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ARTICLE

Development of a group-based behaviour change intervention for people with severe obesity informed by the social identity approach to health

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Abstract

Introduction: Interventions to support behaviour change in people living with chronic health conditions increasingly use patient groups as the mode of delivery, but these are often designed without consideration of the group processes that can shape intervention outcomes. This article outlines a new approach to designing group-based behaviour change interventions that prioritizes recipients' shared social identity *as group members* in facilitating the adoption of established behaviour change techniques (BCTs). The approach is illustrated through an example drawn from research focused on people living with severe obesity.

Methods: A prioritization process was undertaken in collaboration with stakeholders, including behaviour change experts, clinicians, and a former patient to develop an evidence-based, group intervention informed by the social identity approach to health. Three phases of development are reported: (1) identification of the health problem; (2) delineation of intervention mechanisms and operationalization of BCTs for group delivery and (3) intervention manualization. The fourth phase, intervention testing and optimization, is reported elsewhere.

Results: A group-based behaviour change intervention was developed, consisting of 12 group sessions and 3 one-to-one consultations. The intervention aimed to support the development of shared social identity among recipients, alongside

the delivery of evidence-based BCTs, to improve the likelihood of successful intervention and health outcomes among people living with severe obesity.

Conclusions: A manualized intervention, informed by the social identity approach to health, was systematically designed with input from stakeholders. The development approach employed can inform the design of behavioural interventions in other health contexts where group-based delivery is planned.

KEYWORDS

behaviour change, group processes, intervention, severe obesity, social identity

Around 15 million adults in the United Kingdom live with obesity, and at least 5 million live with severe obesity (di Cesare et al., 2016). Severe obesity is defined as having a body-mass index (BMI) score of ≥35 kg/m^2 with co-morbidities, or ≥40 kg/m^2 without co-morbidities (Kitahara et al., 2014). Obesity increases the risk of cardiovascular and kidney diseases, diabetes, cancer and musculoskeletal disorders (Berrington de Gonzalez et al., 2010; Lu et al., 2014; MacMahon et al., 2009; Ni Mhurchu et al., 2004; Singh et al., 2013; Wormser et al., 2011; Zheng et al., 2011), and is associated with depression and other mental health problems (Kolotkin & Andersen, 2017; Sarwer et al., 2004), which can be exacerbated by pervasive societal experiences such as weight stigma (Tomiyama et al., 2018). People with severe obesity (PWSO) additionally report significantly impaired quality of life and have a reduced life expectancy of between 8 and 10 years (Collins et al., 2016; MacMahon et al., 2009). The National Health Service (NHS) in England offers specialist, multi-disciplinary services to support PWSO in the behavioural management of their weight (often referred to as 'Tier 3' services). In accordance with the National Institute for Health and Care Excellence (NICE) guidelines, Tier 3 services offer behavioural and medical treatments (e.g., dietary regulation and increasing physical activity levels/decreasing inactivity) and include a multi-disciplinary team approach to provide patients with access to psychologists, dietitians and specialist practitioner support (NICE Clinical Guideline 189, 2014; Welbourn et al., 2016).

The causes of obesity are complex and are influenced by physiological, behavioural and environmental factors. The Foresight Obesity Map System (FOMS: Vandenbroeck et al., 2007) alerts us to this complexity by providing a comprehensive map of 108 interlinked variables ('determinants') that outline the drivers of obesity. These determinants are organized across seven key thematic clusters: (1) social psychology; (2) physiology; (3) individual psychology; (4) individual physical activity; (5) physical activity environment; (6) food production and (7) food consumption, and can help identify key drivers to target in interventions. The FOMS has been used previously to better understand the potentially modifiable social and environmental determinants of obesity (e.g., see McGlashan et al., 2018).

Similar to treatment options for other chronic health conditions, such as diabetes (e.g., Booth et al., 2015), services for PWSO have increasingly adopted a group-based approach to care, which may allow for efficient use of staff time and reduce waiting times for treatment (Swancutt et al., 2019). However, the design and delivery of such group programmes are often poorly rationalized and are highly variable (Capehorn et al., 2016; Public Health England, 2015; Swancutt et al., 2019). While a range of guidelines are available to inform the delivery of care in weight management services (Intercollegiate & Network, 2010; NICE Clinical Guideline 189, 2014; Welbourn et al., 2016), and some evidence supporting the use of and the effectiveness of groups for PWSO (Intercollegiate & Network, 2010; Paul-Ebhohimhen & Avenell, 2009), there remains scant information about precisely how group programmes are constructed, or detail of the 'active ingredients' of interventions to support behaviour change (Swancutt et al., 2019). For example, programme reports (e.g., in published service evaluations)

tend to lack precision in reporting, focusing on broad structural elements of interventions and general descriptions of content (e.g., 'dietary education') (Public Health England, 2015; Swancutt et al., 2019). The lack of clear descriptions of behavioural interventions can make it difficult to understand the mechanisms that may contribute to effective (or ineffective) interventions, in turn making programmes difficult to replicate. A better understanding of weight management interventions can be developed through using well-established taxonomies. One such taxonomy is the Behaviour Change Technique (BCT) Taxonomy version 1 (BCTTv1), which includes 93 distinct BCTs, offering a reliable method for specifying, interpreting and implementing the active ingredients of behaviour change interventions (Michie et al., 2013). The BCT taxonomy has previously been used to identify effective behavioural techniques in interventions, including for overweight and obesity (e.g., Carraça et al., 2021). However, how BCTs should be operationalized for delivery in group settings is less well understood and requires attention, as group-based interventions introduce unique complexities (e.g., group dynamics) that are not present in one-to-one interventions and may influence the effectiveness of BCTs.

