Supplementary Material 1

Mechanisms of Action in Group-based Interventions (MAGI) Framework with Definitions

This is Supplementary Material 1 to accompany the following study report:

Borek AJ, Smith JR, Greaves CJ, Gillison F, Tarrant M, Morgan-Trimmer S, McCabe R, Abraham C. Developing and applying a framework to identify and understand "Mechanisms of Action in Group-based interventions" (MAGI) for changing health behaviour: A mixed-methods study. *Efficacy and Mechanism Evaluation* (www.journalslibrary.nihr.ac.uk/programmes/eme/1420203/#/documentation)

This document comprises the detailed version of the Mechanisms of Action in Group-based Interventions (MAGI) framework, including definitions of the framework categories and hypotheses on how they may influence each other and intervention outcomes.

More details, such as methods used in developing the framework and sources of the definitions and hypotheses, are reported in the full study report. In brief, the framework and the definitions of the framework categories were developed on the basis of: (1) reviewing relevant literature (including theoretical literature about groups, taxonomies of change techniques, qualitative studies of participants' experiences of weight-loss groups, and measures of group processes); (2) content coding and analysis of transcripts of group sessions and intervention manuals from three recent group-based behaviour-change interventions (focused on diet, physical activity and weight loss); and (3) consulting with experts (including group participants, facilitators and researchers with expertise in group-based interventions).

Following the Table of Contents, we reproduce the framework diagram and summary table (as in *Chapter 2* of the study report) and describe the main framework categories and relationships between them. Then, we list the framework categories and the sub-categories, and then report definitions of all categories and sub-categories with hypotheses on why these might be important in group-based interventions and how they might affect each other, behaviour change and interventions outcomes. These links between processes and outcomes are hypotheses derived from the reviewed literature and expert consultations. The amount and quality of the evidence to support different hypotheses is variable, and in this study we have not attempted to evaluate this evidence. Readers will need to consult available literature (e.g. summaries of social psychological and group dynamics literature) relevant to the processes or concepts of interest, and refer to original studies and reviews to fully evaluate context and evidence.

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Figure S1 (Figure 3 in *Chapter 2* of the report) illustrates how the main categories of group features, processes and techniques included in the MAGI framework relate to each other and how they are hypothesised to influence outcomes in group-based interventions.

Table S1 (Table 5 in *Chapter 2* of the report) is a more detailed summary of the identified group features, processes and techniques included in the main six categories, which are a part of the mechanisms of action in group-based interventions.

The subsequent list includes details all the main categories and sub-categories that form the framework, including their definitions and hypotheses on potential relationships between them and how they may influence interventions outcomes. Categories that are specific to group interventions are marked with an asterisk (*).

Each of these sections provides increasing detail on the MAGI framework.

Additionally, Supplementary Material 2 includes coding instructions developed to assist with using the framework in qualitative analyses of group sessions.
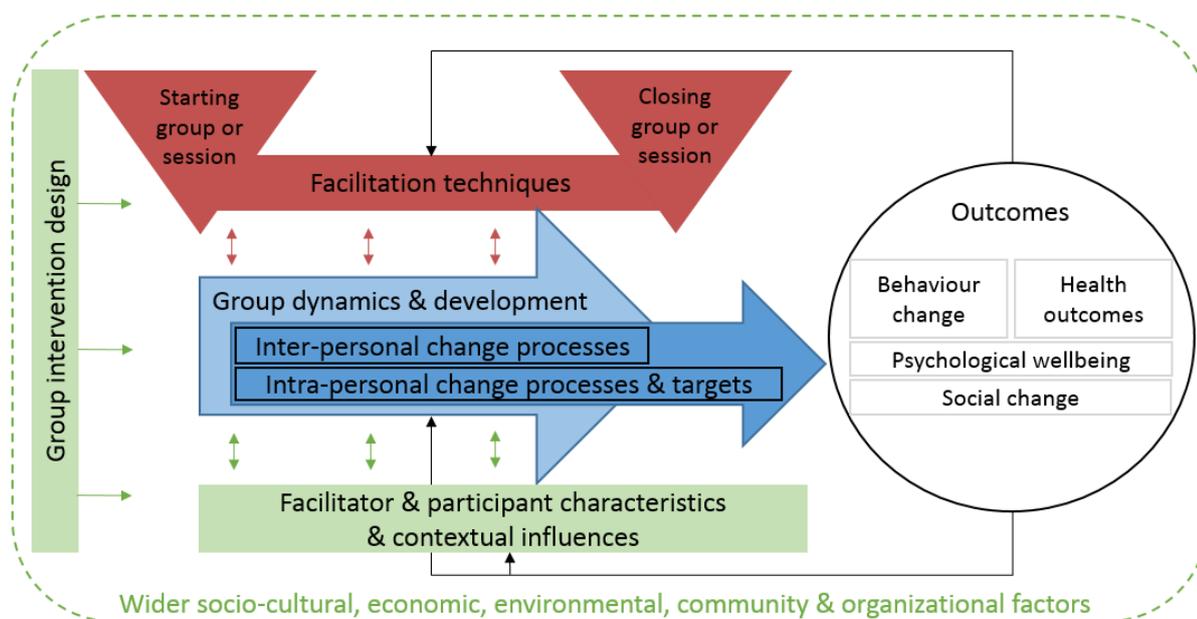
Note: The **green** boxes (corresponding with categories 1 and 6) and the green line around the diagram represent external influences on the group (e.g. design prior to group sessions, influences from outside the group sessions) but which may be brought to and have a bearing on the group; the **red** triangles and box between them (category 2) represent the techniques that facilitators use to facilitate the group and instigate or support group processes; the **blue** arrows (categories 3, 4 and 5) represent within-group processes leading to change, that is, what happens during and potentially beyond the end of a group-based intervention to bring about behaviour change and other outcomes.

Figure S1. Main MAGI framework categories and relationships between them[1]

The MAGI framework comprises six overarching categories of group features, processes and techniques hypothesised to constitute the mechanisms of action in group-based interventions:

1. Group intervention design elements are important to consider when designing group-based health interventions (i.e. *before* the groups are set-up) as they can influence how groups work, including group facilitation, group dynamics and change processes.

2. Facilitation techniques are techniques that facilitators use to facilitate groups and deliver intervention content. These include starting the groups/sessions, which are hypothesised to be particularly important for establishing group dynamics that are conducive to change processes, and closing the groups/sessions particularly important for promoting maintenance of change.

3. Group dynamics & development are dynamic processes and properties of groups that can be used to explain how any group works and performs, and group development are processes of how groups change over time. These are affected by facilitation techniques (including how the groups are set up and facilitated), by facilitator and participant characteristics (including the relationship and interaction between facilitators and participants), and by other contextual influences (e.g. social norms). These influences could include both planned changes (e.g. in facilitation techniques) and unplanned

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influences on dynamics that the group responds to (e.g. progress by group members or attendance rates). They provide the context for change processes to occur.

4. Inter-personal change processes are processes prompting individual psychological or behaviour change that are reliant on interactions with, or the presence of, others in the group (i.e. inter-personal) and that are unique to, or enhanced by, the group setting. They are influenced by group dynamics and development, facilitation techniques, and by facilitator and participant characteristics and other contextual influences. They may also directly or indirectly influence intra-personal change processes.

5. Intra-personal change processes & targets include examples of change processes and psychological targets for change that occur at an individual (i.e. intra-personal) level. They are not reliant on the group context (i.e. could be delivered without a group) but may be affected (impeded, reinforced or altered) by the group setting. They may be independent from, or influenced by the group dynamics and inter-personal change processes. They may also (and ideally do) extend beyond the group sessions and lifespan of the group. We report a subset (rather than an exhaustive list) of key intra-personal processes and targets that are commonly used in group interventions and are likely to be particularly sensitive to, or operate differently in, a group setting. There is extensive literature in social and health psychology about intra-personal change processes, and other, more comprehensive classifications of intra-personal change processes and related change techniques exist.

6. Facilitator and participant characteristics & other contextual influences include characteristics of group facilitators and participants that they bring to the groups (e.g. cognitive, emotional, health factors) that may affect the group dynamics and development, change processes, and achievement of outcomes. Similarly, there might be other contextual factors external to the group, which influence participants' health-related behaviours and health outside the group, but that participants may bring to bear on the group (e.g. wider social norms, social support networks outside the group). These may directly or indirectly influence group dynamics, inter- and intra-personal change processes, and outcomes.

The diagram includes also two important elements of the model of mechanisms of action in group-based interventions. These are briefly described here and in *Chapter 2*, but are not discussed in detail because they were not a key focus of this study.

Outcomes include a range of possible health-related outcomes of group-based behaviour change interventions. These may include changes in behaviours (e.g. diet, physical activity), health-related outcomes (e.g. weight loss), psychological wellbeing (e.g. social connectedness) or social change (e.g. wider social norms or practices). Outcomes are specific to each intervention and its targets, and may be intended or unintended, positive or negative. They are hypothesised to be affected, directly and indirectly, by the underlying group dynamics and inter- and intra-personal change processes. Observing outcomes (and progress towards them or a lack of progress) and receiving feedback on outcomes can create a feedback loop affecting the group dynamics, change processes, participants' characteristics and facilitation techniques.

