



Fostering physical activity motivation at substance use disorder treatment facilities: A qualitative study grounded in self-determination theory

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ABSTRACT

Background and aims: Studies have found inconclusive results for the effects of physical activity (PA) interventions on substance use, mental health, and physiological health of people experiencing substance use disorders (SUDs). To improve PA interventions for individuals with SUDs, a deeper understanding of the underlying motivational processes is imperative. This study employs self-determination theory as a framework to explore factors impacting PA motivation in SUD treatment contexts.

Methods: A qualitative research design utilising semi-structured interviews explored the experiences and perspectives of five people with lived or living experience of SUD treatment and five stakeholders within SUD treatment facilities across Western Australia. A reflexive thematic analysis was employed for the data analysis. **Results:** Five themes were developed: (i) Belonging to a Community, describing the sense of community fostered by group PA (ii) Mind, Body, and Soul, outlining the impact of PA on mental and physical well-being and sense of self; (iii) Physical Activity and Recovery Integration, describing how structured PA supports individuals transitioning from SUD treatment to community environments, (iv) Goals and Rewards, illustrating how setting goals fosters a sense of accomplishment, and (v) Safe Space, describing the importance of creating safe environments for PA exploration.

Conclusion: Insights gained from this study could be used to design PA interventions that address individuals' basic psychological needs and promote more autonomous motivation while fostering peer connections, PA knowledge, and independence. These implementations may lead to greater PA engagement and adherence.

1. Introduction

Treatments for substance use disorders (SUDs) often have poor adherence rates and high risks of participant relapse (e.g., Thal et al., 2023; Thompson et al., 2020), highlighting the importance of finding ways to improve outcomes. Physical activity (PA) is associated with multiple long-term benefits for the mental and physical health of individuals with SUDs (Piché et al., 2023; Thal et al., 2023). Research has shown that like substance use, PA activates the dopaminergic brain reward system, enhancing responses to natural rewards, which

potentially normalises the disrupted dopaminergic signalling that occurs with SUDs (Abrantes & Blevins, 2019). Therefore, PA may be a promising adjunct treatment for people with SUDs (Weinstock et al., 2017).

1.1. PA interventions for SUDs

Engaging in regular PA may contribute to numerous health benefits, such as improved respiratory capacity, endurance, cardiovascular function, neuromotor skills, flexibility, and physical fitness in people with SUDs (Giesen et al., 2015; Hallgren et al., 2017). Nevertheless,

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findings regarding the effects of PA interventions on psychological factors and substance use among individuals with SUDs are inconclusive. Some studies have reported improved self-esteem, quality of life and perceived well-being (Gür & Can Gür, 2020; Furzer et al., 2021) and decreased craving, substance use, and psychological distress (Piché et al., 2023; Saxena et al., 2009). Other studies have not found significant effects of PA on substance use, self-efficacy, anxiety, or depression (e.g., Giménez-Meseguer et al., 2020; Thompson et al., 2020). These inconclusive findings could be due to heterogeneous study designs, intervention approaches, and outcomes. Additionally, many studies do not account for adherence to PA interventions, which plays a crucial role in achieving the desired benefits (Giménez-Meseguer et al., 2020; Thal et al., 2023). The development of effective PA interventions requires an understanding of the factors that contribute to poor PA adherence among participants with SUDs (Abrantes & Blevins, 2019).

Difficulty sustaining motivation for PA is one factor that may contribute to low adherence to PA interventions within SUD treatment settings, yet a recent review found that previous PA intervention studies rarely address motivation for PA (Thal et al., 2023). This is a major gap as motivation is a well-documented barrier for PA participation in the context of SUD treatment (Abrantes & Blevins, 2019; Zschuke et al., 2012). A recent systematic review found that offering choice and tailoring support for PA participation to align with an individual's abilities, preferences and beliefs fostered PA motivation in the context of SUD treatment (Horrell et al., 2020). This finding aligns with the tenets of self-determination theory (SDT).

1.2. Self-determination theory

SDT (Ryan & Deci, 2000, 2017) has been used to inform numerous PA interventions across a range of populations (Quested et al., 2021). It is a macro theory of motivation that proposes that the basic psychological needs of relatedness (connection and belonging), competence (effectiveness and task mastery), and autonomy (choice and self-direction) are essential for developing autonomous motivation for behaviours such as PA (Teixeira et al., 2012).

In SDT, motivation is viewed along a continuum. At the lower end of the continuum is amotivation, reflecting lack of intrinsic or extrinsic motivation to engage in a behaviour. This is followed by extrinsic motivation which comprises of a) external regulation (behaviour driven by external rewards or pressures), b) introjected regulation (internal pressures or ego involvement), c) identified regulation (alignment with personal values and goal), and d) integrated regulation (alignment with one's core values). External and introjected regulations represent low quality, that is, controlled motivation, and lie at the low end of the self-determination continuum. In contrast, identified and integrated regulations represent high quality, that is, autonomous motivation, and lie at the high end of the continuum. Besides amotivation and extrinsic motivation, in SDT there is a third type of motivation called intrinsic motivation (behavioural engagement due to enjoyment), which lies at the highest end of the self-determination continuum. SDT predicts that when the basic psychological needs for relatedness, competence and autonomy are satisfied, one's motivation is likely to shift along the continuum from amotivation and controlled forms of motivation to more autonomous motivation, i.e., from lower to higher quality motivation (Ryan & Deci, 2017). It is important to note that an individual can simultaneously experience multiple forms of motivation for the same behaviour. For instance, one may feel introjected regulation ('I should exercise') while also experiencing identified regulation ('Exercise is important for me'; Miquelon et al., 2017).

