Evaluation of Community-wide Health Promotion Interventions

by

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Abstract

The purpose of this thesis was to expand the evaluation of community-wide health promotion interventions aimed at individuals by first reviewing previous evaluation research of the effectiveness of community-wide interventions and then incorporating new approaches in implementation and outcome evaluation. To achieve this goal, the first study of the thesis was a systematic review of recent evaluation research that illustrated the effectiveness of community-wide media physical activity campaigns. Twenty-three articles (18 campaigns) were included from the initial 1,692 articles found in 13 databases. The review found that the evaluation of community-wide media physical activity campaigns varied in their respective scope, duration and target population. The effectiveness of the campaigns was determined by individual changes either in proximal, intermediate, or distal level outcomes. The review data supported previous research that the effect size of the campaign decreased when the level of the outcomes moved from proximal to distal. The role of automatic and implicit cognitions in campaign evaluation research has yet to be identified; rather, most research has incorporated explicit and controlled cognitions that are measured using self-report questionnaires. The outcomes of the first study provide guidance for health promoters to implement successful interventions and best practice.

The second study of this thesis tested the effects of a community-wide physical activity campaign (UWALK) by examining the relationships among proximal, intermediate, and distal outcomes as outlined in the hierarchy of effects model. Furthermore, the study incorporated the measure of automatic processes (attentional bias and implicit attitudes) in addition to controlled processes (self-reported awareness and explicit attitudes). Participants (N = 127) reported unprompted awareness and then completed online implicit tasks. Next, they rated prompted awareness of UWALK before watching a UWALK video, and finished questionnaires measuring

instrumental and affective attitudes, and leisure time physical activity. Results showed that participants with unprompted awareness of UWALK demonstrated attentional bias toward UWALK images, positive implicit attitudes, and greater leisure-time physical activity compared to unaware counterparts. Attentional bias, awareness, and implicit attitudes significantly predicted behavior, accounting for 15.2% of the variance. However, explicit attitudes were neither related to awareness nor to physical activity. This study demonstrated the importance and feasibility of measuring automatic cognitions in campaign evaluation and provides additional information independent of self-reported controlled cognitions.

The third study was to assess a collaborative partnership between a public and private organization when implementing a smoking cessation program (Run to Quit) based on participants' perspectives. A qualitative description method and inductive analysis process guided the study in order to comprehensively summarize participants' experiences of the Run to Quit program. A total of 14 informants participated in a semi structured phone interview two months after the program ceased. The results provided potential benefits of public-private partnerships collaborating in the program delivery as well as the challenges in managing the program when multiple organizations are engaged. It is further proposed that who a public organization partners with will possibly affect how individuals evaluate information of the intervention; examining automatic cognitions such as attentional bias and implicit attitudes triggered by partner names or logos in the intervention advertisements is proposed to be included in the campaign evaluation framework.

Behavior change interventions are fundamental to the effective practice of public health. The evaluation of interventions that have been conducted in real world settings serves guidance for health promoters when they establish an evidence-based intervention. PPPs in

implementation of community-wide health promotion interventions continue to engage the attention of public sector in search of strategies to mobilize resources beyond those available to public sector entities alone, and offering solutions to complex problems. Examining the consequences of PPPs on the implementation and outcome of the intervention provide evidence whether the partnership has actually resulted in positive impacts on participants.

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Preface

This thesis is an original work by Lira Yun. Chapter 2 of this thesis has been published as Yun, L., Ori, E., Lee, Y., Berry, T. R., Sivak, A. (2017). A Systematic Review of Mass Media Campaigns to Promote Physical Activity: an Update from 2010. *Journal of Physical Activity and Health*, 14, 552-570. I led the research by developing research questions, search protocols and coding frames. Data search was assisted by Dr. Sivak. I also conducted data screening and coding with the collaboration of Ms. Ori. I initially prepared the manuscript and wrote the whole section. Dr. Lee assisted to ensure the reliability of the coding and contributed to manuscript edits. Dr. Berry was the supervisory author and contributed to manuscript edits.

Chapter 3 of this thesis received research ethics approval from the University of Alberta Research Ethics Board (ID: Pro00058834, 15/01/2016). This research has been accepted as Yun, L., & Berry, T. R. Examining Implicit Cognitions in the Evaluation of a Community-wide Physical Activity Program. *Evaluation and Program Planning*. I developed an online experiment measurement, conducted data collection and analysis and prepared the original manuscript with Dr. Berry's assistance. Dr. Berry was the supervisory author. She advised for the development of the experiment and data analysis and contributed to manuscript edits.

Chapter 4 of this thesis received research ethics approval from the University of Alberta Research Ethics Board (ID: Pro00069135, 17/02/2017). The research will be submitted to peer-reviewed journal, coauthored by Dr. Faulkner and Dr. Berry. Dr. Faulkner commented on the research method and contributed to manuscript edits. Dr. Berry was the supervisory author and contributed to manuscript edits.

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Chapter 1. Introduction

Overall Summary

Community-wide health promotion interventions including media campaigns and community-wide programs are actions aimed to improve the health risk factors of a whole population by offering an opportunity to increase capacity, knowledge, and skills relevant to the behavior, and change positive attitudes toward the behavior (Grembowski, 2016). Community-wide interventions often apply public-private partnerships (PPPs) to scale up the interventions for a broader impact to help populations to engage in health-enhancing behaviors (Milat et al., 2012). A comprehensive evaluation of community-wide intervention assesses both the process and contextual aspects of the activities, in addition to evaluation of outcomes (Bauman & Nutbeam, 2013).

Intervention outcomes are defined based on the scope of the research and the level at which the intervention is aimed (Bauman & Nutbeam, 2013). Outcome evaluations of the intervention aimed at individuals answer whether intervention components have changed psychological antecedents and behavioral changes in a recommended direction, which ultimately lead to long-term changes in health risk factors (Baker, Francis, Soares, Weightman, & Foster, 2015; Cavill & Bauman, 2004). Outcomes of implementation evaluations answer the extent to which the program corresponds to the originally intended program, how much of and how correctly the elements of the initial program have actually been delivered (Durlak & DuPre, 2008).

The purpose of this thesis was to expand the evaluation of community-wide health promotion interventions (campaigns and programs) aimed at individuals by first reviewing previous evaluation research of the effectiveness of community-wide interventions and then

incorporating new approaches in implementation and outcome evaluation. Three studies were conducted accordingly. The first study was conducted to synthesize recent literature on community-wide mass media physical activity campaigns in order to find gaps in the campaign evaluation literature. Based on the research gaps identified in the first study, the second study was an experiment measuring individuals' automatic and reasoned cognitions related to a target behavior (i.e., physical activity) as an outcome of the community-wide physical activity campaign, called UWALK. Attentional bias toward UWALK and implicit attitudes toward physical activity as automatic cognitions and self-reported awareness of UWALK and explicit attitudes toward physical activity were selected as short-term outcomes that inform the effectiveness of the campaign.

While study 1 and study 2 were focused on outcome evaluation of campaigns promoting physical activity that identifies the extent to which the campaign has achieved its outcomes, study 3 was to conduct implementation evaluation to investigate the extent to which the program corresponds to the originally intended program, how much of and how correctly the elements of the initial program were actually delivered. Furthermore, the target behavior of the program evaluated in the third study is smoking cessation by running, called Run to Quit. A unique aspect of the Run to Quit program is that it was delivered via a collaborative partnership between a public and private organization hoping that applying a public-private partnership strategy will have positive impacts on the program participants engaging in health-enhancing behaviors. Examining participants' perceptions of a partnership is proposed to provide evidence whether a collaborative public-private partnership is a useful strategy to address public health challenges. The outcome of the study also suggests recommendations for government officials and program implementers to improve partnership effects.

1.1. Evaluation of a Community-wide Health Promotion Intervention

Community-wide health promotion interventions are actions aimed to improve the health risk factors of a whole population by offering an opportunity to increase capacity, knowledge, and skills relevant to the behavior, and change positive attitudes toward the behavior (Grembowski, 2016). A community-wide intervention includes various types of actions such as community approaches to environmental change, media campaigns, and programs (Baker et al., 2015). Among these categories, campaigns are designed to inform, persuade, or motivate whole populations or large population segments (Rice & Atkin, 2012). Campaigns generally apply media activities to disseminate messages in multiple channels, to raise awareness, to provide specific information, and to persuade individuals in the community for behavioral change (Rice & Atkin, 2012). Campaigns are often supplemented by community-wide programs that provide interpersonal supports to increase capability, opportunity, and motivation to generate behavior (Baker et al., 2015; Michie, van Stralen, & West, 2011). Programs generally include individually focused components such as tailored support, counseling, education at social settings and environmental activities such as community events.

Community-wide health promotion interventions have horizontal as well as vertical complexity (Grembowski, 2016; Hornik, 2002). For example, interventions to promote physical activity involve interdisciplinary inputs from health, education, transportation, sport, and recreation sectors (horizontal complexity) and operate at several levels from an individual, a community, and to a nation (vertical complexity) over a long period of time (Baker et al., 2015). For this reason, it is challenging to identifying whether and/or to what extent the intervention has achieved its goals and how to improve its effects (Valente, 2001). A comprehensive evaluation

plan applying theoretical frameworks has been suggested to deal with such complexities and to better examine intervention effects.

A comprehensive evaluation of community-wide interventions is to assess both the process and contextual aspects of the activities, in addition to evaluation of outcomes. Formative evaluation is to assess whether the program or campaign activities are feasible, appropriate, and acceptable before it is fully implemented (Bauman & Nutbeam, 2013). This involves developing and pre-testing messages and materials to be used in the program and campaign. Process evaluation, also called implementation evaluation, is conducted when the intervention is underway in order to determine whether activities have been disseminated as intended (implementation fidelity) to the targeted audiences (reach and amount of exposure). Factors that assisted or hindered the implementation process are also assessed in process evaluation. Conducting process evaluation is a prerequisite before conducting an outcome evaluation because the intervention can be only effective when properly implemented as planned (Bauman & Nutbeam, 2013). Outcome or summative evaluations measure program effects in the target population (Bauman & Nutbeam, 2013; Bauman, Smith, Maibach, & Reger-Nash, 2006). Community-wide interventions are implemented in a broadly defined population under a real world setting; the focus of the outcome evaluation is to test the intervention effectiveness (i.e., testing the intervention effects under a real world setting) rather than to test the efficacy of the intervention (i.e., testing the intervention effects under a controlled setting, Flay et al., 2005). Evaluating the effectiveness of the intervention can provide evidence to determine whether the expected outcomes, from short- to long-term are achieved (Cavill & Bauman, 2004).

Intervention outcomes are defined based on the scope of the research and the level at which the intervention is aimed (e.g., outcomes of the interventions targeting individuals are

different from those aimed at the community or organizational and policy levels; Bauman & Nutbeam, 2013). Outcome evaluation aimed at individuals identify the relationship between the health promotion actions and health outcomes, e.g., does the program or campaign, through increasing physical activity, lead to reduction in the risks of cardiovascular disease, morbidity and mortality related to physical activity behavior? Assessing health benefits through behavior change requires years or decades after the intervention ceased. Therefore, measuring short-term outcomes including psychological antecedents and behavioral trialing and maintenance are suggested to be more appropriate to determine intervention effects (Baker et al., 2015; Cavill & Bauman, 2004).

