Health research often aims to prevent noncommunicable diseases and to improve individual and public health by discovering intervention strategies that are effective in changing behavior and/or environments that are detrimental to one's health. Ideally, findings from original research support practitioners in planning and implementing effective interventions. Unfortunately, interventions often fail to overcome the translational block between science and practice. They often ignore theoretical knowledge, overlook empirical evidence, and underrate the impact of the environment. Accordingly, sustainable changes in individual behavior and/or the environment are difficult to achieve. Developing theory-driven and evidence-based interventions in the real world is a complex task. Existing implementation frameworks and theories often do not meet the needs of health practitioners. The purpose of this article is to synthesize existing frameworks and to provide a tool, the Matrix Assisting Practitioner’s Intervention Planning Tool (MAP-IT), that links research to practice and helps practitioners to design multicomponent interventions. In this article, we use physical activity of older adults as an example to explain the rationale of MAP-IT. In MAP-IT, individual as well as environmental mechanisms are listed and behavior change techniques are linked to these mechanisms and to intervention components. MAP-IT is theory-driven and evidence-based. It is time-saving and helpful for practitioners when planning complex interventions.

Keywords: behavior change; program planning and evaluation; behavior change theory; physical activity/exercise

INTRODUCTION

Noncommunicable, cardiometabolic diseases like diabetes, stroke, and coronary heart disease are the leading causes of morbidity and premature death worldwide. The World Health Organization (2003) has predicted that noncommunicable diseases will account for almost three quarters of all deaths worldwide by

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MAP-IT: A Practical Tool for Planning Complex Behavior Modification Interventions

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2020. An unhealthy diet (e.g., high sugar intake), sedentary behavior (e.g., extensive screen time), and physical inactivity (i.e., adults failing to reach the public health recommendation for physical activity) are known as significant risk factors for chronic diseases (Heath et al., 2012). An impressive number of interventions that aim to change unhealthy behaviors have been implemented in different settings and for different priority populations.

Unfortunately, large-scale interventions (e.g., Multiple Risk Factor Intervention Trial), based on behavioral change strategies, have often only a modest or even a negligible impact on a person’s risky behaviors and health status (Glass & McAtee, 2006; Stokols, 1996). Relapses to the former habitual and risky behaviors are common during the intervention and after the intervention ends. The effectiveness of interventions—physical activity interventions or smoking cessation, for example—has proven to be unpredictable (Biddle, Brehm, Verheijden, & Hopman-Rock, 2012).

In accordance with our experiences and with Glanz and Bishop (2010) or Horodyska et al. (2015), there are a number of reasons for the poor success of interventions. These may include but are not limited to an approach (1) lacking theoretical knowledge and empirical evidence, (2) neglecting the environmental underpinnings of behavior and health or illness, and (3) failing to successfully translate scientific knowledge into practice.

The Matrix Assisting Practitioner’s Intervention Planning Tool (MAP-IT) addresses the fact that extensive scientific knowledge is required to understand results of original research and that these results need to be applicable to real-life conditions. MAP-IT covers health practitioners’ needs by linking scientific research with practical applications. The aim of this article is to highlight the role of MAP-IT in supporting practitioners in developing effective interventions.

**THEORY-DRIVEN AND EVIDENCE-BASED INTERVENTIONS**

“Commonsense interventions,” which can often be seen in intervention practice, frequently ignore theories and fail to follow evidence-based results generated by systematic evaluations of former interventions. Instead of using a systematic approach driven by theories or theoretical models and frameworks and based on empirical evidence, less systematic and often even “down-to-earth” strategies are applied. Interventions often start without clearly defined objectives, aims, and targets. They therefore miss logical connections between components, activities, targets, and objectives (Michie, Fixsen, Grimshaw, & Eccles, 2009). As Trickett and Espino (2004) pointed out when they looked at community collaboration interventions in real life, “There is more theology than conclusion, more dogma than data” (p. 62). This statement applies to many interventions for changing unhealthy behaviors or environments that make the unhealthy choice, the easy choice (e.g., obesogenic environment).