Wider socio-cultural, economic, environmental, community and organisational factors are determinants of health and factors that affect all aspects of group-based interventions, including their design, implementation, group dynamics, change processes, facilitator and participants characteristics and outcomes.

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Table S1. Mechanisms of Action in Group-based Interventions (MAGI) framework

1. Group intervention design	2. Facilitation techniques					
	2.1. Techniques to start the group/session	2.2. Generic facilitation techniques	2.3. Techniques to facilitate group dynamics	2.4. Techniques to facilitate inter-personal change processes	2.5. Techniques to facilitate intra-personal change processes	2.6. Techniques to end the group/session

1.1. Intended changes & processes
1.2. Purpose & benefits of using group format
1.3. Group characteristics
1.4. Participant selection & group composition
1.5. Facilitator selection & training
1.6. Intervention content
1.7. Setting & venue
1.8. Group set-up & delivery

3. Group dynamic & development processes

3.1. Group goals	3.4. Group climate	3.7. Group norms
3.2. Identifying with/as a group	3.5. Group engagement	3.8. Group roles
3.3. Group cohesion & attraction	3.6. Communication patterns	3.9. Group development

4. Inter-personal change processes	5. Intra-personal change processes & targets, e.g.:	
4.1. Sharing experiences	5.1. Committing to attend	5.13. Developing, practising skills & behaviours
4.2. Social learning	5.2. Developing understanding	5.14. Individual barriers & problem-solving
4.3. Social influence	5.3. Self-presenting	5.15. Self-monitoring
4.4. Agreeing, disagreeing, challenging	5.4. Normative beliefs	5.16. Individual-level feedback
4.5. Social support	5.5. Attitudes	5.17. Developing self-insight
4.6. Social validation	5.6. Attributions	5.18. Identity shift
4.7. Social identification	5.7. Cognitive dissonance	5.19. Using self-talk
4.8. Social comparisons	5.8. Intervention outcome expectations	5.20. Associative learning
4.9. Accountability to the group	5.9. Motivation	5.21. Forming habits
4.10. Competition	5.10. Self-efficacy & personal control	5.22. Managing stress, emotions
4.11. Cooperation	5.11. Setting goals	
4.12. Group problem-solving	5.12. Reviewing progress, goals	
4.13. Group-level feedback		
4.14. Social facilitation		

6. Facilitator and participant characteristics & contextual influences

6.1. Facilitator characteristics	6.2. Participant characteristics	6.3. Other contextual influences

List of framework categories and sub-categories

Categories specific to group interventions are marked with an asterisk (*).

1. GROUP INTERVENTION DESIGN
   1.1. Intended changes & processes
   1.2. Purpose & benefits of using group format*
   1.3. Group characteristics*
      1.3.1. Group size*
      1.3.2. Process of becoming a group member*
      1.3.3. Continuity of group membership*
      1.3.4. Pre-set group norms/rules*
      1.3.5. Pre-set group roles*
      1.3.6. Group presentation*
      1.3.7. Incentives, rewards, payments
   1.4. Participant selection & group composition
      1.4.1. Participants' demographics
      1.4.2. Condition-related characteristics & needs
      1.4.3. Attendance of accompanying persons
   1.5. Facilitator selection & training
      1.5.1. Number of facilitators
      1.5.2. Continuity of facilitator to group
      1.5.3. Professional background & skills
      1.5.4. Personal characteristics & inter-personal skills
      1.5.5. Training
   1.6. Intervention content
      1.6.1. Pre-session information & contact
      1.6.2. Participant materials
      1.6.3. Facilitator materials/delivery instructions
      1.6.4. Session content & sequencing of content
      1.6.5. Group activities*
      1.6.6. Other contact outside the group
      1.6.7. Access, signposting to expert advice, facilities, classes
      1.6.8. Take-away tasks
      1.6.9. Post-group information & contact
   1.7. Setting & venue
      1.7.1. Setting type
      1.7.2. Venue characteristics & set-up*
      1.7.3. Accessibility of venue
   1.8. Group set-up & delivery
      1.8.1. Time structure of intervention
      1.8.2. Time structure of group sessions
      1.8.3. Tailing off of group contact/follow-up group sessions
      1.8.4. Facilitation/communication structure & style
      1.8.5. Tailoring of intervention delivery
      1.8.6. Fidelity & adaptation

2. FACILITATION TECHNIQUES
    2.1. Techniques to start the group/session
        2.1.1. Introducing people, ice-breaking*
        2.1.2. Managing expectations
        2.1.3. Identifying/specifying & agreeing group goals*
        2.1.4. Prompting & facilitating group / social identification*
        2.1.5. Identifying/specifying & agreeing group rules*
        2.1.6. Negotiating & managing group roles, responsibilities*
        2.1.7. Establishing a positive group climate*
        2.1.8. Explaining the intervention
        2.1.9. Recapping any previous session(s)
        2.1.10. Outlining the current session
    2.2. Generic facilitation techniques
    2.3. Techniques to facilitate group dynamics*
    2.4. Techniques to facilitate inter-personal change processes*
    2.5. Techniques to facilitate intra-personal change processes
    2.6. Techniques to end the group/session
        2.6.1. Reviewing the session/intervention
        2.6.2. Reviewing individual/group progress & providing feedback
        2.6.3. Planning for long-term & relapse prevention
        2.6.4. Prompting practice of skills & habit formation
        2.6.5. Prompting social support & social connections outside the group
        2.6.6. Signposting to expert advice, facilities
        2.6.7. Explaining tailing off of group contact/follow-up group sessions

3. GROUP DYNAMIC & DEVELOPMENT PROCESSES
    3.1. Group goals*
    3.2. Identifying with/as a group*
    3.3. Group cohesion & attraction*
    3.4. Group climate*
    3.5. Group engagement*
    3.6. Communication patterns*
    3.7. Group norms*
    3.8. Group roles*
    3.9. Group development*

4. INTER-PERSONAL CHANGE PROCESSES
    4.1. Sharing experiences
    4.2. Social learning
    4.3. Social influence (in the group)*
    4.4. Agreeing, disagreeing, challenging (in the group)*
    4.5. Social support (in the group)*
    4.6. Social validation
    4.7. Social identification
    4.8. Social comparisons
    4.9. Accountability to the group*
    4.10. Competition*
    4.11. Cooperation*
    4.12. Group problem-solving*
    4.13. Group-level feedback*

4.14. Social facilitation

5. **INTRA-PERSONAL CHANGE PROCESSES & TARGETS**
   5.1. Committing to attend
   5.2. Developing understanding
   5.3. Self-presenting
   5.4. Normative beliefs
   5.5. Attitudes
   5.6. Attributions
   5.7. Cognitive dissonance
   5.8. Intervention outcome expectations
   5.9. Motivation
   5.10. Self-efficacy & personal control
   5.11. Setting goals
   5.12. Reviewing progress, goals
   5.13. Developing, practising skills & behaviours
   5.14. Individual barriers & problem-solving
   5.15. Self-monitoring
   5.16. Individual-level feedback
   5.17. Developing self-insight
   5.18. Identity shift
   5.19. Using self-talk
   5.20. Associative learning
   5.21. Forming habits
   5.22. Managing stress, emotions

6. **FACILITATOR & PARTICIPANT CHARACTERISTICS & CONTEXTUAL INFLUENCES**
   6.1. Facilitator characteristics
   6.2. Participant characteristics
   6.3. Other contextual influences

Definitions & explanations of the MAGI framework categories & sub-categories

The MAGI framework categories and sub-categories of group features, processes and techniques are defined below with explanations for why they are important in groups and how they might link to, or overlap with, other categories and sub-categories in the framework (underlined in the table). Categories specific to group interventions are marked with an asterisk (*).

1. GROUP INTERVENTION DESIGN

These are issues that are important to consider when designing a group-based health intervention (i.e. *before* the groups are set-up), which are likely to influence all other processes occurring in the groups, including how the groups are facilitated, group dynamics and change processes. Many of these are applicable to any type of intervention but some (marked with *) are specific to group interventions, and for others an explanation as to why they are important to consider when designing a group intervention is provided.

