

How do Small Groups Promote Behaviour Change? An Integrative Conceptual Review of Explanatory Mechanisms

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Background: Small groups are used to promote health, well-being, and personal change by altering members' perceptions, beliefs, expectations, and behaviour patterns. An extensive cross-disciplinary literature has articulated and tested theories explaining how such groups develop, function, and facilitate change. Yet these theoretical understandings are rarely applied in the development, description, and evaluation of health-promotion, group-based, behaviour-change interventions. **Methods:** Medline database, library catalogues, search engines, specific journals and reference lists were searched for relevant texts. Texts were reviewed for explanatory concepts or theories describing change processes in groups, which were integrated into the developing conceptual structure. This was designed to be a parsimonious conceptual framework that could be applied to design and delivery. **Results:** Five categories of interacting processes and concepts were identified and defined: (1) group development processes, (2) dynamic group processes, (3) social change processes, (4) personal change processes, and (5) group design and operating parameters. Each of these categories encompasses a variety of theorised mechanisms explaining individual change in small groups. **Conclusion:** The final conceptual model, together with the design issues and practical recommendations derived from it, provides a practical basis for linking research and theory explaining group functioning to optimal design of group-based, behaviour-change interventions.

Keywords: behaviour change, group dynamics, group processes, intervention, small groups, theory

INTRODUCTION

Small groups have been used to promote personal change and improve health throughout the twentieth century. As early as 1905, Joseph Pratt highlighted the importance of group identification (or group “spirit”), social support, and shared

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hope in psychotherapy groups for tuberculosis patients (Horne & Rosenthal, 1997). Since then, groups have been employed to foster: (1) therapeutic change in psychotherapy, family therapy, and psychodrama (e.g. Yalom & Leszcz, 2005), (2) personal growth and interpersonal skills development outside therapy, for example, in encounter or sensitivity training (“T”) groups (e.g. Lieberman, Yalom, & Miles, 1973), (3) psycho-education, that is, task-specific learning and skills training (e.g. Brown, 2011), and to provide self-help and peer support for people with addictions and other health problems (e.g. Kurtz, 1997). More recently, the increasing prevalence of chronic and lifestyle-related diseases, such as cardiovascular diseases, diabetes, rheumatic diseases, cancers, and chronic respiratory diseases (World Health Organization, 2013), has resulted in small groups being used to deliver health-related, behaviour-change interventions targeting illness prevention and self-management. Lorig’s (1993, 1999) groundbreaking work on self-management of arthritis and other chronic diseases has shaped subsequent group-based applications, including the national UK “Expert Patient” programme (Abraham & Gardner, 2009; Kennedy et al., 2007). Similarly, many weight loss and obesity management interventions (e.g. Dom-browski, Knittle, Avenell, Araujo-Soares, & Sniehotta, 2014) and diabetes prevention programmes (e.g. Aziz, Absetz, Oldroyd, Pronk, & Oldenburg, 2015) have been delivered in groups.

These diverse applications have generated a wide-ranging, decades-old, research literature explaining how small groups work and how they can be used to promote individual change (Horne & Rosenthal, 1997). Evidence of the effectiveness of group-based behaviour-change interventions (GB-BCIs) is accumulating through systematic reviews and meta-analyses. For example, GB-BCIs have been found effective in smoking cessation (Stead & Lancaster, 2009; West, Walia, Hyder, Shahab, & Michie, 2010), promoting physical activity (Harden et al., 2015) and walking (Hanson & Jones, 2015), diabetes self-management (Deakin, McShane, Cade, & Williams, 2009; Steinsbekk, Rygg, Lisulo, Rise, & Fretheim, 2012), self-management among cancer patients (Smith-Turchyn, Morgan, & Richardson, 2016), and weight loss (Borek, Abraham, Greaves, & Tarrant, 2018). Despite encouraging evidence, GB-BCIs exhibit substantial, largely unexplained cross-intervention heterogeneity in effectiveness and considerable variability in design (e.g. Borek et al., 2018; Deakin et al., 2009; Stead & Lancaster, 2009). Consequently, the mechanisms of change accounting for GB-BCI effectiveness remain unclear.

In a meta-analysis of 111 experimental and quasi-experimental studies of health-related small group interventions Burlingame, Fuhrman, and Mosier (2003) found, among many investigated potential mediators, significant differences between interventions and controls for only three characteristics: homogeneous groups improved more than heterogeneous groups, inpatient groups improved more than outpatient groups, and mixed-gender groups improved more than single-gender groups. These findings illustrate the importance of group

composition and setting to effectiveness, but they do not mean that only these three characteristics matter when designing groups to instigate behaviour change. Other factors may also influence intervention effectiveness. For example, conflict in the groups (Nackers et al., 2015), establishment of specific group norms (Cruwys, Haslam, Fox, & McMahon, 2015) or degree of identification with the group (Wakefield, Bickley, & Sani, 2013). However, poor reporting of group characteristics in primary studies, methodological limitations of those studies, and the heterogeneous nature of the groups categorised as either having, or not having, particular characteristics make it difficult for meta-analyses to identify mechanisms of change in GB-BCIs (see Borek, Abraham, Smith, Greaves, & Tarrant, 2015; Borek et al., 2018). A theoretical understanding of potentially important factors in GB-BCIs is a prerequisite to experimental tests of optimal group characteristics and intervention effectiveness and to data synthesis, including meta-analyses that employ categorisation systems based on effectiveness evidence.

Two main rationales have been proposed to justify the use of GB-BCIs. First, groups may be more cost-effective than individual interventions, just as a lecture may be more cost-efficient than a series of one-to-one tutorials. This justification depends on group members changing to a similar degree, on average, to those participating in individual interventions and there is some evidence suggesting that groups may be more effective than similar individual interventions (Paul-Ebhohimhen & Avenell, 2009; Renjilian et al., 2001). Such cost-effectiveness considerations also raise the question of whether mass, online, self-delivered interventions could be more cost-effective than either one-to-one or group-based interventions (e.g. Krukowski, Tilford, Harvey-Berino, & West, 2011).

A second, theoretically-based, rationale is that interaction in groups can generate psychological and behaviour change in ways that one-to-one or self-delivered interventions cannot. For example, research has highlighted the operation of social support (e.g. Kurtz, 1997; McMahon, Visram, & Connell, 2016), group norms (e.g. Cruwys et al., 2015), identification with the group (e.g. Sani, 2012; Sani, Madhok, Norbury, Dugard, & Wakefield, 2015; Wakefield et al., 2013), development of social identities (e.g. Haslam et al., 2016), and the combination of feedback and challenge in trusting, supportive environments (e.g. Smith, 1980) as group-specific facilitators of individual change. Yet, design descriptions (and, where available, logic models) of GB-BCIs almost never specify how group-specific change processes can be harnessed by the specified group design or facilitation strategies (Borek et al., 2015; Borek et al., 2018).