Indeed, an additional and important, but often neglected, element in the design and delivery of group interventions is the role that the group itself plays in influencing intervention effectiveness. Reporting is limited about the group *context* in which behaviour change is promoted, beyond describing factors related to the structural delivery of the programme (e.g., group size, programme length) (Altman et al., 2008; Borek et al., 2015; Swancutt et al., 2019). However, how patients in a group setting come together, psychologically, *as group members*, and – crucially – how group facilitators (i.e., health care professionals) manage emergent group processes and shared social identity, can have a powerful impact on the functioning of a given group, which, in turn, may influence attendance and treatment outcomes (Haslam et al., 2011; Steffens et al., 2014; Tarrant et al., 2020). For example, Nackers et al. (2015) demonstrated that perceived conflict between people with obesity in a group-based weight management programme was associated both with poorer intervention adherence and reduced weight loss. Such findings point to the importance of delineating, on the one hand, the group processes that are likely to support behaviour change and, on the other hand, the group leader actions that may give rise to them (see Tarrant et al., 2020). The social identity approach to health (SIAH: Haslam et al., 2018) provides a theoretical and empirical framework for addressing these priorities in the development of group-based interventions.

The social identity approach to health

Building on social identity and self-categorization theories (Tajfel & Turner, 1986; Turner et al., 1987), the SIAH (Haslam et al., 2018) articulates a core set of principles concerning the relationships between social group memberships, associated social identities and health outcomes. Central to the SIAH is the hypothesis that the potential health-related benefits of belonging to a given social group (e.g., an intervention group) are most likely to be realized if group members see themselves in terms of that group membership – i.e., when they *identify* with the group. Considerable evidence has amassed in support of this hypothesis and demonstrates the impact of social identification across a range of health outcomes (see Steffens et al., 2021) and conditions, including obesity. Through a series of interviews with PWSO attending a group-based weight management programme, Tarrant et al. (2017) found that shared social identity was experienced as an underlying factor supporting intervention engagement and progress. Specifically, participants described how developing a sense of social identification with other members of the intervention group underpinned their motivation to engage with the programme's behaviour change content during group sessions and empowered them to make desired lifestyle changes necessary for subsequent weight management. The study also highlighted the important sense of social support that participants derived from the intervention group as a consequence of identifying with it, which led them to feel less 'alone' with challenges that they faced in their everyday lives and, as participants suggested, promoted the motivation and capability necessary to implement behavioural changes (see also Borek et al., 2019; Swancutt et al., 2019; Tarrant et al., 2017, 2020).

This potential for shared social identity to shape behaviour and health outcomes comes from the ability of groups to provide its members with psychological resources such as social support (Haslam et al., 2004; Stevenson et al., 2021), meaning (Haslam et al., 2021; Tarrant et al., 2016), connection (e.g., Tarrant et al., 2017) and collective agency (Cameron et al., 2018; Haslam et al., 2014; Knight et al., 2010) that individuals can draw upon to support their health and well-being (Haslam et al., 2018). These group processes have been demonstrated to shape treatment outcomes in settings such as eating disorder prevention (Cruwys et al., 2015) and cessation groups (Frings et al., 2016). However, in line with the key principle of the SIAH, these shared resources are only able to be drawn upon by individuals to the extent that they identify with the group. Taking social support as an example, evidence suggests that individuals are more likely to perceive support as more helpful when they identify more strongly with a group (Haslam et al., 2004), and they are more likely to offer support in return (Stevenson et al., 2021). Similarly, groups can define the group norms that govern behaviours of its members (e.g., restricting calorie intake) and shape how group members may influence each other's behaviour but, again, this effect should only be seen to the extent that members identify with the group. These resources and processes shaped by shared social identity therefore represent critical active ingredients of group interventions that may shape members' engagement, behavioural change and health.

However, individuals' readiness to change and their subsequent engagement with a group intervention and its resources, as well as attempts at behaviour change, may depend on the extent to which the interactive psychological processes of 'readiness' and 'fit' are met (Oakes et al., 1994). According to Oakes et al., an individual is more likely to self-categorize as a member of a given group (e.g., as a member of a weight management group) to the extent that they are 'ready' to do so – for example, if that group membership is relevant to them and they have prior (or similar) experiences as a group member. Self-categorization is also likely to occur to the extent that group members are perceived to have something in common, distinct from other social groups ('comparative fit'), and when such a pattern of distinction is in line with prior expectations ('normative fit'). This sense of 'fit' with the group may be particularly pertinent to patients in Tier 3 weight management services who are likely to have prior (positive or negative) experiences of participating in weight management groups and accordingly have prior expectations of what group membership may entail, and which may impact how they engage with the group. Managing the emergent group processes that arise when patients come together in a group could therefore influence participants' perceived 'fit' and 'readiness', and resulting social identity as a member of that group, and potentially impact behaviour change and intervention outcomes that follow (e.g., Haslam et al., 2016).