1.2. A Community-wide Media Physical Activity Campaign

Campaigns are communication-focused interventions to inform, persuade, and motivate target audiences to change behaviors that enhance health status (Atkin & Rice, 2013). The success of the campaign relies on the development of an effective persuasive message to the target audience (Atkin & Rice, 2013). The growth of delivery platforms and channels as well as the amount of media consumed through those platforms indicates that media has become an important tool to influence individuals in the society and even the social norm (Maibach, 2007).

Notably, the diversification of media communication channels has changed the notion of "mass media communication," which can possibly influence the effectiveness of media campaigns (Valkenburg, Peter, & Walther, 2016). In the 1920s, when mass media channels (e.g., newspapers, radio, and television) were developed, mass media communication referred to delivering production to uniformed and anonymous mass audiences (Valkenburg et al., 2016). The advent of the Internet and social media channels, however, changed the notion of mass media communication. This computer-mediated communication is regarded as "media-self

communication," as it shares the notion of mass communication in that messages are transmitted to large audiences (mass communication), yet, the reception of media content is self-selected by consumers (self-communication, Castells, 2007). Computer-mediated communication also enables interpersonal interaction between campaign producers and receivers. Recent media campaigns have included a variety of media delivery platforms and channels beyond traditional media channels (e.g., TV, radio, billboards, print media) to now include the World Wide Web and multiple types of social media such as Facebook, Instagram, and Twitter.

To reflect this evolution, the term "community-wide media campaign," is defined as ''large-scale, intense, highly-visible community-wide campaigns with messages directed to large audiences through different types of mass media and computer-mediated communication channels (Maibach, 2007, p. 358)." This definition is different from the concept of "community-wide program" in that the campaign advertisements through media channels are essential components in the intervention, whereas community-wide programs are generally considered as multi-strategic initiatives involving invisible infrastructure and planning actions regardless of whether media channels are used as promotional tools (e.g., programs such as smoking cessation clinics where trainers provide direct supports to participants in increasing knowledge, skills, motivations, and competances; Baker et al., 2015). Furthermore, this term also refers to a set of actions including community activities (e.g., counseling, training, and education) to provide guidance (or practical tips) to segmented and targeted audiences for helping them engage in healthful behaviors (Abroms & Maibach, 2008; Bauman et al., 2006; Brown et al., 2012).

1.3. Evaluation of a Community-wide Media Physical Activity Campaign

Behavior change in a target population is a long-term process and requires increased acceptance of the need for physical activity within the society (Bauman & Chau, 2009). Behavior

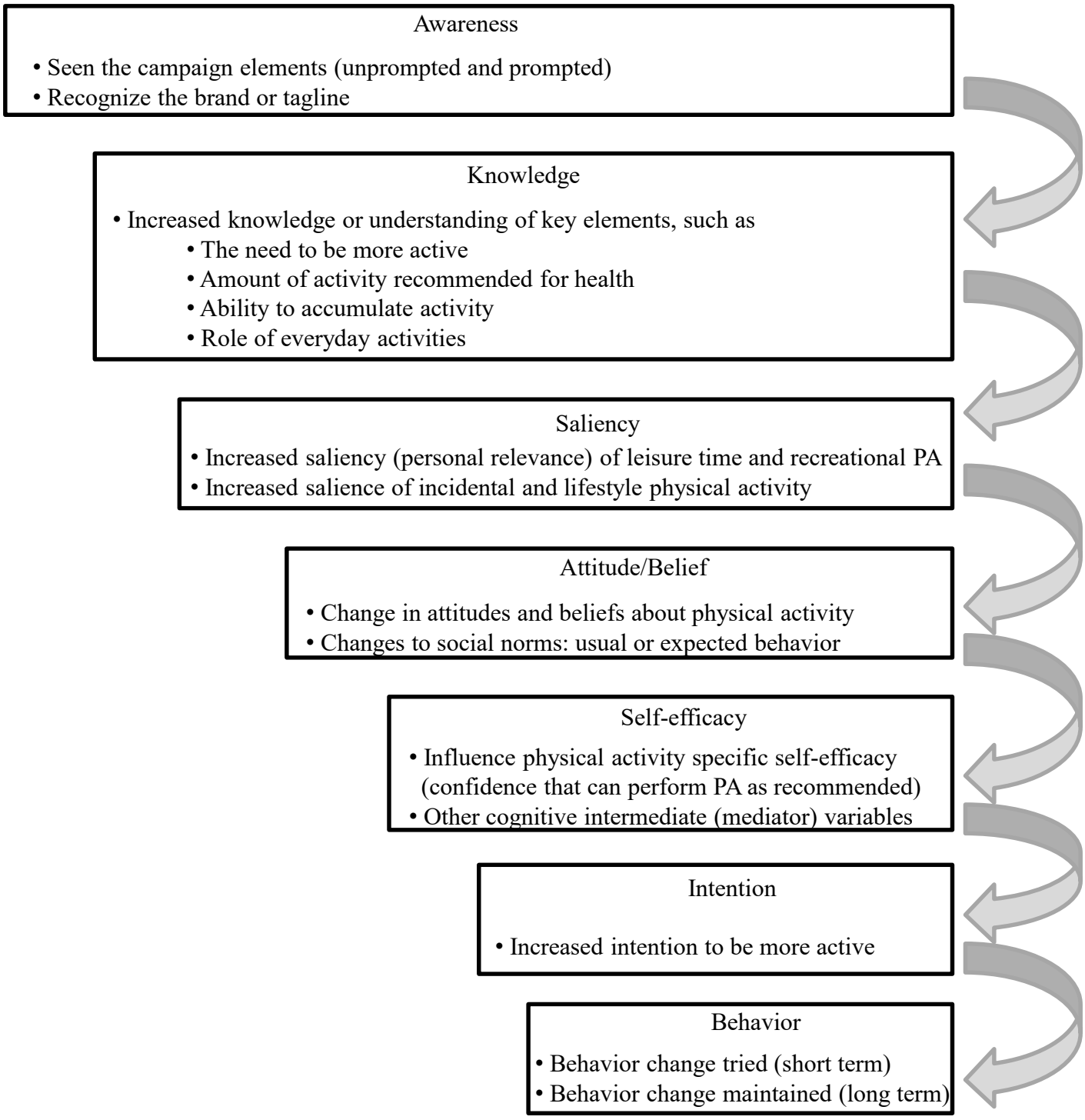
scientists have argued that the effectiveness of a campaign, therefore, needs to be identified through the examination of hierarchical sequences of links among proximal, e.g., awareness of the campaign and understanding of its messages, intermediate, e.g., attitude, salience, confidence, and behavioral intention, and distal outcomes, e.g., physical activity and sedentary behavior (Bauman & Chau, 2009; Bauman et al., 2006; McGuire, 1984). Measuring such outcomes have been used as resources when developing tailored messages and facilitating promotional activities targeted to the audience (Abroms & Maibach, 2008).

1.3.1. The Hierarchy of Effects Model

One of the most popular theoretical models that has been applied in campaign outcome evaluation research is Cavill and Bauman (2004)'s Hierarchy of Effects Model (HOEM, see Figure 1). The HOEM incorporates individual-level campaign outcomes by mapping hierarchical sequences of links from proximal to intermediate, and finally to distal levels. The HOEM was adapted from McGuire's communication / persuasion matrix approach (McGuire, 1984). The model is designed to estimate its overall effects by considering how communication input factors in the message will be likely to elicit mediating process, i.e., pay some attention to it, comprehend what it says, agree with it, and ultimately act as the message argues. Similarly, the HOEM is based on the idea that community-wide media campaigns are meant to increase awareness, i.e., the perception of the campaign brand and understanding of key messages. These factors, which are theoretically the first to change after individuals are exposed to the campaigns, are categorized as proximal variables. The next level of possible change includes cognitive and affective variables related to the message, i.e., knowledge of a target behavior, attitudes, and beliefs, self-efficacy and intentions to perform the behavior. These variables are also called mediators, intermediate or intervening causal variables, given that they are positioned between

proximal variables and distal behavioral factors. What the HOEM emphasizes is that behavioral change is not the only significant or measurable outcome of a campaign; rather, a positive change in any of the psychological antecedent factors is sufficient to identify the effectiveness of the campaign. It is, therefore, critical to identify whether the campaign components have any impacts on raising awareness of the intervention and increasing personal relevance of a behavior among a target population, changing beliefs and attitudes toward the behavior (Bauman et al., 2006; Cavill & Bauman, 2004).

Figure 1.1. The Hierarchy of Effects Model in Physical Activity Campaign Evaluation



1.3.2. Target Cognitions to Measure in the HOEM

Two important constructs, i.e., awareness and attitudes, are selected as a focus of this thesis because the majority of physical activity campaign evaluation work applying the HOEM has demonstrated a positive relationship from proximal awareness to intermediate attitudes toward the behavior the campaign promotes (Bauman et al., 2008; Craig, Bauman, Gauvin, Robertson, & Murumets, 2009). Awareness refers to the easiness in recognizing the brand from memory (Laurent, Kapferer, & Roussel, 1995). This is a respondents' ability to recall the brand name either in response to the product category cue or when the brand name is prompted. In consumer behavior research, awareness has been reported as the most basic proximal factor that influences consumers' subsequent cognitive and behavior factors (Lu, Chang, & Chang, 2014). Campaign awareness has also been discussed in the campaign evaluation literature as the most comparable short-term outcome of the campaign because people who are aware of the campaign have an opportunity to process information in the campaign messages, and in turn to be persuaded to perform the behavior as the campaign recommends (Bauman & Chau, 2009; Cavill & Bauman, 2004; Leavy, Bull, Rosenberg, & Bauman, 2011).

Awareness is related to attitudes, which represents an evaluative integration of affects and cognitions related to an object (Crano & Prislin, 2006). As attitude is presumed to influence behavior, the success of media campaigns has been determined based on whether messages that are mediated via communication channels are effective in changing the attitudes in the desired direction (Petty, Brinol, & Priester, 2009). Previous physical activity campaign evaluation research has reported that campaign awareness predicted positive attitudes toward physical activity and those who reported positive attitudes showed future intention to be active (Craig, Bauman, & Reger-Nash, 2010). Similar results were also found such that awareness of the

campaign was associated with parents' positive attitudes about physical activity for their children, and increase in the number of days parents were physically active with their child (Price, Huhman, & Potter, 2008). Overall, previous findings suggest that awareness and attitudes in the HOEM are important predictors of physical activity behavior; thus, measurement of these constructs need to be incorporated when evaluating physical activity campaign effects.

1.4. Gap in the Campaign Evaluation Research

Extant literature reviews indicate room for improvement on several issues including research design, media exposure process, and outcome measures when evaluating community-wide media campaign effects (Abioye, Hajifathalian, & Danaei, 2013; Brown et al., 2012). The problem of using self-report questionnaires when measuring proximal and intermediate cognitions has also been discussed as they provide biased information to identify campaign effects (Leavy et al., 2011). There is normally more than one competing campaign related to the same health behavior; thus, respondents are more likely to mention other campaigns that have been highly recognized for a long time, even if they have heard of a targeted campaign (bias of using unprompted awareness; Leavy et al., 2011). Furthermore, when respondents are provided with a description of advertisements and asked if they have heard about a health promotion campaign, they are more likely to say that they've heard of the campaign even though they haven't (bias of using unprompted awareness; Kelly, Hoehner, Baker, Ramirez, & Brownson, 2006). This is because health-related research often covers socially sensitive topics and responses may be biased toward what is socially acceptable, e.g., incorporating physical activity into daily life to enhance health status (Sudman, Bradburn, & Schwarz, 1996; Van de Mortel, 2008). Overall, measuring campaign awareness using either technique is problematic:

unprompted recall may produce results that are underestimated and prompted recall may lead to overestimated results.

