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Physical activity messaging for action control

Ryan E. Rhodes, & Alison Quinlan

2018

The final publication is available at:

https://www.routledge.com/Persuasion-and-Communication-in-Sport-Exercise-and-Physical-Activity/Jackson-Dimmock-Compton/p/book/9780367407759

Citation for this paper:

Rhodes, R. E. & Quinlan, A. (2018). Physical activity messaging for action control. In B. Jackson, J. Dimmock, & J. Compton (Eds.), *Persuasion and communication in sport, exercise and physical activity* (pp. 38-54). Routledge.

CHAPTER 3

PHYSICAL ACTIVITY MESSAGING FOR ACTION CONTROL

Ryan E. Rhodes & Alison Quinlan

University of Victoria, Canada

Introduction

There is a strong body of evidence to support the effectiveness of physical activity in the prevention of chronic diseases (1,2). For example, physical activity has been linked to a reduced risk of cardiovascular disease, diabetes, cancer, obesity, and osteoporosis (1). These benefits of physical activity can be incurred through achieving a moderate-to-vigorous physical activity level for at least 150 minutes a week for adults and 60 minutes a day for children (3). Activities such as jogging, playing tennis, swimming, and cycling, for example, can all reach a moderate-to-vigorous level intensity. Unfortunately, many adults and children are not physically active and thus promotion efforts are needed.

Messages to target physical activity (PA) change employ health behavior theories (4). Theories represent an organizing framework to provide structure, function, and common nomenclature to critical variables under study (5,6). Although the breadth of theories applied to understand and promote PA has been growing in diversity, those couched within the social cognitive tradition represent the dominant approach by a wide margin (7). Theories within this tradition each have unique aspects, yet almost all indicate that building awareness of expectations of the outcomes from behavioral action and the perception of one's capability to perform the behavior affect the formation of intentions. These intentions, in turn, are theorized to drive behavior. Models applied to mass-messaging in health behavior have followed in-suit with these approaches (8,9). For example, in McGuire's (9) communication-persuasion matrix for developing effective public health campaigns, the model highlights the importance of message awareness to develop attitude change, which supports intention and, in turn, behavioral action.

Social cognitive approaches to understanding health behavior have been useful, but are not without some limitations that have been the subject of recent debate (10,11). For example, expectations about the health benefits of PA are almost universal; 93% of people in the U.K. (12)

and 97% of those in the U.S. (13) already know that PA is important to health outcomes. It seems little wonder, therefore, why interventions targeting education of the benefits of PA have shown null effects on behavior change (14-17). Mass media campaigns have certainly been evolving; however, the majority of these large-scale campaigns for increasing PA have also relied heavily on the enhancement of knowledge and awareness of PA benefits (18-20). Similar to smaller-scale experimental trials, campaigns focused solely on providing information about PA have yielded inconclusive or null behavior change results (18,21).

Action Control

One of the most common criticisms of the social cognitive tradition of models is the modest association that exists between intention and behavior, when these theoretical models tend to suggest that intention should be the critical proximal determinant of behavior (22). To be clear, the relationship between intention and health behaviors is not insubstantial. For example, the most recent meta-analysis of the theory of planned behavior applied to PA showed $r = .48$ (23), which places this relationship within the medium-sized range (24). Still, the finding also suggests that 77% of the variance is unexplained by intention. The relationship is further reduced to $r = .22$ when examining change in PA (i.e., controlling for past behavior), which is arguably more accurate when attempting to understand intention and its role in behavior change (6,25). Examinations of the absolute, rather than relative, value of intention-behavior relations have also shown considerable discordance (26,27). For example, experimental manipulations that increase PA intention ($d = .45$) result in much lower, and clinically less meaningful, increases in PA ($d = .15$) (28). Dichotomization of the intention and PA relationship around public health guidelines has also shown that 48% of intenders failed to follow-through with PA (29).