Framework categories	Definitions & hypotheses about potential influences
1.1. Intended changes & processes	Changes and/or processes that the intervention and the groups are designed to initiate, and how. This is a key element that should be considered at an early stage of intervention design (e.g. developing intervention logic model) as it influences decisions about other elements of intervention design and techniques to instigate and facilitate the intended change processes, including whether a group format is most suitable for supporting these.
1.2. Purpose & benefits of using group format*	A clear purpose for, or benefit of, using a group-based delivery format (e.g. as opposed to self-delivered interventions or one-to-one delivery). It should correspond with the 'intended changes & processes' and might also influence other aspects of intervention design and techniques to facilitate change processes.
1.3. Group characteristics*	Characteristics of the group(s) of participants receiving the intervention.
1.3.1. Group size*	Number of participants in the group. This may refer to an intended group size or a number of participants allocated to the group. Group size (in particular large vs. small group) affects the types of 'facilitation/ communication structure & style' and 'communication patterns' (e.g. more interactive in smaller groups), 'group activities' (e.g. suitability of whole group vs. sub-group activities), 'group roles' (e.g. need for more structured, formal roles in larger groups), and 'social influence' (e.g. proportion and proximity of sources of influence to group participants who are being influenced).
1.3.2. Process of becoming a group member*	People may be recruited and assigned to groups by others ('gate-keepers', such as group facilitators, researchers, intervention administrators) or may self-select a group (e.g. go to a local group, or a group available at a particular time). This might affect participants' 'commitment to attend' and 'intervention outcome expectations' (e.g. self-initiating to join a group may be linked with stronger commitment to attend and more positive expectations of the group).
1.3.3. Continuity of group membership*	This refers to whether participants remain in the same group throughout the intervention or whether they can change and attend different groups (i.e. open vs. closed groups). This might affect 'identifying with/as a group'

Framework categories	Definitions & hypotheses about potential influences
	and 'group cohesion' (e.g. may be lower if participants attend different groups), and 'group development' (e.g. may be less progressive between sessions).
1.3.4. Pre-set group norms/rules*	Pre-set (e.g. at a design stage) 'ground' rules for how the group is intended to work together. They influence 'group norms' and 'group climate' (e.g. how people behave in the group, what is acceptable or not).
1.3.5. Pre-set group roles*	Pre-set (e.g. at a design stage) roles and responsibilities within the group (e.g. of a facilitator, co-facilitator, visiting expert, participant), and defining these pre-set roles and responsibilities. They are linked with 'group roles' and might affect 'communication patterns' in the group.
1.3.6. Group presentation*	How the group is presented to potential participants, in particular how it can be presented as attractive and helpful; e.g., presenting a group as attractive and helpful to potential participants might affect their willingness to join the group, increase their 'commitment to attend' and perception of 'group cohesion & attraction' (thus, also increasing their commitment to remain in the group).
1.3.7. Incentives, rewards, payments	Use of incentives or rewards to encourage attendance, performance of particular actions/behaviours, or achievement of certain outcomes. They may be material, financial, or include free or discounted access to other resources, such as exercise classes (linked with 'access, signposting to expert advice, facilities, classes'). They may also include participant payments to attend sessions, which may affect 'commitment to attend'. These should be considered during intervention design in relation to, and might be linked with, 'participant selection, group composition' (e.g. socio-economic characteristics of the targeted participants), and might influence the perception of how attractive the group is to potential participants ('group presentation').
1.4. Participant selection, group composition	How the group is composed in terms of individual participants' personal and health condition-related characteristics; some of these characteristics may be pre-set as eligibility criteria (e.g. selecting participants to groups based on specific health condition, age or gender). It may also refer to whether participants can 'attend with accompanying persons'. Moreover, deciding how to refer to group participants (e.g. as 'participants', 'members' or 'attendees') might have different implications for group dynamics. These might affect 'identifying with/as a group' and 'social identification' (e.g. similarities between group members might provide basis for identification), which in turn may affect participants' learning from each other ('sharing experiences' and 'social learning') and 'social influence' processes.
1.4.1. Participants' demographics	Participants' demographic characteristics, such as age, gender, ethnicity, social status/class, one or more of which may be used as the basis for inviting people to attend an intervention, or a particular group within the intervention (e.g. groups for women, working participants only).
1.4.2. Condition-related characteristics & needs	Participants' health or condition-related characteristics and/or needs, which may be used as the basis for selection to attend an intervention or a particular group. These might affect 'social identification' processes, identification and achievement of 'group goals', and 'group problem-solving'.

Framework categories	Definitions & hypotheses about potential influences
1.4.3. Attendance of accompanying persons	Whether other accompanying persons and supporters (e.g. partners, family members, translators etc.) can attend the sessions with the participants. This is linked with 'group goals' (e.g. accompanying persons might not have common goals with other group participants), 'group roles' (e.g. what their role and responsibilities are in terms of participation in the group interaction and activities), 'group cohesion' (e.g. pre-existing relationships might affect overall group bonding or presence of cliques) and will require the facilitators to manage such existing, pre-group relationships.
1.5. Facilitator selection, training	How the facilitators are selected and prepared for delivering the group intervention. This can include decisions about the number and role of group facilitators, and their professional and personal characteristics. These may be used as the basis for the role specification or description used in selection, training or assignment of facilitators to particular groups.
1.5.1. Number of facilitators	Number of facilitators delivering a group session; in particular, whether sessions are co-facilitated. This might affect 'group roles' (e.g. main facilitator, co-facilitator, visiting expert facilitator) and potential for 'social influence' (e.g. proportion of facilitators to group participants).
1.5.2. Continuity of facilitator to group	Whether the same or different facilitator(s) deliver different sessions to the same group. This might affect 'group cohesion', 'group climate' (e.g. the same facilitator throughout the group's lifespan may contribute to group cohesion and a more trusting and relaxed climate), 'group development' (e.g. enabling more continuous process of group change), or 'group roles' (e.g. when sessions are delivered by different 'experts').
1.5.3. Professional background & skills	Facilitators' professional background (e.g. dietician), or whether they are lay/peer facilitators, and related professional skills, expertise and competence. This might affect their ability to facilitate 'social learning' processes (e.g. providing information or advice/recommendations). Their professional expertise or personal experience may increase perception of credibility, thus serving as a source of 'social influence'.
1.5.4. Personal characteristics & interpersonal skills	Facilitators' personal, demographic characteristics (e.g. age, gender) and interpersonal skills (e.g. communication skills, relatedness, ability to empathise). Facilitators' personal characteristics might affect participants' ability to identify with the facilitator(s) ('social identification'), which can be a source of 'social influence'. Facilitators' interpersonal skills might help them establish and facilitate positive 'group dynamics and development', and provide and facilitate 'social support' in the group, 'social validation' and provision of empathy.
1.5.5. Training	Training provided to facilitators to develop their skills in delivering the intervention and/or facilitating the groups. This can affect the quality of intervention delivery, and facilitation of 'group dynamics and development', 'inter-personal change processes', and 'intra-personal change processes'.
1.6. Intervention content	The content of the intervention and group sessions.
1.6.1. Pre-session information & contact	Pre-session information about the intervention and/or pre-session contact with the facilitators or researchers. This might affect (potential) participants' willingness to join the group, 'commitment to attend', perception of group attractiveness (thus might influence 'group cohesion & attraction') and 'intervention outcome expectations'. It is also linked to

Framework categories	Definitions & hypotheses about potential influences
	'group presentation' (i.e. how the group/intervention is presented or advertised before participants join it).
1.6.2. Participant materials	Materials and/or tools for participants to use as part of the intervention, e.g., participant booklet/manual, self-monitoring diary, pedometer, etc.
1.6.3. Facilitator materials / delivery instructions	Materials and/or tools for facilitators to use when delivering the intervention, e.g., facilitator manual, slides, flipcharts, etc. Facilitator manuals might include a description of the role of the facilitator, and guidance on the intended 'communication patterns', 'facilitation techniques', and organising and delivering 'group activities'.
1.6.4. Session content & sequencing of content	Content of the sessions in terms of themes or topics covered, and whether there is (or is not) a sequential progression of the content (i.e. later sessions building on the content of the earlier ones). It is linked with 'continuity of group membership', 'intended changes & processes' targeted in the intervention, and 'group activities' that can be used to deliver the content.
1.6.5. Group activities*	Specific, structured, distinguishable group activities, with a specific start and end, often written into the delivery manual. They might include whole group activities (e.g. whole-group discussion), sub-group activities (e.g. sub-group brainstorming), individual activities (e.g. individual writing of goals), discussion-based activities (e.g. brainstorming pros and cons of increasing physical activity level), practical activities (e.g. games, quizzes, reading labels, cooking practice), or group-building activities and energisers (e.g. ice-breakers). These are linked with 'intended changes & processes', 'session content', intended 'facilitation/communication structure & style', and may affect 'group climate', 'group engagement', 'communication patterns', 'group roles', 'social learning' processes, and other change processes targeted by specific group activities.
1.6.6. Other contact outside the group	Other, additional contact that participants have with the facilitator and/or with each other outside the group (e.g. between group sessions). This might include additional individual counselling sessions or email/telephone contact with the facilitator, and/or participants' contact with each other face-to-face (e.g. at exercise classes) or online (e.g. through online forums, social media groups). It may be designed as part of the intervention, be prompted by the facilitator, or initiated by the group participants. It is linked with 'social support in the group' and 'other contextual influences' (e.g. new social connections outside the group).
1.6.7. Access, signposting to expert advice, facilities, classes	Providing information on, or access to, additional expert advice (e.g. individual support, counselling), facilities (e.g. gym) or classes (e.g. exercise, walking groups) offered as part of the intervention (alongside group sessions) or in addition to the group sessions (i.e. external resources). This might support 'developing, practising skills & behaviours' and longer-term maintenance of behaviour change, and be linked with 'group problem solving' and 'individual barriers & problem-solving'.
1.6.8. Take-away tasks	Take-away tasks for the participants to do between group sessions ('homework'), e.g., keeping a self-monitoring diary, reading relevant parts of the participant manual. These might be linked with participants' engagement with the intervention and behaviour change, 'intervention content', and be reviewed or discussed as part of 'group activities'.