Meanwhile, dual processing theorists contend that human behavior is not only the outcome of conscious and propositional cognitive processes but also unconscious and associative processes (Sheeran et al., 2016). This contrasts with conventional understanding of human cognitions as explicit, conscious and propositional, which can be measured by self-reports. One dual processing model, the associative and propositional evaluation (i.e., APE) model, proposes that individuals automatically activate affective associations that exist in memory (i.e., implicit attitudes), and then validate such associations with reasoning and value of truth (i.e., explicit attitudes) when they construct attitudes toward stimuli (Gawronski & Bodenhausen, 2006, 2011). When individuals are exposed to a campaign advertisement (e.g., a campaign brand, a key word, or an image), this can automatically attract attention when it matches their goals or interests that have been already stored in long-term memory; these, in turn, can influence subsequent cognitions such as attitudes and intentions that precede behavior change. Exposure to media campaign advertisements can also strengthen automatic associations (e.g., positive affect when engaging in physical activity) that individuals store in long-term memory. Once individuals hold automatic associations stored from previous experiences, they are likely to perform the behavior when an environmental cue (e.g., prompts of choices that encourage stair climbing) triggers automatic associations. Therefore, the campaign can successfully achieve its short-term outcome (i.e., behavioral change among the target population) when the campaign components can serve as environmental cues and strengthen positive automatic associations toward physical activity. McGuire (1984) who provided a rationale to develop the HOEM also described the role of implicit cognitions, motivations and values that one holds can provide “impetus for diverting the

behavior into risk-reducing paths (p. 309).” Even though he did not incorporate measure of implicit cognitions in the model, it is an intriguing research question to incorporate implicit cognitions within the HOEM to evaluate a community-wide health campaign.

1.5. Implicit Cognitions – Attentional Bias and Implicit Attitudes

There are two implicit cognitions that can be incorporated in the outcome evaluation of a health promotion campaign: “attentional bias” and “implicit attitudes.” Attentional bias is the tendency to allocate attention toward cues stored in memory that match one’s interests, goals, and needs, at the expense of other stimuli in the situation (Moors, 2016). When individuals show attentional bias toward a campaign, this indicates that the campaign cues (e.g., brand, keywords) automatically attract their attention. Attentional bias can be measured by online implicit tasks to measure categorization accuracy or response time when responding to stimuli as fast as one can (Houben & Wiers, 2008). Therefore, responses are automatic and uncontrollable. This is different from awareness in that awareness measured using self-reported prompted or unprompted questionnaires captures individuals’ controlled or intentional processes. In other words, attentional bias is a similar but independent cognition of awareness; therefore, it provides additional information when evaluating the campaign effects.

Implicit attitudes are defined as attitudes toward stimuli via associative processes when a situational or contextual cue automatically triggers a pre-existing structure of associations stored in the memory (Gawronski & Bodenhausen, 2006, 2011). Implicit attitudes are a measurement outcome that reflects certain cognition in an automatic manner and not necessarily ”unconscious” from a person’s awareness. Implicit attitudes play a role in predicting spontaneous, habitual, and impulsive behaviors that do not require deliberative and conscious thoughts (Gawronski & Bodenhausen, 2006; Strack & Deutsch, 2004). Implicit attitudes contrast

with explicit attitudes resulting from deliberative, reflective, and propositional processing that can be measured by self-reports.

Previous literature has reported that implicit attitudes predicted health-enhancing behavior including physical activity (Calitri, Lowe, Eves, & Bennett, 2009; Conroy, Hyde, Doerksen, & Ribeiro, 2010). Once implicit attitudes are created by repeated exposure to campaign advertisements, individuals are likely to perform behavior when similar cues are encountered in the environment. This is because environmental cues trigger situational representations that are stored from previous experiences as cognitive and affective states in memory, which directly affect behavior (Papies, 2016a, 2016b; Papies, Barsalou, & Press, 2015). In this regard, campaign components can serve as environmental cues and are more likely to be successful if they help participants form a situated conceptualization in memory and strengthen positive automatic associations toward physical activity among targeted community members.

Community-wide campaigns may not attain a strong impact if receivers do not pay attention to the messages or the argument is not persuasive for receivers to consider behavior change (Atkin & Rice, 2013). Incorporating implicit cognitions in the campaign evaluation framework can provide information about the media campaign effects such as how exposure to media campaign can trigger automatic attention and strengthen automatic associations, independent of self-report responses. This thesis proposed to incorporate the measure of implicit cognitions to further inform the effects of the campaign in a physical activity promotion context.

1.7. Context: UWALK campaign

The second study of the thesis was to examine the effects of a community-wide campaign to promote physical activity, called UWALK. UWALK is a multi-strategy, multi-sector, and community-wide physical activity brand in the Canadian province of Alberta (Jennings et al.,

2016). A partnership between the Government of Alberta and the Faculty of Physical Education and Recreation at the University of Alberta was initiated in 2012; funding from the government ($2.2 million CAD) was committed to the University to develop and implement a population-level health promotion campaign. UWALK was officially launched on April 2013 and ceased in March 2016. The aim of UWALK was to encourage individuals to use activity-monitoring devices (e.g., pedometers, smart phone applications) and to track their activities by registering the UWALK website. The development and evaluation of UWALK was guided by a Community Advisory Board and a Research Evaluation and Advisory Board. For the effective implementation of the campaign, partnerships were created with key stakeholders including municipal providers, communities, libraries, workplaces, and private corporates. Existing physical activity promotion programs in the communities were also supported to deliver a variety of UWALK activities.

Marketing and communication strategies were also employed to increase the awareness of the UWALK brand and to deliver physical activity messages. This focused on branding and messaging through various promotional materials (e.g., videos, posters, banners, SWAGs including hoodies, t-shirts, hats) and mass media (e.g., TV, radio, billboards) and social media campaign advertisements (e.g., Facebook). Marketing material ended with the call to action to register on the UWALK website to track and monitor activities and possibly engage in challenges with other users. The expected outcomes include increased awareness of the UWALK brand, knowledge about and favorable attitudes toward physical activity, and ultimately increased physical activity participation among Albertans. Figure 2 describes the UWALK logic model.

Figure 1.2. UWALK logic model

Situation

- Only 59% of Albertans get enough physical activity
- Mass media is considered as powerful channel to disseminate health messages to large population
- The growth in the use of internet in Canada: 80.3% of households used the internet

Inputs

- Political support from the government of Alberta
- Financial resources funded by Government of Alberta
- Human resources
  - Project management team,
  - Advisory Committee,
  - Web & brand development team,
  - Volunteers & students

Outputs

Activities

- Develop the UWALK brand
- Develop and manage the UWALK website
- Develop and provide implementation guides via website
- Provide support to key influencers
- Develop and disseminate promotional resources (e.g., videos, booths)
- Engage in social media
- Utilize mass media channels
- Build partnerships
- Present at conferences
- Undertake evaluation research

Participants

- People living in Alberta
- Online users
- Health care providers
- Professionals who support physical activity
- Local communities
- Public libraries
- Workplaces
- School communities
- Multi-cultural populations
- Clinical populations (i.e., cardiac rehab and/or living diabetes)

Outcomes

Short-term

- Increase awareness of UWALK
- Increase awareness of walking, stair-climbing and physical activity for health benefit
- Increase availability to resources for walking and stair-climbing
- Increase the number of partners
- Increase the number of website users

Mid-term

- Increase engagement and usability of the UWALK website
- Maintain and increase the number of collaborate activities with key partners
- Identify targeted and tailored marketing and communication activities
- Decrease knowledge gaps about physical activity
- Increase attitude and intention to participate in walking, stair-climbing, and physical activity
- Create opportunity to share learning, information, and resources about UWALK with various audiences

Long-term

- Increase Albertans' physical activity level and decrease sedentary behavior
- Active culture among family, friends, neighbors, and colleagues
- Healthy and physically active communities and workplaces
- Policy changes for walk-friendly environment at the local and provincial level
- Develop goal standards for web-based physical activity intervention

Assumptions

- Everyone believes physical activity is beneficial to enhance health status.
- UWALK helps people to be aware of the importance of walking and physical activity.
- Activities of the UWALK team will increase the awareness of the UWALK brand.
- More exposure to the UWALK will lead people to visit website and create account.
- Providing a website for tracking steps and flights will motivate people to be active.
- More engagement with the UWALK website will lead to increased walking and physical activity.
- A web-based campaign is effective strategy to reach large populations.

External factors

- Weather
- Competing logging tools, websites, and apps
- Schedule and competing demands (e.g., work and life balance)
- Policies and priorities at local and provincial level
- Walkability in residential area (constructions, sidewalks, street lights, built environment)
- Individual and/or organizational economic status
- Accessibility of the internet and computers

1.8. A Community-wide Health Promotion Program

Community-wide programs are interventions that are scaled-up to have the greatest public health impact (Reis et al., 2016). Programs generally include individually focused components such as tailored support, training, education at social settings and environmental activities such as community events (Baker et al., 2015). Community-wide programs when embedded in a local, provincial, and national system can effectively achieve maintenance and sustainability of its health benefits (Reis et al., 2016).

Given that a large-scale health promotion intervention is implemented in a real world setting, the test of its efficacy (i.e., testing the effects of an intervention under optimal conditions of delivery) is hardly applicable because it involves an experimental study such as a randomized control trial. Consequently, the generalizability of findings from the efficacy test is limit (Flay et al., 2005). On the other hand, an effectiveness study is to test whether an intervention works among a broadly defined population under a real world setting (Flay et al., 2005). Effectiveness studies assume that a variation in the expected outcomes is subject to intervention fidelity and adoption; thus, an intervention that produces significant effects in an efficacy trial may or may not yield similar effects under real-world conditions (Flay et al., 2005; Milat, King, Bauman, & Redman, 2012). Monitoring the implementation of the program at each stage of intervention cycles is, therefore, essential to improve the effectiveness (Bauman & Nutbeam, 2013). In other words, the outcomes of programs can be only achieved if properly implemented as planned.

1.8.1. Implementation Evaluation of Community-wide Programs

Program implementation refers to what components of an initial program are actually delivered in a particular setting (Durlak & DuPre, 2008). Outcomes of implementation evaluations answer the extent to which the program corresponds to the originally intended

program (program fidelity), how much of the elements of the initial program has actually been delivered (program dosage), and how clearly and correctly elements of the initial program are delivered (program quality). Furthermore, the degree to which the program triggers participants' interest and attention (participant responsiveness) and how the program can be distinguished from other programs (program uniqueness) are also considered in implementation evaluation (Durlak & DuPre, 2008). Managing and monitoring these factors become more complicated especially in the situation where multiple organizations collaborate to implement the program at broad and uncontrollable community settings (Durlak & DuPre, 2008).

1.8.2. A Public-Private Partnership in Implementing a Community-wide Program

A community-wide program generally requires cross- and multi-sector engagement approaches to scale up the program for a broader impact to target populations (Milat et al., 2012). Among the engagements from diverse sectors, Public-Private Partnerships (PPPs) are the specific types of social alliances involving contracts or informal arrangements between a public (governments or nonprofit) organization and a private-sector corporation to achieve joint objectives in which all parties mutually benefit (Kraak & Story, 2010; Nikolic & Maikisch, 2006). PPPs have been seen as innovative strategies for the public sector to create powerful mechanisms to deal with fiscal constraints, to leverage the resources and expertise, and ultimately to achieve a specific public health goal (Reich, 2002).