One way to address these concerns is in theories that separate intention formation from intention translation, or what is sometimes referred to as *action control* (30). This line of

thinking is not novel and traces back to the early 20th century (31), but most of our models in the social cognitive and PA messaging tradition have focused heavily on intention formation through rational persuasion (9). With the now accumulated evidence that intention-behavior discordance is as high as 50% and comes almost exclusively from intenders failing to act (27,29), action control models seem a high priority in PA promotion (32).

Rhodes and Yao (32) recently overviewed 16 action control models that have been specified in PA research. In order to be classified as an action control model, the constructs of the model had to include post-intentional constructs (i.e., the intention to do a behaviour had to already be formed) that explain how intentions are translated into behavior. Some examples of action control models included in the review were the Health Action Process Approach (33), the Integrated Behavior-Change Model (34) and the Multi-Process Action Control model (35). A content analysis of the constructs in these types of models showed that some of the constructs are very similar to those already present in popular theories that focus on intention-formation (e.g., self-efficacy). Thus, some overlap and lack of uniqueness is present that would not veer far from prior reviews on PA messaging (36). Still, several concepts that are not as commonly included in more traditional social cognitive frameworks were also identified. These concepts included volitional regulation behaviors, affective factors (affective judgments, anticipated regret), implicit processes and habit, as well as identity formation. The purpose of this chapter is to overview the use of these action control factors within our current PA messaging research. We conclude the chapter by offering a conceptual frame for examining action control messaging applications and proposing future research directions.

Action Control Constructs

Volitional Regulation Behaviors

The hallmark of most action control models is the inclusion of volitional regulation behaviors used to maintain or augment intentions (32). Theorists of these models suggest that people who form intentions need to then become strategic in order to implement their intentions across the backdrop of competing forces for their attention, motivation, and time (33,37). Thus, messages with content on *how* to make changes in PA are given attention rather than on *why* one should be active (22). These volitional regulation behaviors have been conceived either as a mediator and or moderator of intention-behavior relations, with evidence for both approaches (38). The number and type of volitional regulatory behaviors suggested also varies greatly from very specific concepts, such as action plans or implementation intentions, to a more general array of behaviors, such as goal setting, coping planning, self-monitoring, enlisting support, prioritizing, and problem-solving.

Action plans represent specifying the detail in a plan of action to include factors such as where, when, and what will be performed (39). The extra detail within these plans is thought to help engender commitment to the plan and create a structured act within the backdrop of one's larger schedule. Implementation intentions are specific action plans that concentrate on "if – then" strategizing. This approach is thought to tie particular situations (i.e., if) to the action (i.e., then), thus facilitating a fast and efficient translation of intention into behavior (40). Self-monitoring involves the volitional tracking of a behavior across time with the main objective of raising self-awareness (41). Goal setting involves the specifying of a target accompanied by additional strategies such as measured outcomes, self-monitoring, prioritizing, and reflection to facilitate the goal into actual action (42). Coping planning also includes many of these elements, as people are asked to move through the expected plan to identify barriers to action along with potential solutions to those barriers (33, also see similarity of 'refutational preemption', Chapter 5, this volume). Finally, enlisting social support is used as a process to involve proxy levels of

commitment and impositions of others within one's plans to increase one's own sense of commitment and potentially add more pleasure and social reasons for behavioral enactment (43). For further detail on how these strategies have been implemented in randomized controlled trials and interventions, see Abraham and Michie (44) and Michie et al. (45).

All of these volitional behaviors are used to help translate intention into behaviour and have sound empirical evidence in PA research (16,17,38,46-51). Indeed, when interventions to promote volitional regulation behaviors are compared to educational interventions to increase attitudes and physical activity behavior, the evidence clearly favors volitional regulation behaviors as the most effective means of changing PA (16,17). Messaging of these volitional behaviors for PA promotion, however, has seen far less attention than education-based approaches (52).

In Brown and colleagues' (18) review on mass media campaigns for PA, it was evident that more recent campaigns have just begun to expand beyond persuasive appeals of the benefits of PA. Such campaigns include, for example, the encouragement of PA through the provision of pedometers in Kellogg's cereal boxes (i.e., self-monitoring [53]), the conveying of strategies as to how PA can be incorporated by using multiple outlets (print, schools, communities [54]), or as used in the VERB campaign (55), messages that identify behaviors for how parents could support their child's PA. A review on internet interventions for increasing PA (56) also supported the shift from informational messaging (68 studies) to additional emphasis on volitional behaviors such as goal setting (19 studies), self-monitoring (18 studies), and email reminders (22 studies). All of these volitional behavior methods have some evidence for augmented success in behavior change (57).