Framework categories	Definitions & hypotheses about potential influences
1.6.9. Post-group information & contact	Information about what happens (if anything) and what (if any) contact participants receive after the group sessions or the intervention end. This is linked with 'tailing off of group contact/follow-up group sessions' and may support longer-term maintenance of behaviour change.
1.7. Setting & venue	Type of and characteristics of the setting, and set up and accessibility of the venue where the group sessions are held.
1.7.1. Setting type	Type of setting where group sessions take place, e.g., community, university, healthcare. This might affect participants' expectations of the intervention and motivations to participate; e.g., community groups might be seen as informal or as an opportunity to make new social connections, whereas groups delivered at university might be seen as formal/didactic or as an opportunity to contribute to and find out about research. It may also affect the type of participants interested in attending.
1.7.2. Venue characteristics & set-up*	Characteristics of the venue where group sessions take place, including practical issues (e.g. size of the room, access to water, tea/coffee facilities) and room set-up (e.g. classroom-like facing the facilitator, in a circle facing each other, with/without tables). They might also include issues, such as heat, lighting, projection of voice or noise. The venue should be comfortable and suitable for the purpose so that positive experiences and positive 'group climate' are reinforced. It should also be suitable for any planned 'group activities' or 'developing, practising skills & behaviours' (e.g. allowing sufficient and suitable space and set-up). It should also match the intended 'facilitation/communication structure & style' and 'communication patterns' (e.g. participants facing the facilitator might encourage facilitator-participant communication, whereas facing each other might encourage communication between participants).
1.7.3. Accessibility of the venue	How accessible the venue, or its location, is for group participants, and/or any barriers to accessing the venue, e.g., accessibility, travel time, car parking, public transport. Low accessibility or barriers to accessing the venue might influence 'group composition', negatively affect 'commitment to attend' and attendance, especially among participants with specific health conditions/needs, lower 'motivation' or ambivalent 'intervention outcome expectations'.
1.8. Group set-up & delivery	Practical, pre-set elements of how the groups are set up and delivered.
1.8.1. Time structure of intervention	Time structure of the group intervention, including number, frequency and length of group sessions, and intervention duration. It is linked with the required 'commitment to attend', and may affect 'intervention outcome expectations' (e.g. expectations might differ between very short vs. long interventions). It might also affect 'group dynamics & development' (e.g. a group might become more cohesive over time as participants get to know each other and as the group develops) and change processes (e.g. over time participants might engage in more mutual 'social support in the group').
1.8.2. Time structure of group sessions	Time structure and format of the sessions, i.e. how time is allocated to different activities within sessions. This is linked with 'intended changes & processes', 'group activities and 'session content & sequencing'. More or less detailed session plans and outlines might be included in 'facilitator materials/delivery instructions'.

Framework categories	Definitions & hypotheses about potential influences
1.8.3. Tailing off of group contact / follow-up group sessions	Pre-planned reduction of frequency of group sessions before their termination, or any follow-up sessions (after the core sessions). This might affect 'inter-personal change processes' (e.g. perception of 'accountability to the group'), 'commitment to attend', and longer-term maintenance of behaviours.
1.8.4. Facilitation / communication structure & style	Intended organisation and style of interaction / communication in the sessions; e.g. a degree to which the facilitator talks (or presents) to participants (and participants respond to the facilitator) or how interactive the sessions are (i.e. when participants feel encouraged to talk and respond to each other). It affects 'group engagement', 'communication patterns', and is affected by the types of 'group activities'.
1.8.5. Tailoring of intervention delivery	Degree of flexibility of session delivery and tailoring of delivery to group participants and/or the group as a whole. Tailoring delivery to individuals might be achieved, e.g., by allowing some time during or after the group sessions for facilitator(s) to talk individually with participants (e.g. reviewing individual goals, providing individual feedback). Tailoring delivery to the group might be achieved, e.g., by adapting 'group activities' to the group's characteristics and needs (e.g. engagement/energy levels, focusing more on exploring specific topics of interest to the group). This is linked with 'fidelity & adaptation'.
1.8.6. Fidelity & adaptation	Degree to which the intervention and its key components were delivered as intended and/or as specified in the 'facilitator materials/delivery instructions'. It includes deviations from the manual, including any intended adaptations. The key elements that should be delivered in the sessions, and optional adaptations, consistent with the 'intended changes & processes', should be included in the 'facilitator materials/delivery instructions', and fidelity can be assessed against them.

2.   FACILITATION TECHNIQUES

These are techniques that group facilitators can use to facilitate group interaction and deliver intervention content. Many of these techniques are relevant to any face-to-face intervention, but some (marked with *) are specific to group interventions. See the report *(Chapter 3)* for more examples of facilitation techniques.

Framework categories	Definitions & hypotheses about potential influences
2.1. Techniques to start the group/session	Techniques or tasks for facilitators to use or complete, especially at the beginning of a group (e.g. first session) and/or at the beginning of a session. In some interventions starting a group might not require the same techniques as starting each subsequent session, whereas in others it might (e.g. in open groups that participants can join in any session). Accomplishing these tasks helps set up the group, and establish 'group dynamics & development' conducive to change processes.
2.1.1. Introducing people, ice-breaking*	Facilitators' and participants' personal introductions in the group. They may also involve ice-breaking activities to help participants get to know each other and feel more comfortable in the group. Introductions and getting to know each other in the group may

Framework categories	Definitions & hypotheses about potential influences
	promote a positive 'group climate', 'group cohesion', 'group engagement', and could help participants associate with the group and each other ('identifying with/as a group', 'social identification').
2.1.2. Managing expectations	Managing participants' expectations of the group and the intervention (e.g. exploring and addressing participants' 'hopes and fears' related to the intervention or group). This may be influenced by the 'group presentation' (e.g. before the group starts); it may promote a perception of group attractiveness ('group cohesion & attraction'), help manage 'intervention outcome expectations' (i.e. promoting positive, realistic expectations) and promote 'committing to attend'.
2.1.3. Identifying / specifying & agreeing group goals*	Identifying or specifying group goals, which the group agrees on. Group goals may include common goals for the group (e.g. losing a certain amount of weight as a group) or individual goals that participants have in common with each other (e.g. each individually losing 5% body weight). Group goals increase 'identifying with/as a group' and 'group cohesion', and may promote 'inter-personal change processes', such as 'social influence', 'social support', or 'accountability to the group'.
2.1.4. Prompting & facilitating group / social identification*	Prompting and enhancing identification with the group and with each other. Such identification is necessary for creating a sense of being a group, developing 'group cohesion' and other 'group dynamics & development', and for enabling and reinforcing 'inter-personal change processes'. 'Identifying with/as a group' can be created on the basis of 'social identification' (i.e. seeing each other as members of similar social categories, with similar social identities) or 'group goals' (i.e. having a common purpose), and facilitators may prompt/facilitate it by drawing attention to, or highlighting, similarities between group participants (in their characteristics and/or goals).
2.1.5. Identifying / specifying & agreeing group rules*	Identifying or specifying rules for how the group is going to work together, which the group agrees on. This might involve a facilitator specifying 'pre-set group norms/rules' or asking participants to suggest such rules, negotiating and agreeing them. These group rules may affect 'group dynamics & development', especially 'group norms'. It is important to establish and agree group rules at the beginning of the group/session, as well as to manage them and refer to the agreed group rules if these are breached throughout the group/session (e.g. linked with disruptive behaviours or 'group roles').
2.1.6. Negotiating & managing group roles, responsibilities*	Developing, discussing, negotiating and managing group roles and responsibilities. This might involve establishing formal, 'pre-set group roles' and responsibilities (e.g. a facilitator, co-facilitator), or participants weighing each other up and developing emerging 'group roles' (e.g. a joker, challenger, informal leader). It affects 'group dynamics', especially 'group norms' (e.g. what behaviour is acceptable for whom in the group) and 'communication patterns' (e.g. who, how and with whom talks in the group), and affects

