

Strategies to Promote the Maintenance of Behavior Change: Moving from Theoretical Principles to Practice

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There is strong consensus that efforts to promote and improve people's health will depend, at least in part, on people's behavioral decisions; decisions that cross a broad range of domains (Roberts and Barnard 2005; U.S. Department of Health and Human Services 2011). Some decisions involve behaviors that occur frequently (e.g., food intake; physical activity; the use of substances such as tobacco and alcohol), whereas other decisions involve behaviors that occur regularly, but infrequently (e.g., yearly check-up; flu vaccination) or that emerge at specific times in one's life (e.g., cancer screening). Regardless of the domain, strategies are needed to help people make behavioral decisions that increase the likelihood that they will live healthy, productive lives. To this end, some investigators have relied on strategies that shape the beliefs and skills that guide people's behavioral decisions (e.g., increasing awareness of the benefits or costs posed by different behaviors), whereas

other investigators have relied on strategies that constrain or shape people's behavioral options (e.g., policies that place limits on where people can smoke).

In this chapter, we focus on intervention strategies that have been developed to shape the thoughts, feelings, and skills that guide people's health behaviors (Conner and Norman 2005; Rothman and Salovey 2007). However, we examine these approaches through a particular perspective—their ability to promote the maintenance of behavior change. The benefits that emerge if people make healthier behavioral choices in domains such as diet, physical activity, and substance use require that people not only initiate a healthy pattern of behavior (e.g., increase their physical activity), but also sustain that pattern of behavior over time. Thus, interventions that are able to elicit a new, healthy pattern of behavior are necessary, but not sufficient. Research has consistently revealed that people who are able to make significant changes in their behavior are not necessarily able to maintain those changes over time and, thus, attention needs to be directed toward specifying the factors that facilitate and inhibit sustained behavior change (Rothman et al. 2004, 2009).

Looking across the strategies that investigators have developed to promote sustained behavior change, we have identified three intervention approaches. One approach rests on the premise that to promote successful maintenance the psychological factors and behavioral skills

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that led to the initial change in behavior need to be reinforced continually. The second approach rests on the premise that people will maintain a new pattern of behavior if they are provided with the appropriate set of motivation, beliefs, and behavioral skills at the outset of the behavior change process. The third approach rests on the premise that the set of psychological factors and behavioral skills that facilitate the initiation of behavior change are distinct from those that facilitate behavioral maintenance and, thus, different intervention strategies are needed at each phase of the behavior change process. In the sections to follow, we consider each of the three intervention approaches; first describing the theoretical rationale that underlies the approach and then the evidence available from interventions designed to promote behavioral maintenance. Although the majority of interventions conducted to date have focused on the maintenance of weight loss, interventions in other behavioral domains, when available, are considered. Following our review of these three approaches, we turn to two promising intervention techniques that offer opportunities for innovation—using financial incentives to promote behavior change and tailoring intervention strategies to address an individual's particular needs or psychological dispositions.

Intervention Strategy I: Continually Reinforcing the Determinants of Initial Behavior Change

The first strategy proposes that the psychological factors and behavioral skills individuals possess or develop that guide initial changes in behavior (e.g., self-monitoring, stimulus control, cognitive restructuring; Wadden et al. 2005) must be reinforced continually. To date, most of the work that has evaluated this intervention approach has targeted behaviors that underlie weight loss (but see Joseph et al. 2011). This approach has been referred to as a “continued care” intervention model (Perri and Corsica 2002; Svetkey et al. 2008; Wadden et al. 2005) and the rationale

for using this approach in the domain of weight loss rests on the recognition of obesity as a chronic disorder that requires long-term care (National Institutes of Health 1998).