A collaborative partnership has the highest level of integration between partners and involves long-term commitment from both partners. Collaborative partnerships require closer engagement of both partners in creating mutually beneficial outcomes and sharing responsibility for the program delivery; thus, the benefits from a collaborative partnership can be greater than other types of partnerships that do not equally share commitment and accountability between

both partners (O'Reilly & Brunette, 2014). Potential risks of failing to achieve the partnership goal can also be greater in a collaborative partnership due to complexity in building a productive working relationship between partners from different backgrounds, managing each partner's activities, and assuring the accountability for achieving a partnership goal (Boase, 2000; Richter, 2004).

Previous researchers have taken the organizational perspective on initiating a collaborative partnership (Herlin, 2015). From a public organization perspective, partnerships are expected to receive extensive supports from private partners to achieve the goal of addressing population health problems. Due to fiscal constraints, it is inevitable to prioritize public expenditures and allocate input in an effective manner. Therefore, gaining financial and in-kind investments from a for-profit partner is the greatest benefit for public organizations (Richter, 2004). Furthermore, public organizations hope to improve the quality of services and programs using the private partner's expertise. On the other hand, the private sector may regard a partnership with the public organization as social alliance which involves various types of strategies such as a philanthropic partnership, sponsorship and cause related marketing (CRM). A CRM represents a type of corporate marketing strategy that offers a specified amount of contribution to a designated cause while fulfilling corporate social responsibility (Berger, Cunningham, & Drumwright, 2004; Varadarajan & Menon, 1988). Nowadays, a CRM is a more collaborative effort between a company and a non-profit organization toward the development and implementation of a CRM campaign. Research around CRM has reported a positive impact on brand awareness, brand image, and attitudes toward the company, in addition to gaining measurable profits, i.e., sales (Basil & Herr, 2003; Nan & Heo, 2007; Rifon, Choi, Trimble, & Li, 2004). CRM also showed a positive influence on events or non-profit organizations such as

increased awareness of a cause, and increased donation to support events and non-profit organizations (Chien, Cornwell, & Pappu, 2011; Polonsky & Speed, 2001).

Potential risks of CRM have been discussed when recipients perceive undertaking CRM is only for commercial motives of the company or when they do not perceive the importance and value of CRM (Polonsky & Speed, 2001; Polonsky & Wood, 2001). In other words, a positive evaluation toward CRM is not likely to occur if recipients do not see any direct benefits of supporting CRM on themselves, community or society in which they belong. Furthermore, the private partner's opportunity to commercialize its giving activities is greater in CRM than any other strategies such as philanthropic partnership or sponsorship. This is because in CRM, companies provide their giving activities (e.g., opportunities to participate in a smoking cessation program) only when there is an action from consumers (e.g., paying the registration fee). This is important for public organizations, as they should ensure the accountability of the partnership, for private partners to create and undertake activities not for their own self-interest but to actually address issues in society.

1.8.3. Research Gap in PPPs for Community-wide Health Program Implementations

Little is known about the actual consequences of PPPs, rather most research on collaboration has been descriptive (Herlin, 2015). Furthermore, the consequences of partnerships on participants have been overlooked. Program participants are essential stakeholders of the partnership. Examining participants' perceptions of partnership will provide recommendations for government officials and program implementers to improve partnership effects. For PPPs to be considered as one way to address many public health challenges, the impacts of the partnership need to be examined based on the program participants' or service recipients' perspectives. The third study in this thesis examined how participants perceived a company's

social alliance CRM strategy in delivering a health promotion program where the company commercializes its giving activities (e.g., opportunities of participating in smoking cessation program), only when there is an action from consumers (e.g., paying the registration fee).

Furthermore, process dimensions of the partnership, i.e., how both partners implement the program in a collaborative manner were examined. A program is effective when an efficacious program is sufficiently implemented in a manner to be available and acceptable to target audience (Flay et al., 2005). Examining the process and implementation dimensions of the program via a collaborative partnership enables us to answer whether the partnership synergistic outcomes while ensuring accountability and maintaining the quality of the program (Brinkerhoff, 2002). The outcomes of the study will help researchers understand how to improve the implementation of the partnership and enhance the effectiveness of the program.

1.9. Context: Run to Quit

The third study examined participants' perceptions of public-private partnership in implementing a smoking cessation program called, Run to Quit. The purpose of Run to Quit (www.runtoquit.com) is to empower Canadians to permanently give up smoking and maintain a more active lifestyle. The program was initiated with funding from the Public Health Agency of Canada. The Canadian Cancer Society as a public partner and the Running Room as a private partner jointly collaborated in order to develop and implement the program. The Canadian Cancer Society is a public organization whose mission is to eradicate cancer and enhance the quality of life of people living with cancer (http://www.cancer.ca/). The Running Room is North America's largest specialty retailer of running & walking goods, apparel, and footwear (https://www.runningroom.com/). Run to Quit is a collaborative partnership where accountability, responsibility, and goals and values of the partnership are shared between the

public and private partner. Furthermore, the program applies combined marketing and communication activities from both organizations to maximize mutual benefits from the partnership.

A unique aspect of the program is to help smokers quit their smoking habit by engaging in walking and running. There are two ways for participants to join the program, either an in-person group clinic for ten weeks or an online "Do it yourself" program. A coach plays an important role as an in-class instructor at an in-person group clinic to support participants achieving the goals of quitting smoking and of walking or running five kilometers. Coaches utilize the Running Room Canada learn-to-run curriculum to guide participants to run and ultimately complete a five kilometer running event at the end of the program. They also use the facilitators' manual provided by the Canadian Cancer Society, which delivers information and resources on topics such as tobacco withdrawal symptoms, cravings, dealing with triggers, and quit methods. Participants are also informed about the free local Quit Line service so that they can receive a support call or email from a Quit Coach. In-person group clinic participants were also provided with a self-help guide booklet (called One Step at a Time, OSAAT), created by the Canadian Cancer Society. Furthermore, staff from the Canadian Cancer Society joined some of the clinic sessions to present helpful resources and monitor the program.

1.10. Thesis Purpose Statement

Statement of the Problem. Outcome evaluation studies of community-wide media campaigns have been widely conducted to determine the effectiveness of the campaigns by investigating whether intended outcomes have been achieved. Conducting a systematic review of the recent literature on campaign evaluation studies is important as it provides updated characteristics of the campaign evaluation research and identifies best practice and issues to

address in future research. The majority of evaluation research to test the effectiveness of health promotion campaigns lacks the understanding of media communication effects. No one has yet considered the role of implicit cognitions when evaluating the campaign effects; rather, most research has incorporated explicit and controlled cognitions that are measured using self-report questionnaires. Furthermore, a public-private partnership strategy has been widely applied in implementing a health promotion program; however, little is known how program participants view a collaborative partnership between a public and private organization and whether they perceive the partnership was effective in successfully implementing the program.

Overall Purpose. The purpose of this thesis was to expand the evaluation of community-wide health promotion interventions (campaigns and programs) aimed at individuals by firstly reviewing previous evaluation research of the effectiveness of community-wide interventions and then incorporating new approaches in implementation and outcome evaluation. This was achieved through three studies: 1) a systematic review of recent literature on community-wide mass media physical activity campaigns in order to find gaps in the campaign evaluation literature; 2) a test of campaign effects by incorporating the measure of automatic (attentional bias and implicit attitudes) and reasoned cognitions (campaign awareness and explicit attitudes) related to a target behavior; and 3) examination of participants' perceptions of a public and private partnership in implementing a health promotion program and involvement of each partner. The scope of the research was to examine effects at an individual level.

Study 1. The purpose of the first study was to systematically review the recent literature on community-wide mass media physical activity campaigns. This review was intended 1) to update how media campaigns have been evaluated using what evaluation frameworks and designs, and which measures have been applied to identify the campaign effects, 2) to identify limitations of

previous evaluations to be addressed in future research. Including "valid and reliable measures of campaign outcomes from proximal to distal level" and "formative and process evaluation implemented before conducting the outcome evaluation" are suggested as top priorities to consider in the future.

Study 2. The second study was focused on investigating effects of the campaign on individuals' psychological conditions for behavioral change. The study incorporated measures of attentional bias and implicit attitudes in the evaluation of a community-wide physical activity campaign, UWALK, by examining the relationships among proximal, intermediate, and distal outcomes of the program as outlined in the hierarchy of effects model. The addition of measures of automatic associations is suggested as evaluation tools to assess whether a program automatically attracts attention can further inform the effects of the campaign. The outcomes of the study can be used to inform campaign evaluators that it can be problematic to assume that visiting a website indicates a campaign will be remembered and related cognitions will be affected.

Study 3. The purpose of the third study was to assess program participants' perspectives on a collaborative partnership between a public and private partner on delivering a health program, where both partners share objectives and responsibility for the delivery of programs and services. This study qualitatively examined how the partnership affected participants' experiences while participating in the program and how they viewed the partnering organizations in implementing the health promotion program. The findings provide implications for health promotion practitioners and researchers regarding how partnering with a private company can possibly influence the program implementation and outcomes.

Delimitation. The following elements were acknowledged as delimitations, which provide the scope within which the researcher concludes findings.

1. In the first study, the data included in the systematic review are peer-reviewed papers published in English between 2010 January and 2016 September.
2. The second study was delineated to participants of UWALK who live in Alberta and volunteered to complete the online survey.
3. The third study was delineated to participants of Run to Quit who live in provinces across Canada at the time of program participation and voluntarily provided contact information and responded to a phone interview.
4. The program effectiveness was only determined based on the variables measured using implicit online tasks and self-report questionnaires (study 2) or questions asked during phone interviews (Study 3).

Limitations. The following elements that were not under the control of the researcher were acknowledged as limitations.

1. The second study was limited because the data were self-reported.
2. Participants of the second study are not a random sample.
3. The time and resources to conduct the survey in the second study and interviews in the third study were limited.

Assumptions. Each study in this thesis was based on the following assumptions.

1. The data included in the first study reflect the trend of evaluation research to identify the effectiveness of community-wide media physical activity campaigns.
2. Two programs ("UWALK" for study 2 and "Run to Quit" for study 3) are efficacious when delivered under optimal conditions within the control of researchers over confounding factors.

3. The instruments and procedures used in the second and the third study were valid and reliable for the population tested.

4. All participants would complete the online survey and answer the interview questions honestly.

5. The program was delivered to all participants at the time of same social and economic trends.

Chapter 2. Study 1: A Systematic Review of Mass Media Campaigns to Promote Physical Activity

This study is published: Yun, L., Ori, E., Lee, Y., Berry, T. R., Sivak, A. (2017) A Systematic Review of Mass Media Campaigns to Promote Physical Activity: an Update from 2010. *Journal of Physical Activity and Health*, 14, 552-570.