Framework categories	Definitions & hypotheses about potential influences
	overall interaction and 'group engagement'. Although it is important to establish group roles at the beginning of the group/session (e.g. by outlining key responsibilities), it is also necessary to manage emerging roles throughout the group/session.
2.1.7. Establishing a positive group climate*	Establishing a positive 'group climate', such that participants feel comfortable, safe, engaged, and the group has an intended ethos (e.g. of 'empathy' and 'social support in the group'). It may involve ensuring participants feel comfortable in the room/venue (e.g. not too cold, having enough space), facilitating 'introducing people', 'managing expectations' (so that they feel comfortable with what to expect from the group), encouraging/promoting informal interaction, building rapport and making associations with each other and the facilitator (e.g. asking how people are, how their journey to the group was, whether they have experiences of similar groups etc.).
2.1.8. Explaining the intervention	Explaining what the intervention is about, and what it isn't, and what is intended in the intervention/group. This might involve explaining 'intended changes & processes', 'session content', 'time structure of intervention', etc. It is linked with 'group goals' and is important for 'managing expectations' and preparing group participants for the group.
2.1.9. Recapping any previous session(s)	Reviewing a previous session (if there was any). It might involve a discussion of key content covered/learned in the previous session, and can help reinforce learning (through recollections), check 'developing understanding' and provide opportunities to pick up and correct any misunderstanding. If done as a 'group activity' (e.g. a group quiz), it may also facilitate 'social learning' and other group processes.
2.1.10. Outlining the current session	Introducing and outlining the current session. It might help 'manage expectations' of the session, prepare participants for learning and any 'group activities', and may help with managing time during the session.
2.2. Generic facilitation techniques	Generic techniques that can be used to facilitate group interaction regardless of content or processes; e.g. encouraging participation, checking understanding, summarising/paraphrasing. (For examples refer to *Chapter 3* in the MAGI study report.)
2.3. Techniques to facilitate group dynamics*	Techniques that can be used to facilitate 'group dynamic & development processes', i.e. manage and influence how the group works and develops; e.g. identifying or referring to common goals, agreeing ground rules for the group, prompting selection of informal group roles. (For examples refer to *Chapter 3* in the MAGI study report.)
2.4. Techniques to facilitate inter-personal change processes*	Techniques that can be used to facilitate 'inter-personal change processes'; e.g. eliciting sharing experiences, exchanging information interactively, encouraging peer support in the group. (For examples refer to *Chapter 3* in the MAGI study report.)
2.5. Techniques to facilitate intra-personal change processes	Techniques that can be used to facilitate 'intra-personal change processes' (distinguished 'by function'). E.g., eliciting expressions

Framework categories	Definitions & hypotheses about potential influences
	of motivation, prompting individual goal setting, prompting identification of individual barriers. (For examples refer to *Chapter 3* in the MAGI study report.)
2.6. Techniques to end the group/session	Techniques or tasks for facilitators to use or complete, especially at the end of a group (e.g. last session) and/or at the end of a session (especially if it is an on-going group). Accomplishing these tasks helps close or terminate the group, or close the group session while reinforcing learning in the session and 'commitment to attend' the next session. Although many of these techniques might be used throughout the intervention, at the end of the group the facilitators should ensure that these techniques have been delivered, and reinforce them as they are critical to maintenance of change. In some interventions closing a group might not require the same techniques as closing each session, whereas in others it might (e.g. in open groups that participants can join and leave at any session).
2.6.1. Reviewing the session/intervention	Reviewing the content covered in the session or in the intervention (if it's the final session). It might involve a discussion of the key content, messages, activities etc., and it can provide an opportunity to check participants' 'understanding' and correct any gaps in understanding.
2.6.2. Reviewing individual/group progress & providing feedback	Reviewing progress and providing feedback to individuals or the whole group at the end of the intervention. Progress might be discussed individually (e.g. 'tailoring of intervention delivery' by offering individual review and feedback) or it might be discussed as a group, thus promoting an overall sense of group progress in relation to 'group goals'.
2.6.3. Planning for long-term & relapse prevention	Planning for long-term and relapse prevention at the end of the intervention to help participants maintain behaviour changes after the intervention ends. It might draw on 'goal setting', 'group problem-solving' and 'individual barriers & problem-solving' to help identify and plan for risk situations or lapses, set long-term goals and engage social support outside the group, or other techniques, to prevent relapse.
2.6.4. Prompting practice of skills & habit formation	Prompting and promoting practice of health-related skills and behaviours, repetition and forming/maintaining health-promoting habits. It might draw on, and reinforce, 'developing, practising skills & behaviours' and 'forming habits' delivered in the intervention, and encourage participants to continue to practise the behaviours after the intervention ends.
2.6.5. Prompting social support & social connections outside the group	Prompting and promoting social support and supportive social connections outside the group. Although it might be delivered throughout the intervention, reinforcing it at the end of the session or group is particularly important in order to help participants transition from relying on 'social support (in the group)' to developing social networks and support outside the group, e.g. through utilising existing support network, developing new social connections, or transferring the social connections and

Framework categories	Definitions & hypotheses about potential influences
	buddy-ups developed in the group to outside the group/intervention.
2.6.6. Signposting to expert advice, facilities	Sharing information about, and signposting participants to, expert advice, facilities, classes or other resources outside the group/intervention that can be accessed after the group ends.
2.6.7. Explaining tailing off of group contact / follow-up group sessions	Explaining what (if anything) happens after the (core) group sessions end ('tailing off of group contact or follow-up group sessions'), e.g. 'reunion' or participant-initiated group session(s) or other contact (e.g. online).

3.   GROUP DYNAMIC & DEVELOPMENT PROCESSES

These are changing (i.e. dynamic) processes and properties of groups that are used to explain how (any) groups work and change over time. These processes are a unique to group interventions (thus, all are marked with *).

Framework categories	Definitions & hypotheses about potential influences
3.1. Group goals*	Individual goals/tasks that participants develop or agree for the group, either *common* goal(s) for the group or goals that participants have *in common* and that the group can help them achieve. Group goals can help create a perception of a common purpose and interdependence of goals (i.e. that one person's success depends on, and positively influences, another person's success). Thus, they might help facilitate 'identifying with/as a group', 'group cohesion & attraction', 'cooperation', and enhance other 'inter-personal change processes'.
3.2. Identifying with/as a group*	Perception of the group (in the intervention) as a unity, identifying oneself as a member of the new group and with the group's goals, values and norms, perception of belonging to the group. Identification with the group can develop on the basis of similarities between participants' characteristics (e.g. as part of 'participant selection/group composition') and/or 'group goals', and it reflects perceptions of group belonging (i.e. 'group cohesion & attraction'). It is hypothesised to underpin 'inter-personal change processes'.
3.3. Group cohesion & attraction*	Perception of group attractiveness that makes people want to become group members, and a bond (based on a positive evaluation of the group) that makes them want to remain group members; a sense of 'groupness', relatedness or belonging. It is linked with 'identifying with/as a group' and 'group climate' (e.g. cohesion might be higher in groups in which members identify with the group and in groups characterised by warm interactions), and it might be reflected in how participants are referred to (e.g. 'group members' might suggest higher level of cohesion than 'group participants' or 'attendees'). It may

Framework categories	Definitions & hypotheses about potential influences
	influence 'group norms' (e.g. pressure to conform to group norms might be higher in more cohesive groups), and may be linked with 'group size' (e.g. a presence of cliques or lower cohesion might be more likely in larger groups). It might also underpin 'inter-personal change processes'.
3.4. Group climate*	Socio-emotional context of the group, group ethos or atmosphere. It might refer to an overall warmth of group interactions, sense of trustworthiness, collective levels of engagement or resistance of group participants, and their perception of enjoyment (or 'fun') in the group. It may be positive or negative (e.g. including a sense of conflict, scapegoating or disengagement). It can be influenced by other 'group dynamics & development', 'group characteristics' (e.g. 'group size'), and 'participants' characteristics' (e.g. personalities, sense of humour, positivity/negativity). It might also affect 'commitment to attend' (e.g. it might be higher in groups with positive climate) and underpin other 'inter-personal change processes'.
3.5. Group engagement*	Level of active participation in, and contribution of group participants to, group activities and interactions. It can also more broadly be indicated by attendance at sessions (thus is linked with 'committing to attend'). It may have impact on participant drop out from the group, which is particularly important for groups established for longer periods of time. It is closely related to other 'group dynamics & development', such as 'group climate' (e.g. climate of engagement and active participation) and 'communication patterns'. It also underpins and helps facilitate other 'inter-personal change processes' and 'intra-personal change processes'.
3.6. Communication patterns*	Patterns of interaction in the group, such as direction, shape and distance of connections/interaction; how participants communicate (e.g. with/through the facilitator or directly with each other) and how facilitators interact with any co-facilitators. They are affected by pre-designed, intended 'facilitation/communication structure & style', 'group size' and 'venue characteristics & set up'. They might also be linked with other 'group dynamics & development' (especially 'group engagement') and 'inter-personal change processes' (e.g. encouraging more direct, between-participants communication might enhance 'sharing experiences' and 'social learning' processes).
3.7. Group norms*	Emergence and operation of implicit, group-specific social norms, i.e. normative expectations, standards or beliefs providing prompts on how to behave in the group. These can include norms about acceptable (or not) group behaviour or norms about health-related behaviours (e.g. beliefs about health-related