Contextual factors (e.g., perceptions of how others behave and support) may influence whether these psychological needs are met. Contexts that support versus contexts that thwart needs may thus promote or hinder one's striving, respectively (Ryan & Deci, 2000, 2017). Autonomy support from the social environment (e.g., provision of choice and provision of meaningful rationales for task engagement) and refraining

from controlling behaviours (e.g., intimidation and conditional acceptance) is positively associated with need satisfaction and, in turn, with life satisfaction and positive health behaviours (Ng et al., 2013; Ntoumanis et al., 2021). Competence support (i.e., provision of challenges and opportunities, encouragement, and structure) and relatedness support (i.e., showing interest, empathy, and care) were also associated with positive health behaviours (Ntoumanis et al., 2021). It is also noteworthy that a context can exist which neither supports nor thwarts need satisfaction. Such a context is called need indifferent (for more details, see Huyghebaert-Zouaghi et al., 2023; Ntoumanis, 2023).

The Australian National Health and Medical Research Council (2016) recommends the active involvement of consumers in the development of behaviour change interventions. This reflects the broad advocacy for stakeholder engagement (Brett et al., 2014; Gray-Burrows et al., 2018; Staniszewska et al., 2012) in behaviour change intervention research. Identifying and focusing on the priorities and needs of the end users (i.e., those who receive and those who implement the intervention) when designing behaviour change interventions is likely to enhance their relevance, quality, engagement, and acceptability.

Given the well-documented lack of comprehensive inclusions of theory in the development of behavioural interventions (Prestwich et al., 2014), this study was grounded in SDT. It aims to explore experiences of PA motivation, and perceptions of basic psychological need support and need satisfaction from the perspectives of people with experience of SUD treatment and other stakeholders in SUD treatment facilities. Study findings could inform the design of interventions aimed at promoting PA participation and maintenance in SUD populations.

2. Method

2.1. Study design

This qualitative study used semi-structured interviews, grounded in a constructivist epistemology, to understand participants' subjective experiences of PA motivation, while recognising these experiences were shaped by their social and cultural context (Denicolo et al., 2016).

2.2. Positionality statement

We acknowledge our role as researchers and how our positionality informed data collection and analysis (Levitt et al., 2018). The two authors involved in the collection, processing, and analysis of the data (ST and CG) are Caucasian psychologists residing in Australia. ST has five years of experience working with people with SUDs. All authors are advocates of PA and believe it is beneficial for physical and psychological well-being. To identify the potential influence of our positionality on the research approach, we engaged in reflexivity. This involved reflective journaling and detailed notetaking throughout the research process, as well as ongoing reflexive dialogue between CG and ST and structured reflexive discussions within the research team.

2.3. Ethical considerations

Ethics approval was granted by the Curtin University Human Research Ethics Committee (HRE2022-0671), and the Western Australian Aboriginal Health Ethics Committee (HREC1215). Aboriginal and/or Torres Strait Islander people are proportionally overrepresented (around 20%) in Australian residential SUD treatment facilities. Thus, we purposefully recruited a representative proportion of Aboriginal and/or Torres Strait Islander people for our interviews. We collaborated with an Aboriginal researcher and employed research methods and processes designed to foster mutual trust and establish an equitable research partnership. We ensured that our interview guides were culturally safe and sensitive and that any potential distress was minimised by limiting the number of interview questions and other research procedures that enquired about participants' substance use and

sedentary behaviour. Any refusal from any participant to partake in the study at any stage was respected. We adhered to the six values (spirit and integrity, cultural continuity, equity, reciprocity, respect, and responsibility) outlined in the Values and Ethic Guidelines for Ethical Conduct in Aboriginal and/or Torres Strait Islander Health Research (NHMRC, 2003).

2.4. Participants

Purposeful sampling was used to recruit people with experience of SUD treatment as well as stakeholders (managers, consultants, and clinicians) from SUD treatment facilities in Western Australia that shared affiliation with the Western Australian Network of Alcohol and Other Drug Agency (WANADA). Participants were over the age of 18 and included five people with lived or living experiences (PLE; see Table 1) of SUD treatment and five stakeholders (see Table 2) from four different SUD treatment facilities. The average age of participants was 39.8 years (SD = 11.8). Seven participants identified as Caucasian, two as Aboriginal and/or Torres Strait Islander and one participant identified with another ethnicity.

2.5. Procedure

WANADA identified suitable facilities for the study and passed on the study information to staff members at these facilities. We emailed study information to key stakeholders at each of the facilities who expressed their interest in participating in the study. Individuals with experience of SUD treatment were recruited in collaboration with partner facilities, which helped identify and connect potential interviewees with researchers. Prior to the interviews, participants were emailed a link to an online information sheet, consent form and a demographic questionnaire. Interviews were conducted using the most convenient location and format for the participants, resulting in a mix of in-person, telephone, and online video interviews. Interviews were conducted by ST, a

Table 1
Sociodemographic characteristics of PLE.