Despite PA interventions beginning to move beyond solely information on benefits, the majority do not specifically target action control through the distinguishing of intenders and non-

intenders. Indeed, there was no mention of action control or related readiness in any of the internet delivered interventions examined in Davies and colleagues' review (56), nor was there any mention of action control in Brown and colleagues' review on mass media physical activity campaigns (18). Specific approaches tailored toward people who have different intentions could prove to be helpful. Research using the transtheoretical model (43) provides some evidence for distinguishing between intenders and non-intenders through the different stages of pre-contemplation (non-intenders), to contemplation (intenders), and the addition of volitional regulation behaviors (processes of change) when moving to action. In a review on the effectiveness of distance-delivered PA interventions, Jenkins and colleagues (58) found that 12 out of 16 studies that used the transtheoretical framework with targeted information to match stage of readiness were successful at changing PA. In one study (59), researchers specifically examined the difference between stage-matched information, stage-mismatched information, a standard intervention (action-oriented) group, and a standard control group, and found that those who received stage-matched messages or action-oriented messages (e.g., "today I am going to go for a run on my lunch break") had superior positive results in physical activity change compared to those who received stage mis-matched information or control information. Furthermore, those who received stage mis-matched information displayed no differences in physical activity change compared to those in the control group. Although the transtheoretical model incorporates a far more elaborate series of stages than basic action control, future messaging research could benefit from continuing to incorporate people's readiness to act and the target messages of volitional regulation behavior.

Affective Factors

Affective Judgments. Although volitional strategies, such as those discussed above, are the centerpiece of most action control models, affective factors are also important (30). One of

the major criticisms of past social cognitive approaches is a reliance more on reasoned expectations that guide behavior compared to affect (60-62). This reliance on reasoned processes is also present in the amount of PA messaging content dedicated to rational health reasons for PA (52). However, PA, exercise, and sport participation are all unique behaviors that take one out of rest and exert physical demands for a considerable amount of time (6). The affective experience produced by PA, exercise, or sport participation is highly variable (63); however, greater positive affect experienced by the person during the activity has been shown to predict future behavior in that activity (64).

Affective judgments are considered an umbrella term to encompass the expected feelings of pleasure/displeasure and enjoyment surrounding an experience of performing a given behavior (65). The term is meant to provide an overarching scaffold for concepts such as affective attitude (66), perceived enjoyment in various social cognitive approaches (67), and intrinsic motivation in self-determination theory (68). Affective judgments are considered to utilize more cognitive processing than state or incidental affect (i.e., one's feelings in the moment) and can be based on many factors, from memories of the affective state induced from prior performance of the behavior to various aspects related to the expected context, potentially including social and environmental appraisals (65,69).

Although affective judgments are most commonly positioned as antecedents of intention, two lines of research show that they may also be important for action control. First, affective judgments may represent moderators of intention-behavior relations primarily by creating more stable initial intentions over time. Keer et al. (70), for example, showed that intentions formed from affective judgments were more stable across time than intentions formed for other reasons. Thus, people who intend to engage in a behavior because they enjoy it are more likely to maintain their intentions and follow-through with behavior. For example, some people perceive

playing recreational team sport as being enjoyable. This should lead to more consistent follow-through of intentions into actual sport participation, compared to an individual who is playing the sport merely to lose weight. Second, affective judgments about a behavior may augment health behavior performance after one makes an intention to perform the behavior. This may happen naturally/incidentally or through active volitional regulation on the part of the individual in order to enhance the likelihood of action control. For example, both Bagozzi (71) and Kuhl (30) suggest the importance of active regulation of affective judgments using volitional strategies in their models of action control. In relation to the abovementioned example, a person may intend to join a recreational sport team for reasons to lose weight, but then find the social aspects of being on a team enjoyable in their own right, thus creating an impetus to stick to the original intention. Alternatively, that person may carefully plan to join a particular sport, league, or team in an attempt to maximize the enjoyment of the experience, thus using volitional regulation behaviors to improve the likelihood of sticking to one's original intentions.