Extending this reasoning, the Social Identity Model of Behaviour Change (SIM:BC: Tarrant et al., 2020) recognizes shared social identity as the central factor influencing the effectiveness of group-based behaviour change interventions and provides a basis for the development and management of these interventions. The SIM:BC outlines six key group processes (meaning; connectedness; emergent norms, values and goals; support; influence and agency) that provide the foundation to build group members' motivation and capability beliefs necessary for achieving behavioural goals. The model further specifies three key action sets that guide facilitators to attend to group processes arising from a group in order to enable the intervention to become a resource for change. These action sets – referred to as the '3 Rs' – are: (i) *reflection*, comprising actions to help group facilitators form an understanding of the individual group members and their health goals and priorities, including for example individuals' past experiences of weight management groups; (ii) *representation*, comprising actions for establishing a shared social identity among group members and to help the group articulate and consolidate its shared values and change goals and (iii) *realization*, involving behavioural actions (e.g., change techniques) for helping the group to achieve these goals. Thus, group leaders play a pivotal role in cultivating an environment that allows a sense of shared and positive social identity among group members (Steffens et al., 2014) by actively attending to and managing key group processes (see Haslam et al., 2011; Tarrant et al., 2020). Actively fostering a shared social identity thus helps ensure that group members are well placed to utilize the educational and behavioural skills on offer within the intervention. In other words,

shared social identity represents the platform upon which behaviour change content can be delivered and sustained (i.e., a key mechanism supporting behaviour change).

Worked example: Development of a group-based intervention for people living with severe obesity

This article reports the development process of a new group-based intervention which is designed to support the behavioural management of severe obesity. Central to this intervention is the establishment of shared social identity among patients. The intervention development process was informed by the Medical Research Council's guidelines for developing and evaluating complex interventions (Skivington et al., 2021), and drew on the following resources: (1) the FOMS to guide the identification of target determinants (priorities) for the intervention to address; (2) the BCTTv1 (Michie et al., 2013) to guide the selection of BCTs and uniquely, a description of their adoption and operationalization for group delivery; (3) the SIAH (and specifically the SIM:BC: Tarrant et al., 2020) to guide the design of group facilitation strategies that support the development of shared social identity and (4) NICE guidelines on the identification and treatment of PWSO (NICE Clinical Guideline 189, 2014) to guide intervention manualization and ensure compliance with guidelines.

The steps taken in developing the intervention are presented next, including the prioritization of target determinants and their corresponding target behaviours (i.e., behaviours to target in the intervention), description of how the change techniques for addressing these behaviours were operationalized for group delivery in a way that supports and reinforces recipients' emerging social identity, and finally, the manualization of the intervention. While the focus of the intervention is on people living with severe obesity, the development process is intended to be generalizable to the development of group interventions that support the management of other chronic health conditions, a point which is considered further in the Discussion section. The intervention, called PROGROUP (version 1, reported here), is currently being subjected to a randomized controlled trial (RCT) to test its effectiveness and cost-effectiveness.

METHOD

The intervention development process involved four linked phases of work as recommended by Hankonen and Hardeman (2020): (1) identification of the health problem and articulation of intervention objectives; (2) identification of intervention mechanisms; (3) intervention manualization and (4) feasibility testing and intervention optimization. This article reports on the first three phases; the final phase is reported elsewhere (Hawkins et al., in preparation).

Procedure

In Phase 1, a sub-group of the project team ($N = 11$) spanning a range of academic and clinical backgrounds from the PROGROUP team and a patient with lived experience of participating in a weight management programme, participated in a prioritization process to determine the key modifiable determinants to be addressed in the intervention. Clinical specialities in the sub-group comprised endocrinology, physiotherapy, clinical psychology and dietetics expertise, as well as academic experts in health services research, behaviour change, social and health psychology and public health. As part of the prioritization process, a form listing each obesity determinant from the FOMS (Vandenbroeck et al., 2007) was first distributed to the sub-group. Members of the sub-group were asked to independently rate each determinant as 'low', 'medium' or 'high' in terms of its priority for targeting in the PROGROUP intervention, accounting for the perceived importance of the determinant and feasibility of addressing it

specifically in a group setting. The sub-group were also asked to suggest any other additional priorities based on their clinical/academic expertise or experience that they felt were not adequately reflected in the FOMS.