Sample Characteristics	n	%	M	SD
Age			34.25	4.42
Gender				
Female	1	20		
Male	3	60		
Ethnicity				
Aboriginal	2	40		
Caucasian	2	40		
Other	1	20		
Currently Physically Active				
Yes	2	40		
No	3	60		
Days Physically Active ^a				
4-7	2	40		
Physical Activity in Treatment ^b				
Yes	4	80		
No	1	20		
Current Substance Use				
Alcohol	2	40		
Benzodiazepines	1	20		
Nicotine	2	40		
Cannabis	1	20		
(Meth-)Amphetamines	1	20		
Painkillers/Opioids	1	20		
Employment				
Part-time	1	20		
Full-time	3	60		

Note. n = 5. Data from one participant is partially missing.
^a Days per week on which moderate or vigorous physical activity is currently performed for at least 30 min.
^b Was physical activity a part of the substance use treatment participants engaged in.

Table 2
Sociodemographic characteristics of stakeholders.

Sample Characteristics	n	%	M	SD
Age			44.2	14.48
Gender				
Female	3	60		
Male	2	40		
Ethnicity				
Caucasian	5	100		
Currently Physically Active				
Yes	4	80		
No	1	20		
Days Physically Active ^a				
1-3	1	20		
4-7	3	60		
Employment				
Part-time	1	20		
Full-time	4	80		
Job Role				
Managing role	3	60		
Exercise Physiologist	1	20		
Registered Counsellor	1	20		
Years Employed				
Less than 10	3	60		
Greater than 10	1	20		
Greater than 20	1	20		

Note. n = 5.
^a Days per week on which moderate or vigorous physical activity is currently performed for at least 30 min.

PhD student in Psychology, using a semi-structured interview guide. The guide was refined through input from collaborating organisations, resulting in two respective interview guides, one for individuals with lived or living experiences of SUD treatment and one for stakeholders. Each guide had 18 open-ended questions (see Supplementary Material E) and explored personal values regarding PA, barriers to implementing PA interventions, and barriers to and facilitators for PA motivation. Example questions for PLE included “how important is PA for you?” and “what motivates you or could motivate you to do more PA? For these questions, probes were included, such as “health reasons?” and “feeling a sense of pleasure or satisfaction from it?”. Stakeholders were provided with a similar structure of questions such as “thinking about your experiences – are PLE fairly regularly active?” and “What motivates or could motivate PLE to being or do more PA”. The same set of probes were provided to stakeholders.

The interviews lasted between 30 and 45 min, with an average of 33 min, and took place over six weeks. Interviews were audio recorded and transcribed verbatim using Otter.ai. To ensure the accuracy of transcripts, audio cross-checking was performed. Upon completion of the interviews, participants were provided with the opportunity to indicate their interest in obtaining feedback about the study’s findings. As a token of appreciation for their time and contribution, participants were given a \$35 supermarket voucher.

2.6. Data analysis

We used deductive reflexive thematic analysis (Braun & Clarke, 2021) to identify factors that influence PA motivation within SUD treatment facilities through the lens of SDT. We adopted a critical orientation to explore the mechanisms shaping the construction of systems of meaning, offering interpretations that go beyond the participants’ explicitly stated perspectives (Byrne, 2021). This approach involved interrogating underlying factors, such as societal norms, and their contributions to participants’ experiences, even when these factors were not explicitly articulated by the participants themselves. The RTA was conducted in line with Braun and Clarke’s (2021) six analytic phases.

2.6.1. Phase one – familiarisation

As part of initial familiarisation, CG listened to the audio recordings, focusing on the participants’ expressions and communication. Afterwards, audio-recordings and transcripts were cross-checked to ensure a comprehensive understanding of the data.

2.6.2. Phase two – generate initial codes

Next CG, and separately ST, carefully read the transcripts and applied semantic codes to any meaningful information related to SDT principles. The transcripts were revisited, and latent coding was employed to identify underlying insights beyond the participants’ explicit statements. As coding progressed, CG recorded connections between the codes which reflected our thought processes (see Supplementary Materials A and B).

2.6.3. Phase three – search for initial themes

The process of generating themes involved searching through the codes to find common experiences and perspectives. During weekly meetings, the coding team met to discuss the grouping and merging codes to develop initial themes. This process was aided by an iterative review of notes, diagrams of how initial themes may relate to each other, and reflective journaling (see Supplementary Materials B and D for a preliminary representation of the team’s understanding of the relationships between emerging themes, which was iteratively reviewed and revised in Phase 4).

2.6.4. Phase four – reviewing potential themes

Potential themes were reviewed, with supporting evidence from each transcript mapped to the themes. A thematic map was created to visually represent the analytic narrative that the themes could convey (see Supplementary Material C). Potential themes were refined via discussion within the research team to ensure compatibility with SDT principles.

2.6.5. Phase five – defining and naming themes

CG proceeded to define each theme, with inputs from ST to enhance clarity and distinctiveness of themes and the emerging narrative. To ensure comprehensibility for readers less familiar with the data, this process was repeated with the other co-authors. Subsequently, we have discussed preliminary themes and findings with a stakeholder advisory group.

2.6.6. Phase six – reporting findings

A logical connection among the themes was established to provide an analytic narrative supported by evidence relevant to SDT (Braun & Clarke, 2021).

3. Results

Five themes were developed: (i) Belonging to a Community, which describes the sense of community fostered by engaging in group PA (ii) Mind, Body, and Soul, which described the impact of PA on both mental and physical well-being and sense of self; (iii) Physical Activity and Recovery Integration, which described the impact of structured PA on supporting the transition from SUD treatment environments to community environments (iv) Goals and Rewards, which described setting goals to foster a sense of accomplishment, and (v) Safe Space, which described the importance of creating an environment where individuals can explore PA safely. Table 3 presents the themes, illustrated with representative quotes from study participants.