The most relevant evidence for messaging of affective judgments and action control comes from experimental intervention. For example, Conner et al. (72) examined the effect of affective-based persuasive material on subsequent performance of PA over two weeks. They found that participants exposed to persuasive communications about enjoyment and affect management (e.g., stress relief, anti-depressant, anti-anxiety) aspects of PA increased PA more than the material focused on health benefits or a control group. Intention scores, however, were high at baseline and did not change during the intervention, thus supporting that the manipulation was one of increased action control. It is important to note that messaging about affective factors in PA is not merely effective in improving action control. For example, Parrot et al. (73) showed that affect-based messages, particularly when framed positively, can increase intention and this approach is commensurate with social cognitive models such as theory of planned behavior that

position affective judgments as critical antecedents of intention (74). Thus, affective messaging may be able to increase both intention formation and the translation of that positive intention into PA (i.e., action control).

Anticipated Regret. Affective judgments are reliable predictors of closing the intention-behaviour gap; however, there is also evidence that the anticipated affective experience from performing the behavior may be different from the anticipated affective reaction from *not* performing the behavior (75). These anticipated affective reactions to abstention are typically labelled anticipated regret (76). Conner and colleagues (75) propose that the theoretical process for how anticipated regret affects health behaviors occurs via self-conscious emotions (e.g., guilt [77]), although Rhodes and Mistry (78) have demonstrated that much of the regret stems from simple missed opportunities and not personal shame. In either case, however, negative emotions are anticipated pre-emptively and serve as motivation to avoid the outcome (79).

Like affective judgments, anticipated regret has typically been considered an antecedent of intention. Nevertheless, the anticipated regret construct also has convincing evidence as a moderator of intention-behavior relations (80,81). Thus, anticipated regret may be a critical affective construct in bolstering action control. Interestingly, the mechanisms for messaging regarding anticipated regret have thus far involved merely raising the topic in a questionnaire (76,82). Abraham and Sheeran (76) showed that manipulating anticipated regret – by asking participants questions about whether they would regret not being physically active – moderated the intention-behavior relationship by creating more stable intentions over time. Sandberg and Conner (83) have also shown that manipulations of anticipated regret through asking these questions overtly may improve action control mainly under conditions of high initial intentions. These findings suggest that considerations of anticipated regret may help reinforce the importance of the reasons behind forming intentions in the first place and augment motivation

beyond the initial intention. Despite these promising findings for anticipated regret, no mass media campaign studies could be found that have incorporated this variable in order to help increase motivation and subsequent behavior.

Automatic and Habitual Factors

Reasoned processes, such as attitudes and intentions, are central to the most popular social cognitive models used to understand PA (7) and represent the target of most attempts to promote change through messages (8,36). Nevertheless, there is evidence to suggest that some behavior is driven by implicit processes rather than reasoning (11). Implicit components to behavioral action or inaction have not received as much research attention as reasoned processes (84), but the area has seen enormous growth in PA science in recent years (11,85; also, Chapter 7, this volume). Implicit processes are considered "hot" (or automatic) reactions that are a function of contextual stimuli and associations. These processes are by no means novel to persuasion theory, however, and are often used as a means to entice buyers toward a product (e.g., a TV add illustrating a sunny day at the beach used to entice buying a new car). For example, the elaboration likelihood model of persuasion (86, also, Chapter 2, this volume) suggests there are central (cold, calculated) and peripheral (hot, impulsive) routes to change attitudes and this peripheral route represents the more implicit foundation of motivation.