Research Questions

The aim of this review was to identify what group processes can be generated to harness change mechanisms and enhance the effectiveness of GB-BCIs. Identifying group processes (e.g. group dynamics) allows specification of mechanisms of change that determine whether or not groups facilitate personal change in

group members. This, in turn, enables identification of practical group design and facilitation methods to manage group processes, thus instigating change mechanisms and optimising groups as change agents. In order to address this overall aim of this review, from a theoretical and practical standpoint, we had two more specific research questions:

1. What processual models explain how small groups facilitate individual change; that is, what do we know about group processes that would recommend their use in behaviour-change interventions?
2. What are the implications of such understanding for designers and group facilitators planning to employ small groups in behaviour-change interventions?

METHODS

The “group processes” and “group dynamics” literature spans disciplines over decades and employs a variety of methodologies. Electronic searches of key terms, such as “group dynamics”, “group processes” or “group-based”, result in large numbers of records. For example, our search for “group dynamics” in PubMed returned more than 33,000, and in PsycINFO more than 13,000, references. Similarly, searches of the British Library identified more than 160 books on group dynamics and group processes. Relevant theories have emerged in social psychology, psychiatry, sociology, social work, education, and organisational research, and have been published over more than 80 years across these different disciplines. Reviewing or summarising *all* of this extensive body of work or conducting a systematic review are not practical or feasible methods of integrating these diverse conceptualisations presented across thousands of texts. Indeed systematic reviews, because of their strictly defined inclusion criteria, often generate conclusions and recommendations that generalise to a specific sub-field of investigation. We aimed for a more generic overview and so employed a “discovery” approach to map out and integrate the existing relevant research into a conceptual and processual model. In our approach we draw from a core set of texts describing explanatory concepts and models that could guide the design of GB-BCIs. We started by reviewing key texts in detail, and then used each new text that we identified to confirm or extend our developing conceptual model.

We reviewed research into groups designed to generate individual behaviour change among members, that is, “counselling” or “psychoeducational” groups. We focused less on “work groups” and “therapeutic groups” as their primary aims are achievement of a task-specific group outcome and treatment of mental health issues, respectively, rather than individual behaviour change (for descriptions of these types of groups see, e.g. Association for Specialists in Group

Work, 2000). We focused on small groups of between three and approximately 20 members who have a common purpose and who spend time interacting to achieve this purpose (Mills, 1967; Jaques & Salmon, 2007). We considered articles and books for review if they provided explanations of how groups work and how they affect individuals or facilitate individual change in groups. Thus, we focused on texts concerning *intra*-group processes (not *inter*-group processes, e.g. in-group, out-group bias) in *small* groups (not large groups, e.g. crowds or institutions), and on explanations directly relevant to the design and delivery of GB-BCIs.

We began with key books summarising research into group dynamics. These included Cartwright and Zander's *Group Dynamics: Research and Theory* (1953/1968), Yalom and Leszcz's *Theory and Practice of Group Psychotherapy* (1967/2005), Lieberman et al.'s *Encounter Groups: First Facts* (1973), Smith's *Group Processes and Personal Change* (1980), Brown's *Group Processes: Dynamics within and between Groups* (1988/1993), and Johnston and Johnston's *Joining Together: Group Theory and Group Skills* (1975/2013). These core texts, by themselves, provide a wealth of theoretical explanations of how groups work and how they facilitate individual change; explanations developed theoretically and tested over decades.

Following this conceptual review of core texts, we conducted a series of database searches in Medline and Google Scholar, and the British Library. We used generic search terms (e.g. "group dynamics") and more specific searches for key concepts and processes that we identified in the core texts (e.g. "group development", "group norms"). In addition, we hand-searched five relevant journals: *Psychological Review*, *Psychological Bulletin*, *Social Science & Medicine*, *Journal for Specialists in Group Work*, and *Group Dynamics: Theory, Research & Practice*.

The searches identified a large number of relevant publications, including approximately 160 books and 900 journal articles and book chapters, which we included in our "library". Some of these were especially influential to the development of this conceptual review because they reviewed or theorised a range of potentially important group processes; for example, Levine and Moreland (1990), Horne and Rosenthal (1997), Association for Specialists in Group Work (2000), Furr (2000), McGrath, Arrow, and Berdahl (2000), Murphy and Johnson (2006), Hoddinott, Allan, Avenell, and Britten (2010), Drum, Becker, and Hess (2011), McCarthy and Hart (2011), and book chapters by Burlingame, Fuhrman, and Johnson (2004) and Forsyth and Burnette (2005). Many other articles shaped our review and are referenced below and/or in the Supplementary Document (available online). The main stages of identifying and reviewing the relevant literature are summarised in Figure S1 in the Supplementary Document.

We acknowledge that this pragmatic, discovery approach to reviewing relevant texts cannot be replicated precisely because we followed our growing understanding of a very large number of texts to cumulatively develop a

conceptual model of theorised mechanisms. However, our identification of core texts and the detailed referencing of our findings (see Supplementary Document) allow interested readers to follow up and critically evaluate the research that underlies our interpretations and our conceptual model. We accept, too, that we may have missed relevant texts. Our conceptual review is not a definitive mapping of all theories of how small groups can generate behaviour change. Instead, we aimed to provide a summary model of core processes that can be translated into practical strategies that may be used to design, form, and manage GB-BCIs so they are optimally effective (Bartholomew, Parcel, Kok, Gottlieb, & Fernandez, 2016).

RESULTS

Early Foundations Underpinning our Conceptual Model

Our current understanding of how groups generate individual change has been strongly influenced by Jacob Moreno and Kurt Lewin in the 1930s and 1940s (Cartwright & Zander, 1968). Moreno (1953; Moreno & Fox, 2008) argued that groups provide an environment in which participants can either enhance or, importantly, block their personal development. He developed psychodrama and sociodrama methods that facilitated “catharsis” by allowing people to enact responses to personal and social problems. He also pioneered sociometric methods used to map connections between people in groups.

Lewin coined and popularised the term “group dynamics” (Lewin, 1948). He explored the impact of different leadership styles, and developed sensitivity training (or “T-groups”). T-groups trained participants in the management of social interaction, developing interpersonal skills and self-reflection by observing and providing feedback on members’ “here-and-now” behaviour in the group (Smith, 1980). In 1944 Lewin founded the Research Center for Group Dynamics and in 1947 established the National Training Laboratories Institute that advanced research on small groups. This work developed scientific approaches to coding interaction in groups and evaluation using follow-up questionnaires (Cartwright & Zander, 1968) as well as applying sociometric methods, ethnographic observation, case studies, and laboratory experiments (Forsyth & Burnette, 2005). This provided a foundation for social psychological research into group processes.