Framework categories	Definitions & hypotheses about potential influences
	behaviours agreed/hold by the group). They may be influenced by 'pre-set group norms/rules'. They might affect individual 'normative beliefs' and other 'inter- and intra-personal change processes' (e.g. through 'social influence', 'social validation' or 'cognitive dissonance' processes) and might be linked to wider social norms generally appraised in a society.
3.8. Group roles*	Emerging functions or informal, individual roles in the group (e.g. note-taker, sub-group/informal leader, joker); this can also include formal roles and responsibilities and how they are shared in the group (e.g. between co-facilitators) and any roles related to pre-existing relationships (e.g. if a participant attends with a partner or translator). They can include task-oriented roles (e.g. information-seeker), socio-emotional or group-building roles (e.g. mediator) and non-functional or dysfunctional roles (e.g. recognition-seeker). Formal roles should be planned during intervention design reflected as 'pre-set group roles'. Informal roles might be linked with other 'group dynamics & development' (especially 'group climate' and 'group norms') and are likely to require management by facilitators (e.g. promoting task-oriented and group-building roles, while minimising negative, dysfunctional roles).
3.9. Group development*	How the group changes over time. Although different models exist, commonly referred to stages of group development include: forming, storming, norming, performing, and adjourning. Group development can be influenced by 'group intervention design' (e.g. 'time structure of intervention' and 'time structure of group sessions') and 'facilitation techniques' (e.g. facilitator can help the group form and progress through stages). It might be linked with other 'group dynamics' as they are likely to be different across the stages of group development, e.g. 'group cohesion' might be higher, 'group climate' warmer, and 'group roles' more established in the later stages of well-performing groups. It might also be linked with 'inter-personal change processes', which might have stronger impact in the later, performing stage of the group. Groups may also fail to develop into well-functioning, performing groups, and/or may have more challenges over time with decreasing attendance and increasing drop out; thus developing positive group dynamics may be crucial to maintain participants' 'group engagement'.

4.   INTER-PERSONAL CHANGE PROCESSES

These are change processes facilitated by interactions with, or presence of, others in the group (i.e. inter-personal, social processes). Although some of these might be supported in a more limited way by interactions with a facilitator in one-to-one interventions, most are specific to the group setting (marked with *), or otherwise likely to operate in a much more powerful way in a group context.

Framework categories	Definitions & hypotheses about potential influences
4.1. Sharing experiences	Process of sharing (self-disclosing) and discussing one's experiences, e.g., sharing everyday, health-related or emotional experiences, self-disclosing potentially sensitive personal experiences (e.g. personal struggles, distressing experiences, mental health issues), or self-disclosing 'transgressive' behaviours (i.e. behaviour that is at odds with the intervention recommendations or group norms). Sharing experiences might help facilitate change through self-reflection (leading to 'developing self-insight') or 'catharsis' (i.e. a sense of relief), or by eliciting other 'inter-personal change processes', e.g. 'social learning' (e.g. learning from others' experiences and ideas), 'social comparisons', 'social support (in the group)' or 'social validation'.
4.2. Social learning	Processes of inter-personal learning in the group, learning from the facilitator and/or other group participants. They might involve providing or exchanging information, advice, suggestions, recommendations, or sharing ideas related to health behaviours and behaviour change. These are closely linked with other 'inter-personal change processes', such as 'sharing experiences', 'agreeing, disagreeing, challenging', 'social influences' and 'group problem-solving'. They may influence many other 'intra-personal change processes', in particular 'developing understanding', 'normative beliefs', 'attitudes', and 'attributions'. Social learning can also involve demonstrating and modelling behaviours, or vicarious learning (linked with 'developing, practising skills & behaviours') and providing instructions on how to perform behaviours.
4.3. Social influence (in the group)*	Influencing, or ability to influence, others' norms, beliefs or behaviours. This includes social power of high-status members (e.g. group leader/facilitator), pressures to uniformity in groups (e.g. compliance with 'group norms'), and minority influences. Different types of social influence can be distinguished (e.g. compliance, identification and internalization), and different sources of social influence (e.g. rewards, punishments, legitimation, identification, expertise). It might be affected by 'facilitator characteristics' (e.g. being an expert or a peer whom members can identify with), 'participant characteristics' (e.g. via 'social identification') or 'group cohesion' (e.g. pressures to conformity are likely to be stronger in more cohesive groups). Social influence might be exerted by facilitators or participants, e.g., through verbal persuasion, encouragement (emotional 'social support (in the group)', 'sharing experiences' or role modelling. Social influence can have a positive effect on others, thus, promoting health behaviours and health-related 'group norms', e.g. through 'change talk' (i.e. expressions of desire, intentions to change, positive 'attitudes' towards health behaviours etc.) and sharing positive experiences of engaging in health behaviours. It may also have a negative effect on others through 'resistance / sustain talk' (i.e. expressions of negative attitudes

Framework categories	Definitions & hypotheses about potential influences
	towards health behaviours, preference for unhealthy behaviours, reports of lack of engagement or interest in healthy behaviours etc.).
4.4. Agreeing, disagreeing, challenging (in the group)*	Expressing agreement or disagreement with others in the group (participants or facilitators), group procedures, group/social norms. These may be expressed as part of general group interaction, group discussions and debates (thus linked with 'group activities'). Disagreeing with, or challenging, others might have positive effects (e.g. challenging their negative attitudes towards health behaviours) or negative effect (e.g. repeatedly disagreeing with or challenging others to the point that it is disruptive to the group progress and goals). It may be linked with 'group dynamics & development', such as 'group norms', 'group climate' and informal 'group roles'. It may also be linked with 'inter-personal change processes', such as 'social learning' or 'social influence' processes, and may affect 'intra-personal change processes' (e.g. 'developing understanding' or changing 'attitudes').
4.5. Social support (in the group)*	Providing and receiving social support in the group. Different types of social support can be distinguished, e.g. emotional, practical (instrumental) or informational support; it can also be perceived, provided or received. Support in the group can be provided by the facilitators or by group participants (i.e. peer support). It may also involve buddying up or making social connections with other participants. Participants may benefit from receiving support or from providing support to others (i.e. reciprocal help). Social support is linked with 'group climate' (e.g. a perception of how supportive the group interactions are). It might facilitate change directly, e.g. through emotional support, such as encouragement, or practical support. It might also underpin other 'inter-personal change processes', such as 'social learning' (e.g. exchanging information or ideas are a form of informational support), 'group problem solving', 'social validation' (e.g. offering personal validation or empathy might be perceived as supportive), or eliciting feelings of 'accountability to the group'.
4.6. Social validation	Validating and/or normalising one's experiences or feelings, creating a perception of universality of experiences or feelings (e.g. realising that one is not the only person having a particular experience). It can be facilitated by meeting people in similar circumstances, which might be enhanced, e.g., by 'identifying with/as a group', 'social identification' (with other social identities or categories) and/or 'group goals'. It can also be facilitated through 'sharing experiences' in a supportive, safe context (linked to 'group climate'). It can include personal validation, normalising or expressions of empathy and understanding.
4.7. Social identification	Membership of social groups or categories that are external to the treatment group but that are contextually salient in the group. These may include social categories, such as gender, ethnicity, vocation and hobby groups, specific health conditions (e.g. 'stroke survivor') etc. External social identities may facilitate 'identifying with/as a group' (such as when identity norms and values are aligned with those of the group in the intervention), or may inhibit it (e.g. when norms/values conflict). It may include reinforcing (or making salient) positive, health-promoting social identities or negative, stigmatised social identities (which could be re-labelled into positive identities to minimise their negative effect). It may be reinforced