Evidence from randomized controlled trials (RCTs) indicates that this intervention approach can be effective for long-term weight loss maintenance (Perri et al. 2008; Svetkey et al. 2008; Wing et al. 2006). In this area, investigators have been particularly interested in the relative effectiveness of different modes of delivering continued care [e.g., face-to-face contact vs. web-based contact (Svetkey et al. 2008; Wing et al. 2006) or telephone contact (Perri et al. 2008)], the duration of continued care during the maintenance period [e.g., 12 months (Perri et al. 2008) to 30 months (Svetkey et al. 2008)], and the frequency of contacts with the intervention staff [e.g., biweekly (Perri et al. 2008) or monthly (Svetkey et al. 2008; Wing et al. 2006)].

Findings from these RCTs indicate that some forms of continued care result in slower weight regain compared to minimal contact during the maintenance period and that some forms of contact between intervention staff and participants are more effective. For example, face-to-face contact was found to afford the slowest rate of weight regain (Perri et al. 2008; Svetkey et al. 2008; Wing et al. 2006), whereas web-based contact was found to be no better than control (Svetkey et al. 2008; Wing et al. 2006). However, Perri et al. (2008) found that continued care provided via telephone had similar effects to face-to-face contact and both were more effective than a minimal contact control condition. The findings suggest that some form of personal contact, whether face to face or over the telephone, may be a necessary component for a continued care approach to be effective. Consistent with the premise underlying this approach, individuals who received continued care were more likely to continue to self-monitor their dietary behavior, and self-monitoring mediated the intervention effect on weight regain (Perri et al. 2008). However, findings from these trials also suggest that while a continued care approach

can delay or slow the rate of relapse, it does not completely prevent it (Kiernan et al. 2013; Perri and Corsica 2002; Wadden et al. 2005).

Intervention Strategy II: Instantiating the Appropriate Set of Motivations and Skills at the Outset of Treatment

The second class of intervention strategies to promote the maintenance of behavior change is grounded on the premise that people are more likely to maintain changes in their behavior if, at the outset, they are motivated to initiate the change for the right reasons and have appropriate expectations for what the change in their behavioral practices will entail. Most of the intervention work in this area is based on Self-Determination Theory (SDT; Ryan and Deci 2000). SDT is a general theory of human motivation that has provided valuable insights into the decision processes that underlie the maintenance of health behavior change.

According to SDT, maintenance is more likely when motivation for the change and the skills needed to make it are internalized by the individual. Three factors—autonomy, competence, and relatedness—facilitate the internalization of the motivation and skills. Autonomy occurs when the individual personally endorses or identifies with the importance of the behavior, in contrast to engaging in the behavior change due to external pressure. Competence occurs when the individual has the skills and confidence to make the change. Relatedness occurs when the individual feels a connection to and trusts those promoting and supporting the change. Observational data across different behavioral domains [e.g., weight loss (Williams et al. 1996), glycemic control among Type 2 diabetics (Williams et al. 2004), and medication adherence among chronically ill patients (Williams et al. 1998)] have provided empirical support that autonomy and perceived competence are associated with long-term maintenance. Moreover, a recent meta-analysis observed that autonomy, competence, and relatedness are all reliably related to internalized motivation and skills, and that

internalized motivation and skills are reliably related to better physical health (Ng et al. 2012).

Trials that have evaluated interventions targeting autonomy and competence have similarly supported the efficacy of an SDT approach to promoting the maintenance of behavior change. For example, an intervention to support autonomy and competence in smoking cessation was designed to allow participants to make their own decisions about cessation, including whether and when they were ready to quit smoking (as opposed to an intervention-imposed quit date; Williams et al. 2002). The autonomy-supportive intervention led to higher rates of smoking abstinence after two years compared to an education-based control intervention, and changes in autonomous motivation and perceived competence for smoking cessation mediated the effect of intervention on abstinence (for similar findings see Silva et al. 2011; Williams et al. 2009).