Early research clarified that groups have identifiable emergent properties that can generate and accelerate individual change and that group memberships influence members’ perceptions and action during and beyond interaction in the group itself. Some of the foundational research in group dynamics includes, for example, Sherif’s experiments on development of, and conformity to, group norms and the importance of group identity to individual action (Sherif, 1936;

Sherif, Harvey, Hood, Sherif, & White, 1961) and studies of leadership highlighting how different styles (i.e. democratic, autocratic, and laissez-faire) shape group climate and performance (e.g. Lewin, Lippitt, & White, 1939). This fundamental knowledge about groups, developed by many early researchers, can be summarised as seven key group characteristics (e.g. Brown, 1993; Cartwright & Zander, 1968; Jaques & Salmon, 2007; Knowles & Knowles, 1972; Luft, 1984). These and their importance are briefly explained in Table 1. We regard these characteristics, highlighted by many authors, as core characteristics of small groups capable of changing members' behaviours. Some, but not all, of these characteristics are also evident in large groups and crowds. We suggest that these seven characteristics need to be initially considered when designing a small group with the potential to generate individual behaviour change. The model presented below simplifies the change processes that operate in such groups.

A Conceptual Model of Change Mechanisms in Groups

We organised our model of theorised mechanisms of change in groups into five overarching categories, as described below and summarised in Figure 1 and Table 2. We acknowledge that this is a simplification of the processes that operate in small groups. Our aim was to capture key elements of the complexity of change processes operating in groups and present these in an accessible conceptual framework that could be used practically by designers and facilitators of

TABLE 1
Core Characteristics of Groups

<i>Core characteristic</i>	<i>Importance</i>
1. Common purpose	Fosters social identification with the group such that members self-identify and are perceived by others to be group members.
2. Pro-group perceptions	Promotes adoption of values and strengthens motivation to further group goals.
3. Shared values and norms	Internalisation of group values and norms creates collective perceptions and shapes behaviour patterns inside and outside the group.
4. Group structure	Members are ascribed or develop different roles, statuses, power, and relationships that channel interaction within the group.
5. Interdependence	Members become interdependent and act collectively on the basis of common perceptions of group purpose, norms, and structure.
6. Group cohesion and climate	Groups that are attractive to members become more cohesive and so more readily influence members' beliefs and values and encourage common motivations and behavioural patterning.
7. Disclosure and feedback	Self-disclosure can invite social validation and generate trust. This in turn facilitates receipt and acceptance of potentially helpful, but sometimes challenging, feedback.

small groups intended to promote individual behaviour change. Those interested in greater detail may wish to explore the references provided (see also our Supplementary Document) and future research may elaborate the model developed here.

1. *Group development* refers to internal group processes that determine how group members relate to one another over time. Such development may establish implicit or explicit rules and interaction patterns that facilitate or limit social and individual change. Critically, these rules and patterns change over time. They may change during the course of a single group session and are likely to develop over multiple group meetings. For example, as group members come to trust one another and share a commonly-understood group identity this changes how they respond to feedback and evaluation.
2. *Dynamic group processes and properties* transform a collection of individuals into a group, establishing interaction patterns, shared goals, interdependence, collective perception, group identification, group structure, cohesion and unity. The operation of these processes can enhance or limit social and personal change within groups and their operation will change as the group develops.
3. *Social change processes* (or *inter-personal* processes between group members) are patterns of interaction that facilitate, instigate, or impede personal change in groups.
4. *Personal change processes* are individual (or *intra-personal*) change processes that may be prompted and facilitated by interaction in groups but which may also operate in self-delivered or one-to-one interventions.
5. *Group design and operating parameters* are features of group-based interventions likely to shape group processes and properties as well as the

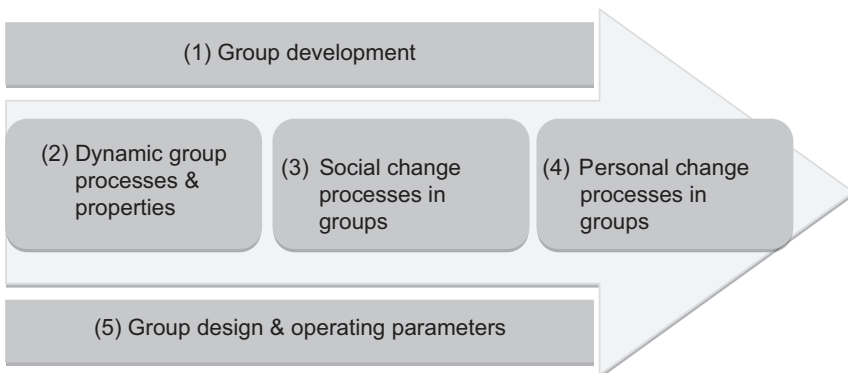


FIGURE 1. Conceptual structure

TABLE 2
Overview of Key Concepts and Change Processes in Groups

1. <i>Group development</i>	2. <i>Dynamic group processes & properties</i>	3. <i>Social change processes</i>	4. <i>Personal change processes</i>	5. <i>Group design & operating parameters</i>
1 Forming	1 Social identification	1 Social comparison	1 Individual cognitive change	1 Group purpose
2 Storming	2 Group cohesion	2 Social facilitation	2 Individual skill development	2 Group composition & size
3 Norming	3 Group norms	3 Modelling, imitation, & social learning	3 Self-disclosure, feedback, & challenge	3 Leadership processes
4 Performing	4 Group roles & statuses	4 Social power & influence		4 Facilitator characteristics
5 Adjourning	5 Group climate	5 Social support		5 Group & interaction management

social change processes that operate within those groups. These features, including how a group is set up and terminated, can be anticipated at the design stage and used to mould and manage groups to perform optimally.

As illustrated in Figure 1, (1) group development, (2) group dynamic processes and properties, and (5) group design and operating parameters can affect within-group (3) social change processes. Each of these group properties and processes interacts with the others and constitutes mechanisms of change that drive (4) personal change processes in small groups. So understanding these mechanisms is critical to generating change theories or logic models that explain how GB-BCIs can most effectively alter members' psychological functioning and, thereby, change behaviour patterns beyond the group (Bartholomew et al., 2016). For example, (2) group dynamic and (3 and 4) social and personal change processes may be affected by (1) group development or (5) operating parameters, such as the facilitators' approach to group management. At the same time the emerging group dynamics and change processes may affect how the group develops and how facilitators can best manage interaction within the group. Moreover, group development and group dynamic processes and properties help establish group context, or conditions, that may or may not be conducive to the facilitation of social and personal change processes.