Framework categories	Definitions & hypotheses about potential influences
	through similarities in 'participant selection/group composition', 'facilitator characteristics' or 'group goals'. It may affect 'social influence' processes (e.g. it might increase an ability to influence), 'social comparisons' (e.g. participants might cease comparisons with those whom they do not identify with), 'social validation' (e.g. it might strengthen its impact), or 'normative beliefs' and 'attitudes' (e.g. one might adopt norms and attitudes compliant with those of the group/category that they identify with).
4.8. Social comparisons	Making comparisons with others to enable self-evaluation of one's performance or status (e.g. how well you do compared to others). They include upward comparisons (e.g. comparing with others doing better to oneself, or role models) or downward comparisons (e.g. comparing with others doing worse than oneself). People tend to compare with others who are, or whose performance is, relatively similar, and/or who one identifies with ('social identification'); social comparisons might cease if there are bigger differences or lack of identification (i.e. when others are beyond one's 'reference frame'). They might have a positive impact, e.g. through promoting 'social validation', positive 'competition', increasing 'self-efficacy' (e.g. through upward comparisons or role modelling), or creating opportunities to provide 'social support (in the group)' or become role models. They might also have a negative effect, e.g. continuously/repeatedly performing worse than others might decrease 'self-efficacy' or 'motivation'.
4.9. Accountability to the group*	Creating a perception of accountability, or feeling accountable, to others in the group (participants or facilitators) for taking the intended action(s) and/or achieving goals. It might be facilitated by telling the group about one's goals or intentions (e.g. public promise/commitment, linked with 'setting goals'), and 'reviewing progress, goals' in the group.
4.10. Competition*	Striving to perform better than others. It can include intra-group competition (i.e. competing with others in the group in achievement of personal goals), which might result from making 'social comparisons' and might have a positive or negative effects for individuals (e.g. affecting 'self-efficacy') or for the group (e.g. affecting 'group cohesion', 'cooperation'). It can also include inter-group competition (i.e. competing as a group with other groups in achievement of group goals), which might enhance a perception of common 'group goals', 'group identification', 'group cohesion' and 'cooperation'.
4.11. Cooperation*	Working together as a group to achieve group goals. It is linked with the types of 'group goals' (e.g. having a common goal for the group might facilitate more cooperation than individual goals). It might also be linked with 'group roles' (e.g. division of roles in cooperative group work), 'group climate' (e.g. cooperative climate), 'social learning' (e.g. sharing information, advice or ideas might be seen as cooperative learning), 'accountability to the group' (e.g. members might feel more accountable for not 'letting the group down' in a cooperative group), or 'competition' (e.g. intra-group competition may lower cooperation, inter-group competition may increase it).
4.12. Group problem-solving*	Identifying and/or discussing general barriers to health-related behaviours or behaviour change (rather than specific to individuals) and identifying

Framework categories	Definitions & hypotheses about potential influences
	potential solutions to these barriers as a group (e.g. brainstorming/sharing ideas). It might help with 'individual barriers & problem-solving' (e.g. by providing ideas that individuals can draw on), and might contribute to developing problem-solving skills ('developing, practising skills & behaviours').
4.13. Group-level feedback*	Providing feedback to the group in relation to performance or behaviour *as a group*. Feedback includes some evaluative, measurable data related to performance or behaviour (e.g. losing 2kg, step-count going up by 2000 steps), rather than just affective statements (e.g. praise). It is linked with 'group goals' (e.g. having an overall goal for the group), and it may enhance 'identifying with/as a group' and 'group cohesion'. It may also be used to reduce 'social comparisons' or intra-group 'competition'.
4.14. Social facilitation	Influencing performance by the presence of others. Presence of others can enhance performance of easy or well-trained tasks, but it might impede performance of complex, less-trained tasks. The potential effects of social facilitation might be taken into account when designing 'group activities' and deciding which behaviours/skills might be effectively practised in the sessions, and which ones might be better practised alone ('developing, practising skills & behaviours').

5. INTRA-PERSONAL CHANGE PROCESSES & TARGETS

These are change processes, or targets for change, operating at an individual (i.e. intra-personal) level, which do not require or rely on a group context. However, they may be affected (impeded, reinforced or altered) in a group context (including group dynamics & development and inter-personal change processes). None are specific to group interventions. The list of intra-personal processes and targets is not comprehensive. As this was not the primary focus of this study, and other classifications of intra-personal change techniques and processes are available, we selected a subset of intra-personal processes and techniques identified in groups to date. The processes and targets presented here are particularly important and common in behaviour change interventions, and amenable to supporting in a group setting. Expressing or acknowledging these concepts, or change in them, might interact with other inter-personal change processes and with group dynamics.

Framework categories	Definitions & hypotheses about potential influences
5.1. Committing to attend	Making and expressing commitment and/or plan to attend the group sessions. It might be linked with 'motivation' for change and 'setting goals', e.g., by helping to 'timetable' goals (i.e. to set a goal for the next session).
5.2. Developing understanding	Developing and demonstrating, or confirming, receipt and understanding of information from the content of the group session/intervention (e.g. understanding about a healthy diet, health recommendations or how behaviour change works). It can be facilitated by 'social learning' processes. It may also involve demonstrating a lack of understanding, or misunderstanding, which can be then addressed.
5.3. Self-presenting	Conveying certain information about oneself to others/group, concern with how one is perceived by others/group. Often it involves presenting positive information about oneself (e.g. when group participants talk about themselves as being health-oriented, healthy, or knowledgeable about health), but it may also involve negative self-presentation or self-deprecation. It may be linked with 'social identification' (e.g. making

Framework categories	Definitions & hypotheses about potential influences
	certain social identities salient), 'identity shift', 'developing self-insight', or 'using self-talk'. It may also facilitate change through 'cognitive dissonance' if one's self-presentation is at odds with their behaviours.
5.4. Normative beliefs	Recognition and expression of one's own normative position, i.e. personal health-related norms relative to guidelines or beliefs about other people (e.g. being 'normal' or 'different' to others, being more/less active than other people). This could include using normative information to suggest ideas/information (e.g. what other people do in a similar situation); and challenging unhelpful norms expressed in a group (e.g. related to unhealthy behaviours). It may be linked with 'identity shift' and 'social identification' (e.g. norms related to one's self and social identities), and wider social norms. It may also facilitate change through 'cognitive dissonance' if personal norms are at odds with behaviours or social norms.
5.5. Attitudes	Recognition and expression of positive or negative evaluative beliefs about the targeted health behaviour(s), outcomes or the group, or change in attitudes. Expression of positive or negative attitudes in the group may influence 'group norms' and 'social influence' processes, and may affect individual 'normative beliefs' and 'motivation'. It may also facilitate change through 'cognitive dissonance' if a person's attitudes are at odds with their behaviours.
5.6. Attributions	Recognition and expression of beliefs about causal relationship between health and factors affecting it; e.g. beliefs about how certain health-related behaviours may cause, or not, good or bad health. They may affect 'motivation' and a sense of 'self-efficacy & personal control' related to uptake or change of particular health-related behaviours, 'setting goals' and 'social learning' processes (i.e. learning in the group about causal links between health and behaviours).
5.7. Cognitive dissonance	Change of one's norms, attitudes or behaviours resulting from experiencing conflict, ambivalence or inconsistency between them; e.g. when one expresses a positive attitude towards engaging in a health behaviour but then does not engage in it. Cognitive dissonance can be instigated when participants 'self-present' or express 'normative beliefs' or 'attitudes' that are inconsistent with their behaviours. This inconsistency can create uncomfortable psychological tension, which can be reduced by change in behaviours, norms or attitudes.
5.8. Intervention outcome expectations	Expectation of desired changes or outcomes from the group/intervention; participants' expectation or hope that the group/intervention will be helpful to them. It can affect 'commitment to attend' and 'motivation' to make changes and follow intervention's recommendations. It can also be linked with 'group climate' and 'group engagement' (e.g. engaging, hopeful climate can reinforce positive expectations, whereas resistant, hopeless climate might be linked with more negative expectations), and 'social influence' (e.g. referring to evidence-base for, or previous positive results of, the intervention can raise positive expectations).
5.9. Motivation	Motivation to make and maintain health-related behaviour changes, engage with health behaviours, and sources of such motivation. Motivation might be linked with 'intervention outcome expectations', 'group climate' and 'group engagement', and it can affect 'setting goals' and 'developing, practising skills & behaviours'. It may also be linked with

Framework categories	Definitions & hypotheses about potential influences
	'social influence', e.g., expressing motivation or intentions to change (i.e. 'change talk') or a lack of them ('resistance talk'), and reinforce or impede other participants' motivation and intentions.
5.10. Self-efficacy & personal control	Confidence in one's ability to perform or change health behaviours, and a sense (or locus) of personal control over health and health behaviours. It may involve expressions of a lack of, or low, self-efficacy, or change in self-efficacy. It may also involve development or expression of a sense of personal responsibility for one's behaviours and health. Self-efficacy and a sense of control can be linked with 'attributions' and 'attitudes', and they may affect 'setting goals' and 'developing, practising skills & behaviours' (e.g. matching level of self-efficacy with the level of difficulty/challenge of goals, skills or behaviours). Expressions of self-efficacy or responsibility for self in the group may facilitate 'social comparisons' (e.g. confident members might be a positive example to others), 'social influence' (e.g. adopting similar beliefs about personal control), and may prompt or elicit 'social support' and/or 'social validation' (e.g. if one's self-efficacy is low).
5.11. Setting goals	Prioritising and setting goals for behaviours or outcomes. It can involve setting specific ('SMART') goals and making action plans, but may also involve setting less specific, general goals and expressing general intentions. Facilitators may prompt participants to set graded goals, more realistic or more challenging goals, or long-term goals for maintaining health behaviours. Goal setting can be conducted individually, thus facilitating other 'intra-personal change processes' (linked with 'motivation', 'developing, practising skills & behaviours'). It may also be conducted as a group (i.e. setting 'group goals') or with a group (i.e. sharing and discussing individual goals with a group), thus facilitating 'inter-personal change processes', such as 'social learning', 'social support', 'accountability to the group'.
5.12. Reviewing progress, goals	Reviewing progress or goals, i.e. whether, and how, the goals were met and/or whether and how health-related behaviour(s) were performed. It can involve reviewing and discussing specific goals (e.g. set in a previous session), general review of progress (e.g. without references to specific goals), or referring to objective measures indicating progress in achieving outcomes (e.g. weighing, or other data gathered via 'self-monitoring'). Goal/progress review can be conducted individually, but it may be reinforced by conducting it in the group; e.g., by reinforcing 'intervention outcome expectations' (e.g. through a positive/negative feedback loop between outcomes and the group) and 'accountability to the group'. It may also provide opportunities for 'social comparisons', 'group problem-solving' or 'individual barriers & problem-solving' (especially if goals are not met), or for prompting/eliciting 'social support' and 'social validation'.
5.13. Developing, practising skills & behaviours	Developing and/or practising new skills required to perform health-related behaviours (i.e. motor, social, communication, time management or cognitive skills), and/or practising new targeted health behaviours. This may involve reporting development or practice (or lack of it) of new skills or behaviours outside the group sessions (e.g. as part of 'reviewing progress, goals), or practising them in the sessions – linked with demonstrating and modelling behaviours (part of 'social learning').