To create an overall group ranking of the determinants, ratings were given a numerical score of 2, 1 and 0 corresponding to high, medium and low priority respectively. Blank/unclear responses were scored zero. The mean value for each determinant was calculated and ranked. Each determinant scoring an average of 1 or above was shortlisted as a priority determinant. Eleven determinants received polarized ratings, where some members scored them highly and others low. Determinants with an average score below 1 but rated by >25% (3/11) group members were not automatically shortlisted, but considered for further discussion and collective agreement. This step was taken to acknowledge how the experiences of experts from different fields may impact their perception of the importance of certain determinants (e.g., what a clinical psychologist might deem a priority could differ from that of a physiotherapist). Collated scores and additional priorities nominated by the sub-group were then reviewed during a single group meeting to determine the final list of determinants for inclusion in the intervention. The resulting determinants formed the basis of the objectives of the PROGROUP intervention.

Phase 2 consisted of a second sub-group of the PROGROUP research team comprising experts in behaviour change and social identity theory ($N = 5$). This sub-group was tasked with (1) articulating BCTs to address the prioritized determinants from Phase 1 and adapting/operationalizing these for use in group delivery; and (2) articulating the specific facilitator strategies for promoting and managing shared social identity among the patient group. Specifically, these strategies articulated how the facilitator could *support behaviour change* (through the delivery of the intervention's behaviour change content and operationalization for group delivery) while also *building the group* according to the 3 Rs (through establishing and managing shared social identity).

To articulate the intervention behaviour change content, the sub-group first drew upon the determinants identified in Phase 1 and articulated their corresponding target behaviours (i.e., the behaviours that the intervention should address). For example, in order to address the priority determinant 'portion size', it was decided that the intervention should aim to increase patients' awareness of portion sizes and identify behavioural strategies to manage portion sizes and monitor portion control (further examples are provided in the Results). Subsequently, BCTs designed to elicit the target behaviours were identified using the BCTTv1 (Michie et al., 2013) and articulated for operationalization in a group setting with a specific focus on how these might support the formation of the group's social identity (e.g., by encouraging collective problem solving and identifying shared group goals: see Results). Because there is limited research evidencing the most effective BCTs for use in programmes for people living with severe obesity (Swancutt et al., 2019), decisions about which techniques to incorporate in the intervention were informed by three sets of resources: (1) service evaluations of existing Tier 3 programmes, identified using a targeted literature search (Brown et al., 2015; Jennings et al., 2014; Logue et al., 2014; Moffat et al., 2019; Steele et al., 2017); (2) unpublished intervention materials from Tier 3 services and (3) expert opinion of health care practitioners working within Tier 3 services.

Phase 3 involved manualization of the intervention by the research team, with input and feedback from a patient advisory group which comprised past and current patients of a Tier 3 weight management service for patient facing material to ensure its compliance with NICE 189 guidelines (NICE Clinical Guideline 189, 2014). This phase involved developing a patient resource handbook and detailing the structure of the intervention (i.e., the frequency and outline of intervention sessions), as well as developing a facilitator resource handbook, session manual (i.e., session notes to guide the delivery of the intervention) and facilitator training materials. Phase 4 of the development process (feasibility testing and optimization of the PROGROUP intervention) is currently being undertaken and is reported elsewhere (Hawkins et al., in preparation).

RESULTS

Phase 1: Problem identification and development of intervention objectives

Shortlisted determinants are listed in rank order in Table 1. These determinants were drawn from across the thematic clusters, but primarily reflected themes of food consumption, physical activity and individual/social psychology. These determinants formed the basis of the objectives of the intervention, which were to: (1) create a group environment for building shared social identity among recipients, (2) address obesity determinants through use of established BCTs that are (3) operationalized and manualized for group delivery.

Phase 2: Intervention mechanisms for managing social identity and operationalization of BCTs

Supporting behaviour change

In line with research suggesting that continuous monitoring and goal setting can be helpful for sustained weight loss among people living with overweight and obesity (Spreckley et al., 2021), behaviour change clusters commonly applied in the current intervention included *Goals and Planning* and *Shaping Knowledge*. The core intervention content focused on one or more components of dietary behaviours, social and/or individual psychology and physical/recreational activity (see Appendix S1 for an overview of the PROGROUP sessions). For example, educational material was developed on topics such as portion awareness, stress management and the benefits of physical/recreational activity, and instructions/demonstrations on how to perform these behaviours. Intervention components were planned to be revisited iteratively across the intervention period (detailed further in Phase 3), such that no single component was exclusively considered in any given session. Key behavioural skills (e.g., self-monitoring) were planned for early introduction in the intervention and incrementally reinforced throughout the programme in order to support members' emerging, shared efficacy beliefs around implementing change strategies in their daily lives. Intervention recipients were expected to be encouraged to implement these strategies at home each week as 'homework' (detailed further in Phase 3), which were then discussed at a subsequent group session.

Table 2 presents the operationalization and delivery of the BCTs for group delivery. For example, BCTs were operationalized for group delivery through planned discussion tasks which asked the patient group to share and draw upon successful stories about how they had dealt with stressful situations in the past (BCT 15.3), or to develop solutions to common behaviour change barriers through group discussions and sharing of experiences (BCT 1.2) (see *Building the Group* for more detail on the facilitation strategies developed in accordance with the 3 Rs).