Below, we summarise our review findings highlighting processes central to personal change organised within these five overarching categories. More detailed findings that underpin this conceptual overview cannot be presented within the page limitations of this article but are included in a fully-referenced Supplementary Document that presents our results in more detail, explaining each of the change process categories listed in Table 2.

Group Development

Group development refers to change processes within the group as a whole. Tuckman initially identified four stages of group development, namely, forming, storming, norming, performing (Tuckman, 1965), and subsequently added a final dissolution or "adjourning" stage (Tuckman & Jensen, 1977). Similar sequential models of group development have been proposed and there is some consensus that groups generally proceed through an initial period of ambiguity and insecurity leading to a period of tension, frustration, or conflict which, if resolved, leads to consensus and norm formation that, in turn, allows harmonious, interdependent work (in the performing stage) (Knowles & Knowles, 1972). Unfortunately, the evidence supporting these models of group development is limited (Smith, 1980) and more than 100 different theories of group change have been identified (Arrow, Poole, Henry, Wheelan, & Moreland, 2004; Hill & Gruner, 1973; Chang, Duck, & Bordia, 2006). Other, potentially important, developmental processes have been described, and these may differ between group types

(e.g. therapy versus work groups), across cultures (Chang et al., 2006), and in response to time structure and leadership (Smith, 1980). Nonetheless, while the five-stage sequence identified by Tuckman, and echoed in other analyses, may be simplistic, it may also be helpful to GB-BCI designers because it provides pointers to specific group management tasks, emphasising that personal change in groups may need to be facilitated differently across a group's lifespan. Further, it emphasises that if group development is unsuccessful, group effectiveness may be impaired.

Early meetings, and especially the first session, are important because they need to facilitate establishing a sense of belonging and reduce ambiguity, detachment, and artificiality. This requires skilled management, including facilitator engagement and responsiveness (Tarrant et al., 2016). Motivational Interviewing techniques, such as OARS (Open questions, Affirmations, Reflections, Summary statements), double-sided reflections followed by invitation to explore ambivalence, or rolling with resistance (Miller & Rollnick, 2002), can be used in these early (forming and storming) sessions to engender trust and discourage ambivalence and disengagement (Young, 2013).

Transition to "norming" and "performing" may be facilitated by feelings and expressions of shared values, empathy, and tolerance between members over time and groups managing such interaction well may achieve higher levels of personal change (Marks, 1972, and Lundgren & Knight, 1978, in Smith, 1980). Such consolidation can facilitate the offering and accepting of feedback, challenge, and suggestions for change between members, and this may be critical to some behaviour-change goals.

GB-BCIs are often time-bound so, at some point, they reach the end or "adjourning" phase. This stage is particularly important in developing independence (rather than dependence on the group), social support outside the group (rather than in-group support), and a sense of personal responsibility (rather than accountability to the group), all of which are critical to sustaining long-term change (Ampt & Engwicht, 2013).

Dynamic Group Processes and Properties

Dynamic group processes distinguish interaction in groups from interaction between a collection of individuals. They bind the group together and enable pursuit of group goals. These processes are "dynamic" in the sense that they fluctuate throughout the group's development. Many such processes can be important in specific groups but we have highlighted five that are consensually acknowledged as critical across literatures.

Social Identification. Acknowledgement of group membership by participants is critical to group functioning, and identification with other group members can facilitate group cohesion (Cartwright & Zander, 1968). Categorising

oneself as a group member can alter one's self-concept, re-prioritise goals, and amplify social influence processes (Turner, 1985). When membership is salient, identification enables group norms and standards of behaviour to shape individual goals and action (Turner, 1991). Such identification allows groups to generate new social identities; for example, breast cancer support groups can help develop a survivor identity and promote post-traumatic personal development (Morris, Campbell, Dwyer, Dunn, & Chambers, 2010). Identification can also influence members' self-evaluations such that the self is judged in accordance with group performance, which may, in turn, affect motivation to achieve group goals (Zander, Stotland, & Wolfe, 1960). Social identification has been associated with better mental health and recovery from depression (Cruwys et al., 2014; Wakefield et al., 2013), and greater engagement with groups and networks in everyday life has been associated with healthier behaviour patterns (Sani et al., 2015). Consequently, identification processes have been viewed as a critical aspect of developing and maintaining well-being—indeed a “social cure” (Haslam, Jetten, Postmes, & Haslam, 2009; Jetten, Haslam, & Haslam, 2012). Group identification can also have undesirable personal consequences when the group identified with is not valued, for example, when it is stigmatised (Crabtree, Haslam, Postmes, & Haslam, 2010). The key implication for GB-BCIs is that social identification should be promoted (or “nurtured” by, e.g. naming the group or identifying a common group goal) during early meetings (Tarrant et al., 2016).

Group Cohesion. When group members value their membership and want to remain members, the group is said to be cohesive. Group cohesion has been identified as critical to learning in T-groups (Lieberman et al., 1973) and change in psychotherapy groups (Yalom & Leszcz, 2005). Cohesion is predictive of members' satisfaction with group interventions (Loughead & Carron, 2004) and more cohesive groups are better able to shape members and their beliefs and self-evaluations (Cartwright & Zander, 1968). Group attractiveness facilitates cohesion, and it can be increased when membership is incentivised and perceived to be beneficial by generating outcomes commensurate with individuals' aspirations (Cartwright, 1968). Group incentives may include group characteristics (e.g. similarities between members), group goals, group activities, leadership style, and positive group climate (Cartwright & Zander, 1968).

Group Norms. Group norms are expectations, or standards, that direct members' interpretations of events, beliefs, and behaviours (Cartwright & Zander, 1968). Newcomb (1943) demonstrated that individual attitudes are strongly influenced by the groups to which people belong and that groups evaluate members on the basis of conforming to group norms, and so tend to reject members who deviate from normative beliefs or values.

Norms for group behaviour can be pre-set by agreeing group ground rules, and norm development can be encouraged when group leaders exemplify and approve of particular values and behaviour patterns (Lieberman et al., 1973). Group norms can shape, consolidate, and make salient particular beliefs, attitudes, and intentions among members (Berkowitz, 2003). Some group norms may be important for all GB-BCIs, for example, respect for other members, while other norms are purpose-specific. For example, Cruwys et al. (2015) showed how establishing group norms that challenged a “thin ideal” helped prevent eating disorders.