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5.14. Individual barriers & problem-solving	Identifying individual barriers to health-related behaviours and possible solutions to these (specific to individuals rather than generic or common to the group, e.g., by participants writing them down in their action plans). This is different from, but linked with, problem-solving *as a group* ('group problem-solving') when the group identifies generic barriers and solutions, or collaboratively identifies possible solutions to individual barriers (e.g. group brainstorming, sharing ideas for solving someone's problem or barrier). Individual problem-solving can also involve 'relapse prevention', i.e. identifying and anticipating future risk situations or barriers for long-term maintenance of health-related behaviours, and planning in advance how to deal with lapses and relapses. Individual barriers might also include a lack of relevant skills (linked with 'developing, practising skills & behaviours'), 'participant characteristics' that may impede their ability to engage in health behaviours, or 'other contextual influences' (e.g. social situations or social norms that may make it difficult to engage in healthy behaviours or not engage in unhealthy behaviours).
5.15. Self-monitoring	Self-monitoring of one's health-related behaviours or outcomes. It can take place in the group (e.g. weighing in), involve participants sharing in the group whether or how they self-monitor, or sharing information about, and recommendations for, methods of self-monitoring (e.g. using scales or activity monitors). Self-monitoring may be reported or referred to during 'reviewing progress, goals'. Discussing in the group ideas for, or ways to, self-monitor, or benefits of it, can also facilitate 'social learning' and 'social influence'.
5.16. Individual-level feedback	Providing individual-level feedback to a participant on their performance or progress, and participants receiving such feedback. Feedback includes evaluative, measurable data or information related to performance/behaviour (e.g. losing 2 kg, step-count going up by 2000 steps), rather than just affective statements (e.g. praise). Feedback provided to individuals in the group may provide opportunities for 'social comparisons' or 'competition', and may enhance 'accountability to the group' or 'social influence' (e.g. shaming or peer pressure to achieve results). 'Group-level feedback' can also be provided to the group, e.g. on achieving 'group goals'.
5.17. Developing self-insight	Developing self-awareness, understanding of one's feelings, thoughts and behaviours, discovering previously unknown aspects of oneself. This may involve expressions of self-understanding, or development of a new self-insight, e.g. of one's feelings, thoughts or behaviours, or what drives one's engagement with unhealthy behaviours (e.g. comfort eating). It may be linked with 'sharing experiences' in the group, thus promoting 'social learning', 'group problem solving' or 'social validation'. It may also be linked with 'intra-personal change processes', such as 'motivation' (e.g. identifying sources of one's motivation), 'self-efficacy & personal control' (e.g. exploring and reflecting on one's confidence and a sense of personal control).
5.18. Identity shift	Perception, or change in perception, of oneself, one's own characteristics or self-concept, especially those related to health or targeted health behaviours, e.g. a cyclist, not a 'salad eater'. This may affect one's behaviours or 'normative beliefs', and may be linked with 'identifying

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	with/as a group' or 'social identification' (e.g. adopting norms or behaviours aligned with one's identity, which might be influenced by norms and behaviours accepted by the treatment group or social identities).
5.19. Using self-talk	Using positive or negative self-talk that may reinforce or inhibit motivation or goals. It may involve positive self-talk (e.g. encouraging oneself, self-praise) or negative self-talk (e.g. self-criticism, self-deprecation, diminishing one's achievements). When expressed in the group, it may be linked with 'self-presenting' and 'identity shift'. It may also elicit 'social validation' or 'social support' from the group (e.g. the group might respond to negative self-talk by providing encouragement, positive reinforcement or reframing).
5.20. Associative learning	Using rewards, self-rewards or incentives for effort or performance of behaviours that may help participants learn and change behaviours through association and reinforcement. In the group, it may involve talking about using rewards, self-rewards or incentives or reporting using them; thus, it may be linked with 'sharing experiences' and 'social learning' (e.g. sharing ideas for types of self-rewards that can be used). It may also involve incentives and rewards provided in the group, e.g., social rewards (e.g. praise) or material rewards (e.g. linked with pre-designed 'incentives, rewards, payments'). Associative learning may increase 'motivation' for change and effort and 'commitment to attend' the sessions.
5.21. Forming habits	Forming new, or changing old, health-related habits. It can include developing awareness of current habits, breaking habits or forming new habits; in the group, it can also involve learning about specific techniques to prompt forming/changing habits or participants reporting changing their habits. It may be linked with 'sharing experiences' and 'social learning' (e.g. about habits), 'developing self-insight' (e.g. self-awareness of habits) and 'developing, practising skills & behaviours' (e.g. repetition of health-related behaviours in or outside the group that can help form habits).
5.22. Managing stress, emotions	Set of techniques to reduce or manage stress, anxiety or other emotions that may influence one's engagement with healthy or unhealthy behaviours. In the group, it can involve sharing ideas and learning about, or practising techniques for stress and emotion management (e.g. relaxation techniques), or participants reporting using these techniques; thus, it may be linked with 'sharing experiences' and 'social learning' (e.g. about stress management techniques), 'developing self-insight' (e.g. about current stress levels, emotional reasons for engaging in unhealthy behaviours) and 'developing, practising skills & behaviours' (e.g. practising relaxation techniques in the session).

6. FACILITATOR & PARTICIPANT CHARACTERISTICS & CONTEXTUAL INFLUENCES

This category includes other types of factors external to the group which may influence the group dynamics and development, and inter- and intra-personal change processes. It includes characteristics of group facilitators and participants that they bring to the group (regardless of whether they were pre-planned), and the influences on the relationships between facilitators and participants in the group. It also includes other contextual factors related to participants or facilitators that are external to the group but may influence participants' health, health-related behaviours and interactions in the group.

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6.1. Facilitator characteristics	Individual characteristics of group facilitators (that they bring to the group), including personality and inter-personal skills (e.g. warmth, relatedness), cognitive and emotional factors influencing their role (e.g. knowledge, experiences, passion), professional skills and experience (e.g. in presentation, group management), or demographic characteristics (e.g. age, gender, ethnicity, related health conditions). All of these factors may influence the relationships or rapport with group participants, 'group dynamics & development', 'inter-personal change processes' and 'intra-personal change processes'. E.g., facilitators' warmth, ability to relate to participants and express empathy may affect 'group climate' and 'social validation'; their professional background and expertise might be a source of 'social influence'; skills in providing information in non-directive, interactive ways and facilitating interaction may support 'group engagement', 'social learning' and 'sharing experiences'; similar age and gender may reinforce shared social identities ('social identification'); whereas personal experiences of successful behaviour change (e.g. losing weight, preventing diabetes) may prompt 'social comparisons' (e.g. role modelling). Facilitator characteristics are also important factors to consider at the intervention design stage and in the role description or specification ('facilitator selection, training').
6.2. Participant characteristics	Individual characteristics of group participants (that they bring to the group), which may influence their health and health-related behaviours, or their relationships and rapport with facilitators and other participants, including personality, cognitive and emotional factors, clinical/physical or mental health issues, values and beliefs, initial motivation, personal agenda or reasons to attend, readiness to change, type of locus of control, level of knowledge, previous experiences, etc. These factors may be linked with 'participant selection, group composition' and participants' social identities salient in the group ('social identification'); thus, they might be important to consider at the intervention design stage. All of the factors that participants bring to the group may influence 'group dynamics & development', 'inter-personal change processes' and 'intra-personal change processes'.
6.3. Other contextual influences	Other factors specific to participants' lives and external to the group that may influence their health and health-related behaviours. They may include factors, such as social support, social connections and positive or negative influences of other people outside the group, social situations or events that may influence health behaviours and social norms related to these (e.g. practices related to celebrations or festivities), and wider social norms. These may be shared and discussed in the group (e.g. prompting social support outside the group); thus, they might facilitate various 'inter-personal change processes' and 'intra-personal change processes'.