It was recognized that not all identified determinants were readily modifiable (e.g., some were beyond an individual's direct control), but that determinants could be interlinked and collectively impact obesity, and accordingly may have a common behavioural target. For example, strategies to manage stress and emotional eating may share common behavioural targets, such as identifying cues and solutions to emotional eating when feeling stressed, and therefore, behavioural targets in PROGROUP were planned to address multiple determinants simultaneously. It was also recognized that an individual's response to such determinants could similarly be managed. For example, 'food exposure', such as the ready availability of sugary snacks during a work team meeting, may not be a directly modifiable determinant, but nonetheless could be managed through enacting strategies to employ when such a determinant is triggered. Several such strategies were articulated (e.g., bringing alternative snacks to a team meeting or developing 'if-then' plans to control one's response to an exposure; Gollwitzer & Sheeran, 2006).

TABLE 1 Shortlisted priority determinants of obesity to be targeted in the PROGROUP intervention.

Foresight domain	Shortlisted determinants from Foresight map	Additional priorities suggested
Food consumption	• Tendency to graze[a] • Portion size[a] • Energy density of food offerings[a] • Convenience of food offerings[a] • Demand for convenience • Nutritional content of food and drink • Food variety • Rate of eating • Food exposure • Palatability of food offerings • Alcohol consumption • De-skilling • Fibre content of food and drink • *Food abundance*	• Caregiver responsibilities and relationship to eating related to 'demand for convenience' • Triggers, including non-hunger-related eating
Individual physical activity	• Level of recreational activity • Functional fitness • Level of transport activity • *Level of domestic activity* • *Level of occupational activity*	
Physical activity environment	• Access to opportunities for physical exercise[a] • Socio-cultural valuation of activity • *Cost of physical exercise* • *Opportunity for team-based activity*	
Individual psychology	• Self-esteem[a] • Stress[a] • F2F social interaction • Food literacy • Perceived inconsistency of science-based messages • Demand for indulgence/compensation • *Individualism*	• Trauma (childhood trauma, domestic abuse) and relationship to eating behaviours • High levels of self-criticism • Low mood/depression • Fear of failure
Social psychology	• Peer pressure[a] • Perceived lack of time[a] • Conceptualization of obesity as a disease • Social acceptability of fatness • Exposure to food advertising • *TV watching* • *Socio-cultural valuation of food* • *Availability of passive entertainment options*	• (Internalized) Weight stigma • Family norms, especially surrounding food and exercise, and patients' power to challenge this norm at home
Physiological	• Level of satiety • Reliance on surgical intervention • *Predisposition to activity*	• Functional exercise/muscle strength/exercise physiology
Food production	• Societal pressure to consume • *Demand for health*	

[a]Top-ranked determinants (top nine highest scores). Determinants that received polarized ratings are indicated in *italics*. Additional priorities are presented separately, assigned to the most relevant domain.

Building the group

Intervention delivery strategies to support development of the group that were identified by the subgroup included both *fixed* and *flexible* group building tasks. *Fixed* tasks were expected to be employed by facilitators in all groups: for example, at the start of the intervention (e.g., ice breakers to make salient shared interests, group-based problem solving), as group members came together for the first time (Tarrant et al., 2016, 2020). Other strategies were intended for *flexible* delivery according to the group's

TABLE 2 Examples of target behaviours and behaviour change adaptation for the PROGROUP intervention.

Example determinant	Target behaviours	PROGROUP content example (session no.)	BCT cluster/s	BCT examples	Operationalization
Portion size Energy density of food offerings Nutritional content of food and drink Food literacy	• Increase awareness of portion size for food groups • Identify strategies to manage portion sizes (e.g., barriers and facilitators) • Monitor portion sizes	• Making a plan – mealtimes (Session 2) • Starchy food, labels and support (Session 3) • Understanding hunger, creating healthy meals and snacks (Session 5) • Eating more mindfully (Session 6) • Meal planning and smart shopping (Session 7)	1. Goals and planning 2. Feedback and monitoring 4.Shaping knowledge 5. Natural consequences	1.2 Problem solving 2.3 Self-monitoring of behaviour 4.1 Instruction on how to perform a behaviour 5.1 Information about health consequences	• 1.2 Prompt group members to share challenges related to managing portion sizes and together with the group discuss and brainstorm strategies to overcome common challenges • 2.3 Ask members to record daily, in a diary, the amount of high-sugar drinks consumed throughout the day and identify common behavioural patterns at the next group session • 4.1 Ask the group to demonstrate their usual portion sizes for a certain food group and compare this with the recommended portion size guidance. Advise the group on strategies for managing portion sizes • 5.1 Explain the Eatwell guide to the group and ask members to collectively shoutout and/or brainstorm the benefits of portion awareness for weight management
Level of recreational activity	• Improve understanding about social benefits of recreational activity • Identify strategies to improve level of recreational activity • Demonstration of chair-based exercises and how to use this as a resource at home • Set achievable activity goals	• Getting active (Session 2) • Stress, sleep and exercise (Session 10)	1. Goals and planning 4. Shaping knowledge 5. Natural consequences 6. Comparison of behaviour	1.1 Goal setting (behaviour) 1.4 Action planning 4.1 Instruction on how to perform a behaviour 5.3 Information about social and environmental consequences 6.1 Demonstration of the behaviour	• 1.1 Agree on a shared group goal – for example, each member aims to take part in 5 minutes of a chosen physical activity and/or recreational activity. Members to share their progress at the next group session • 1.4 In small groups, ask group members to plan the performance of a preferred activity at a set time on certain days of the week – ask the group to share their progress at the next group session to establish group progress • 4.1 Instruct and walk the group through chair-based exercises, advising any adaptation that members may need (to be delivered by a registered exercise professional) and praise collective effort. If not qualified, ask the group (and then advise on) how to build up exercise/activity at home and signpost the group to local opportunities, and to NHS resources for alternative home exercise programmes • 5.3 Inform the group about how recreational activity could be a way to develop new, rewarding social connections – ask members to share ideas/suggestions on local groups/events with the group • 6.1 Demonstrate to the group how to carry out chair-based exercises (to be delivered by a registered exercise professional). If not qualified, ask the group how to build up exercise/activity at home and signpost the group to local opportunities, and to NHS resources for alternative home exercise programmes