Group Roles and Statuses. Roles and statuses provide guidance about one’s own and others’ behaviour. Some roles are formally prescribed (e.g. facilitator), while others develop informally (e.g. a joker, scapegoat, or problem-solver) (Brown, 1993). Benne and Sheats (1948) usefully distinguished between group-building roles that contribute to group development, and task- or performance-oriented roles. The former include encouraging, mediating, gate-keeping, standard-setting, following, and relieving tension. These group-building actions can increase trust and group attractiveness and cohesion and, thereby, progress group development and facilitate the group’s capacity to initiate personal change. The latter, performance-related actions, include initiating, information-seeking, information-giving, opinion-giving, clarifying, elaborating, coordinating, orienting, testing, and summarising. These can progress the core business of the group, for example, establishing how members can cooperate to meet their shared goals. Both need to be fostered and established as normative.

Benne and Sheats (1948) also highlighted a series of “non-functional” behaviour patterns including blocking, aggression, recognition-seeking, special pleading, withdrawing, and dominating. These latter actions, while momentarily serving individual member needs, may disrupt group-building and task-oriented work and so need to be managed and minimised by group leaders/facilitators.

Group Climate. The attractiveness of a group, its consequent cohesion, the extent of group identification, the norms that direct attitudes and behaviour in a group, and the operation of social power all influence the socio-emotional climate of the group and interaction within it. Group climate was studied extensively in T-groups and was defined as the degree of members’ involvement, trust, and empathy as well as the warmth of the interpersonal interactions (Smith, 1980). In this research, “involvement” referred to the frequency, type, and content of self-disclosures and feedback, whereas “trust” referred to “a state in which the group member is aware that others in the group are in a position to say or do something which may harm them, but has confidence that this will not occur” (Smith, 1980, p. 61). Studies of T-groups showed that establishing a climate of interpersonal trust, care, empathy, and acceptance rendered personal change more likely (Friedlander, 1970; Golembiewski & McConkie, 1975;

Rogers, 1970). Qualitative studies of participants' experiences of GB-BCIs have also highlighted that a trusting, empathetic, accepting, and supportive group environment, in which members feel it is safe to self-disclose, is important to personal change (e.g. Abraham & Gardner, 2009).

Social Change Processes in Groups

Dynamic group processes and properties, as summarised above, provide the context for interaction between members and social change processes that can initiate and consolidate personal development and change. Many social processes may support personal change. We selected five types of social change processes that are commonly identified across literatures. Nurturing and channelling these processes may help optimise the effectiveness of GB-BCIs.

Social Comparison Processes. Social comparison theory (Festinger, 1954) proposes that individuals continually self-evaluate based on comparisons with others. Such comparisons may be especially powerful when they involve members of a valued group to which we belong. Festinger argued that the psychological consequences of such comparative evaluations mean that we prefer groups that are homogeneous in relation to members' interests, knowledge, or abilities. Members' observation of modifiable discrepancies with other members can have a positive effect resulting in social influence, increased motivation, and learning. Large or non-modifiable discrepancies may, however, lead to derogation and rejection of comparisons. In optimally functioning GB-BCIs both upward and downward social comparisons may support motivation (see, e.g. Abraham & Gardner, 2009). Upward comparisons with more successful members (as defined by group goals, norms, and members' status) can inspire members to achieve the standards exemplified by these high performers. While downward comparisons, especially with other members who are constrained or handicapped but performing optimally within their capacity, may highlight that more able or less constrained members could do better. Anticipating such comparisons at the design stage, and facilitating them in the groups, can optimise the change potential of GB-BCIs.

Social Facilitation. The presence of others prompts neurological arousal and self-evaluation. Such "social facilitation" (Allport, 1920; Triplett, 1898) has been found to enhance performance of well-learned skills or habitual behaviours and can enhance learning and performance. By contrast, the presence of others may disrupt or undermine performance on less well-established or more complex tasks (Zajonc, 1965). This means that groups may provide optimal environments for practising easier or more habitual skills, but may impede development and practice of more complex skills. Thus facilitators of GB-BCIs may need to protect and scaffold early learners to avoid failures (e.g. by prompting practice outside the group) while supporting more skilled learners to provide role models.

Social Learning. From infancy, we have the capacity to imitate others, and modelling and imitating are central to social learning (Bandura, 1977). Modelling relies on attention to others, memory of what others do, and reproduction capacity, that is, having the skills to perform observed actions. Imitation and maintenance of imitated behaviour patterns also depend on individual motivation which is fostered by observing others being rewarded for their actions. We are more likely to adopt behaviours modelled by those who are perceived as credible and high status and with whom we identify. Observing someone perceived to be similar to oneself perform an action successfully can enhance self-efficacy (confidence that one can succeed) and thereby support imitation (Luszczynska & Schwarzer, 2005). Modelling can be facilitated through verbal instruction and demonstration, and providing opportunities for observation and practice. However, ensuring that members have the necessary skills to imitate and ensuring positive social comparisons (supporting, not undermining self-efficacy) are critical to personal development.

Social Power and Social Influence. Social power is the capacity to exert influence over others, for example, to shape others' beliefs and values and to prompt imitation and behaviour change (Cartwright & Zander, 1968). The operation of social power, and therefore the extent of social influence in groups, is shaped by emergent group properties. For example, high-status members have more power to influence other members than lower-status members, and the influence of high-status members over others increases with higher group attractiveness, social identification, and group cohesiveness (Lewin, 1951; Cartwright & Zander, 1968).

Kelman (1958) distinguished between three types of social power: compliance, identification, and internalisation. Compliance is a response to another person's control over rewards and punishments and may be short-lived if the other's power is absent or declines. Identification prompts agreement and imitation to enhance self-evaluations and maintain rewarding relationships. Internalisation, the most powerful type of social influence, involves acceptance of values and beliefs as one's own. French and Raven (1968) identified five key sources of social influence: reward power (having control of rewards), coercive power (having control of punishments), legitimate power (based on members' belief that the person has a right to exert influence), referent power (identification with the person exerting power), and expert power (perception of superior knowledge). Echoing Kelman's (1958) discussion of identification and internalisation, they argued that referent power, based on identification with the person exerting influence, is the strongest type of influence because it leads to internalisation, whereas reward and coercive power prompt conformity and depend on the continuing control of behavioural consequences. Coercion can also result in decreased attractiveness of the person exerting influence and encourage resistance, thereby reducing power over time. Thus, how group facilitators are

viewed in terms of, for example, personal characteristics (e.g. matched with participants' condition, gender, or culture) and professional competence (e.g. expertise) can strongly affect their capacity for social influence, in particular fostering identification.

Social Support. Social support, that is, the provision of psychological and/or material help, can promote well-being and health by enhancing individual coping and mitigating physiological and psychological responses to stress (Cohen & Wills, 1985). Meta-analyses have shown that social support reduces cardiac reactivity to stressors (Thorsteinsson & James, 1999) and has beneficial effects on immune and endocrine functioning (Uchino, Cacioppo, & Kiecolt-Glaser, 1996). By contrast, social isolation has been linked to greater likelihood of strokes (Rutledge et al., 2008), cognitive decline (Shankar, Hamer, McMunn, & Steptoe, 2013), and depression (Golden et al., 2009).