3.1. Belonging to a community

Participants highlighted the connections and encouragement that arise when engaging in PA within a supportive group environment. PLE of SUD treatment described rehabilitation as a lonely process and

Table 3
Quotes from the themes developed in the reflexive thematic analysis.

Theme	Speaker	Example Quote	
Belonging to a Community	PLE 3	I think teams [are] really important because when you first get clean you feel alone, and if you can bond with people, it’s a really important thing.	
	PLE 4	fitness for people with substance abuse, it provides structure, it also provides a place of belonging, so that kind of ... belonging to like a fitness group.	
	PLE 1	but the group one was, was a good thing as well. Sort of made it a little bit of a community	
	S 5	Well, it’s about connection. It’s about building a team ethos through exercise as a whole basic component. In terms of building cohesion for the individual, to be part of a team.	
	S 4	I mean, motivation is obviously not a fixed state, and it goes up and down. When motivation is low, that’s where things like having a community or a group of people to carry you through that is helpful.	
	Mind, Body, and Soul	PLE 4	for my mental health, if I didn’t train, I kind of get depressed, I kind of get agitated. And so, it’s very important for my mental health [to continue to train].
		PLE 5	Definitely makes me feel like mentally better.
		S 4	And also with, you know, a lot of relapses are to do with people feeling depressed and anxious and, you know, then they turn to drugs and alcohol to deal with those negative mental states. So, you know, also maybe helping them to feel ... continue to feel good in themselves and good about themselves. Yeah. So I think it can potentially have benefits.
PLE 4		I like the effects it has on my body as well, like the improvements it has in my body, like definition of your muscles, and in improving that muscle health, that cardiovascular kind of health as well.	
Physical Activity and Recovery Integration	PLE 3	exercise made me feel good, so I just keep doing it.	
	S 4	you might come for the exercise because of perhaps perceived benefits there are around say weight loss, but you stay because of either the community or the way that it makes you feel.	
	S 4	I think we learn a lot through movement, you know, we can better connect with our mind ... our mind can better connect with our body.	
	PLE 1	I think it’s important for me personally, and other people, just joining the physical, the spiritual, and what’s the other one: the mind, body, and soul, you know? Like that whole concept? I think it’s important, including them all, and just sort of intertwining them all.	
	S 2	As I do think it, it gives that option of having something to do, you know, that’s, that’s not expensive, and that can be structured. And that gives you a sense of achievement.	
	PLE 4	Alright, so now I’ve got this and I can’t drink or can’t, can’t go out tonight, because I got bootcamp in the morning. You know? Yeah. So you’ve got that kind of that structure? Yep. Yeah.	
PLE 5	the person’s got to be in the right environment and surrounded by the right people. That’s why if you’re training, maybe with the same people you’re in rehab with, all those people are going to keep you accountable.		

(continued on next page)

Table 3 (continued)

Theme	Speaker	Example Quote
Goals and Rewards	PLE 5	because with addiction, like it's so easy to isolate yourself. So yeah, once you leave the rehabilitation centre, you can just go off by yourself and just lose kind of your way a little bit.
	PLE 1	And the people I do associate with through work or outside of work, like to drink a lot and have a beer after work. Because it's just part of the culture up here. Which has influenced me, because I know I can say yes or no, but it can get quite lonely here too
	S 3	You know, all the other things will happen if they have a really clear routine, as part of their daily life, then I imagined it would be maintained.
	PLE 3	I'm not really experienced in that but setting goals I think is very important, even as small as just this week goal, or just today like I do in NA. And a lot of it is just today stuff. [...] So small goals. And like, I think there's that beautiful acronym SMART, make him smart, smart goals around fitness are really important. And if you want to be measurable, don't, I just think don't set too big a goals either. Like, don't be like, oh, you know, I'm running a marathon in two weeks, like: No!
	S 2	I do think that one-on-one support and linking to what's your exit plan, I guess, in terms of how this can fit into your life and your goals on going.
	S 1	From now, goal setting is huge, because if you don't know what you're working towards, like, you're just running blind.
	S 1	So helping them sort of figure out what it is that they want, now that they've left, because they're told they have to do these classes at [somewhere]. Again, they have to do these classes. It's part of the program. So you go along, and you do them. Right. There's no real I mean, everyone knows that exercise is good for you. But there's no real goal setting behind it. It's just part of the program. I think that having, you know, perhaps someone to just sit with and go, right, so exercise, what's your plan? I'm going to go for a walk. Okay. But why ... what is the why behind? You know, and that's just PT talk. Now, why are we doing this? What is your goal? What's your measurable goal? Okay, so this is what you need to do to achieve that, and then having the access to do that as well. So yeah, just, it's got to get him to the individual after that.
	PLE 1	and I think it just starts the track for the rest of the week. It gives you a good feeling for the remainder of the week
	PLE 3	In the morning it [a workout] would eliminate that heavy craving I'd imagine. Because you would feel satisfied.
	PLE 4	Every time I would do a club and go do a boot camp. I'd be happy. Like it'd be so much more happier. And it'd be like, Yep, I've got my next boot camps ... This at this time. So yeah, especially when you're not doing much is ... you'd have that kind of ... the next thing.
	S 3	Yeah, we do have a goal setting class and a lot of people do pick that. Such as I'm gonna ... when they start getting a bit better, and start seeing the rewards of fitness, they do start saying, I'm going to work out more this week. And they will set that for themselves. So yeah, I think it would be effective if it's conducive to what that person wants.