(Continues)

TABLE 2 (Continued)

Example determinant	Target behaviours	PROGROUP content example (session no.)	BCT cluster/s	BCT examples	Operationalization
Stress Tendency to graze Demand for indulgence/ compensation	• Identify methods to manage stress • Prevent emotional eating when feeling stressed by monitoring behaviour/ identifying cues • Identifying past success with managing emotional eating	• Understanding hunger (Session 5) • Unhelpful self-talk (Session 7) • Managing relapse: Stopping slips becoming slides (Session 8) • Hunger and eating away from home (Session 9) • Stress, sleep and exercise (Session 10) • Relapse prevention and recovery (Session 11)	2. Feedback and monitoring 5. Natural consequences 15. Self-belief	2.3 Self-monitoring of behaviour 5.1 Information about health consequences 15.3 Focus on past success	• 2.3 Ask group members to record, in a diary, how they feel after taking part in a daily breathing exercise for a week. Share and discuss collective progress at the next group session • 5.1 Provide information about the benefits of mindful eating when feeling stressed and ask the group to take part in a group 'mindful eating' exercise (e.g., eating a sultana). Ask members to share their experiences of taking part in this activity with the group • 15.3 Ask the group to share occasions on which they have successfully dealt with negative self-talk

Abbreviation: BCT, behaviour change technique (Michie et al., 2013).

needs and were therefore expected to be employed to greater or lesser degrees and also organized according to the 3 Rs, with consideration of their potential to support group members' emerging social identity *as members of the intervention group* – that is, to ensure that the group became a collective basis for behaviour change (*realization*). The practical application of these strategies begins with the consideration of individual members' past experiences and priorities that may shape their engagement with the group, and planning opportunities for bringing the group members together in meaningful ways during the early group sessions that draw on these experiences (*reflection*). For example, instructions for facilitators encouraged learning about the individuals in the group during the initial one-to-one session in order to plan group discussions that help make salient similarities in patient experiences of weight management and priorities (e.g., drawing upon similarities between patients' shared experiences of weight management, patients suggesting solutions to common problems or attendance at commercial weight loss groups). The instructions also encouraged facilitators to anticipate the inevitable variability that exists between patients (in terms of past experiences, knowledge, priorities and needs), and the potential impact of this variability on the development and progression of shared social identity and associated group processes over time (see e.g., Cruwys et al., 2020; Tarrant et al., 2021). Finally, the instructions encouraged facilitators to reflect on this variability regularly and to tailor their delivery flexibly, recognizing that the dynamic of a given group or session can be shaped by a variety of factors that are both extrinsic to the group (e.g., a new member who joins the group mid-way through the programme) and intrinsic to it (e.g., an existing member who seeks to dominate a given discussion topic), all of which may disrupt the group and impact social identity (e.g., Nackers et al., 2015). The facilitator session manual (detailed in Phase 3) outlined strategies for facilitators to employ in order to manage such disruption (e.g., by addressing disruptive members during the session break).

As the group programme progresses, facilitators are expected to provide ongoing opportunities for patients to develop and consolidate a sense of shared ownership of the group, for example, through group discussions and shared problem solving and goal setting, reinforcing commonalities between members, praising contributions to the group and collectively recognizing/celebrating individual achievements, and also using inclusive language (such as 'we' and 'us'), in order to help create and sustain shared social identity (*representation*). Encouraging and providing members with opportunities to learn, motivate and support each other through delivery of specific BCTs were also planned to iteratively support this process, in ways that helped the group members *realize* their change goals (see before: *Supporting behaviour change*).