Although most research on implicit factors and PA has been designed to build intentions, there is the potential for implicit factors to shape action control. However, this area of research is still in its infancy and there is limited evidence thus far that implicit factors moderate the relationship with behaviour (87). Given the relative novelty of this line of investigation, researchers are still exploring whether implicit factors are important to PA, rather than focusing on how to use or develop these factors in persuasive messaging. Almost all of these studies have been conducted using observational designs. The only messaging study of this kind at present

showed that persuasive appeals to PA and automatic associations (via latency assessment) do not contribute to reducing intention behaviour discordance of those with high intentions, but that these automatic associations do show small effect size relationships with PA independent of these high intentions (88). Rebar et al. (85) reviewed 52 studies examining non-conscious processes and their effect on behaviour and highlighted four different ways priming (i.e., non-consciously cued) associations could affect behaviour. However, the priming associations varied greatly in their approaches across the studies and many used only single bout PA tasks that are not necessarily reflective of regular PA. There is some evidence that automatic associations, measured in different manners, are related to PA and this might be in the form of action control by augmenting positive intentions on behavior. There is limited literature at present, however, to determine whether these automatic associations can be primed with persuasive techniques that would lead to sustained PA or regular sport participation (see Chapter 7, this volume).

Although automatic association research is gaining momentum, another implicit factor involved in shaping behavioral patterns is the concept of habit (89). Habits represent impulses to perform behavior initiated via stimulus-response bonds (90), and contribute to PA largely via repeated, consistent behavioral practices, and salient cues associated with behavioral initiation (91,92). Furthermore, habits show evidence of affecting PA by sustaining behavior over time partially independent of intentions (84,93) and through helping turn intentions into actual behavior (35). While there is a mix of evidence regarding how intentions, habit, and PA interact (85), those who engage in PA almost exclusively have high intentions (29). Thus, a relationship between PA and habit seems most likely patterned in a form of goal-directed automatic behavior (94-96) where habit increases the efficiency of action control (35). That is, the consistent cues of a well-practiced behavior that was originally driven by motivation, gradually become more

efficient through habit, thus freeing at least some conscious awareness to other things while performing the behavior.

Like the research on automatic associations, the PA and habit literature has been mainly observational in nature and has been focused on exploring whether habit can predict PA. One review of this literature showed that the habit–behavior relationship is similar in size to the intention–behavior relationship (93), while a more recent review of habit and PA showed that 13 of 15 studies explained significant variance in behavior after controlling for motivational variables (85). In terms of PA action control, Rhodes and deBruijn (35) reported that five out of five studies that isolated the translation of positive intentions to be active into behavior showed significant associations with higher self-reported habit strength. Thus, in these studies when participants had higher self-reported habit strength, the gap between intention and PA behaviour was reduced. The observational evidence is supportive that habit may influence action control of PA.

Limited research has been conducted on the antecedents of habit formation, but a review of various theoretical models identified reward from the behavior, complexity of the act, consistency of practice, and the presence of similar cues as the key criteria (91). Advancing these suggestions, Kaushal and Rhodes (92) investigated a sample of new exercisers over 12 weeks and found that peak habit formation occurred around six weeks and plateaued thereafter. Consistency of practice was the strongest positive predictor of habit formation followed by expected reward (in this case measured as affective judgments). Whether this information might be of use in messages to build regular PA via habits has not been tested.

Identity

Identity is considered an important construct in several action control theories (32). Identities are components of self-concept, organized by how individuals view themselves in a

given role (97). These conceptions of self are individualized but also correspond to social structure, such as parent, employee, and spouse (98), serving as personal standards of behavior (99). Identity is thought to be activated in relevant situations where it is either aligned or mismatched with one's behavior. Alignment experiences serve to strengthen the identity while discrepancies challenge an identity and provide negative affect and dissonance that serve to motivate identity-consistent behavioral actions (100). Similar to habit, given that identity would seemingly form long after early goal-directed behavior has been established, its role in action control may be particularly important. Observational support for this premise has been strong within the PA domain. Rhodes and colleagues (101) reported that five of six studies examining identity as a moderator of intention-behavior relations were significant, with a positive relationship being found between higher rated PA identities and PA behaviour.