Table 3 (continued)

Theme	Speaker	Example Quote
Safe Space	S 2	they need that kind of structured support to make sure that the exercise they're doing is safe and appropriate
	S 1	Education, again, you know, like you might not know, particular exercises and how to do them properly, or even if you're doing them and your form's a little bit off. So, someone's just going on, you need, maybe just tweak this or whatever that case may be
	PLE 1	Just setting the ... setting the ground and the space and the environments and just making people realize it's a safe space.
	S 2	And, you know, it doesn't mean that an exercise physiologist guarantees that but I think people who can just have emotional intelligence and understand where people are coming from and, and be culturally appropriate to be able to make people feel safe to support them to do movement.
	PLE 1	some of us can be ashamed. You know? And, you know, the common like, people would rather be inside, you know, so no one's seeing you.
	S 2	obesity, and even shame ... shame about size or exercise perhaps being you know, white fellas business.
	S 4	That shame is another one. Yeah. So yeah, especially those that have got a bit of extra weight on or they're not as strigil or as well as they could be. They don't always like to exercise in front of other people.
	S 3	he [personal trainer] is Mr. Motivator. And also, you know we have the support staff sometimes participate. So, it's about mentorship, leadership and role modelling what is good practice for your health.
	PLE 4	you just need to find that kind of mentor. That's how I kind of did it as well. Found someone who would help me ... Keep me accountable.
	PLE 3	that it's fun [exercise]. Not that it's gruelling. It's really important that we teach them that it's fun. Because it is
	PLE 1	Yeah, I think it needs some fun.
	PLE 4	As long as your release ... like having fun doing it. I mean, there's no point doing it if you're not having fun as well. Yeah. Enjoying yourself? Getting those ... that positive vibe.
	S 5	Something that encourages autonomy. Yeah, I think choice.
	S 4	And supporting them ... they have to come within their own time. And yet providing them with some options to do exercise independently if they do muster up the motivation. [...] I think a bit of both, I definitely think there needs to be a facilitator. But we also do, you know, you do want to build this idea around independence and empowering and self management, and, you know, supporting people to see how they could do it by themselves.
S 3	I mean, something that's familiar for them and reminds them of home think definitely. Something that encourages autonomy. Yeah, I think choice. Yeah. And not sort of like spoken ... like this is how we do it.	

Note. PLE = People with lived or living experiences of SUD treatment; S = Stakeholders.

perceived building connections as an important part of the recovery process (PLE3). Several participants described how their experience of engaging in group PA provided a sense of belonging and connection to others based on mutual understanding (PLE4, PLE1, S5). There was an overriding consensus that being part of a group played an important role

in fostering motivation for PA at a vulnerable time when bonding with others was so important.

Treatment stakeholders agreed that being part of a community was an important source of support and motivation for SUD treatment and recovery and viewed group PA as an additional opportunity for clients to build a supportive community in which they could encourage and motivate each other, providing the necessary support to reach their recovery goals. Group support was considered especially important when individuals experienced amotivation (S4).

3.2. Mind, body, and soul

Stakeholder and PLE all described the impact of PA on their mental and physical well-being and sense of self. They described how the positive effect of PA on mental health motivated them to continue to engage in PA interventions. Both PLE and stakeholders expressed that PA within SUD treatment facilities can function as a coping mechanism and potential tool for managing mental health challenges (PLE4, PLE5, S4).

Participants also described how the physical health benefits of PA motivated them to sustain PA, tapping the identified regulation aspect of motivation. When discussing the importance of PA and its benefits, many participants referred to the physical benefits (PLE4). Although the physical benefits may act as the initial incentive to engage in PA, several participants explored other reasons such as the sense of community, or the 'feel-good' factor, as key to maintenance of PA behaviours (PLE3, S4). The Mind, Body, and Soul theme illustrated that although weight management may be important in developing motivation, factors such as community and enjoyment, capturing the need for relatedness, may be more important in sustaining PA motivation.

An integral aspect of this theme was the interconnectedness of mind, body, and soul. Participants conveyed how PA goes beyond mental and physical health benefits, as it facilitates a deeper connection to their minds and bodies, potentially capturing the integrated aspect of motivation in which the activity is an important part of one's self. Physical movement provides individuals with a means of better understanding the relationship between their mind and body which enabled them to connect with a deeper sense of empowerment (S4, PLE1).

3.3. Physical activity and Recovery Integration

The theme Physical Activity and Recovery Integration referred to progress towards a healthier lifestyle following substance use treatment. PLE described the importance of remaining committed to engaging in PA post-treatment. Those who had undergone treatment emphasised the importance of having a good social support network and a structured environment after treatment, both for SUD recovery and PA engagement. They emphasised how this had helped them during the treatment process, and that distancing themselves from substance-related influences and surrounding themselves with individuals who held them accountable and encouraged them to adhere to their PA goals retained its importance in the post-treatment period. Participants further described the importance of carrying over the structured and supportive environment of SUD treatment into their post-treatment lives. Participants described the need for structure in addition to a good support network, with examples of how this environment could include structured and pre-scheduled (group) exercise sessions that participants thought may reduce risk of relapse, as the commitment to exercise and a structured exercise regime may increase PLE's accountability and discourage from using substances (S2, PLE4). According to participants, creating a supportive and structured environment helped counteract negative social influences and stay committed to engaging with PAs (PLE5, PLE1).

Participants expressed a sense of loneliness and isolation post-treatment, describing this as a barrier to engaging in PA. Post-treatment integration in structured environments, including PA, might help counteract these challenges (PLE5).