2.1. Introduction

2.1.1. A Community-wide Media Physical Activity Campaign

Health promotion interventions are actions directed at offering an opportunity to increase capacity, knowledge, and skills relevant to the behavior, and change positive attitudes toward the behavior (Grembowski, 2016). A community-wide intervention includes various types such as community approaches to environmental change, community-wide campaigns, and community-based programs for interpersonal supports (Baker et al., 2015). Among these categories, campaigns refer to intended efforts to inform, persuade, or motivate whole populations or large population segments (Rice & Atkin, 2012). Campaigns generally apply media activities to disseminate messages in multiple channels and to raise awareness and provide specific information to individuals in the community (Rice & Atkin, 2012).

Notably, the diversification of media communication channels has changed the notion of "mass media communication," which can possibly influence the effectiveness of media campaigns (Valkenburg, Peter, & Walther, 2016). In the 1920s, when mass media channels (e.g., newspapers, radio, and television) were developed, mass media communication referred to delivering production to uniformed and anonymous mass audiences (Valkenburg et al., 2016). The advent of the Internet and social media channels, however, changed the notion of mass

media communication. This computer-mediated communication is regarded as "media-self communication," as it shares the notion of mass communication in that messages are transmitted to large audiences (mass communication), yet, the reception of media content is self-selected by consumers (self-communication, Castells, 2007). Computer-mediated communication enables interpersonal interaction between campaign producers and receivers. Recent media campaigns have included a variety of media delivery platforms and channels beyond traditional media channels (e.g., TV, radio, billboards, print media) to now include the World Wide Web and multiple types of social media such as Facebook, Instagram, and Twitter.

To reflect this evolution, the term used in this study is "community-wide media campaigns," defined as large-scale, intense, highly-visible communication actions that disseminate messages directed to community members through different types of mass media as well as computer-mediated communication channels (Maibach, 2007, p. 358). This definition is different from the concept of "community-wide intervention" in that the campaign advertisements through media channels are essential components in the intervention, whereas community-wide interventions are generally considered as multi-strategic initiatives involving invisible infrastructure and planning actions regardless of whether media channels are used as promotional tools (Baker et al., 2015). Furthermore, the current definition is more comprehensive than the one proposed by Brown and colleagues; they used the term, Stand-alone Mass Media Campaigns, which refers to "interventions that rely on mass media channels to deliver messages about physical activity to large and relatively undifferentiated audiences" (Brown et al., 2012, p. 550). Community-wide programs (e.g., community events, counseling, and education) generally supplement media communication activities to provide guidance (or practical tips) to segmented and targeted audiences for helping them engage in physical activity

(Abroms & Maibach, 2008; Bauman, Smith, Maibach, & Reger-Nash, 2006; Brown et al., 2012), hence the term "community-wide media physical activity campaigns" used in this study is comprehensive as it includes campaigns whether media campaign activities are exclusively incorporated as campaign activities or supplemented by community-wide programs.

2.1.2. Evaluation of a Community-wide Media Physical Activity Campaign

Community-wide health promotion interventions have horizontal as well as vertical complexity (Grembowski, 2016; Hornik, 2002). For example, interventions to promote physical activity involve in interdisciplinary inputs from health, education, transportation, sport and recreation sector (horizontal complexity) and operates at several levels from an individual, community, and to nation (vertical complexity) over long periods of time (Baker et al., 2015). Due to this complexity, it is challenging to demonstrate whether initiating a community-wide intervention was good investments and worthwhile to be prioritized. By conducting the evaluation of the intervention, funders and facilitators of the intervention can assess the effects of the interventions and identify whether and/or to what extent the intervention has achieved its goals (Valente, 2001).

The ultimate goal of a campaign is to create behavior change in a target population. However, behavior change in a target population is a long-term process and requires increased acceptance of the need for physical activity within the society (Bauman & Chau, 2009). Behavior scientists have argued that the effectiveness of a campaign, therefore, needs to be identified through the examination of hierarchical sequences of links among proximal, e.g., awareness of the campaign and understanding of its messages, intermediate, e.g., attitude, salience, confidence, and behavioral intention, and distal outcomes, e.g., physical activity and sedentary behavior (Bauman & Chau, 2009; Bauman et al., 2006; McGuire, 1984). Measuring such

outcomes have been also used as resources when developing tailored messages and facilitating promotional activities targeted to the audience (Abroms & Maibach, 2008).

Several reviews synthesizing the effectiveness of community-wide media campaigns to promote physical activity report that most campaign evaluations have included proximal, intermediate, and distal factors as the main campaign outcomes at the individual-level (Abioye, Hajifathalian, & Danaei, 2013; Bauman & Chau, 2009; Brown et al., 2012; Cavill & Bauman, 2004; Finlay & Faulkner, 2005; Leavy, Bull, Rosenberg, & Bauman, 2011). Cavill and Bauman (2004) report that large-scale campaigns appear to be able to reach large numbers of people, and disseminate initial awareness of physical activity and its benefits. Similarly, Finlay and Faulkner (2005) note that mass media physical activity campaigns are largely concerned with audience knowledge, recall of the media message, and the determinants of physical activity behavior (i.e., attitude, self-efficacy, and intention). The success in achieving proximal outcomes (i.e., increased awareness of the campaign and understanding of the messages) and lack of success in achieving distal outcomes (i.e., change in behavior) have also been found elsewhere (Abioye et al., 2013; Bauman & Chau, 2009; Brown et al., 2012).

In addition, Leavy et al. (2011) found that beyond raising awareness, changes in other outcomes were measured but reported in varying ways, suggesting there have been improvements in evaluation methodologies applying rigorous research designs as well as validated measures. The authors also highlighted the importance of formative research to inform theories/frameworks, campaign content, and sufficient evaluation resources to provide evidence of campaign effects. Brown et al. (2012) examined how stand-alone mass media campaigns effectively increase physical activity. The study reports drawbacks of campaign effectiveness caused by heterogeneity in evaluation methods, lack of outcome measures for cross-study

comparisons, invalidated self-report measures, and inconsistent patterns of findings. The authors further suggest that future research should implement a more refined evaluation method involving important outcomes such as a cost-effective and a dose-related analysis of channels used to deliver campaigns. The systematic review and meta-analysis by Abioye et al. (2013) indicate that mass media campaigns effectively improve sufficient walking but do not reduce sedentary lifestyles or help achieve recommended levels of overall physical activity. They suggest that future investigators need to report intensity and frequency of media campaigns using standard metrics and also measure physical activity objectively or with validated questionnaires.

Extant literature reviews have also indicate room for improvement on several issues including research design, media exposure process, outcome measures, and outcome evaluation (Abioye et al., 2013; Brown et al., 2012). Hence, several recommendations have been proposed for future researchers when assessing the effects of the campaign: rigorous evaluation design, inclusion of the number and duration of media exposures, validated outcome measures, and inclusion of formative and process research with outcome evaluation (Abioye et al., 2013; Brown et al., 2012; Leavy et al., 2011).

The objective of this study was to systematically review the recent literature on community-wide media physical activity campaigns from 2010 January to 2016 September. Specifically, this review was intended to update the characteristics of the evaluation of campaigns including 1) campaign features and promotional activities, 2) inclusion of formative and process evaluation / theoretical Framework, 3) evaluation design and sampling and 4) campaigns impacts. Furthermore, investigation of the dose response analysis and evaluation of study quality were also included to assess whether the research meets the criteria of optimal evaluation previously noted.

2.2. Methods

2.2.1. Search Strategy / Search Protocol

A systematic search of the literature was conducted based on Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009) through major online research databases including Medline, PubMed, Embase, PsychInfo, CINAHL plus, SPORTDiscus (with full text), Current Contents, Web of Science (which includes Science Citation Index Expanded, Social Sciences Citation Index, and Arts & Humanities Citation Index), Communication & Mass Media Complete, Academic Search Premier, Business Source Premier, Health Source: Nursing, Academic Edition, and Health Source: Consumer Edition.

Search terms included “health promotion,” “counter marketing,” “counter advertising,” “social marketing,” “health communication,” “health marketing,” “mass media,” “media campaigns,” “campaign,” “public education,” “brand,” “brands,” “branding,” “diffusion of information,” “diffusion of innovation,” “promotion,” and “advertising” in combination with the following terms: “physical activity,” “fitness,” “exercise.” The reference lists of relevant systematic review or meta-analysis articles were screened for additional papers where pertinent data were available. Details of search strategy and initial search result from each database are described in the Appendix.

2.2.2. Criteria for Inclusion and Exclusion

Articles that met the following criteria were included: 1) evaluated a campaign to promote physical activity or exercise or specific types of physical activity as the targeted behavior, 2) published in English in peer-reviewed journals between January 1, 2010 and

September 22, 2016, 3) contained a clear description of media channels used including type of channels, description of messages in the advertisements, and the duration the advertisements were aired, 4) measured any individual-level impacts as the outcome of the campaign, 5) included a description of evaluation design (e.g., time points that outcomes were measured, intervention and control groups) that identified the effectiveness of the campaign.

Review articles, editorials, and commentaries, formative or process evaluations, or evaluations using qualitative methods were excluded. Dissertations were also excluded since there are not peer-reviewed publications. Organizational-level or policy changes, which did not identify individual-level changes, and those that did not include statistical tests were also excluded.

2.2.3. Selection of Articles

A bibliographic program (Refworks) was used to manage all eligible articles identified after the initial search. Titles and abstracts were screened in a three-stage process (Ng et al., 2014). First, a single reviewer excluded irrelevant titles and abstracts. Second, two reviewers independently screened the remaining titles and abstracts. Finally, full papers of abstracts categorized as potentially eligible for inclusion were screened in a meeting including at least two reviewers, and disagreements were resolved by the third person.

2.2.4. Data Extraction and Data Analysis/Coding Form

A data extraction table and coding form was adopted from previous reviews relevant to the objective and issues addressed in the current review (Abioye et al., 2013; Evans, Blitstein, Vallone, Post, & Nielsen, 2015; Leavy et al., 2011). The coding form was piloted by two coders who independently coded the first three articles and performed cross-checking of the results prior

to extracting the final data for reports. Coded variables were categorized into several domains of interest: 1) characteristics of articles (year, authors, country), 2) campaign features (name of the campaign, target behavior, duration of the campaign implementation, campaign scope, target audience, theoretical framework), 3) description of message dissemination (media channel used, dose of media exposure, link to the community engagement activities, strategy of audience segmentation and message tailoring used), 4) evaluation design and sampling (evaluation design, sampling strategy, recruiting methods, sample size, data analysis methods), 5) the principal measures to identify campaign impacts by reporting difference in means and p-values on each variable including proximal variables (i.e., awareness), intermediate variables (i.e., understanding, attitude, knowledge, salience), and distal variables (i.e., behavior change). The overall quality of each study was rated using a 9-item scale with binary scores to assess risk of bias. The scale was adopted from previous literature (Evans et al., 2015) and reflects the following criteria: 1) the theory of change used in the campaign is clearly described, 2) the role / input of formative or process research is reported, 3) key elements of the campaign are discussed, 4) media channels used in marketing execution are described, 5) marketing techniques to increase message adoption are reported, 6) sample size and sample characteristics are described, 7) a response or completion rate is reported, 8) explicit measure of outcomes are described, 9) hypotheses/research questions are clearly stated and matched outcome measured. Sum of the scores were used to categorize the quality of study as low (score ≤ 3), medium ($4<\text{score}\leq 6$), or high ($6<\text{score}$). Data were extracted by two investigators independently using a statistical program (SPSS 20), and inter-rater reliability was checked to ensure congruency of the data across the two coders. Figure 1 provides a Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) diagram for this review.