The effectiveness of interventions depends in part on the use of a “program theory,” specifying assumptions that answer why a given intervention component (e.g., education) and an appropriate activity (e.g., a fact sheet) will influence a behavioral or an environmental change under a given condition (e.g., education, Guichard, & Ridde, 2015). Program theories indicate the mechanisms that are likely to change behavior or environment. Theory-driven interventions identify mechanisms linked with behavior, and therefore, the mechanisms are “adjusting screws” to change the environment (e.g., organization) or the behavior (Michie & Prestwich, 2010). Mechanisms are supposed to operate as determinants, causes, or predictors of behavioral changes (Noar & Zimmerman, 2005). Mechanisms give rise to the causal regularities expected in the intervention. Reflecting the work of Pawson, Greenhalgh, Harvey, and Walshe (2004) and applying this to our objective, namely, to develop a tool for practitioners in health promotion, a mechanism represents the idea of how the environmental or behavioral change will be achieved through a specific intervention under a given condition or in a given setting. In another scientific context, according to Bauman, Sallis, Dzewaltowski, and Owen (2002), mechanisms are called determinants, defined as “causal factors, and variations in these factors are followed systematically by variations in . . . behavior” (p. 6).

Program theories answer “why” a given measure in a defined context has an effect. The answer is the basis of an evidence-based intervention. Theory-driven interventions contain statements about the proposed logical interaction of components and measures or activities to derive the reasons why a certain strategy may be effective in a given context. Evidence-based and theory-driven approaches follow a systematic path. Interventions can be successfully completed and replicated only if there are theoretical assumptions providing information about the mechanisms (Davidoff, Dixon-Woods, Leviton, & Michie, 2015) that are crucial to change a specific behavior or environment, and if they use components and measures or activities that have been proven to be effective.

With respect to the measures or activities intended to be used in an intervention, well-described behavior
change techniques (BCTs) help reach the objectives and aims of an intervention (Greaves et al., 2011). Michie et al. (2013) have published one of the most elaborate taxonomies for systematizing BCTs. Changing one’s behavior is usually a complex task and often requires the use of multiple BCTs.

Unfortunately, health practitioners are often not trained to use models or theories of behavior change. They are often not trained in identifying relevant mechanisms and suitable BCTs to influence behaviors (Gonzales, Handley, Ackerman, & O’Sullivan, 2012). Thus, the existing frameworks—albeit reflecting the existing knowledge—are still too abstract to be used in interventions intending to change behavior in real life. They often lack the manual on how to implement a complex intervention in the real world.

**ENVIRONMENTAL INFLUENCES**

Different authors have pointed out that interventions often address only personal and, in particular, psychological factors (e.g., motives or attitudes), and the environment (e.g., the built or social environment) is less likely to be considered (Davis, Campbell, Hildon, Hobbs, & Michie, 2015). Neglecting the structural limitations given by the environment and addressing only motivational and volitional mechanisms have proven insufficient (Stokols, 1996). This has been postulated impressively in Glass and McAtee’s (2006) seminal article. Multiple personal and environmental factors interact to either underpin or hinder individuals’ health behaviors. As previously demonstrated, targeting both personal (i.e., psychological) and environmental mechanisms simultaneously in multicomponent interventions has proven helpful in increasing the effectiveness of an intervention (National Institute for Health and Clinical Excellence, 2007). Socioecological models deal with the “person × environment interaction” (e.g., Sallis et al., 2006).

Planning a theory-driven and evidence-based multicomponent intervention is a challenging task in a complex environment that includes hidden dynamic processes involving multiple factors resulting in inevitable uncertainty. To develop complex interventions, a deep understanding of the needs, wants, and underlying dynamic processes to change behavior in a given setting is essential. Due to insufficient financial resources or due to limited time, for example, practitioners are often not able to acquire the necessary expertise or deep insights into these complex processes (Glasgow & Emmons, 2007).

**EXISTING FRAMEWORKS AND EXISTING KNOWLEDGE**

Many frameworks for designing and evaluating interventions have been proposed to support practitioners to develop effective interventions. PRECEDE-PROCEED (Green & Kreuter, 1991) and intervention mapping (IM; Bartholomew, Parcel, Kok, Gottlieb, & Fernandez, 2011) are two prominent frameworks. Common throughout these planning tools is the alignment with a planning circle like the public health cycle (Ruckstuhl, Somaini, & Twisselmann, 1997), starting with an assessment of the demands and needs in a given setting, continuing with planning, and following with implementation, monitoring, and evaluation. Additional helpful frameworks for designing and evaluating interventions are composed as tools to address special public health issues like obesity. For example, the ANGELO framework (Analysis Grid for Environments linked to Obesity, developed by Swinburn, Egger, & Raza, 1999) is especially useful in the “Needs Assessment” phase of developing an intervention.