Research into social support is extensive and many categorisations of social support have been developed (e.g. Barrera, 1986; Cohen, 2004; Hogan, Linden, & Najarian, 2002; Uchino, 2009; Uchino et al., 1996). However, four types of social support are relevant to interaction in GB-BCIs: informational (in the form of advice and instruction), appraisal (that assists with self-evaluations, e.g. identifying positive characteristics of another person), emotional (in the form of empathy and expressed care and regard for others), and instrumental (i.e. providing practical help with tasks, or addressing practical needs).

Social support can create opportunities for social connection and identification (e.g. Crabtree et al., 2010) and may be particularly helpful to people experiencing high levels of stress and those who are isolated or stigmatised (e.g. ethnic minorities). Providing support is likely to be beneficial for the provider (e.g. Liang, Krause, & Bennett, 2001), although this may be more likely for women than men (Väänänen, Buunk, Kivimäki, Pentti, & Vahtera, 2005). The benefits of providing support may be optimised when the recipient later becomes the provider. Always receiving support may undermine self-evaluations, self-esteem, and self-efficacy, and these negative effects may be exacerbated when the provider's role is to judge the recipient (Deelstra et al., 2003). Benefits are also most likely when support is provided within high-quality relationships in which the receiver feels positively regarded and can trust the provider. Effective social support is more likely in cohesive groups with high levels of social identification and a positive group climate and in which supportive norms have been established (e.g. Priebe & Spink, 2011; Wakefield et al., 2013).

Personal Change Processes in Groups

We have outlined how groups may develop over time to generate dynamic group processes that distinguish groups from collections of individuals. We have also highlighted five key social change processes that operate in formed groups to

facilitate performance and personal change among members. The capacity of a small group to support personal change is dependent on the establishment of these processes. However, personal change is mediated by the intra-personal processes prompted and maintained within members.

Personal change processes may be more or less relevant to any particular GB-BCI. For example, if the purpose of a group is simply to impart information, change beyond belief change may be unlikely and, in such cases, questions arise as to whether small groups, as opposed to online lectures and webinars, provide the most cost-effective way in which to impart specified information. Here we briefly highlight the importance of intra-personal cognitive change in groups, the development of individual skills and competencies, and the process of self-disclosure, feedback, and challenge as a prerequisite to personal change in groups.

Individual Cognitive Change. Understanding individual cognitive change and being able to apply evidence-based change-inducing techniques to direct these processes is critical to the design of GB-BCIs (see Bartholomew et al., 2016). An extensive psychology of individual behaviour-change processes is summarised in many health psychology texts (e.g. Abraham, Conner, Jones, & O'Connor, 2016). In the Supplementary Document provided, we highlight key insights important to the design and management of GB-BCIs. These include understanding attentional processes, attitude change, the development of motivation, and making and breaking habits.

Individual Skill Development. Individual change in groups also involves learning new skills and behaviour patterns, which vary with the group purpose. Different skills are needed in managing specific long-term illnesses, coping with chronic pain, reducing opioid use, and losing weight. Nonetheless, some generic skills change can be identified. These include, for example, learning how to set and revise personal goals and plans, how to monitor, record, and evaluate one's own behaviour patterns, how to identify and avoid cues to undesirable habitual responses, how to seek social support and practical help, how to self-disclose, how to offer validation and support, how to express empathy, and how to receive and exchange feedback.

Self-Disclosure, Feedback, and Challenge. There is a considerable body of work suggesting that interactive patterns involving self-disclosure, social validation, acceptance, feedback, and challenge promote personal change in small groups (e.g. Lieberman et al., 1973; Smith, 1980; Yalom & Leszcz, 2005). Self-disclosure is risky because others may judge the self negatively. It is also potentially rewarding because it may lead to social affirmation or validation in which others acknowledge similar beliefs, feelings, experiences, and problems (Jourard, 1971). Such validation, also referred to as "universality" (Yalom & Leszcz, 2005), can be very valuable to group members who feel that they are not

understood outside the group. Social validation provides a basis for social identification, the development of group cohesiveness, helpful social comparisons, and useful social support (e.g. Abraham & Gardner, 2009).

Self-disclosure also allows for feedback from others and new self-reflection, enhancing self-awareness (Yalom & Leszcz, 2005). Feedback from others with whom one does not identify or whom one dislikes may be quickly dismissed but feedback from others perceived to be like oneself, and especially those who care for oneself, is more likely to be accepted. Such feedback, especially when it challenges the self or suggests change, may be more likely to be internalised and to result in personal change (Smith, 1980). Thus, it is not self-disclosure per se but how such disclosures are responded to by other members that promotes personal change (Lieberman et al., 1973).

Feedback in which others tell us how they see us and how our actions make them feel allows us to learn about our social impact (Smith, 1980). Supportive feedback is highly valued by group members (Lieberman et al., 1973). Moreover, greater frequencies of feedback in groups have been found to be associated with substantially greater levels of personal change (Kolb, Winter, & Berlew, 1968). Feedback is most likely to support personal change when it challenges the recipient, when it directly addresses behaviour that one wishes to change (French, Sherwood, & Bradford, 1966), when it is provided in later stages of group development (Kolb et al., 1968), when the recipient is motivated to listen (Smith, 1980), and when it describes the recipient's behaviour and the sender's feelings (Jacobs & Spradlin, 1974). In summary, promoting self-disclosures and challenging feedback in a supportive, functioning group may optimise personal change.

Note how this discussion links the panels in Figure 1 and Table 2. Optimising group climate (panel 2) engenders social change processes (panel 3) that in turn prompt personal change (panel 4). Management of these processes is critical to GB-BCI effectiveness (panel 5).

Group Design and Operating Parameters

GB-BCIs are pre-designed and their design parameters facilitate or constrain group development and dynamic group process and properties and, consequently, the social and personal change processes that they promote. Many GB-BCI design features are important, including, for example, how much time is allocated to group meetings, the number of group sessions, characteristics of the setting for group meetings, and preparation of members before the first meeting. However, here we highlight just five of the most critical features.

Purpose of the Group. Lewin (1948) distinguished between interdependence of fate and interdependence of goals, arguing that the latter is more important to group cohesion. Interdependence of goals can be fostered by identifying

and accepting group goals (e.g. overall group weight loss, rather than individual weight loss). Group goals facilitate social identification, promote group cohesion, and provide the basis for developing a positive group climate in which group influence, empathy, and open communication can be developed (Raven & Rietsema, 1957). These processes, in turn, motivate members to work towards group goals. Lonergan (1989) argues also that it is important for group leaders/facilitators and group members to establish realistic expectations and achievable goals in order to avoid disappointment, frustration, or anger if unrealistic expectations and goals are not met.