The premise that successful maintenance is predicated on how people are trained at the outset of behavior change can also be seen in a recent weight loss intervention in which individuals learned and practiced maintenance-specific skills prior to their initial weight loss efforts in order to capitalize on their initial motivation and to provide opportunities to experience success with weight maintenance before being faced with the challenge of maintaining actual weight loss (Kiernan et al. 2013). To test this premise, participants were randomized to either a weight loss first condition (20 week weight loss program followed by 8 weeks of continued care) or a maintenance first condition (8 weeks of maintenance skills followed by the 20 week program). Both conditions provided the same period of active intervention, but participants in the maintenance first condition spent the initial 8 weeks learning and practicing maintenance skills (e.g., daily weighing to collect data about weight fluctuations, practicing a 1-week disruption in new dietary habits). Findings revealed that there was no difference in weight loss across intervention conditions at the end of the active intervention period, but participants in the maintenance first intervention regained less

weight over the subsequent 12 months (3.2 vs. 7.3 lb). Although this is the only intervention of this type reported to date, these findings suggest that this may be a promising approach to health behavior change maintenance.

Intervention Strategy III: Targeting the Specific Sets of Motivations and Skills that Facilitate the Initiation and Maintenance of Behavior Change

The third class of intervention strategies to promote the maintenance of behavior change is grounded on the premise that initiation and maintenance are each different phases of the behavior change process and the criteria that shape decisions to initiate and decisions to maintain a change in behavior are distinct (Rothman et al. 2011; Schwarzer et al. 2007).

Two theoretical frameworks have guided research in this area. First, Rothman (2000) and Rothman et al. (2011) proposed that the decision to initiate a new pattern of behavior is guided by people's favorable expectations for the behavior change and confidence in their ability to successfully change behavior (i.e., self-efficacy), whereas the decision to maintain that pattern of behavior is guided by an assessment of whether the experiences and outcomes associated with the new behavior are worth the effort required (i.e., perceived satisfaction). In addition, initiation is conceptualized as an approach-based self-regulatory process (i.e., progress toward one's goals is indicated by a reduction in the discrepancy between one's current state and a desired reference state), whereas maintenance is conceptualized as an avoidance-based self-regulatory process (i.e., progress toward one's goals is indicated by maintaining the discrepancy between one's current state and an undesired reference state). In the domain of smoking cessation, there is evidence to support the theoretical premise that beliefs about one's ability to change behavior (i.e., self-efficacy) are more important when initiating a change, whereas perceptions of satisfaction are more important when people are faced with the decision

to maintain the change (Baldwin et al. 2006). In addition, evidence across both smoking cessation and weight loss interventions suggests that people's self-regulatory mindset differentially predicts their ability to initiate and maintain a new pattern of behavior and is consistent with the conceptualization of initiation and maintenance as approach- and avoidance-based regulatory processes, respectively (Fuglestad et al. 2008, 2013).

Second, the Health Action Process Approach model (HAPA; Schwarzer et al. 2007) also emphasizes different phases of the behavior change process: non-intentional, intentional, and action. The non-intentional phase is when a person has not formed an intention to act. The intentional phase is when a person has already formed an intention but has not changed her or his behavior (or is acting below a recommended level). The action phase is when a person is acting at the recommended level (Lippke et al. 2005; Schwarzer et al. 2007). The intentional and action phases could be considered analogous to the initiation and maintenance phases described by Rothman et al. (2011). Different psychological factors are believed to be more important at different phases of the behavior change process. Specifically, risk perceptions, outcome expectancies, and motivational self-efficacy predict forming intentions for people in the non-intentional phase, whereas action planning and recovery self-efficacy predict behavior for people in the intentional and action phases (Lippke et al. 2005; Schwarzer et al. 2007; Sniehotta et al. 2005).