2.3. Results

2.3.1. Characteristics of Campaigns (authors, country)

Table 1 summarizes the twenty-three individual articles evaluating the outcome of eighteen campaigns some of which were assessed in multiple articles: “Find Thirty Everyday” (Barnes et al., 2013; Leavy et al., 2013; Leavy, Rosenberg, Bull, & Bauman, 2014), “5-4-3-2-1 Go!” (Evans, Christoffel, Necheles, Becker, & Snider, 2011; Evans, Wallace, & Snider, 2015), “The COMMUNICATE” (Kamada et al., 2015; Kamada et al., 2013), and “Measure-Up” (Grunseit, O'Hara, Chau, Briggs, & Bauman, 2015; King, Grunseit, O’Hara, & Bauman, 2013). The characteristics of articles generally reflect aspects of the underlying campaign; however, each study was conducted with a different study design and research questions to examine the effects of the campaign. The features of individual campaigns were, therefore, assessed for the basis of each campaign, whereas campaign impacts were assessed on an article-by-article basis.

The campaigns assessed in this review were conducted in the United States (Boardman, Lob, Fineman, Ford-Keach, & Fox, 2011; Buchthal et al., 2011; Evans et al., 2011; Evans et al., 2015; Gebel, Bauman, Reger-Nash, & Leyden, 2011; Huhman et al., 2010; Reininger et al., 2015; Rogers et al., 2013; Sharpe et al., 2010), Canada (Craig et al., 2015; Faulkner, Kwan, MacNeill, & Brownrigg, 2011; Gainforth et al., 2016), England (Croker, Lucas, & Wardle, 2012), the Netherlands (Verheijden et al., 2012), Belgium (Van Acker et al., 2012), Australia (Barnes et al., 2013; Grunseit et al., 2015; King et al., 2013; Leavy et al., 2013; Leavy et al., 2014), Japan (Kamada et al., 2013; Kamada et al., 2015), and Korea (Jo, Song, Yoo, & Lee, 2010). Campaigns were implemented on a range of scales: national (Craig et al., 2015; Croker et al., 2012; Faulkner et al., 2011; Gainforth et al., 2016; Grunseit et al., 2015; Huhman et al., 2010; King et al., 2013; Verheijden et al., 2012), regional or provincial (Barnes et al., 2013; Buchthal

et al., 2011; Jo et al., 2010; Leavy et al., 2013; Leavy et al., 2014; Van Acker et al., 2012), and local or municipal (Boardman et al., 2011; Evans et al., 2011; Evans et al., 2015; Gebel et al., 2011; Kamada et al., 2013; Kamada et al., 2015; Reininger et al., 2015; Rogers et al., 2013; Sharpe et al., 2010) levels. Table 1 describes campaign characteristics in more detail.

2.3.2. Campaign Features and Promotional Activities

The majority of the studies evaluated campaigns that targeted general physical activity or any types of daily activities (Barnes et al., 2013; Boardman et al., 2011; Craig et al., 2015; Croker et al., 2012; Evans et al., 2011; Douglas Evans et al., 2015; Faulkner et al., 2011; Grunseit et al., 2015; Huhman et al., 2010; King et al., 2013; Leavy et al., 2013; Leavy et al., 2014; Reininger et al., 2015; Rogers et al., 2013; Sharpe et al., 2010; Van Acker et al., 2012; Verheijden et al., 2012). A few campaigns specified certain types of activities, such as walking (Buchthal et al., 2011; Gebel et al., 2011; Jo et al., 2010) or exercise (not only aerobic, but also flexibility and muscle-strengthening exercise, Kamada et al., 2013; Kamada et al., 2015) as target behaviors. Among this set of campaigns, three promoted physical activity in combination with other behaviors: measures to prevent obesity (i.e., measuring waist circumference in the "Measure-Up" campaign, Grunseit et al., 2015; King et al., 2013) and dietary behaviors (i.e., increasing fruit and vegetable consumption, healthy eating, and reducing sugary beverage intakes, Buchthal et al., 2011; Evans et al., 2011; Evans et al., 2015; Faulkner et al., 2011; Reininger et al., 2015; Rogers et al., 2013; Verheijden et al., 2012). Two campaigns focused on promoting parental support for children's obesity prevention (i.e., Change for Life, Croker et al., 2012) and physical activity promotion (i.e., ParticipACTION's Think Again, Gainforth et al., 2016).

The target populations of the campaign were diverse; two campaigns targeted the general population rather specifying a target audience (Jo et al., 2010; Verheijden et al., 2012), eight targeted the adult population (Barnes et al., 2013; Boardman et al., 2011; Buchthal et al., 2011; Craig et al., 2015; Gebel et al., 2011; Grunseit et al., 2015; King et al., 2013; Reininger et al., 2015; Van Acker et al., 2012), four targeted children (Evans et al., 2011; Evans et al., 2015; Faulkner et al., 2011; Huhman et al., 2010; Rogers et al., 2013) and two targeted older adults (Kamada et al., 2013; Kamada et al., 2015). Two campaigns focused on helping parents to promote their children's physical activity (Croker et al., 2012; Gainforth et al., 2016). The campaign "Step Up. Step Out!" targeted female adults (Sharpe et al., 2010), and "Physical Activity: The Arthritis Pain Reliever" was developed to promote physical activity among adults with arthritis. The duration of these campaigns varied, ranging from as little as one day (Jo et al., 2010), to less than six months (Boardman et al., 2011), less than a year (Barnes et al., 2013; Buchthal et al., 2011; Craig et al., 2015; Grunseit et al., 2015; King et al., 2013), approximately one year (Croker et al., 2012; Evans et al., 2011; Evans et al., 2015; Faulkner et al., 2011; Gebel et al., 2011; Kamada et al., 2013; Sharpe et al., 2010), and longer than a year (Gainforth et al., 2016; Huhman et al., 2010; Kamada et al., 2015; Leavy et al., 2013; Leavy et al., 2014; Reininger et al., 2015; Rogers et al., 2013; Van Acker et al., 2012; Verheijden et al., 2012).

The campaigns used a diverse range of media channels including television, radio, billboards, and print media (notably newspapers and magazines). Campaigns also applied online tools such as campaign websites and social media channels for broader reach and interaction with audiences as the use of the Internet has increased (Boardman et al., 2011; Buchthal et al., 2011; Croker et al., 2012; Faulkner et al., 2011; Gainforth et al., 2016; Gebel et al., 2011; Grunseit et al., 2015; Huhman et al., 2010; King et al., 2013; Leavy et al., 2013; Leavy et al.,

2014; Reininger et al., 2015; Rogers et al., 2013; Sharpe et al., 2010). Thirteen campaigns involved community events and educational sessions as community engagement strategies in combination with media advertisements (Boardman et al., 2011; Buchthal et al., 2011; Croker et al., 2012; Evans et al., 2011; Evans et al., 2015; Faulkner et al., 2011; Gebel et al., 2011; Grunseit et al., 2015; Huhman et al., 2010; Jo et al., 2010; Kamada et al., 2013; Kamada et al., 2015; King et al., 2013; Leavy et al., 2013; Leavy et al., 2014; Reininger et al., 2015; Rogers et al., 2013; Sharpe et al., 2010; Van Acker et al., 2012), whereas five campaigns, "Measure-Up (Grunseit et al., 2015; King et al., 2013)," "The Long Live Kids (Faulkner et al., 2011)," "My ParticipACTION (Craig et al., 2015)," "Think Again, ParticipACTION (Gainforth et al., 2016)," and "Maak je niet dik (Verheijden et al., 2012)," relied heavily on media channels as the major tool to disseminate messages. The details of media actions and community engagement activities are described in Table 2.

2.3.3. Formative and Process Evaluation / Theoretical Framework

Formative and process evaluation may potentially contribute to the success of health promotion initiatives and increase intervention impacts among target populations (Dehar, Casswell, & Duignan, 1993). Nine campaigns were developed based on formative evaluation activities such as pre-testing of campaign materials (Boardman et al., 2011; Craig et al., 2015; Grunseit et al., 2015; King et al., 2013; Leavy et al., 2013; Leavy et al., 2014) and performing stakeholders and community needs assessments (Reininger et al., 2015; Sharpe et al., 2010); three campaigns performed extensive formative evaluation in the planning stages of the campaigns, however, did not provide the details of the evaluation in the articles (Buchthal et al., 2011; Huhman et al., 2010). Process evaluations were conducted in one campaign, "The COMMUNICATE," in order to identify whether it was being implemented the way it was

planned and whether problems in implementation had emerged. This was done by tracking the quantity of campaign activities that reached target audiences (Kamada et al., 2013; Kamada et al., 2015).

Twelve campaigns applied theories or frameworks related to the development, implementation, or evaluation stage of the campaign in order to achieve their outcomes. Such theories included the hierarchy of effects model (Craig et al., 2015; Faulkner et al., 2011; Gainforth et al., 2016; Kamada et al., 2015), the social cognitive theory (Huhman et al., 2010; Leavy et al., 2013; Leavy et al., 2014; Reininger et al., 2015; Sharpe et al., 2010), the theory of planned behavior (Evans et al., 2015; Huhman et al., 2010; Verheijden et al., 2012), the transtheoretical model (Jo et al., 2010), and the socio-ecological model (Rogers et al., 2013; Van Acker et al., 2012).

2.3.4. Evaluation Design and Sampling

The evaluation designs used for the campaigns included quasi-experimental intervention versus control group design (Croker et al., 2012; Gebel et al., 2011; Sharpe et al., 2010); clustered randomized controlled trial (RCT) design (Kamada et al., 2013; Kamada et al., 2015); quasi-experimental pre-post design (Evans et al., 2011; Evans et al., 2015; Faulkner et al., 2011; Jo et al., 2010; Rogers et al., 2013; Van Acker et al., 2012); cohort / longitudinal design (Huhman et al., 2010; Leavy et al., 2014; Verheijden et al., 2012); cross-sectional multiple cohort design (Gainforth et al., 2016; Leavy et al., 2013); cross-sectional pre-post design (Barnes et al., 2013; Boardman et al., 2011; King et al., 2013); and cross-sectional post-only design (Buchthal et al., 2011; Craig et al., 2015; Grunseit et al., 2015; Reininger et al., 2015).

The “Change for Life (C4L)” campaign used a quasi-experimental design by collecting data at baseline and follow-up using population samples from the intervention and comparison

communities (Croker et al., 2012). The effects of the "Wheeling Walks" campaign was also examined based on a comparison between the intervention and control communities surveyed before and three months after campaign implementation (Gebel et al., 2011). The evaluation of the "Let's Go! 5-2-1-0" campaign applied a quasi-experimental design collecting the data from a survey conducted at baseline, mid-, and post-campaign time points (Rogers et al., 2013). The evaluation of the "Step Up, Step Out!" campaign was designed using a full intervention group, assessed pre- and post-intervention (24 weeks), and two cross-sectional groups (media exposure only, no intervention) surveyed before and after the project period. "The COMMUNICATE" campaign applied a cluster randomized controlled design with imbalanced randomization including three interventions and one control group. The effects of the campaign after the first year of its implementation were described (Kamada et al., 2013), and the three-year follow up evaluation was also conducted (Kamada et al., 2015).