A recent framework that supports interventions aimed at behavioral changes is the behavior change wheel (BCW; Michie, van Stralen, & West, 2011), which summarizes knowledge from previous frameworks of different authors. The BCW is a helpful tool for compiling crucial elements of an intervention plan. It brings policy categories (e.g., fiscal measures), intervention functions or components (e.g., education), and behavioral sources or mechanisms (e.g., motivation) into a logical order. As Michie et al. (2013) pointed out, more than 90 different BCTs are currently available. The BCW can serve as a guide to keep a logical sequence between objectives and appropriate strategies for reaching the targets. Its practical application has been studied by Porcheret et al. (2014), and it “... proved to be a practical way of using theory to inform the development of complex interventions” (p. 7). The BCW may be applied to any health-relevant behavior in any setting, making it a powerful tool. But, identifying mechanisms of behavior and finding the links between the behavioral mechanisms, intervention functions, and BCTs are not straightforward tasks. Rather, we presume that the appropriate use of the BCW requires substantial knowledge of those psychological processes that accompany behavior modification.

Michie, Atkins, and West (2014) suggested using the APEASE criteria: affordability, practicability, effectiveness/cost-effectiveness, acceptability, side effects/safety, and equality. These criteria help select the most
appropriate BCT for a specific intervention function. For this to be achieved, practitioners must know what each BCT means and how to work with it. The definition and meaning of each BCT can be found in Michie et al. (2013) and in the digital application (BCT taxonomy) for iPhones from David Crane (https://itunes.apple.com/de/app/bct-taxonomy/id871193535?mt=8).

However, most practitioners are neither psychologists nor experts in BCTs. Of course, the BCW pools existing knowledge in a compact but abstract form, leaving important decisions up to the intervention planner.

Another tool supporting practitioners to plan and evaluate health-enhancing interventions is IM (Bartholomew et al., 2011). IM includes a structured stepwise process that is iterative and cumulative rather than linear, providing appropriate elements to guide each of the six steps. First, intervention planners carry out a needs assessment and identify important personal and environmental determinants for a target behavior that should be changed. In subsequent steps, intervention, adoption, and implementation plans are developed by means of addressing objectives with specific methods and strategies. IM includes all the relevant steps, strategies, and tools for designing and evaluating interventions. However, its comprehensiveness reduces its feasibility, as it requires time and a significant amount of personal and financial resources.

Glanz and Bishop (2010) have highlighted the need for more theories that address environmental variables, as these are enablers or barriers to changing a risky behavior. IM addresses environmental determinants by addressing environmental agents (e.g., the mayor of a community), and it includes environmental strategies (e.g., systems change). ANGELO provides a further indication of important environmental barriers or enablers of health-related behaviors. Environment is seen as a risk regulator, determining the likelihood of individuals participating in a healthy behavior (see Glass & McAtee, 2006). The ANGELO framework separates the environment into four types (physical, economic, political, and sociocultural) and two sizes (macro and micro; Swinburn et al., 1999). The grid is helpful for answering questions such as the following: What is available? What are the costs for an intervention? What are the rules/policies/social norms/attitudes to consider?

All these tools or frameworks are helpful. They have advantages but also disadvantages. To work with them is challenging, is time-consuming, and requires extensive knowledge of motivational and volitional processes (see Figure 1).

Most frameworks are designed to change risky behavior into health-promoting and risk-reducing behavior. These frameworks are products of implementation science. As such, they are not applicable for practitioners of health promotion. They require further translation. The main objective of implementation science is to answer the question of what the “best” method is to treat a given public health problem. Four
steps in translational (T) research (Woolf, 2009) were recently distinguished (Lobb & Colditz, 2013): (T1) case series and efficacy trials; (T2) effectiveness studies, developing clinical guidelines, meta-analyses, and systematic reviews; (T3) effectiveness studies, developing implementation guidelines, and dissemination; and (T4) use of evidence-based interventions and implementation strategies in the real world. These four steps or translational blocks (T1 to T4) refer to the distinctions that are commonly made in medicinal translational research: (1) “from bench to bedside” and (2) “from bedside to community,” that is, laboratory research results are tested in the clinical setting with patients, usually (1) using randomized controlled trials and (2) afterward transferring effective clinical findings to the community. The National Institute of Health distinguishes between research for “dissemination” and research for “implementation,” where the former refers to the targeted distribution of information and intervention materials to a specific public health or clinical practice audience. The latter tries to find out the best use of strategies to introduce or change evidence-based health interventions within specific settings (Proctor et al., 2009; Proctor et al., 2011).