Phase 3: Intervention manualization

PROGROUP structure and patient material

The intervention comprised 12 group sessions and 3 one-to-one consultations delivered across a 5-month period which is comparable in length to that of many Tier 3 programmes in the United Kingdom (Swancutt et al., 2019). Key logistical aspects of the intervention were planned ahead of the programme (e.g., mid-session breaks; room set-up; group size; facilities). Group sessions 1–8 were planned to be delivered on a weekly basis, with sessions 9–12 occurring bi-weekly to allow patients to practice skills learned during the group sessions without formal weekly input from their group and to help them prepare for the end of the group intervention. Research has indicated the potential benefits for longer term weight maintenance of providing support and guidance to intervention recipients during and after the weight loss period (Spreckley et al., 2021) and reducing intervention intensity over time is associated with slower weight re-gain, a common issue reported in the weight management literature (Hartmann-Boyce et al., 2021).

The three one-to-one clinical consultations (at the beginning, mid-point and end of the intervention) were designed to fulfil several functions. First, as described earlier, they aimed to help the facilitators understand individual interests and goals (to help identify points of similarity between members that

can be the basis for group discussion: i.e., *reflection*) and to address anxieties that individual patients may have about group participation. Second, they provided confidential opportunities for facilitators to review progress with patients and provide individualized feedback on progress; and third, they supported the assessment of individual health care needs, including of medical co-morbidities, and referral of patients to additional NHS services (e.g., mental health, diabetes, respiratory and reproductive medicine) as necessary, thereby personalizing the treatment programme (see NICE Clinical Guideline 189, 2014).

A patient handbook was assembled with input and feedback from a patient advisory group comprising past and current patients of a Tier 3 weight management service. The handbook consisted of resources to support the delivery of the intervention, such as guidance about dietary intake (e.g., Eatwell guide) (NHS UK, 2022), and chair-based exercises (NHS UK, 2024). The handbook also included space to complete in-session tasks, such as bespoke intervention tasks developed by the research team, for example a 'group pulse' activity where patients were encouraged to reflect on and share their opinions about the group functioning. There was also space for homework tasks, including self-monitoring activities such as completing a physical activity log or a food diary, or follow-up tasks from group sessions (e.g., identifying a 'group name').

Facilitator materials and training programme

A facilitator manual (outlining instructions for the delivery of each group session), and accompanying slide set (for presentation of educational material and activities), was assembled by the research team. The facilitator manual detailed the intervention structure, including logistical aspects of delivery such as an equipment list (e.g., flip chart and pens), fixed intervention content (e.g., ice breakers, educational materials and behavioural skills training which were to be delivered across the programme) as well as flexible content to be delivered according to the group's needs in any given session, allowing the patient group to discuss topics deemed important to them; facilitator strategies to support the development of shared social identity among patients were also specified (see before: *Building the group*).

An online training programme was assembled to prepare the intervention facilitators to deliver the intervention. This training programme aimed to develop facilitation skills around delivering the educational content of the intervention and managing group processes, including management of group conflict and variability in individual contributions to group discussions. Facilitators also received guidance on how to manage topics that may be sensitive or distressing for patients (e.g., experiences of stigma and/or discrimination). Facilitators were provided a resource handbook to support intervention delivery which provided an overview of the programme content (Appendix S1), information about how facilitators could support patients' weight management behaviours and guidance on how to manage the group in accordance with the 3 Rs (Appendix S2). Support for facilitators during the intervention delivery period was also planned, to be provided by the research team, which included post-session telephone/online debriefs and access to an online forum for sharing experiences of intervention delivery with other facilitators.

DISCUSSION

This article demonstrates a step-by-step approach to developing a group-based intervention informed by the SIAH. The example presented here is focused on a specific, chronic health condition, severe obesity, but the development approach employed can be usefully applied to the development of other behaviour change interventions intended for delivery in group settings.

Behavioural interventions are complex in nature (Craig et al., 2008). When the mode of intervention delivery is the group, additional complexity arises from the intervention components (e.g., relevance to group members' social identity), the target health condition (e.g., for PWSO, see Vandenbroeck et al., 2007) and also the group processes that emerge during delivery. A further source of complexity

stems from the characteristics of group members themselves (e.g., personality, existing health conditions, past experiences of other groups), which can shape participants' readiness to engage with the intervention and other group members. The SIAH and the SIM:BC alert us to this specific group-based sources of complexity and signal the importance of planning for this at the intervention design stage.

Of relevance to this latter point is the two interactive psychological processes of 'readiness' and 'fit' (Oakes et al., 1994). In the current intervention, the eligibility criteria for the feasibility randomized controlled trial go some way in supporting the categorization process by targeting a specific sub-population of people living with obesity. PWSO are commonly referred to Tier 3 weight management services following a long history of living with this condition, typically have in common co-morbidities and routinely report extensive experience of weight loss attempts and exposure to stigma. However, it cannot be assumed that PWSO are always aware of the broader characteristics and experiences that they may share and which may provide a basis for shared social identity; thus, a key action for group facilitators is to *reflect* on these individual characteristics and experiences and plan ways that they can contribute to the development of shared understanding during the early phase of the intervention, following the processes outlined here – and then monitor the functioning of the group to manage these processes over time.