3.4. Safe space

Participants described how creating a safe space involved enhancing knowledge on appropriate engagement in PAs, providing mentorship, and ensuring that the PA is enjoyable. Participants also emphasised physical safety when engaging in PA by educating individuals about the correct execution of exercises to minimise their risk of injury (S2, S1).

Stakeholders and PLE further reinforced the importance of fostering an environment where individuals feel confident and psychologically safe to engage in PA (PLE1, S2). Specifically, shame related to body composition (i.e., obesity), perceived lack of fitness, and cultural perceptions of PA might otherwise prevent PLE from exercising (PLE 1, S2, S4).

Both PLE and stakeholders described how having a PA mentor for guidance helps PLE establish a feeling of psychological safety, support, and commitment (S3, PLE4).

Additionally, PLE emphasised the importance of incorporating fun and enjoyment, i.e., intrinsic motives, into PA so to enhance PLEs' inclination to participate in PA (PLE3, PLE1, PLE4). Further, stakeholders expressed that, in addition to requiring support, individuals value the freedom to explore PA options and the autonomy to decide what types of activities to pursue and how to participate, describing this choice as empowering and fostering PA motivation (S5, S4, S3). Thus, while PLE highlighted the importance of considering intrinsic motives (enjoyment), stakeholders focused on autonomy need satisfaction.

3.5. Goals and rewards

PLE described the importance of setting attainable, short-term goals for their recovery and PA to foster a sense of accomplishment. According to participants, achieving small PA goals contributed to positive feelings such as a sense of satisfaction and motivated them to continue with PA. PLE elaborated that achieving small PA goals led to rewarding experiences, such as feelings of satisfaction and the reduction of negative feelings like cravings (PLE3, PLE1).

Stakeholders also described the significance of establishing long-term PA goals. Participants described having a structured PA plan or a PA goal to work towards as a factor that supports motivation to maintain involvement in PA posttreatment (S1, S2, S3).

4. Discussion

This study is the first qualitative investigation applying SDT to understand PA motivation in SUD treatment contexts. The findings outline five themes that describe how basic psychological needs may be satisfied or undermined in the context of PA within SUD treatment.

The *Belonging to a Community* theme demonstrates that group PA provides a foundation for establishing a sense of relatedness, allowing PLE to encourage each other, which in turn may foster sustained participation. This highlights how satisfying the need for relatedness fosters more autonomous motivation. Research has found some disparity in the role of perceived relatedness in the exercise setting (Hancox et al., 2018; Ntoumanis & Moller, 2023; Teixeira et al., 2012). Teixeira et al. (2012) found that the context of exercise itself may explain the lack of association for relatedness satisfaction. In contexts where exercise is predominantly a solitary activity, the need for relatedness may not be as prominent as for team-based activities (Teixeira et al., 2012). It is important to note that optimal social environments are not likely to be the same for every individual (Kirkland et al., 2011). Brown et al. (2009, 2010, 2014) found that treatment adherence is facilitated by group interventions among individuals with an alcohol use disorder. This aligns with our findings related to how group-based PA can counteract the isolation often experienced during SUD treatment and recovery and, in turn, can lead to more autonomous motivation to engage in PA. Group support and group PA emerged as particularly important factors in supporting individuals experiencing amotivation,

suggesting that social support may facilitate an individual's transition from amotivation to autonomous motivation. This process mirrors how autonomy support is postulated to move individuals alongside the SDT continuum towards more autonomous motivation (Ntoumanis et al., 2021).

The literature has consistently shown a positive association between psychological need satisfaction and exercise participation (Teixeira et al., 2012). Many people may not feel sufficiently competent to participate in PA, such as not being physically fit enough or skilled enough to exercise (Teixeira et al., 2012). The *Safe Space* theme supports such findings, with participants highlighting the importance of providing PLE with the necessary knowledge and guidance, through mentorship and instruction, on how to properly execute PA to overcome competency-related barriers and to create a safe environment that fosters motivation. Roessler, Bramsen, Dervisevic, and Bilberg (2017) also found support for the important motivating role of an instructor and a safe environment to foster PA motivation within those with an alcohol use disorder. An environment where individuals feel confident, psychologically safe, and relatively free from shame to exercise was considered particularly important. This finding aligns with previous research reporting that intimidating exercise environments and perceptions of others can deter participation (e.g., Neale et al., 2012; Sari et al., 2017). Within the *Safe Space* theme, PLE emphasised the need for PA to be enjoyable, reflecting intrinsic motives that are positively associated with PA behaviour (Teixeira et al., 2012). Both the pursuit of positive emotional experiences and the promotion of these states during exercise are essential for establishing psychological safety. Enjoyment nurtures a positive emotional atmosphere, crucial for cultivating a setting where individuals feel secure, respected, and able to engage fully without fear (Vella et al., 2024). Stakeholders emphasised the importance of providing PA choices for PLE. These findings align with the SDT-based premise that autonomy support and autonomy need satisfaction are important prerequisites for autonomous motivation and sustained PA participation (Ntoumanis et al., 2021) and with the principles of person-centred care (Marchand et al., 2019). These findings also align with previous research grounded in SDT that found a positive relationship between autonomy support and various positive outcomes, such as greater autonomous self-regulations, increased need satisfaction and higher PA attendance rates (Fenton et al., 2021; Hancox et al., 2018; Ntoumanis & Moller, 2023). The divergent focuses of PLE and stakeholders underline the importance of including both groups in our analysis. PLE may prioritise enjoyment because of its immediacy, a sensation they are familiar with from substance use. Conversely, stakeholders promote strategies associated with long-term behaviour change, enabling PLE to regain and maintain control of their lives – which is a fundamental principle in most substance use treatment approaches. While PLEs' emphasis on enjoyment might lead to immediate increases in PA behaviour, stakeholders' focus on autonomy support might facilitate long-term PA sustainment. These findings highlight the need for a balanced approach in PA interventions for PLE with SUD, one that incorporates both the immediate appeal of enjoyable activities and the long-term benefits of autonomy-supportive strategies.

