

Developing and applying a framework to understand mechanisms of action in group-based, behaviour change interventions: the MAGI mixed-methods study

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Disclaimer: This report contains transcripts from group session recordings obtained in the course of the research and contains language that may offend some readers.

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Scientific summary

The MAGI mixed-methods study

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Background

Groups are commonly used to deliver health-related behaviour change interventions, often because they are perceived as a time-effective and cost-effective mode of delivery. So far, understanding of the mechanisms of action in these interventions (i.e. how they work to bring about changes) has been mainly based on individual-level change theories and meta-analyses that have explored relationships of change techniques with outcomes. However, it is still unclear how group-based behaviour change interventions (GB-BCIs) (as opposed to individual-level interventions) work. In particular, little is understood about how individual-level change processes and techniques operate in a group context, and what other change processes and techniques more specific to groups influence participants' psychological change, behaviour and intervention outcomes.

There is extensive research and a variety of theories, particularly in social psychology, on how group processes influence personal change. However, this body of literature is largely disconnected from behaviour change research and is not commonly considered in the context of health-related behaviour change interventions. Identifying and characterising group-level change processes and techniques and providing a detailed analysis of what happens in groups will enhance understanding of the mechanisms of action in GB-BCIs.

Objectives

The overall aim of this study was to identify and describe mechanisms of action in GB-BCIs, building on the current understanding of individual-level change processes. To address this, the study had three specific objectives:

1. Develop a generalisable framework of mechanisms of action in GB-BCIs by identifying, defining and categorising potentially important group design features, group processes, facilitation techniques and contextual factors in groups.
2. Test and refine the framework, using a coding schema derived from it, as a tool for identifying these group features, processes and facilitation techniques in the recordings of sessions from three GB-BCIs (focused on diet, physical activity and weight loss), and provide examples to illustrate framework elements.
3. Develop mixed-methods approaches based on the framework to explore why some groups may be more or less successful than others, and illustrate their use with available qualitative and quantitative data from a GB-BCI.

In the protocol, for objective 3 originally it was planned to provide explanations for why some groups may be more successful than others by mapping qualitative data on group processes and facilitation techniques to indicators of engagement and outcomes (e.g. weight loss) from one of the GB-BCIs. However, the available quantitative and qualitative secondary data had limitations that precluded the intended sampling and comparison of groups with better and worse outcomes. Therefore, instead the research team focused on developing research questions and illustrating methods for conducting such analyses in future research.

Methods

In this mixed-methods (primarily qualitative) study, we reviewed literature, conducted consultations and used secondary data from three GB-BCIs targeting weight loss through changes in diet and physical activity: (1) the 'Living Well Taking Control' (LWTC) programme evaluated in the Community-based Prevention of Diabetes (ComPoD) trial, (2) the 'Skills for weight loss Maintenance' (SkiM) intervention and (3) the 'Waste the Waist' intervention. We accessed intervention manuals, sampled and transcribed a total of 46 audio-recordings of group sessions from the three interventions, observed eight sessions in the LWTC programme and analysed quantitative data on group and participant characteristics, attendance and outcomes (primarily weight loss) from the LWTC programme.

The research was conducted in three stages, in line with the objectives. In stage 1, relevant literature on groups and group processes was identified. Searches were conducted for theories of group dynamics and change in groups using pre-identified key texts and key words, such as 'group dynamics', in the PubMed and PsycINFO databases. Based on the expertise of the study team, commonly used taxonomies of change techniques were identified. We searched for qualitative studies (published between 2000 and June 2016) of participants' experiences of group-based weight loss interventions using a detailed search strategy in the EMBASE, MEDLINE, PsycINFO, PscARTICLES and Social Policy and Practice databases. Measures for assessing group processes were found from reviews of such measures identified via prior searches and personal contacts. Initially, 10 recordings of group sessions from the three GB-BCIs were selected and transcribed (sampled to ensure diversity between interventions, groups, session numbers and facilitators), and inductively coded. Furthermore, eight sessions in the LWTC programme were observed to provide additional insights into groups not captured in audio-recordings. Synthesising information gleaned from these sources, an initial framework of group features, processes and techniques was developed, which was refined in an iterative manner throughout the study. Feedback was also sought and incorporated on the evolving framework from group participants from the LWTC programme, facilitators from the LWTC and SkiM interventions, and internal and external researchers and practitioners with expertise and experience in GB-BCIs.