In developing MAP-IT, measures were carefully selected to ensure that it was adequate, appropriate, and feasible and offered low implementation costs. Given the distinctions between different steps in translational research, MAP-IT is designed to enable practitioners to perform their tasks effectively and efficiently. This represents the T4 step in translational research. Our experience working with practitioners indicates that there is a need for a planning tool that practitioners feel comfortable using. Recently, Nilsen (2015) argued that existing theories, models, and frameworks that aim to translate research into practice fail to support practitioners in choosing suitable techniques to influence behavioral mechanisms. Furthermore, most frameworks do not consider “external criteria” in terms of the practitioner’s cost constraints. For practitioners, the amount of knowledge available for intervention planning as proposed in implementation research is, in our view, still challenging and difficult to understand.

THE RATIONALE OF MAP-IT

MAP-IT supports health practitioners in designing systematic (theory-based and evidence-based) interventions, which is usually a complex task. MAP-IT is time-saving and easy to use. MAP-IT helps practitioners when selecting techniques to address relevant mechanisms in a guided manner, reducing cognitive effort and the need for in-depth knowledge of all the techniques available. The tool is written in matrix form. It (1) lists the mechanisms of a specific behavior for a specific age-group and (2) links techniques to mechanisms grouped by intervention components in the columns. MAP-IT synthesizes existing concepts and tools; among them, the most prominent are the BCW (Michie et al., 2011), the ANGELO framework (Swinburn et al., 1999), the BCT taxonomy (Michie et al., 2013), and IM (Bartholomew et al., 2011).

MAP-IT is constructed as a logical model (connecting objectives with mechanisms and BCTs) following a rationale.

To show the rationale of MAP-IT, we exemplify its use on older adults. The objective chosen here is to enhance older adults’ volume of physical activity. Several meta-analyses and narrative reviews confirmed the health-enhancing effect of regular physical activities in older adults (e.g. Bouaziz et al., 2017; Ludyga, Gerber, Brand, Holsboer-Trachsler, & Puhse, 2016).

METHOD

According to the socioecological paradigm, it is essential to address personal and environmental mechanisms to successfully achieve behavior modification. The MAP-IT matrix (see Figure 2) is divided into a personal segment, addressing social-cognitive mechanisms, and an environmental segment, focusing on mechanisms concerning the physical, political/economic, and sociocultural environment (the two leftmost columns). Taking physical activity as an example, the column labeled “mechanisms” includes theory- and evidence-based mechanisms that promote physical activity in older individuals. Experts have identified these mechanisms using a consensus approach, which will be described later.

Theories, models, and frameworks underlying the specific mechanism of physical activity in older adults, and objectives regarding the mechanism are identified and written down in the second and third columns of the matrix, respectively. The headings of the subsequent nine columns are components or “intervention functions,” as outlined in the BCW (Michie et al., 2014; Michie et al., 2011; education, persuasion, incentivization, coercion, training, restriction, environmental restructuring, modeling, enablement). The rows link a mechanism to an objective and address a “theory.” This enables practitioners to establish a program theory as a basis for completing a theory-driven evaluation. In each cell of the matrix, BCTs are stated. BCTs are linked to mechanisms (in our example linked to mechanisms enhancing physical activity in older adults). BCTs are categorized in one or more intervention components.
| Mechanisms | Theories | Objectives | Components |
|---|---|---|---|
| Personal | TPE, TIPS, AIDS, any program theory | Increase self-efficacy | Education, Persuasion, Informationalization, Training, Enactment, Environmental Reinforcement, Restraining the Social Environment |
| Social support | Social support theory, TPE, any program theory | Increase social support | Information about health consequences, Participation, Social support, Informationalization, Training, Enactment, Environmental Reinforcement, Restraining the Social Environment |
| Knowledge | Theory of information processing, any program theory | Increase knowledge | Information about health consequences, Participation, Social support, Informationalization, Training, Enactment, Environmental Reinforcement, Restraining the Social Environment |
| Initiation | TPE, TIPS, AIDS, any program theory | Facilitate implementation | Proximal Goal, Information about health consequences, Behavioral contract, Informationalization, Training, Enactment, Environmental Reinforcement, Restraining the Social Environment |
| Motivational | Theory of motivation (e.g., TPE, any program theory) | Increase motivation | Consequence rating, Social support, Information about health consequences, Behavioral contract, Informationalization, Training, Enactment, Environmental Reinforcement, Restraining the Social Environment |
| Attitude | TPE, any program theory | Increase motivation | Consequence rating, Social support, Information about health consequences, Behavioral contract, Informationalization, Training, Enactment, Environmental Reinforcement, Restraining the Social Environment |
| Relations (family, peers, health status) | Any program theory | Enhance relations | Information about health consequences, Consequence rating, Informationalization, Training, Enactment, Environmental Reinforcement, Restraining the Social Environment, Goal setting, Participation, Information about health consequences, Verbal communication, Informationalization, Training, Enactment, Environmental Reinforcement, Restraining the Social Environment, Goal setting, Participation, Information about health consequences, Verbal communication, Informationalization, Training, Enactment, Environmental Reinforcement, Restraining the Social Environment |
**FIGURE 2 (CONTINUED)**