The "5-4-3-2-1!" campaign applied a quasi-experimental design that involved administrating a survey to a sample before and after the campaign, and further examined the effects of counseling by comparing those who received counseling to those who were only exposed to media advertisements (Evans et al., 2011; Evans et al., 2015). "The Long Live Kids" campaign used a cohort (panel) pre-experimental design by conducting a baseline survey of a sample in the two weeks preceding the campaign release and after one year as a follow-up (Faulkner et al., 2011). Similarly, the effects of the "Gangwon Walking Campaign" were examined based on a survey of a sample of participants completed before and one month after the campaign launch (Jo et al., 2010). The individual-level impacts of the "10,000 Steps" campaign were examined based on a survey of respondents who participated in the previous study as a baseline, and after 14 months as a follow-up (Van Acker et al., 2012).

A few campaigns applied a cohort design with measurement at multiple-time points (more than three times with the same sample). The influence of the "VERB Campaign" was examined based on data drawn from an existing population-based survey and a telephone survey of cohorts of children and their parents (Huhman et al., 2010). The study that examined the impacts of the "Maak je niet di" campaign (meaning "Don't get fat!" as well as "Don't worry" in Dutch) applied a cohort design with four data collection points over the duration of the campaign implementation (Verheijden et al., 2012). The evaluation of the "Find Thirty Every Day" campaign likewise applied a cohort design with four such points from surveys of a randomly selected population sample (Leavy et al., 2014), as well as cross-sectional surveys measured at baseline, and two subsequent time points when the campaign advertisements were aired (Leavy et al., 2013).

The rest of the campaigns did not apply an experimental design. Instead, the evaluation of the "Think Again, ParticipACTION" campaign applied a cross-sectional design with a sample of national web-based surveys at two time points, two months after the campaign launch and at the end of the campaign implementation (Gainforth et al., 2016). The impact of the "Find Thirty Every Day" campaign was also examined using pre-post cross-sectional survey data linked with a specific variable chosen on the basis of its relevance to the research question, which objectively measured neighborhood walkability (Barnes et al., 2013). "Physical Activity: The Arthritis Pain Reliever" was evaluated using a pre/post quasi-experimental design to compare random cross-sectional population samples of people with arthritis interviewed before and after the campaign interventions in two cities whose residents were provided with standard campaign materials or enhanced campaign materials (Boardman et al., 2011). The evaluation of the "Measure Up" campaign applied cross-sectional pre- and post-campaign telephone surveys of randomly

selected adults (King et al., 2013). Another study to evaluate the impacts of the awareness of the "Measure Up" campaign applied a cross-sectional post-only design (Grunseit et al., 2015).

"The Start Living Campaign" and "My ParticipACTION" campaign used results from cross-sectional surveys, which were conducted immediately following the conclusion of the campaign (Buchthal et al., 2011; Craig et al., 2015). The evaluation of the "Tu Salud, ¡Si Cuenta!" campaign used a cross-sectional sample for this study, which included cohort members who were interviewed at any one point during the period in which the media and individually focused components of the campaign were fully implemented (Reininger et al., 2015).

In terms of recruiting participants, most of the evaluations used random or stratified random sampling strategies and analyzed data collected via phone (Barnes et al., 2013; Boardman et al., 2011; Buchthal et al., 2011; Evans et al., 2011; Evans et al., 2015; Faulkner et al., 2011; Gebel et al., 2011; Grunseit et al., 2015; Huhman et al., 2010; Jo et al., 2010; King et al., 2013; Leavy et al., 2013; Leavy et al., 2014; Sharpe et al., 2010; Van Acker et al., 2012), posted mail (Croker et al., 2012; Kamada et al., 2013; Kamada et al., 2015), online or email (Craig et al., 2015; Gainforth et al., 2016; Verheijden et al., 2012), or in-person (Evans et al., 2011; Evans et al., 2015; Reininger et al., 2015). Sample sizes ranged from 483 (Van Acker et al., 2012) to 11665 (3114 at baseline, 2729 at T1, 2256 at T2, 1946 at T3, 1623 at T4 (Huhman et al., 2010). The details of evaluation designs, and sample size of each evaluation, are provided in Table 3.

2.3.5. Campaign Impacts

Proximal impact measures (i.e., awareness, recall, reach) using self-report questionnaires were reported across eighteen different articles (Barnes et al., 2013; Boardman et al., 2011; Buchthal et al., 2011; Craig et al., 2015; Croker et al., 2012; Faulkner et al., 2011; Gainforth et

al., 2016; Gebel et al., 2011; Grunseit et al., 2015; Huhman et al., 2010; Kamada et al., 2013; King et al., 2013; Leavy et al., 2013; Leavy et al., 2014; Reininger et al., 2015; Rogers et al., 2013; Van Acker et al., 2012; Verheijden et al., 2012) . Five articles demonstrated that the level of awareness significantly increased after the campaign was implemented when compared to awareness before the campaign had been initiated (Barnes et al., 2013; Faulkner et al., 2011; Huhman et al., 2010; King et al., 2013; Leavy et al., 2013; Rogers et al., 2013). Three articles reported a substantial increase in awareness of the campaign among individuals in intervention groups compared to those in control groups (Croker et al., 2012; Kamada et al., 2013). Three articles reported no significant proximal impact on campaign awareness (Boardman et al., 2011; Gainforth et al., 2016; Leavy et al., 2014).

The other seven studies measured awareness, but did not test the campaign effects to identify proximal impacts, either pre- vs. post- campaign results or comparisons between intervention and control groups (Buchthal et al., 2011; Craig et al., 2015; Gebel et al., 2011; Grunseit et al., 2015; Reininger et al., 2015; Van Acker et al., 2012; Verheijden et al., 2012). Instead, these articles reported the measure of campaign awareness as an independent variable to predict changes in intermediate or distal level measures. “The Start Living Health. Step It Up, Hawaii,” campaign tested its proximal impact based on respondents’ demographics and types of the messages (Buchthal et al., 2011). Similarly, “Measure-Up” reported the difference of prompted recall by types of awareness measures (i.e., no recall, unprompted, and prompted recall) and demographics of respondents (Grunseit et al., 2015). The awareness of the “Tu Salud, ¡Si Cuenta!” campaign was reported based on the source of the campaign such as media channels and community engagement action (Reininger et al., 2015).

Intermediate impact measures (e.g., knowledge, attitude, self-efficacy, intention) were included in sixteen articles (Barnes et al., 2013; Boardman et al., 2011; Buchthal et al., 2011; Craig et al., 2015; Croker et al., 2012; Evans et al., 2015; Faulkner et al., 2011; Gainforth et al., 2016; Grunseit et al., 2015; Huhman et al., 2010; Jo et al., 2010; Kamada et al., 2013; King et al., 2013; Leavy et al., 2013; Rogers et al., 2013; Sharpe et al., 2010). Two articles reported a significant effect of the campaign on intermediate cognitive factors by comparing baseline and post-campaign results (Barnes et al., 2013; Leavy et al., 2013). Four articles reported an increase of intermediate factors based on individuals' awareness of the campaign such that participants who were aware of the campaign showed a significant change in their attitudes, knowledge, and intention scores (Craig et al., 2015; Gainforth et al., 2016; Grunseit et al., 2015; Huhman et al., 2010). Seven articles reported mixed results of the campaign effects based on intermediate factors (Croker et al., 2012; Evans et al., 2015; Jo et al., 2010; Kamada et al., 2013; King et al., 2013; Rogers et al., 2013; Sharpe et al., 2010). Only one article reported that the campaign did not significantly change any intermediate factors (Boardman et al., 2011). Buchthal et al. (2011) found attitudes toward "The Start. Living. Healthy." campaign messages (i.e., believability, trustworthiness) differed by respondents' level of education, gender, and ethnicity. Faulkner et al. (2011) examined the relationship between awareness of the "The Long Live Kids" campaign and intentions toward physical activity and found physical activity intentions did not predict campaign awareness.

Distal impact measures (i.e., physical activity behavior) were included in twenty one articles (Barnes et al., 2013; Boardman et al., 2011; Craig et al., 2015; Croker et al., 2012; Evans et al., 2011; Faulkner et al., 2011; Gainforth et al., 2016; Gebel et al., 2011; Grunseit et al., 2015; Huhman et al., 2010; Jo et al., 2010; Kamada et al., 2013; Kamada et al., 2015; King et al., 2013;

Leavy et al., 2013; Leavy et al., 2014; Reininger et al., 2015; Rogers et al., 2013; Sharpe et al., 2010; Van Acker et al., 2012; Verheijden et al., 2012). Most articles applied self-report questionnaires to measure physical activity behavior except for one campaign, "Step Up. Step Out!." The article additionally included objective measure using pedometers (Sharpe et al., 2010). Five articles reported a significant impact of the campaign on increasing physical activity behavior (Gebel et al., 2011; Jo et al., 2010; King et al., 2013; Leavy et al., 2013; Sharpe et al., 2010). Six articles reported significant behavior change based on either proximal (Grunseit et al., 2015; Huhman et al., 2010; Reininger et al., 2015; Van Acker et al., 2012) or intermediate outcomes (Barnes et al., 2013; Craig et al., 2015), such that increased awareness or cognitive factors led to an increase in behavior. Four articles reported that the behavioral change was based on type of activities (Faulkner et al., 2011; Gainforth et al., 2016; Rogers et al., 2013) or sub-groups of target the population (Boardman et al., 2011; Kamada et al., 2015). Leavy et al. (2014) reported a behavioral change that was not sustained over time. Four articles reported no significant campaign effects on behavioral change (Croker et al., 2012; Evans et al., 2011; Kamada et al., 2013; Verheijden et al., 2012). The details of campaign impacts are provided in Table 4.

2.3.6. Dose Response Analysis

A quantified measure of media exposure of the campaign advertisements included objective measures of dosage such as Target Audience Rating Points (TARPs: an estimate of the population reach of the target or priority group within the total audience of a specific TV channel or program reached by an advertisement (Leavy et al., 2013) and Gross Rating Points (GRPs: a percent of the target reached multiplied by the exposure frequency), or self-reported doses of exposure. Eleven articles reported quantified dose of media exposure. Target Audience Rating

Points (TARPs) were reported in six articles (Barnes et al., 2013; Boardman et al., 2011; Grunseit et al., 2015; King et al., 2013; Leavy et al., 2013; Leavy et al., 2014), Gross Rating Points (GRPs) were reported in two articles (Craig et al., 2015; Huhman et al., 2010) and the other three articles reported 'spots' in the mass media (Sharpe et al., 2010) and daily or weekly viewers (Faulkner et al., 2011; Reininger et al., 2015). Dose-response analysis, quantifying the response (campaign outcomes) under consideration of a different exposure time or for a different route to identify the relationship on the effects of the media campaign (Crump, Hoel, Langley, & Peto, 1976), was only performed in one study (Huhman et al., 2010). Huhman et al. (2010) comes for one psychosocial (expectations of the benefits of physical activity) and one behavioral (sessions of free-time physical activity) outcome in the first and the second year of the VERB campaign. These associations, however, weakened in the last year due to no consumption of the media among target populations (i.e., adolescents). Reininger et al. (2015) also found that participants who reported exposure to combined components of the "Tu Salud, ¡Si Cuenta!" campaign (e.g., Radio and TV) was more likely to meet physical activity guidelines compared to participants who reported only one exposure (e.g., radio).