Unfortunately, too little research attention has been placed on identity formation. Kendzierski's (102) model of self-definition highlights the importance of *commitment* (i.e., importance of the behavior to oneself) and *perceived ability* (i.e., perceived capability/skill to perform the behavior) for identity formation. The review by Rhodes and colleagues (101) found support for these constructs as predictors of identity, as well as social activation, affective judgments, and autonomous motivation. Given the critical importance of identity alignment to behavioral enactment, the promotion of facilitating goals that align with PA while minimizing conflicting goals may serve as a potential intervention strategy. For example, interventionists could focus on eliciting the main values and activities with which a person identifies. The focus would then be on increasing the person's PA identity through the use of identity predictors such as social activation (e.g., surround themselves with other physically active individuals), affective judgements (e.g., choosing activities they enjoy or about which they have positive memories), and autonomous motivation (e.g., linking the activity with other values that were elicited). Other

conflicting life goals (e.g., socialising with friends over dinner) have been established as a correlate of negative affective state when these other goals do not align with one's identity (108, 109), underscoring the significance of identity as a mechanism that may influence what intention individuals choose to act upon (110-112). To our knowledge, messages targeting identity via any of these means have not been examined, suggesting a potentially important future research direction.

Future Research Directions and Messaging Considerations

Guided by several action control frameworks and theories, we have proposed some considerations for future messaging content-based research in Figure 3.1 for people who are inactive. Our review of these factors throughout this chapter shows that most of these lines of research are in their infancy and almost all of these suggestions still require more advanced evidence. Below, we highlight how these action control processes may be tested, and offer future directions to examine our propositions in more detail.

INSERT FIGURE 3.1. ABOUT HERE

We suggest, similar to stage models of behavior change (33,113), that considerations of the readiness of an inactive target population should largely dictate the focus of the content in promotional messages. Although action control approaches do not include the elaborate stage structure of prior stage-based theories (114,115), a basic understanding of whether the target population is considering PA or not is valuable in the organization of messaging material, which has been supported in a small series of stage-matched compared to mis-matched studies on the uptake of PA (58). Seasonal opportunities may also guide the choice of message content. For example, early January would seemingly be a good time to position action control-based

messaging in order to facilitate New Year's resolutions where intentions to engage in new PA practices are high (116). Late spring and early summer may also intuitively be opportune times to engage action control messaging where considerations of leisure-time and weight control are pervasive.

Commensurate with popular social cognitive theories and communication approaches (9,117), we suggest that much of the content targeting non-intenders should be focused on increasing attitudes and self-efficacy, as well as making people aware of PA-related norms and opportunities. Some of these message recipients may subsequently move forward with PA without further need for intervention as posited in traditional theories of intention formation (9,117). Nevertheless, it is expected that many of those who form PA-related intentions as a result of these messages may need further action control intervention (28,29).

Promotion of volitional regulation behaviors is the most advanced area of research in action control thus far (16,17,38,46-51). These volitional strategies for turning intentions into behavior are also the most common elements of action control approaches (32). Thus, we suggest that a sizeable proportion of action control messaging to improve PA participation should focus on behavioral regulation factors (e.g., action and coping planning, self-monitoring, enlisting support), supplemented by content targeting affective judgments (e.g., enjoyment, pleasure) as well as anticipated regret in the form of potential missed opportunities to improve one's health and well-being (see relevance for 'message framing', Chapter 1, this volume). In terms of testing the assumptions of Figure 3.1, experiments should be designed with intending and non-intending PA populations. If action control messaging is more effective for producing PA changes among those with intentions to be active (relative to those who do not receive action control messaging), then this would support the approach outlined in Figure 3.1. By contrast, if

the two types of targeted messages result in no difference in behavior, this would indicate the need to revise the model.

In conclusion, the intention to act has often been considered the critical (and proximal) determinant of PA in many of our most popular theories, and this consideration has extended into strategies employed within public health messaging approaches. The link between intention and PA has been substantiated by a strong correlation observed in meta-analyses (23), but a close inspection of intention–behavior relations suggests that much of this strong association is accounted for by those with no intention to act who subsequently do not act. By contrast, there is considerable PA variability among those with intentions to act (27,29). Thus, action control – the translation of positive intentions into behavior – is an important focus for PA communication strategies. Contemporary action control theories support the development of messages targeting the use of volitional strategies to reduce intention–behavior discordance as well as focusing on affective factors, implicit and automatic aspects of behavior, and identity. This approach has not been implemented or investigated sufficiently at present to examine its utility, but future messaging and mass media research may benefit through exploring whether action control messages increase the effectiveness of PA (and other behavior change) campaigns.