| Environmental | Preventive Actions to Promote Healthy Behaviors | Behavioral Interventions | Social Interventions |
|---------------|-----------------------------------------------|-------------------------|---------------------|
| **Access to Facilities** | a. Increase access to facilities | i. Increase access to facilities |  |
| | b. Create new buildings | j. Provide easy access to facilities |  |
| | c. Improve pedestrian and cycling infrastructure | k. Increase accessibility to facilities |  |
| **Pedestrian and bicycle infrastructure** | d. Enhance walkability and cycling infrastructure | l. Increase safety and accessibility |  |
| | e. Provide safe walking and cycling routes | m. Increase the number of pedestrian and cycling routes |  |
| **Traffic Safety** | f. Enhance visibility and accessibility | n. Improve safety and accessibility |  |
| | g. High-quality streets and spaces | o. Increase the number of pedestrian and cycling routes |  |
| | h. Create safe streets | p. Improve accessibility and safety |  |
| **Environmental** | i. Promote walking and cycling | q. Increase accessibility and safety |  |
| **General Built/Urban Context** | j. Enhance walkability and cycling infrastructure | r. Increase accessibility and safety |  |
| | k. Reduce exposure to poor conditions (e.g., heat) | s. Increase accessibility and safety |  |
| **Physiological Environment** | l. Improve ventilation and lighting | t. Increase accessibility and safety |  |
| | m. Provide comfortable environments | u. Increase accessibility and safety |  |
| **Physicians/Advisor** | n. Enhance walkability and cycling infrastructure | v. Increase accessibility and safety |  |

**FIGURE 2** The Matrix Assisting Practitioner’s Intervention Planning Tool (MAP-IT)

NOTE: PA = physical activity; TPB = theory of planned behavior; HBM = health belief model; HAPA = health action process approach; SDT = self-determination theory; ANGELO = Analysis Grid for Environments linked to Obesity.
The environmental section of the matrix is subdivided into different types of environment: physical, political/economic, and sociocultural. The cells here are filled in using BCTs from the taxonomy by Michie et al. (2013) to address individual behavior, and with methods to change environmental agents and policies taken from IM (Bartholomew et al., 2011).

Five experts who are familiar with health promotion in research and practice independently selected mechanisms for physical activity in older adults, using a qualitative round table discourse. Each expert was asked to independently evaluate the importance of each mechanism and to prioritize 10 mechanisms as particularly relevant for a physically active lifestyle in older adults. The 50 mechanisms were discussed afterward and evaluated by the whole group. The first step resulted in a list of 50 mechanisms, which, in a second step, were discussed at a round table in order to come to an agreement on the most important mechanisms. A mechanism was included in the list of most important mechanisms when at least three of the five experts reached consensus regarding its relevance. This resulted in 15 mechanisms, which were found relevant to changing the physical activity behavior of older adults. Four of the 15 mechanisms were immediately included, as all researchers had listed them during the first step.

Primarily using the work by Michie et al. (2014) and Michie, Johnston, Francis, Hardeman, and Eccles (2008), BCTs were categorized into the various cells of the matrix. To place them, the same qualitative discursive approach was used as previously. Five experts acquainted with multicomponent interventions independently ascribed the BCTs to the cells of the matrix. Different ascriptions between the researchers were again discussed at a round table. Consensus was reached when at least three out of the five researchers agreed to an ascription.

Some BCTs may appear in more than one intervention component and may apply to more than one mechanism. Self-monitoring, defined as to “monitor and provide informative or evaluative feedback on performance of the behaviour (e.g. form, frequency, duration, intensity),” is a technique helpful in education and in incentivization (Michie et al., 2014, pp. 151-152). Furthermore, self-monitoring can be applied to change skills and therefore can be an appropriate measure in trainings, or it can foster self-efficacy and therefore serve as an enablement technique (Michie et al., 2008). Michie et al. (2013) and Bartholomew et al. (2011) in IM provided all definitions and examples of the MAP-IT techniques.