Group Composition and Size. Group composition can shape social identification and the development of group cohesion. Perceiving other members to be very different from oneself can inhibit social identification, whereas acknowledging shared differences from non-group members can increase social identification. Lonergan (1989) emphasises the importance of anticipating “the balance between homogeneity and heterogeneity, the potential isolate, and the potentially destructive or inappropriate group member” (p. 114). A degree of heterogeneity can helpfully increase the diversity of experiences, knowledge, and skills that members can share. However, it may be prudent to avoid inclusion of participants who are markedly different from others (e.g. the only older person in a group of younger members, or the only woman in a group of men) because minority status (e.g. based on ethnicity, culture, gender, or education) members are more likely to drop out (Kurtz, 1997).

Group characteristics and functioning change with increases in group size (see, e.g. Jaques & Salmon, 2007, pp. 11 and 35). For example, in larger groups more members become peripheral, while fewer members make decisions and take part in discussions. This can influence members’ engagement with the intervention and satisfaction with the group. Moreover, in larger groups, social power and influence are dispersed among more members, thus reducing the potential influence of the group and the facilitator and increasing the danger of “social loafing” (Latané, Williams, & Harkins, 1979) and higher drop out. It has been argued that five to seven members is optimal because groups of this size require little formal structure and organisation, and allow greater interactive engagement between members, so facilitating the relationship development and intimacy between members (Blenko, Mankins, & Rogers, 2010; Jaques & Salmon, 2007). Groups with 20 or more members can be regarded as large because, as the number of members increases, direct interaction between members reduces and there is a tendency for sub-groups or “cliques” to form (Jaques and Salmon, 2007). Thus, groups that operate as integrated small groups are likely to have no more than 10–12 (or in some contexts no more than 20–25) members, and may function optimally with fewer members. There is also evidence to suggest that an odd number of members may assist decision making and that the proportion of women members increases equality in distribution of conversational turn-taking

and social sensitivity more generally. When such interactive features are considered, smaller groups may be optimal, with an ideal of around five members (Woolley, Chabris, Pentland, Hashmi, & Malone, 2010).

Leadership Processes. There is an extensive literature on group leadership. Two key leadership challenges face facilitators of GB-BCIs: (i) helping the group achieve its goals (i.e. the task-related function), and (ii) helping the group manage the dynamics and relationships within the group (i.e. the socio-emotional or group-building function). These functions may be divided between members who may focus more on either one or the other (Bales, 1970). Generic and group-specific skills are needed to manage both challenges effectively. Leaders, occupying positions of high status and social power, may influence the group in different ways; for example, by being a “goal setter” who facilitates merging personal and group goals, an “opinion leader” who influences beliefs and attitudes of group members, and a “socio-emotional leader” who makes members feel comfortable and satisfied with the membership—or perhaps all three (Cartwright & Zander, 1968). Facilitators’ capacity to lead GB-BCIs will depend critically on their interpersonal skills because acknowledgement of a leader’s right to lead depends on the establishment of credibility and acceptance among followers, including agreement between the facilitator and members on group norms and goals (Brown, 1993). What is required of a facilitator will depend on the group purpose and the initial views and skills of the other group members, and the style of leadership adopted needs to be matched to the group purpose and composition (Lewin et al., 1939).

Depending on group purpose and the intended change mechanisms, a group facilitator may have most credibility and influence as a peer or as a professional, and some groups may benefit from both peer and professional leaders. Peer leaders might enhance perceived credibility, facilitate social identification processes, may be seen as more empathetic, and can act as role models. Professional leaders, such as healthcare professionals, can facilitate social power and influence through their professional expertise but may be less effective if they are perceived to be unable to understand the experiences of members. All facilitators need topic-relevant expertise and skills in managing group processes.

Facilitator Characteristics. The characteristics and training of group facilitators determine their capacity to lead a group and manage interaction patterns within it. A credible, likeable facilitator with relevant expertise and good interpersonal skills, and with whom members can identify, is most likely to be effective in promoting personal change in groups. Participants’ perception of facilitator attractiveness has been associated with more positive orientation towards the facilitator’s attitudes and actions, and congruence between members’ self-concept and their perception of the facilitator has been associated with greater internalisation, necessary for the maintenance of behaviour change.

Group members who identify most strongly with facilitators have been found to demonstrate greater personal change in T-groups, and similarities between facilitators and members promoted acceptance of the facilitator as a role model.

Group and Interaction Management. Facilitators have many tasks when managing small groups aimed at personal change. For example, Champe and Rubel (2012, p. 87) suggest that small group facilitators should prioritise: (1) “creating a safe learning environment” (e.g. by openly exploring any participants’ fears of sharing, disclosing personal information, or being judged); (2) “engaging group members in others’ learning” (e.g. by reflecting on how the group develops, how members interact, and how they respond to giving and receiving feedback); (3) exploring group members’ relationship to the core content (e.g. by exploring how the members respond to the content and noting when content is engaged with—or not); and (4) ensuring that group interaction stays focused on agreed content and content-related activities (e.g. by curtailing digressions and linking content back to members’ comments and disclosures). Furr (2000) notes that new information should be combined with experiential learning that “allows material to be encountered on a personal level” enabling group members to “learn by doing” (p. 36). This is likely to encourage engagement and prompt members to take responsibility for applying the new learning to their everyday lives. Furr (2000) also observes that optimal change, especially in relation to habit change, may be achieved when members have time to reflect on how learning experiences have influenced their own personal thoughts, insights, and feelings.

Managing communication patterns is crucial to group leadership and management. A group in which most communication is mediated by a facilitator (creating a pyramid-shaped communication structure) is very different from a non-hierarchical group in which all members talk directly to one another (in a circular structure). The effectiveness of particular communication patterns depends on the goals and requirements of a group at a particular stage of its development (Jaques & Salmon, 2007). Interaction patterns can influence group performance, role differentiation, and the capacity of group members to contribute to leadership functions (Bavelas, 1950, and Guetzkow, 1968, in Cartwright & Zander, 1968). They also influence the satisfaction of group members (Shaw, 1964) as being heard and being able to contribute is important to members. Thus, planning of interaction patterns, with implications for group size and room layout, is important to GB-BCIs design.

Facilitators are also responsible for ensuring that the group develops in optimal ways so that, for example, conflicts are constructively resolved and norms conducive to personal change are established. Observing other expert group facilitators, being observed and receiving supportive and critical feedback, exchanging ideas with other group facilitators, and having access to experienced supervisors can all be helpful in developing facilitation skills (Lonergan, 1989).

Useful guidance on facilitator training is now emerging from research into change processes in groups (e.g. Avery, Whitehead, & Halliday, 2017).