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Address correspondence to: Ryan Rhodes, Ph.D., Room A366, MacLaurin Building, Faculty of Education, University of Victoria, Victoria BC V8W 3N4, Canada. E-mail: rhodes@uvic.ca

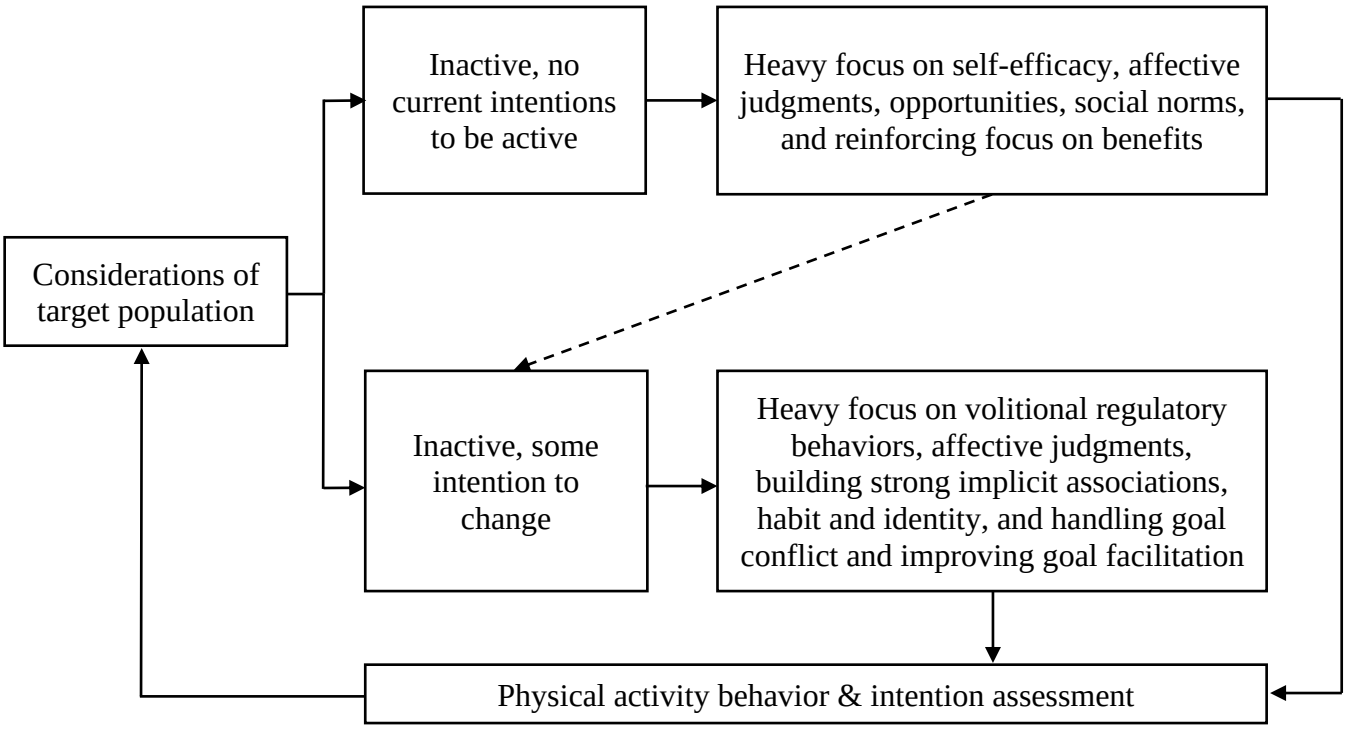

Figure 3.1 Action control in Persuasive Messaging: A Framework for Intervention