Evidence from RCTs provides some support for the efficacy of this approach to behavior change maintenance. Guided by the Rothman framework (Rothman 2000; Rothman et al. 2011) and Self-Determination Theory (Ryan and Deci 2000), West et al. (2011) conducted a RCT in which all participants enrolled in a standard weight loss program for 6 months. Following this initial weight loss period, participants were randomized to a satisfaction- and motivation-focused condition (the novel intervention), a continued care condition (reinforcement of weight loss skills), or a control condition. The novel intervention was designed to strengthen participants' satisfaction with their progress and

elicit personal motivations for engaging in long-term behavior changes. The results indicated that both maintenance conditions resulted in smaller weight regains compared to the control condition, but they did not differ from one another. However, the extent to which people focused on the progress they made (a form of satisfaction) predicted lower rates of weight regain in both maintenance conditions. Moreover, among people who received the novel intervention, the extent to which they focused on the progress they made was a stronger predictor of maintained weight loss than other factors. Although this was a single RCT, these findings suggest that having people focus on different factors and skills when faced with maintenance may be effective.

Several HAPA-based randomized interventions have examined the efficacy of planning at different phases of behavior change. For example, orthopedic rehabilitation patients were randomized to an interviewer-assisted planning intervention or one that was self-directed (Ziegelmann et al. 2006), and reported different types of planning: action planning (predicted to be more important initially) and coping planning (predicted to be more important for maintenance). Consistent with predictions, coping planning accounted for physical activity minutes, above and beyond action planning, at both 4 weeks and 6 months after the intervention but not 2 weeks after. This pattern of findings suggests that coping planning is relevant only when people are faced with the decision to maintain the change they have made. Taken together, there is an emerging body of evidence that interventions can be more effective if they target the specific factors that underlie successful initiation and maintenance of behavior change, respectively.

Emerging Intervention Technique: The Impact of Financial Incentives on Maintenance of Behavior Change

Each of the three classes of intervention approaches to promote behavioral maintenance has a distinct objective; however, there are

numerous techniques that can be used to meet these objectives. We now turn to a discussion of two emerging intervention techniques that may be useful means through which the goal of a specific approach to interventions is achieved.

The premise that the provision of financial incentives will motivate behavior change is a principle that has reemerged as an intriguing intervention technique. Typically, this approach involves awarding or reimbursing an incentive (i.e., money, prizes, coupons) if a person achieves a specified criterion within a predetermined time period. The incentivized criterion can be the performance of a behavior (e.g., taking medication daily) or the downstream consequence of a behavior (e.g., losing 2 lb in 2 weeks).

Providing financial incentives to elicit behavior change is based on the premise that people's behavioral choices reflect a weighing of benefits and costs and that the failure to take action (e.g., be more physically active) reflects a determination that the costs outweigh the benefits. The provision of a financial incentive that is contingent upon meeting a particular criterion is designed to alter the cost-benefit analysis, such that the benefits of taking action to meet the criterion outweigh the costs of not acting. The use of financial incentives to promote behavior change is also rooted in operant conditioning theory (Skinner 1953)—the provision of an incentive in response to a behavior affords the opportunity to develop an association between a behavior and its consequences, which, in turn, can increase or decrease of the frequency of the behavior. Furthermore, the structure of an incentive program can vary along two theoretically meaningful, orthogonal dimensions that may have implications for its influence on people's health behavior (Burns et al. 2012).

First, incentives can differ in reinforcement procedure. With positive reinforcement, a behavior is performed more frequently because it is associated with the provision of a pleasant stimulus, whereas negative reinforcement increases the frequency of the target behavior by associating it with the removal of an unpleasant stimulus (Skinner 1953). For example, in weight loss interventions, incentives that are structured as

positive reinforcement takes the form of cash rewards or lotteries (e.g., Francisco et al. 1994; Volpp et al. 2009), whereas incentives that are structured as negative reinforcement involve deposit contracts or payroll deductions (e.g., meeting a criterion removes the threat of not getting one's money returned; Jeffery et al. 1993; Volpp et al. 2008). Because people perceive the costs of losing a particular amount of money to be greater than the perceived benefit associated with gaining the same amount of money (Tversky and Kahneman 1991), one would expect an incentive program structured as negative reinforcement to be more effective than an incentive program structured as positive reinforcement.