The *Physical Activity and Recovery Integration* theme highlights the importance of satisfying one's basic psychological needs to support autonomous motivations and behaviour change. The importance of a need supportive environment within SUD treatment facilities and the positive impact this has on PA participation is emphasised. This aligns with previous findings by Ntoumanis et al. (2021) evidencing increases in need support and autonomous motivation to be associated with positive changes in health behaviours such as increased PA. Physical Activity and Recovery Integration also highlights that many individuals return to environments that no longer support their basic psychological needs post-treatment. If these individuals have not internalised PA motivation during SUD treatment, their PA participation outside of treatment may decline. This may be further compounded by a lack of need support outside of the treatment facility which may reduce feelings

of need satisfaction. Reduced feelings of need satisfaction are, in turn, a key predictor of physical activity cessation (Ntoumanis et al., 2021; Teixeira et al., 2012). The above aligns with Mullan and Markland's (1997) suggestion that controlled motivations may result in more relapses from exercise due to fluctuating motivation regulations. This underscores the significance of internalising PA motivations to mitigate motivational setbacks (Teixeira et al., 2012).

The *Goals and Rewards* theme demonstrates how PLE tend to prefer achievable short-term introjected goals while stakeholders emphasised the importance of long-term intrinsic goals, which can clarify motivation for PA, aligning this with the person's core values. Individuals have unique reasons for setting goals and these reasons vary in the extent to which they represent autonomy (Koestner & Hope, 2014). One may pursue an exercise goal because it reflects their interests and values, whereas another may pursue the same exercise goal because of external or internal pressures (Koestner & Hope, 2014). Sheldon and colleagues completed a series of studies examining the extent to which the source of goals impacted their attainment (Sheldon & Elliot, 1999; Sheldon & Houser-Marko, 2001; Sheldon & Kasser, 1998). They found autonomous (i.e., intrinsic) goals were significantly associated with greater goal progression over time. Our study's findings align with this earlier work and a recent meta-analysis by Sezer et al. (2024), highlighting the significance of PA goals being personal, achievable, reflective of one's core values, and capable of evolving into viable long-term intrinsic goals. Similar to the *Safe Space* theme, there appears to be a difference in future orientation between PLE and stakeholders. PLE tend to emphasise short-term goals and immediate rewards, whereas stakeholder focus more on long-term objectives.

The *Mind, Body, and Soul* theme explores this continuum of motivation quality as participants discuss the physical benefits of PA acting as the initial incentive for engagement. By engaging in PA to alleviate emotional difficulties, participants may initially be driven to engage in PA by identified regulation, as they are internally rewarded for their PA with improved mental well-being. However, participants did reflect that with time, their motivations for PA expand and evolve. They described experiencing PA as personally valuable and meaningful, that is integrated regulation, which became a stronger drive for PA engagement than emotional regulation. The transition from controlled to autonomous motivation, specifically from introjected to identified or integrated regulation, reflects the internalisation process (Ryan & Deci, 2017; Ryan et al., 2022). Our findings suggest that people with living or lived experiences of SUD treatment may be more likely to internalise and integrate both the practice of and the values associated with PA, if the social context is structured and supportive, similar to earlier research in other settings (Ryan et al., 2022).

There are similarities between our findings and studies of PA interventions for individuals with severe and enduring mental illness. These studies demonstrate the benefits of PA for mental well-being, a sense of achievement, and social connection (Hodgson et al., 2011; Rosenbaum et al., 2014) and suggest that these mental well-being benefits are facilitated through PA's positive effects on social support and social engagement (Harvey et al., 2010). Another similarity is the importance of perceived autonomy and role of PA in providing a sense of structure (Hodgson et al., 2011). A key distinction between individuals with SUDs and those with severe and enduring mental illnesses is the former's emphasis on short-term introjected motives and immediate gratification in relation to PA. PLE highlight the importance of hedonic motivation in relation to PA (Stevens et al., 2020). Repeated experiences of positive reinforcement (i.e., feelings of satisfaction) and negative reinforcement (i.e., reduction of negative feelings like depression, anxiety, and craving) related to (achieving) PA (goals) may become targets of hedonically driven desire. This associative learning process may be crucial to recondition the disrupted dopaminergic signalling associated with SUDs (Abrantes & Blevins, 2019; Berridge, 2007). Similarly, the emphasis on enjoyment may reflect PLE's awareness of the need to prevent hedonically driven dread in relation to PA (i.e., the automatic

subjective experience of not wanting to engage in PA due to past experiences of displeasure during PA).

Our findings, thus, indicate that to effectively motivate PLE to increase and sustain PA levels, future PA interventions should create opportunities for participants to experience frequent, small, short-term successes and on making PA enjoyable. These considerations might be necessary to foster the internalisation process necessary to maintain PA.

