet./Informant 5

Being prepared for a potentially stressful situation made occupational engagement easier both at home and in workplaces. For example, several informants expressed that working had become easier when equipped with new understandings about their sensory needs and being able to use sensory strategies during working hours.

> I find it easier to plan my everyday life. When I have to go to work it's easier to plan. Before, it was hard to go outside… But now I think it feels better, I kind of know, what I'm going to do…/Informant 18

Creating a stronger sense of self

The informant's new understanding of their sensory needs and existing strategies led to increased self-acceptance and a new vocabulary to express themselves. Within this theme two subthemes were constructed; *'Accepting myself'* and *'Expressing and asserting my needs'*.

Accepting myself

The informants explained how the increased understanding of their behaviours and reactions related to sensory stimuli led to a gentler and more compassionate attitude towards themselves. This decreased the informants' judgement of themselves regarding their behaviour and their existing sensory strategies. Instead of feeling that they did 'strange things', such as fiddling with things or moving their bodies in a specific manner to feel comfortable, the informants expressed they felt competent using their strategies, which were meeting elementary sensory needs and supporting well-being.

> I realized that it is the feet that need to move… so it's something you need, to feel calm in some way… I think since I have taken the course I have accepted a lot more things about myself, that this is how it is… that there is nothing wrong…that's what I need./Informant 22

This more compassionate attitude that developed after the group intervention appeared to be significant, as the informants had a history of viewing their behaviours and responses to certain sensory stimuli as wrong or shameful, and to be avoided. With the focus on living with or adapting these forms of coping behaviours, rather than struggling against them led to a greater acceptance of their needs and a more positive sense of themselves.

Expressing and asserting my needs

The informants reported that the intervention helped them to build a new vocabulary around sensory needs and triggers based on sensory theories and group discussion. This allowed them to explain their embodied experience to others, such as the experience of anxiety in the supermarket due to overwhelming visual input and sensory triggers. The ability to express experiences using the new vocabulary was closely

connected to both understanding themselves and increased self-acceptance.

> So, you become…a little more self-confident… you can put why you feel the way you feel into words and… it becomes easier to explain to others./Informant 8

The informants further reported their new vocabulary helped them to set boundaries for themselves and with others. They were able to say 'no' in specific situations, such as declining an invitation to a party with too much noise or explaining to family why they needed to have some time for recovering and resting.

> I have adopted some kind of strategy, when I am at a party… it's nice, but still noisy…now I have become better at telling people, just saying I find this very difficult. Can we reduce the noise level… I've become, as I said, better at speaking up./Informant 1

From alienation to belonging

The final theme shows the informants' experience of the group process as an important part of the intervention. They expressed being in a safe and supportive environment in the group and two subthemes were constructed: *'Daring to open up in a safe space' and 'Developing validating and supportive relationships'*.

Daring to open up in a safe space

Many of the informants reported feeling nervous to meet in a group and talk about sensory preferences and triggers. Looking back and reflecting on earlier sensory experiences and reflecting together was an emotional effort. However, the informants described how they soon found that sharing feelings and sensory difficulties with other peers in similar situations built trust. Sharing difficulties with others created a feeling of being understood and in a 'safe space' where they could express their thoughts about sensory needs and life issues without feeling judged.

> Yes, like talking about your problems with others and bringing up old things and new things and…it feels right…it feels a bit nervous that you have to…opening up like that…But it strengthens you./Informant 15

Developing validating and supportive relationships

After meeting for several weeks and talking about their experiences within the group, the informants expressed feelings of friendship and developing reciprocal relationships. They reported that the other group members validated their sensory needs and strategies, as many could relate and had similar experiences.

> Every time after [the intervention end], we stood outside for at least an hour and talked… And we plan to meet in the future… if the course hadn't sparked such interesting discussions, there probably wouldn't have been that group dynamic. It was probably when we started giving each other more concrete tips./Informant 4

Exchanging insights and strategies facilitated the recognition of expertise through experience, leading to feelings of empowerment and a greater sense of control. The informants also spoke about continuing to meet after the program ended, which was encouraged in the course material. This expansion of supportive relationships beyond the sessions appeared to be another significant outcome of the group-based approach.

Discussion

This study contributes to knowledge about the experiences of participating in a group-based SM intervention. The overarching finding in the study was that the intervention increased embodied awareness, facilitated more optimal coping strategies and improved sense of self. This assisted informants in better managing everyday occupations as well as providing peer-to-peer support and belonging through group sessions. The components of this intervention that seemed to have made the greatest impact on the informants were the educative components, along with opportunities for new insights in the context of active 'doing', both within the group, as well as in everyday life. Informants contrasted the practical and embodied focus of the sensory strategies with previous talking-based treatments they had participated in. The new embodied coping strategies appeared to align well with the informants' needs and perhaps highlighted a neglect of their bodily experience in previous anxiety management strategies. Since research on this type of intervention is scarce [6,11,12], these results will be discussed in the light of a few existing similar studies and SM studies within inpatient units, as well as general occupational therapy intervention research.

The results in the current study showed that the informants increased knowledge about their bodies and bodily reactions, in terms of identifying and adapting to their sensory needs, sensory triggers and different sensory strategies in everyday life. This indicates that the intervention has the potential to support coping with mental health symptoms and sensory sensitivities, as well as improved occupational engagement. There appears to be a reciprocal relationship

between SM interventions and occupational engagement that could be applied with a greater focus in occupational therapy and mental health practice. Targeted sensory strategies can be used in the moment, to mitigate sensory sensitivities, anxiety and other symptoms, and enable occupational engagement in everyday life (such as being at work, picking up the kids, or taking the bus). In turn, engagement in occupation is multisensorial and has the potential to influence sensory and embodied experience, including further reducing anxiety and managing arousal levels. The informants' reports of opening up to greater engagement are significant, as patterns of sensory and emotional overwhelm, avoidance behaviours and increased disengagement from everyday occupations are common in many mental health disorders [7].