In stage 2, the aim was to apply the framework to coding group session transcripts. To do so, the framework categories and their definitions were adapted into more practical coding instructions. Instructions were drafted on how to identify the framework categories in the transcripts and then this coding schema was tested and revised. Finally, the coding schema was used to code 28 further transcripts of group session recordings from the same three interventions (also sampled to ensure diversity). Six transcripts were double-coded independently to test and improve coding instructions. In coding the transcripts, we sought to identify examples of features, processes and techniques included in the framework, and practical facilitation techniques used by facilitators.

In stage 3, group-level descriptive analyses of available quantitative data were conducted on group participant characteristics, attendance and outcomes from the LWTC programme. These explored variability within and between groups in characteristics that might link to group processes, including participants' sociodemographic, socioeconomic and clinical characteristics, their perceptions of the importance of, and confidence in, making lifestyle changes, and weight loss outcomes. Data from a questionnaire assessing participants' perceptions of aspects of the group (e.g. group support) were also summarised. To illustrate how the Mechanisms of Action in Group-based Interventions (MAGI) framework can be used to conduct in-depth qualitative analyses of group sessions, two groups with different facilitators were selected for analysis for which full recordings of all group sessions and sufficient, matched quantitative data were available, and detailed summaries of observations about these groups were produced. Finally, using the example of the two groups, quantitative and qualitative findings were integrated using the techniques of triangulation, 'following a thread' and a matrix table to highlight further research questions and illustrate potential mixed-methods approaches for exploring links between group features, processes and outcomes in future research.

Results

In stage 1, building on an existing conceptual model summarising a vast body of theoretical literature on change processes in groups, concepts were extracted from six relevant taxonomies of change techniques, 27 qualitative studies of participants' experiences of weight loss groups and three reviews of measures of group processes. These concepts were used along with session observations, coding of intervention manuals and transcripts from the three weight loss programmes, and consultations with four group participants, four group facilitators and 31 researchers and practitioners, to inform the iterative development of a MAGI framework. This had six overarching categories: (1) group intervention design features, comprising eight subcategories (e.g. facilitator selection and training, intervention content); (2) facilitation techniques, comprising six subcategories (e.g. techniques to start the group/session, techniques to facilitate group dynamics); (3) group dynamic and development processes, comprising nine subcategories (e.g. group goals, group climate); (4) interpersonal change processes, comprising 14 subcategories (e.g. social support, social validation); (5) selected intrapersonal change processes and individual-level targets influenced by groups, comprising 22 common subcategories (e.g. developing understanding, setting goals); and (6) contextual factors, comprising facilitator characteristics, participant characteristics and other contextual influences. Each of these categories comprised specific elements and some (e.g. intervention design features) had more detailed features that explain how GB-BCIs work to facilitate behaviour change and health outcomes. All elements were defined, and hypothesised relationships and influences between them based on literature and consultations were captured in a detailed definitions table. A summary table of the six categories and 62 subcategories was also developed, along with a diagram representing key mechanisms of action and relationships between the main framework categories and intervention outcomes.

In stage 2, a coding schema was developed that included detailed instructions on how to apply the framework to coding and analyses of group sessions, which was used successfully by several researchers (including one from outside the study team). Using this to code more transcripts, practical examples were identified that illustrated many of the group processes included in the framework operating in group sessions. For example, the most commonly coded interpersonal change processes included participants 'sharing experiences', exchanging information to promote 'social learning' and having 'social influence' on each other by positive talk about their lifestyle changes or health behaviours. Examples were also identified of facilitation techniques used in group sessions that instigated and facilitated the framework processes. For example, we identified frequent instances of facilitators encouraging participation, asking questions, checking understanding, and reframing and reinforcing messages. Based on this, the framework developed in stage 1 was further refined and its content validity in the context of group-based weight loss interventions targeting diet and physical activity was demonstrated.