As for behaviors in general and—as used as an example here—physical activity specifically, self-efficacy is an effective psychological belief to motivate and to promote behavioral adherence. When planning the intervention, therefore, practitioners may choose to increase an older adult’s self-efficacy as a relevant psychological mechanism. To increase self-efficacy, they may choose the component “training” (action self-efficacy). As a relevant environmental mechanism, they may focus on “perceived traffic safety” in terms of making people feel safer to move around in their neighborhood, which will support their belief in their ability to overcome obstacles (coping self-efficacy). A suitable component to address “traffic safety” might be “restriction” (e.g., speed limit). A theory that addresses different dimensions of self-efficacy is, for instance, the health action process approach (Schwarzer, 1992). The ANGELO framework (Swinburn et al., 1999) helps identify environmental barriers or enablers. The mechanisms self-efficacy and traffic safety are based on these theories (see Figure 1).

Experts’ task in designing a complex intervention by using MAP-IT is to collect ideally evidence-based or even plausible mechanisms of a behavior that should be changed. They then sort the corresponding BCTs to change the behavior into the matrix’s cells. A definition and an example of the techniques are easily available. Using MAP-IT is straightforward. It reduces the effort, as it readily offers an applied logic for designing a multicomponent intervention.

When crossing mechanisms (self-efficacy and traffic safety) with appropriate components, several BCTs can be identified. Looking at the cross section cell for self-efficacy and training, one finds, for example, the BCT “graded task.” This BCT is defined as “setting easy-to-perform tasks, making them increasingly difficult, but achievable, until behavior is performed” (Michie et al., 2013: online Supplementary Materials Table 3). An example is provided as well: “Ask the person to walk for 100 yards a day for the week, then half a mile a day after they have successfully achieved 100 yards, then two miles a day after they have successfully achieved one mile” (Michie et al., 2013: online Supplementary Materials Table 3). Knowing the content of the BCT and having an example, practitioners can use the BCT and apply it to their specific intervention objective.

**FUTURE PROSPECTS**

One of the future tasks will be to update MAP-IT concerning different behaviors (e.g., diet, nonsmoking, etc.) and different priority populations (e.g., children, adolescents, etc.). This remains necessary because mechanisms of certain behaviors differ and different populations need different attentions. There will never be a “one-size-fits-it all solution.” For instance, where
(subjectively assessed) personal safety (e.g., from crime) is an important mechanism for older adults to be active outdoors, it may not be as important for children and adolescents. Furthermore, the BCT “identification of self as role model” may be much more important for adults than for children. Even though it is challenging to develop MAP-IT for other health-enhancing behaviors and for different populations, it is worth striving for. After accomplishing this work practitioners have available a time-saving but theory-driven and evidence-based tool to systematically plan complex interventions.

Despite all the wheels, matrices, tools, and other helpful planning devices, designing and implementing interventions remain challenging processes. Success depends not only on the content of the intervention but also on the characteristics of those delivering and those receiving the intervention (e.g., different age-groups, different groups of vulnerable individuals, etc.) on the setting in which the intervention occurs (e.g., school, workplace, etc.) and on the modes of delivery (e.g., Internet-based intervention, mass media campaign, etc.). Furthermore, the success of an intervention depends on the intensity and duration of particular measures as well as the extent to which an intervention is delivered as planned (Horodyska et al., 2015). In its current state, MAP-IT is useful but in one respect is still insufficient: It does not take into account the context in which an intervention takes place. Context includes “the wider socioeconomic background, the health service system, the characteristics of the population, the prevalence or severity of the condition and how these factors change over time” (Campbell et al., 2007, p. 455). The use of a contextual system is an important issue because even systematic and well-designed interventions based on theory will not be effective in an inappropriate context. Using MAP-IT does not give dispensation from determining an intervention objective, setting aims, and targeting and tailoring the intervention. If these preconditions are not met, and if BCTs are incorrectly understood and applied, MAP-IT as well as other existing tools may not prove successful for designing multicomponent interventions.

**CONCLUSION**

MAP-IT was designed to support practitioners in developing theory-driven and evidence-based interventions that aim to change the behavior of particular individuals or groups of people. The matrix offers a practical, time-saving tool for designing and evaluating multicomponent interventions. It leads practitioners to address relevant behavioral mechanisms and to link these with intervention components and related BCTs. Even when using MAP-IT there still remain challenging tasks. We hope that health practitioners will find that MAP-IT facilitates intervention development and evaluation.

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