4.1. Limitations and future directions

While the ultimate assessment of generalisability lies with the readers of our research, we acknowledge the need to address potential limitations in this regard. Given the broad consensus among researchers that statistical types of generalisability are not applicable to qualitative research (Braun & Clarke, 2019), we reject the neo-positivist positioning of the concept of saturation and assert that the narrow research aims and sample specificity of this study allowed for rich participant information to be obtained, demonstrating the sample to have high information power (see Malterud et al., 2016). Building on this notion, we aim to focus our discussion on the different types of generalisabilities proposed by Smith (2018), which offer a more nuanced approach to considering the broader applicability of qualitative findings:

The naturalistic generalisability (Stake, 1978, 1995) of our study might be limited. Despite our considerable effort to provide readers with ample (contextual) details, evidence, and theoretical expressions of the reality depicted in this research, we have not invited reader responses or feedback regarding their perceived generalisability of our findings. While we have discussed general findings from the interviews with a stakeholder advisory group, future research may incorporate a follow-up phase where readers, particularly PLE and stakeholders, are invited to comment on the extent to which these findings generalise to their own experience. Additionally, or alternatively, future research might engage in member reflections (Smith & McGannon, 2018) to foster further dialogue and generate deeper insights into the findings.

We have attempted to enhance the transferability of our research (see Smith, 2018) through the inclusion of testimonies and rich descriptions of participants' accounts. While readers will ultimately need to judge the intuitive transferability of our findings, we acknowledge that SUD treatment contexts and available resources for treatment are highly variable. Consequently, the transferability of our findings may vary and may be limited to similar populations and treatment contexts.

Analytical generalisation (Lewis et al., 2014; Polit & Beck, 2010) was established through the application of our findings to SDT – an established macro theory of motivation. This analytical generalisation enhances the theoretical understandings of motivation in PA interventions within SUD contexts, specifically. Future studies should aim to replicate these results in diverse SUD treatment settings to further strengthen this generalisation and explore its boundaries.

The intersectional generalisability (Fine et al., 2008) of our study is limited. While we focused on including a representative number of participants who identified as Aboriginal and/or Torres Strait Islander people, we recognise that this was primarily done to ensure cultural safety and sensitivity, and to enhance the broader applicability of our results to SUD populations in Western Australia. However, our interviews did not specifically focus on the motivations and needs of participants who identified as Aboriginal and/or Torres Strait Islander people. Future studies could be conducted with samples composed entirely of participants who identify as Aboriginal and/or Torres Strait Islander people to explore similarities and differences with our findings. Furthermore, future studies may employ an Aboriginal 'critical friend' to encourage reflexivity by challenging each other's construction of knowledge (Smith & McGannon, 2018) to minimise potential biases in the data interpretations.

A further limitation of this study is the heterogeneity of participants in terms of their PA levels. Although we successfully recruited participants representing a diverse spectrum of PA levels, it is worth noting

that some individuals reported exceptional levels of activity, such as marathon running, and might thus not be representative of the average PA levels encountered in individuals with SUDs. We also did not collect data on the type and duration of SUD treatment PLE received or the timing of their most recent treatment. These factors could influence their PA engagement and should be considered by future studies. Furthermore, one PLE asked to conclude the interview prematurely. However, it is crucial to recognise that this study is an exploration of individual experiences and perspectives. In this context, the experiences shared by PLE are insightful, shedding light on their PA journey and the gradual internalisation of motivations for PA over time.

Another limitation is that our sample focused on people engaged in a SUD treatment process and offers little insight into individuals with SUD who are not receiving treatment. Future research may also consider exploring individuals diagnosed with SUDs who are not currently participating in treatment. This approach may offer valuable insights into their PA motivation while still using substances. It may be beneficial to explore the varying qualities of motivations between individuals at the beginning of treatment compared to those who have already progressed in their treatments. Employing diverse perspectives in qualitative analyses can reduce potential biases in the data interpretations (Cornish et al., 2013). Lastly, future research may use the insights gained from both PLE and stakeholders within SUD treatment facilities, to facilitate a co-design approach for future PA interventions in an SUD treatment setting. Future PA interventions should be tailored to satisfy basic psychological needs to encourage autonomous motivations, potentially leading to greater PA adherence. By utilising the SDT framework along with a co-design approach, future interventions can ensure the needs of the target audience are being considered and integrated which may lead to superior results.

5. Conclusion

Participating in PA interventions in a group setting may foster basic need satisfaction, and in turn, autonomous PA motivation among individuals participating in SUD treatment. Supportive SUD treatment environments may enable individuals to internalise their motivations for PA over time, which is important in fostering high-quality and sustained motivations for PA participation. The internalisation of motivation for PA during SUD treatment is important, as people find it challenging to maintain PA when moving from a highly structured and supportive SUD treatment environment to a less structured and supportive community environment. Interventions to support the development of peer connections and PA knowledge and independence within SUD treatment may increase the likelihood of sustaining PA after treatment. Future PA interventions should be designed to provide participants with opportunities for frequent, small, short-term successes and should place special emphasis on making PA enjoyable. Future research in this domain is warranted to build upon and enhance our understanding of how to design effective PA interventions that foster sustainable PA motivation and behaviour.

CRediT authorship contribution statement

Sascha Thal: Writing – review & editing, Validation, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Chloe Graham:** Writing – original draft, Formal analysis. **Nikos Ntoumanis:** Writing – review & editing, Supervision, Funding acquisition. **Bronwyn Myers:** Writing – review & editing, Supervision. **Stephen Bright:** Writing – review & editing, Supervision. **Jocelyn Jones:** Writing – review & editing, Supervision. **Eleanor Quedest:** Writing – review & editing, Supervision, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial

interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.mhpa.2024.100650>.

Data availability

The data that has been used is confidential.

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