Previous research highlights the significance of increased embodied awareness as experienced by the informants. For example, research within the neuroscientific field on interoception, or the perception of internal bodily sensations, shows that bodily awareness is closely related to both abilities for emotional processing and wellbeing [37,38].

Furthermore, SM research within occupational therapy found that people living with a psychotic disorder described their sensory experiences in relation to embodiment in the context of engagement in everyday occupations [4]. The results of the current study also indicate that the intervention helped the informants to increase their sense of control in everyday life, leading to greater capacity for planning and coping with difficulties in everyday occupations. This aligns with recent research on SM interventions in mental health inpatient units showing increased occupational functioning [15], feelings of control and safety along with increased self-management [9]. Effective coping strategies to gain control in everyday life have been shown to be important for the process of personal recovery [39,40] and difficulties with sensory processing have further been associated with a low level of personal recovery [41]. The results of the current study indicate that the intervention positively influenced both the ability to engage in occupations, and cope with mental distress and sensory processing issues, therefore it has the potential to support broader personal recovery [39,40,42]. However, additional studies are warranted to study this impact further. The result of the current study showed that informants seemed to strengthen their sense of self by utilising new concepts and language to explain and assert their sensory needs with themselves and others. This is in line with earlier research showing that education on SM is important for validating experiences and existing strategies as well as supporting the integration of new sensory strategies in everyday life [9,14,15]. The informants reported that they were more accepting of themselves, through recognising that certain behaviours were needed to manage anxiety and support specific occupations in everyday life. Accepting oneself has been reported as an outcome of other occupational therapy group-based interventions in the form of befriending oneself when participants have learned to talk about their occupational needs [25]. The notion of befriending oneself may also be related to a form of self-destigmatization. Research [43] has shown that self-stigmatization, such as viewing oneself as odd or different, results in low self-esteem and poor quality of life for people with mental health problems. This has multiple consequences in everyday life, including social isolation [44]. Hence, receiving a knowledge base related to SM potentially contributes to a reduction in stigmatised thinking and a strengthened sense of self.

A further result of this study was that the informants seemed to experience improved abilities to endure and cope with their symptoms, such as anxiety and psychotic symptoms including auditory hallucinations, after attending this intervention. Since psychotic auditory hallucinations can diminish quality of life and cognitive function for the target group [45] these results are interesting. The results related to an increased ability of emotional regulation and symptom relief is also confirmed by findings from another recent qualitative study of SM interventions in mental health inpatient units [17]. In addition, a recent neuroscientific review by Rodriguez et al. [46] also stated that interventions focusing on using sensory strategies could be a potentially strong and easily applied strategy for emotional regulation.

Finally, as the intervention was provided in a group format with the possibility of discussion points at sessions there was also a process of informal peer support experienced by the informants. Peer support is an important part of recovery-oriented practice and has been shown to enhance aspects of hope for recovery [26,40]. The group format was viewed as an important part of creating feelings of belonging and sharing difficult experiences with each other in a safe space. These results are not surprising due to the power of group dynamics [47] and similar results have been shown in earlier studies of providing occupational therapy interventions in a group format [21,25]. According to the informants' descriptions of being in a safe space, this could potentially be one powerful factor influencing the impact of this intervention. This is also in line with earlier research by

Geller et al. [48] showing that feelings of safety were a crucial factor for therapeutic change. Feelings of safety are strongly influenced by responses to sensory stimuli and regulation of arousal within the autonomic nervous system [48]. Research and theories of neurophysiological processes support the basic premise of SM that sensory input can be used to directly stimulate both the sympathetic and parasympathetic branches of the autonomic nervous system, and therefore help regulate arousal and support optimal engagement in everyday occupations [3,6,9]. The findings of the present study suggest that the process of developing interpersonal safety and co-regulation with a group setting can be seen as a powerful SM intervention in itself.

Overall, the results from service users' voices are promising regarding the usefulness of a group-based SM intervention. However, as the research of SM interventions in group format is scarce, especially in outpatient mental health units, further studies are warranted.

Methodological considerations

To establish trustworthiness and to ensure an active reflexive approach within thematic analysis, all authors were engaged in the analysis process and analytical ideas. Codes and themes were discussed thoroughly in an iterative process with a back-and-forth movement between empirical material and the constructed themes to make sure that the latter made the empirical material justice [27,49].

All the authors had some preconceptions of sensory modulation interventions in general, but not the specific intervention. A potential limitation of the study was that the first author had not read the manual before the interviews were done. This could have had an impact on how detailed the interview data was and thus have further affected the findings in the analysis. However, the reason for this choice was that the interviewer should be as open as possible to the informants' experiences. A further possible limitation in the study was the lack of gender diversity, which may have affected the transferability in the target group with the findings possibly being more relevant for women than for men and non-binary persons.

Conclusion and clinical significance

The study showed that the informants experienced increased embodied awareness and better abilities to manage occupations and take control of everyday life. They used their knowledge about SM to be able to regulate themselves physically and emotionally, to optimise their well-being and occupational engagement. Further, the reported process of accepting and befriending the self along with the strengthening group process was crucial for the process of personal recovery that seemed to occur through the intervention.

These results are of value for occupational therapists and other professionals working in mental health outpatient units when developing optimal rehabilitation to facilitate engagement in occupations for the target group. However, further qualitative studies and larger quantitative studies are needed to expand the knowledge base of group-based SM interventions.

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