A feature of the intervention presented here, like other behaviour change interventions, is that it targets behaviours that are related to distal health outcomes (i.e., weight loss). However, actively attending to factors that shape shared social identity among intervention recipients can also yield more proximal health benefits. In the context of obesity, research has shown that PWSO often define themselves in relation to their weight (Hunger et al., 2015), may be at a higher risk of loneliness (e.g., Hajek et al., 2021), and are regularly subject to discrimination and prejudice in society: these experiences can become internalized with consequences for subsequent weight-related behaviours (Puhl et al., 2007; Puhl & Suh, 2015; Wang et al., 2004). Group interventions, to the extent that group members develop a sense of shared social identity, may provide a valuable context for individuals to start to address these psychosocial challenges (Branscombe et al., 1999; Farrow & Tarrant, 2009). Thus, in addition to planning intervention content focused on behavioural change (i.e., skills training targeting focal behaviours), the SIAH advocates for consideration of opportunities for realizing the broader health and well-being benefits that come from a shared social identity in group intervention settings.

While the PROGROUP intervention was specifically developed to meet the needs of PWSO, the theory and evidence-based approach to intervention development employed here should be generalizable beyond this population. Similar to other behaviour change interventions, including populations outside of obesity (e.g., Band et al., 2017), the current intervention drew upon the BCTTv1 (Michie et al., 2013) to detail the intervention's content and corresponding BCTs. While the use of the BCTTv1 is well established, this article uniquely articulates how the SIM:BC can be used alongside the BCTTv1 to provide guidance for operationalization of BCTs that is sensitive to the specific mechanisms by which groups might influence change, and specifically through the development of shared social identity. The SIM:BC, and in particular the facilitation principles it articulates (3 Rs), prescribes a flexible and adaptable approach to intervention development and delivery that encourages reflection on the needs of the specific group and its purpose, and actions taken to meet these needs, meaning that this model should be applicable across different group settings. Indeed, the principles of the model have successfully been applied previously to the development of an intervention for stroke survivors with aphasia (Tarrant et al., 2016). More broadly, the impact of social identification building interventions on health outcomes has been observed in numerous populations including individuals with chronic mental health problems, care home residents and University students experiencing social isolation or distress, with the strongest effects emerging in interventions which successfully build social identification among its group members (Steffens et al., 2021). Collectively, these findings support the suggestion that a social identity approach to intervention development is generalizable across different contexts.

Strengths and limitations

The intervention development process reported here is informed by an extensive theoretical and empirical evidence base which has established the role of social identity in shaping health outcomes. There is evidence that shared social identity can be influenced by active facilitation (Tarrant et al., 2021), and the ongoing definitive RCT of the PROGROUP intervention will help determine the causal impact of the approach on health outcomes of PWSO. The BCTs operationalized in the current intervention, such as self-monitoring and goal setting, have been similarly employed in weight management interventions for people at lower BMI levels (Borek et al., 2018; Spreckley et al., 2021), with some evidence of effectiveness (e.g., see Hunt et al., 2014), but it is not yet known whether their particular adaptation and usage contributes to intervention effectiveness in PWSO. This question is also a focus of the ongoing definitive RCT of the intervention.

CONCLUSIONS

This article outlines a theory- and evidence-based approach to the development of group-based behaviour change interventions for people living with chronic health conditions, systematically developed with input from clinicians, behaviour change experts and patients. The intervention is underpinned by the SIAH and prioritizes the importance of facilitating social identity processes alongside the provision of behavioural skills training. To the extent that it successfully supports social identity development, the approach advocated here may offer a basis for building group members' motivation and capability beliefs necessary to elicit desired behavioural changes. By systematically attending to factors that shape social identity among group members, group facilitators may be able to construct intervention environments that pave the way for the optimized delivery of, and recipient engagement with, behaviour change content.

AUTHOR CONTRIBUTIONS

Shokraneh Moghadam: Writing – original draft; writing – review and editing; investigation; formal analysis. **Laura Hollands:** Writing – review and editing; methodology; investigation; formal analysis; writing – original draft. **Raff Calitri:** Writing – review and editing; methodology; investigation; formal analysis; writing – original draft. **Dawn Swancutt:** Funding acquisition; investigation; writing – review and editing. **Jenny Lloyd:** Writing – review and editing; investigation; funding acquisition. **Lily Hawkins:** Writing – review and editing; investigation. **Rod Sheaff:** Writing – review and editing; funding acquisition. **Sarah Dean:** Writing – review and editing; investigation; funding acquisition. **Steve Perry:** Writing – review and editing; investigation; funding acquisition. **Ross Watkins:** Writing – review and editing; investigation. **Jonathan Pinkney:** Conceptualization; funding acquisition; supervision; investigation; writing – review and editing. **Mark Tarrant:** Conceptualization; writing – review and editing; methodology; funding acquisition; supervision; formal analysis; writing – original draft.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflict of interests.

DATA AVAILABILITY STATEMENT

Not applicable to this article.

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SUPPORTING INFORMATION

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