For stage 3, quantitative data were available from a maximum of 67 groups, made up of at least 431 participants in the LWTC programme. The data provided information on participants' baseline sociodemographic, socioeconomic and clinical characteristics (maximum, $n = 431$ participants), attendance at sessions (maximum, $n = 360$), perceptions of the groups (maximum, $n = 266$), perceptions of the importance of, and confidence in, making lifestyle changes at baseline (maximum, $n = 349$) and follow up (maximum, $n = 230$), and weight loss outcomes (maximum, $n = 225$). Descriptive analyses demonstrated considerable variability across groups in characteristics (e.g. group size, group composition), processes (e.g. group engagement, motivation, social support) representative of MAGI framework components, and in outcomes. This variability highlighted the potential for further group-level quantitative analyses to explore links between elements of the framework. The variability also suggested approaches to sampling differing groups on the basis of key features to link to qualitative findings that can explore how the differences in group characteristics can have an impact on processes operating within the groups, and how processes apparent from qualitative coding may explain differences in engagement and outcomes. In-depth qualitative analyses based on the MAGI framework illustrated how qualitative data can provide context that enhances interpretation and understanding of the quantitative data, and illuminate how groups work in practice. Furthermore, the illustrations of integrating group-level quantitative and qualitative data using triangulation, following a thread, and matrix tables showed how such mixed-methods approaches can provide a more

complete assessment of some elements of the MAGI framework and could be used to explore links between framework components and outcomes. Although the secondary data were too limited to formally examine such links and to draw any conclusions as originally planned, we were able to suggest research questions and approaches for exploring these links in future research.

Conclusions

This study enhances understanding of mechanisms of action in GB-BCIs, particularly interventions targeting diet, physical activity and weight loss. The proposed MAGI framework identifies, categorises and defines group features, change processes (e.g. group dynamics, interpersonal and intrapersonal change processes) and contextual influences, which can influence each other and facilitate or impede engagement, behaviour change and other intervention outcomes. The study provides evidence of these processes and examples of techniques used to facilitate them in 'real-life' GB-BCIs focused on diet, physical activity and weight loss, validating the framework in this context. Research questions and methods for further exploring potential relationships between group processes and outcomes are also proposed and illustrated. Thus, the framework and illustrated methods provide a comprehensive resource for designers, facilitators and evaluators of GB-BCIs, and the implications of this research for these audiences have been identified, as well as group participants, commissioners and policy-makers. This research also highlights the true complexity of GB-BCIs and the need for further, sophisticated research to explore this by synthesising and developing evidence on which group features, processes and facilitation techniques are most important in influencing the effectiveness of GB-BCIs in different contexts. This study implies a series of recommendations for research:

1. Specification of minimum data sets for group-based interventions to facilitate future research and capitalise on opportunities for secondary analyses, to include a group identifier, facilitator identifier, information on presence of a supporter in the group (when relevant), attendance or absence at individual group sessions, and, ideally, one or more open questions on the experience of the group, when this can be incorporated.
2. Conduct of systematic reviews to appraise evidence related to the framework concepts and synthesise qualitative studies to examine the robustness and comprehensiveness of the framework across different GB-BCIs, thereby leading to extensions and refinements.
3. Mapping available quantitative measures of group dynamics and processes to the framework to aid selection for use in future research and identify areas for further development.
4. Further developing qualitative methods for coding and analysing group sessions, including methods to assess and improve the reliability of coding, and extend it to video-recordings and observations.
5. Further developing mixed methods, and other research approaches, for exploring group mechanisms in order to facilitate more detailed and sophisticated analyses of mechanisms of action in GB-BCIs.
6. Exploring group mechanisms through process evaluations using the framework, coding schema and suggestions for quantitative, qualitative and mixed-methods approaches to build evidence on what group features, facilitation techniques and group processes are important, when and for whom in GB-BCIs.
7. Undertaking further quantitative group-level analyses using our own, and other secondary, data sets to address specific research questions about mechanisms of action in these interventions and applying appropriate statistical techniques for undertaking such analyses.
8. Adapting/extending the framework to other groups and populations (e.g. targeting smoking, alcohol use or management of chronic illness; involving children, families and adults of different ages; and including virtual/online groups).
9. Exploring the impact of facilitators' characteristics and skills/competencies on outcomes and assessing who should facilitate which groups and with what training to optimise outcomes.
10. Developing and evaluating facilitator training toolkits to help facilitators identify and competently employ specific techniques to optimise participant engagement, group dynamics and interpersonal processes in GB-BCIs, and evaluate these in trials.

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