Second, incentives can differ in the frequency at which the target behavior is reinforced (i.e., reinforcement schedule). With fixed ratio scheduling, a target behavior is consistently reinforced after every n th behavior, whereas with variable ratio scheduling, a target behavior is reinforced at an unpredictable rate (but at an average of every n th behavior; Skinner 1953). A fixed ratio schedule provides a greater degree of certainty and predictability. Research with nonhuman animals suggests that incentives provided on a fixed ratio schedule are more effective at eliciting an initial change in behavior, but incentives provided on a variable ratio schedule are more effective at sustaining behavior over time (see McSweeney 2004).

The efficacy of financial incentives to elicit initial changes in behavior change has been tested in a range of health domains, including weight loss (Volpp et al. 2008), smoking cessation (Volpp et al. 2009), vaccination (Moran et al. 1996), and screening (Slater et al. 2005). The predominant finding is that incentives increase the likelihood that people will perform the incentivized behavior or achieve the incentivized outcome, but once the financial incentive is removed the initiated behavior or outcome is not sustained (Burns et al. 2012; Kane et al. 2004).

Only a few studies have examined the efficacy of financial incentives on maintaining health behavior change directly. In the domain of weight loss maintenance, one study used deposit

contracts in which reimbursement was contingent upon maintaining body weight or meeting physical activity and diet goals; weight regain amongst participants in the deposit contract conditions did not differ from that of participants in a control condition after one year (Kramer et al. 1986). In the domain of smoking cessation, two studies have demonstrated that participants who are offered a cash reward for maintaining a specified period of abstinence were more likely to be abstinent than participants who were assigned to a control condition (Donatelle et al. 2000; Volpp et al. 2009). However, in both studies, the incentive condition included intervention components that were not offered to other participants (e.g., strategies for increasing social support; incentives to attend a smoking cessation program), so it is unclear if the differences in sustained abstinence between the groups reflect the effectiveness of the incentive or other differences between the groups.

To date, the use of incentives as an intervention technique has not been strongly grounded in theoretical perspectives that might offer insights into how or when they may be most effective (Burns et al. 2012). What has emerged is a tremendous heterogeneity in how incentive programs have been structured, which has precluded any systematic test of whether specific combinations of reinforcement procedure and reinforcement schedule might be particularly effective in eliciting favorable rates of behavioral maintenance. The three classes of intervention strategies we have identified provide a productive frame for thinking through how and when to use incentives to promote sustained behavior change. The continued care model of intervention strategies would suggest that the provision of incentives needs to be sustained if people are going to successfully maintain an initial change in their behavior. As has been done for weight loss treatment and smoking cessation treatment, there would be value in systematically examining the effect of incentive programs of different, extended durations; though the repeated provision of the same incentive may result in habituation to the incentive, diminishing its value.

The premise that successful maintenance depends on people initiating a change in behavior under the right conditions would suggest that how the incentive program is designed to elicit initial changes in behavior is critical. SDT would suggest that any provision of incentives would need to be done thoughtfully and in a manner that still enables people to develop a sense of autonomy and competence. Moreover, building on the perspective underlying the intervention conducted by Kiernan et al. (2013), there might be value in providing people with a set of skills and expectations that would complement the strengths of an incentive-based program and enable them to manage the transition that comes with the end of the incentive program.

Finally, incentive programs could be structured around the premise that the initiation and maintenance of behavior change are responsive to different strategies. For example, there might be value in shifting the schedule and structure of the reinforcement as people transition from initiation to maintenance. In the domain of weight loss treatment, Burns et al. (2012) observed that an incentive program that provided positive reinforcement on a fixed schedule might be effective at eliciting initial changes in behavior, but to support the maintenance of those changes it would be beneficial if it shifted to providing negative reinforcement on a variable schedule.