DISCUSSION

We have presented a conceptual model that highlights characteristics and processes that determine how small groups work and how they can promote behaviour change among their members. We purposefully chose a broad approach to developing an integrative conceptual review of extensive cross-decades, cross-disciplinary literatures. We also deliberately simplified the mechanisms of change that operate in small groups so that the final model is easy to understand. We present this model to assist designers and facilitators of group-based behaviour-change interventions. We organised insights from our research into five core categories of concepts and processes. Theorised mechanisms, together with features of group operation, within these five categories are summarised in Figure 1 and Table 2, and practical planning issues that arise from consideration of these change processes are highlighted below.

Implications

A key purpose of this conceptual review is to help designers of GB-BCIs address key elements of group operation and change processes during systematic intervention development (Bartholomew et al., 2016). In Table 3 we highlight key design questions implied by our findings.

No set of simple rules can be provided to designers to answer the questions because the answers to any one question (such as “What is the purpose of the group?”) sets design priorities for subsequent questions. Our guidelines are generic, but specific challenges arise when any particular group aim is considered, for example, weight loss (see Borek et al., 2018). Working through these questions can result in the design of very different GB-BCIs with different purposes, requiring different participant selection and different facilitator training. Such design choices shape the operation of social (or inter-personal) and personal (or intra-personal) change processes. Defining ground rules and group goals will affect group formation, social identification, and the establishment of group cohesion. Group identification and cohesion can be further developed by ensuring homogeneous or balanced group composition and/or making particular aspects of participants’ social identities salient in the group, thus creating a perception of being “in the same boat”. Using humour (within established group norms), managing disruptive behaviour, and encouraging engagement and contribution can help create a positive group climate. Practising relevant behaviours (e.g. exercising, reading food labels, or using inhalers) can help develop skills through social learning and modelling, and improve performance through social comparisons and social facilitation processes. Emotional support can be encouraged through verbal encouragement

TABLE 3
Illustrative Questions to be Addressed during GB-BCI Design

<i>Five key distinctions</i>	<i>Illustrative design questions</i>
Group design & operating parameters	<ul style="list-style-type: none"> • What is the main purpose of the group? • What processes can help achieve this purpose (i.e. what are the intended mechanisms of change)? • What is the planned group composition and why? • How are participants recruited? What is the process whereby they become group members? Is the group open or closed? • How many members will the group have? • How are the participants and facilitators intended to interact and communicate, and why? • What ground rules or norms are imposed by the facilitator, and why? • What is the time structure for the group (length, frequency, duration of the group sessions), and why? • Where does the group meet, and why? Is the venue accessible? Is it set up in a way that will enable the intended mechanism and activities to take place? • What, if any, preparation is required for members before the first meeting? • Who should the facilitators be to optimise identification and credibility? • What skills do the facilitators require?
Group development	<ul style="list-style-type: none"> • What techniques will be used to facilitate initial group formation? • Are there pre-set group norms and how will these be introduced? • How will interactions relevant to optimising task performance be introduced, modelled, and sustained? • Is the group time-bound or ongoing? • If the group is time-bound, how are participants prepared for the end of the group? What else, if anything, happens after the end of the group (e.g. follow-up meeting, individual counselling)?
Dynamic group processes & properties	<ul style="list-style-type: none"> • What is the basis for social identification in the group? • What facilitation methods will be used to initiate and develop social identification, cohesion, norms (promoting involvement, trust, respect, etc.), and positive group climate? • What facilitation methods will be used to manage group roles (especially the non-functional, negative, or disruptive behaviours) and statuses (especially managing formal and informal leadership)?

Table 3 (Continued)

<i>Five key distinctions</i>	<i>Illustrative design questions</i>
Social change processes in groups	<ul style="list-style-type: none"> • How are social comparison processes, including social validation, managed so that they support, and do not impede, change? • What communication patterns and behaviours can be demonstrated and practised in the group to provide opportunities for social learning and modelling? • How can the facilitator increase their potential for influence? • What methods can the facilitator use to influence the group members' behaviour change? • What types of social support should be facilitated—and by what methods?
Personal change processes in groups	<ul style="list-style-type: none"> • What facilitator characteristics will optimise member identification and acceptance? • What are the facilitator's group management priorities and what skills will they need to fulfil these? • What new skills does the facilitator need to encourage in group members? • What training does the facilitator need? • How can a trusting and accepting group climate be established early in the group's development? • How can the facilitator encourage norms of self-disclosure, social validation, and supportive but challenging feedback? • How can the facilitator model, or promote modelling, of these supportive interactive patterns?

and reassurance, whereas practical support can be facilitated through promoting buddying up to perform intended behaviours (e.g. walking together).

Future research could usefully examine the operation of these group-specific change mechanisms in current GB-BCIs, for example, in the management of chronic diseases, preventative and weight loss interventions; identifying which change processes are employed in current practice would help develop the evidence for how particular GB-BCIs work. Further research could identify group features and processes associated with effectiveness, in particular of GB-BCIs, thus providing a foundation for evidence-based training guides for facilitators (see, e.g. Avery et al., 2017).

Strengths and Limitations

This review has not identified *all* change mechanisms in groups; rather, it is a summary of *core* concepts and change mechanisms important for designing and

delivering GB-BCIs. We have presented evidence supporting the importance of these concepts and processes (see also Supplementary Document) but we have not attempted to evaluate the quality of the available evidence. We acknowledge that, in many cases, the evidence presented is not contextualised in the original studies and readers would need to consult referenced papers and books to better understand the research paradigms that have generated the evidence we draw upon. Many of the concepts explained here could be the focus of separate systematic reviews, including evaluations of evidence. We hope that our review will be refined and developed by future research. Nonetheless, the product, summarised in Figure 1 and Table 2, is a parsimonious and practical guide to group management tasks critical to optimum GB-BCI operation.

CONCLUSION

This conceptual review highlights key concepts and processes explaining how small groups promote psychological and behaviour change. These concepts are drawn from a long history of theorising supported by empirical and experimental research. The categories defined and explained here distil the consensual essence of this decades-long research as it relates to the practical management of groups designed to promote personal change. This literature often seems to be overlooked in the design and management of groups to deliver health-related behaviour change. Behaviour-change interventions, even when delivered in groups, are often understood primarily in terms of individual-level change processes that are equally applicable to one-to-one or media-based behaviour-change interventions. This conceptual review highlights the capacity of group-based interventions both to promote and impede personal change. It also identifies the change mechanisms and intervention characteristics that are specific to group-based delivery and that may differentiate between more or less effective group-based interventions.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Supplementary Document (available online) provides a more detailed description of the results of the conceptual review, including a more comprehensive list of references.