Emerging Intervention Technique: Leveraging Psychological Dispositions to Enhance the Effect of Intervention Strategies to Promote the Maintenance of Behavior Change

A second promising approach to enhancing the effectiveness of intervention strategies designed to support maintenance is to consider whether differences in stable psychological dispositions modify how these strategies facilitate or inhibit the behavior change process. Across the three broad classes of intervention approaches discussed earlier, strategies designed to promote the maintenance of behavior change depend on their ability to support or mitigate factors that guide

people's behavioral decisions. To date, limited attention has been paid to whether specific strategies might be more effective for certain groups of individuals. Across a number of research programs, investigators have observed that because people's dispositional tendencies affect how information is processed and how the pursuit of personal goals is managed, people's psychological dispositions can modify the effectiveness of strategies designed to promote behavior change (Rothman and Baldwin 2012). What have emerged from this body of research are two broad approaches: strategies that are particularly effective because they compensate for people's weaknesses and strategies that are particularly effective because they capitalize on people's strengths.

Compensating for people's weaknesses.

Across an array of behavioral domains (e.g., smoking, exercise), investigators have observed that people high in conscientiousness are more likely to act on their intentions than are people who are low in conscientiousness (e.g., Conner et al. 2009; Rhodes et al. 2005). This is particularly true when the behavior is performed under nonoptimal conditions such as unusual circumstances with additional barriers (Conner et al. 2007) or high stress (Schwartz et al. 1999). Conscientiousness may prove to be beneficial because it represents people's tendency to be thorough and deliberate in their actions. People who are trying to change their behavior and are lower in conscientiousness may benefit from additional support or training, especially when having to deal with unexpected or stressful circumstances.

Consistent with research on conscientiousness, Fuglestad et al. (2008) found that people who score low on prevention focus—which indicates that they are *not* dispositionally inclined to be vigilant or careful as they regulate their behavior—were less successful at maintaining cessation in a smoking cessation trial or at maintaining weight lost during a weight loss trial. However, people's level of prevention focus was not related to their ability to successfully *initiate* a change in their behavior in either of these

domains. It may be that the optimal delivery of an intervention strategy will depend on directing it toward a specific group of people at a particular point of time in the behavior change process. For example, efforts to promote the maintenance of behavior change (e.g., more frequent intervention contacts or the provision of additional intervention techniques) might be directed toward people who not only score low on prevention focus, but also are working to maintain an initial change in their behavior.

Capitalizing on people's strengths. An alternative strategy is to develop intervention procedures that leverage an individual's strengths. Higgins' (2005) theory of regulatory fit provides a useful conceptual model of the process by which matching strategies to people's psychological dispositions can augment their effectiveness. According to the theory, people feel a sense of "fit" when the strategies they use to pursue an outcome match their psychological dispositions; this sense of fit increases people's motivation, which, in turn, leads to increased performance. A number of studies have utilized this approach to promote healthful behavior change (e.g., Latimer et al. 2008a, b; Tam et al. 2010; Williams-Piehotka et al. 2006, 2009), and those that have explicitly examined the mechanisms that underlie this approach have found that when intervention strategies match a person's disposition they express greater motivation to perform and satisfaction with the behavior in question (e.g., Latimer et al. 2008b; Tam et al. 2010).

However, only a few studies have examined the effectiveness of this approach on relatively longer term outcomes. For example, several studies have utilized the National Cancer Institute's Cancer Information Service to deliver intervention messages to promote changes in diet or physical activity that either matched or mismatched people's coping styles (Williams-Piehotka et al. 2009), need for cognition (Williams-Piehotka et al. 2006), or regulatory focus (Latimer et al. 2008a, b). Across these studies, when messages were designed to match people's psychological dispositions, they elicited

a more pronounced improvement in initial outcomes (e.g., 2 weeks or 2 months), but the observed difference between matched and mismatched messages did not hold for longer term outcomes (e.g., 4 months; but see Latimer et al. 2008a). Yet, it should be noted that none of these studies focused on intervention approaches that were designed specifically to promote sustained behavior change.

The premise that matching intervention strategies to dispositions will heighten their effectiveness has implications for efforts to advance all three classes of intervention strategies identified earlier. In the context of a continued care approach to promoting maintenance, it may be that different groups of people would benefit from the continued provision of different facets of an intervention. For example, people who score low on conscientiousness might benefit from the continued provision of a tool that facilitates planning or self-monitoring, whereas those who score high on conscientiousness might benefit from a tool that helps people recognize the favorable outcomes that are afforded by their behavior. Alternatively, when investigators are able to triage people, dispositional differences might guide decisions about the frequency or intensity of the intervention—some people might benefit from frequent, in-person contact, whereas others might not need additional support.

To the extent that successful maintenance is predicated on how people initiate the behavior, there could be systematic differences in what people need emphasized at the outset. Even if everyone would benefit from an intervention approach that supports autonomy and competence, people may differ systematically in how they respond to different strategies for providing support. What might prove to be particularly productive is the premise that as people move through the behavior change process they differ in whether or what type of assistance they need. Given the thesis that the initiation and the maintenance of a pattern of behavior are distinct self-regulatory tasks, people may find that they have skills that support one phase of the process but not another. Consistent with this perspective, Fuglestad et al. (2008) found that scoring high on

promotion focus was beneficial when people were charged with the task of initiating weight loss, but scoring high on prevention focus was beneficial when people were charged with the task of maintaining weight loss. This type of relationship would suggest that interventionists would want to be able to both leverage people's strengths (e.g., maximizing the match between promotion focus and behavioral initiation) and compensate for people's weaknesses (e.g., addressing the mismatch between promotion focus and behavioral maintenance). An example of the latter strategy would be to restructure the task of behavioral maintenance in a manner that resonates with how people who are promotion focused regulate their behavior. Although the prospect of needing to take into account both psychological dispositions and phases of the behavior change process may be daunting, it has the potential to optimize the delivery of intervention resources to people who are striving to sustain new patterns of behavior.

Final Thoughts and Future Directions

There is a clear need for effective, evidence-based intervention strategies that enable people to not only initiate, but also maintain a new pattern of behavior. As investigators continue to design and test strategies to support the maintenance of behavior change, it is critical that these strategies are grounded on a set of principles that specify what facilitates and/or inhibits maintenance (Rothman 2004). In this chapter, we have identified three classes of intervention strategies that are each grounded on a different set of theoretical principles. Although within each class of strategies an intriguing array of findings have

emerged, more empirical work is needed before any strong recommendations can be made. In particular, there are three lines of inquiry that would benefit from more focused attention. First, within each class of strategy, investigators should specify more explicitly the mechanisms that underlie the hypothesized effect of an intervention approach and make sure the manner in which the strategy is designed, implemented, and evaluated is consistent with the underlying model. Second, little is known regarding the relative effectiveness of the different classes of intervention strategies that have been identified. The study conducted by West et al. (2011) stands as an excellent exemplar of this type of work as it compared the effectiveness of a continued care intervention program and a satisfaction-based intervention program. Third, further consideration needs to be given to the different ways in which maintenance unfolds across behavioral domains. In some domains, behavioral decisions need to be made daily (e.g., diet, physical activity), whereas in other domains decisions need to be made every six months (e.g., dental exam) or every year (e.g., cancer screening). Furthermore, in some cases maintenance involves continually *not* performing a behavior (e.g., smoking cessation), whereas in others maintenance involves continually performing a behavior (e.g., physical activity). To date, very little is known—both empirically and theoretically—as to whether the different facets of behavioral domains would benefit from different intervention strategies. Taken together, the implementation of well-designed studies that are guided by an explicit theoretical framework will enable us to develop the evidence base needed to provide a clear, useful, productive roadmap for practice (Table 1).

Table 1 Take home messages

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1. To date, intervention strategies that have been developed to promote sustained behavior change can be organized around three intervention approaches
 2. Research on each approach has provided some supporting evidence, but greater clarity is needed regarding underlying mechanisms and the relative effectiveness of each intervention approach
 3. Two classes of intervention techniques—providing financial incentives to promote behavior change; matching intervention strategies to people's psychological dispositions—offer promising areas for future research
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