2.3.7. Study Quality

Observed values after assessing the quality of each study in the current review ranged from 3 to 9, with a mean value of 7.09 and a standard deviation of 1.38. Seventeen articles scored from 7 to 9 (i.e., high quality, Boardman et al., 2011; Craig et al., 2015; Evans et al., 2011; Evans et al., 2015; Faulkner et al., 2011; Gainforth et al., 2016; Grunseit et al., 2015; Huhman et al., 2010; Jo et al., 2010; Kamada et al., 2013; Kamada et al., 2015; Leavy et al., 2013; Leavy et al., 2014; Reininger et al., 2015; Rogers et al., 2013; Sharpe et al., 2010; Verheijden et al., 2012). Five articles (Barnes et al., 2013; Buchthal et al., 2011; Croker et al.,

2012; King et al., 2013; Van Acker et al., 2012) scored between 4 and 6, and one article was assessed as having low quality due to insufficient information of campaign descriptions, marketing techniques using media channels, and statistical results (Gebel et al., 2011). Overall, most studies qualified as good. The details of the quality assessment of each article are described in Table 5.

2.4. Discussion

2.4.1. Summary of Findings

This research extends previous systematic reviews, which examined the effectiveness of community-wide media campaigns to promote physical activity. The review data suggest that the number of evaluated media campaigns continues to grow based on the number of studies published over almost seven years between January, 2010 and September, 2016. The studies included in the current review made some progress since the work by Leavy et al. (2011) in terms of applying stronger research designs (i.e., cohort, quasi-experimental with pre- / post-campaign, or intervention group with a comparison of control group). In addition to updating the work of Leavy et al. (2011), the current study included several new measures. Firstly, measures of study quality were included to expand the analysis and assess the use of theory, formative research, campaign elements, media channels used, sample size and description, study completion rates, clarity, and statistical analysis. Secondly, the current analysis included studies examining campaign impacts on children and adolescents, a noted limitation in previous reviews (Leavy et al., 2011). Finally, while it was a tertiary focus of this review, additional studies reporting campaign variables such as measures of dietary change and obesity prevention, were included and evaluated.

Furthermore, there was more frequent utilization of formative and process evaluation and application of conceptual theory/framework reflect, as recommended by previous researchers (Bauman & Chau, 2009; Bauman et al., 2006; Cavill & Bauman, 2004; Leavy et al., 2011). This particular trend should, however, be interpreted carefully in consideration of the increase in the number of published articles over time. Campaigns with substantial amounts of evaluation funding in particular naturally leads to developing a more stringent evaluation design. Describing the application of theory and framework in each stage of the campaign implementation will further ensure how the activities are logically linked to the intended outcomes. The current review confirms the findings of earlier reviews regarding the diversity in campaign durations and outcome measures (Abioye et al., 2013; Bauman & Chau, 2009; Bauman et al., 2006; Brown et al., 2012; Cavill & Bauman, 2004; Finlay & Faulkner, 2005; Leavy et al., 2011).

There was inconsistency in how outcome measures to identify campaign impacts were examined and reported. Sixteen articles applied quasi-experimental designs and used a cohort sample of respondents, whereas seven articles applied non-experimental studies using cross-sectional surveys, which are less rigorous in identifying campaign effectiveness. Reporting the results based on characteristic of respondents separately (e.g., gender and socio-economic status) or examining the relationships among proximal, intermediate, and distal factors prevents readers from understanding the overall campaign effectiveness. It is, therefore, important to consider appropriate ways of reporting results to help understand the overall campaign effects.

Measures of proximal antecedents of physical activity and physical activity behavior varied in this review. In terms of measuring awareness, confusion around the definitions of "unprompted awareness," "prompted awareness" and "prompted recognition" exists, and the methods for computing such scores as overall awareness levels are inconsistent between

researchers. Moreover, the limitation of using self-report questions has not been addressed including the prevailing awareness of a particular campaign that has been for a long time prior to measurements of unprompted awareness, and the bias of social desirability and ghost awareness when measuring prompted awareness (Leavy et al., 2011; Van de Mortel, 2008).

Media effects are determined by interaction between individuals' dispositional factors and message content features; this cognitive message processing guides sequential media effects from attention to the information presented in the message, information processing that affect changes in belief and attitudes, translating the new attitude into behavioral change such as behavioral intention and finally performing the behavior as the campaign advocates (McGuire, 1984; McGuire, Rice, & Atkin, 2001). Important to note is that the sequential links from proximal to distal level changes are not only guided by propositional and controlled processes but also automatic and unconscious cognitions (Gawronski & Bodenhausen, 2006; Sheeran, Gollwitzer, & Bargh, 2013). Campaign elements transmitted by media channels may automatically attract audiences' attention and trigger relevant concepts stored in memory, which consequently change or strengthen their attitudes, beliefs, or other key antecedents for behavior change in a way that campaign developers intend. Such automatic cognitions cannot be measured if the measurement requires respondents' cognitive metal processes to respond to the question or stimuli, such as self-report questionnaires (Gawronski & Bodenhausen, 2006). Incorporating automatic cognitions in the media campaign evaluation research enables researchers and practitioners to gain better understanding of campaign communication effects and to improve the effectiveness of future community-wide media campaigns.

The most distal level of campaign effect as well as long-term outcome of a given campaign is behavioral change (Bauman et al., 2006; Cavill & Bauman, 2004). Measuring

physical activity behavior is not the only significant or measurable outcome of a campaign, yet quantifying the amount of physical activity is essential to identifying any antecedents or proximal variables to demonstrate campaign effects. The current review recognized only one campaign that applied an objective measure to examine the effects of a campaign on individual behavior change (Sharpe et al., 2010). Applying objective measurements such as pedometers and accelerometers is ideal to examine behavioral change resulting from campaigns. Recognizing the feasibility issues of including objective measurement in large-scale evaluation, future research should at least use validated self-report questionnaires to measure physical activity.

This study also demonstrates the trend of community-wide media campaigns to use 'multi-strategy' and 'multi-channels.' Whereas, five campaigns heavily relied on media as the major tool to disseminate and promote their messages, (Craig et al., 2015; Faulkner et al., 2011; Gainforth et al., 2016; Grunseit et al., 2015; King et al., 2013; Verheijden et al., 2012) the other thirteen combined media-based actions with community-based interventions. This illustrates that campaign developers have not only tried to draw attention from the whole community or nation about the issues related to physical activity but have also included multi-strategic community-wide activities to guide and support physical activity participation to make distal change. Furthermore, none of the campaigns examined the effects of using online channels in increasing exposure to and engagement in the message. Examining campaign effects by types of activities will enable researchers to identify the alignment and relationships between specific activities and outcomes. Testing campaign impacts by types of media channels (see Reininger et al., 2015) should be further considered when identifying the effectiveness of the campaign. It was observed that physical activity is often promoted with another health-related behavior (e.g., healthy eating) as a way of disease prevention (e.g., obesity). Various types of behavior were also chosen in the

physical activity campaigns (e.g., undefined physical activity, walking, active transportation, and exercise). Future initiatives are, therefore, advised to examine how the messages are framed based on the target behavior in the campaign since it is a critical factor of campaign effects.

Dose-response analysis is another relevant topic examined in the current review. Conducting process evaluations to provide the number of campaign activities developed and actually implemented within a target community, as well as demonstrating a quantified dose of media exposure, should be conducted a priori to performing dose-response analysis. Examining the link between the quantified exposure to a campaign by type of media channels and the extent of awareness achieved is an important element of evaluation. This effort will guide future initiatives when developing campaigns and allocating resources to each campaign component.

Not a single campaign in this review conducted an analysis of cost-effectiveness. The effectiveness of the campaign based on expenditure will help campaign stakeholders to decide whether the benefit received is worth the cost of the campaign components, or whether there are other less expensive activities that would result in a similar or greater benefit.

2.4.2. Strengths and Limitations

The current study implemented a comprehensive review, which identified scholarly articles from various databases to be screened, appraised, and synthesized. Community-wide interventions in combination of the media channels offer a number of advantages over offering only one approach to a population. This updated review reflects the trend of applying online and social media components in the campaign, although quantified exposure of the advertisements through such media (number of website visits, or members of social media pages) to audiences was not provided in the studies included in this review. The coexistence of mass communication (e.g., newspapers, radio, and television) with mass self-communication (e.g., via the Internet and

social media) need to be further assessed to determine whether applying such channels have influenced the overall effects of the campaign; a similar comparison of the effects based on the interactivity on engagement and information processing (Sundar et al., 2015) and comparison of the effects based on the interpersonal and group interaction (Valkenburg et al., 2016) is also needed. This updated review helps health promotion researchers and practitioners to develop, implement, and evaluate media campaigns by providing the most recent evidence of campaign effectiveness on multiple levels of perspectives.

As commonly discussed in systematic review protocols, the current review is not without limitations. The inclusion criterion of incorporating only peer-reviewed journals written in English is the first limitation. This review did not include grey literature such as research reports, conference papers, theses, and dissertations, which omitted campaign evaluations reported outside of peer-reviewed journals that may further inform this issue. Furthermore, most published evaluations generally reported significant campaign effects with few non-significant findings being reported, which in turn, leads to issues related to the inclusion criterion of the study. This may have resulted in relevant interventions with nonsignificant or negative intervention effects being excluded. Future systematic reviews that include thesis and dissertation studies reporting significant and nonsignificant findings may provide a more comprehensive view.

2.5. Conclusion

Changes in media technology have altered how people think of participating in physical activities since the information related to physical activity is now more actively consumed as individuals seek out desired information using media as a resource (Maibach, 2007). The growth of delivery platforms and channels as well as the amount of media consumed through those

platforms indicates that media has become an important tool to influence the behaviors of physical activity participants and even social norms (e.g., being physically active is desirable). Indeed, behavioral scientists have claimed that population- or community-wide interventions are more effective on physical activity behavior change than individually tailored interventions for reaching broader target groups and shifting the distribution of risk factors of the whole population (Finlay & Faulkner, 2005; Reis et al., 2016; Rose, 2001).

This updated systematic review assessed the outcome evaluation of community-wide media physical activity campaigns that varied in their respective scope, target population, evaluation designs, and outcome measures. The review evaluated various campaigns and found inconsistent effects. Most campaigns implemented media activities to reach broader target audiences in combination with multicomponent community-based interventions to change attitudes and social norms – to create a broader social environment supporting population behavior change. Including results from formative and process evaluation when conducting the outcome evaluation applying rigorous methodologies is suggested for future research. Furthermore, understanding how mediated messages automatically trigger respondents' attention and strengthen automatic associations stored in memory are suggested to predict the behavior change which the campaign is ultimately intended to achieve.

2.6.Tables

Table 2.1. Characteristics of campaigns

Author	Campaign name	Country	Target behavior	Other target behavior	Scope	Target population	Theoretical framework
Barnes (2013)	The Find Thirty every day	Australia	Physical activity	N/A	Provincial	Adults	N/A
Boardman (2011)	Physical Activity: The Arthritis Pain Reliever	USA	Physical activity	N/A	Municipal	Adults	N/A
Buchthal (2011)	The Start Living Healthy: Step It Up, Hawaii! Fruits and Veggies, Good Choice!	USA	Physical activity (walking)	Diet	Provincial	Adults	N/A
Craig (2015)	My ParticipACTION	Canada	Physical activity	N/A	National	Adults	Hierarchy of effects model
Croker (2012)	Change for Life (C4L)	UK	Physical activity	Parental behavior for children's obesity prevention	National	Children (parents)	N/A
Evans (2011)	5-4-3-2-1 Go!	USA	Physical activity	Diet	Municipal	Children	N/A

Evans (2015)	5-4-3-2-1 Go!	USA	Physical activity	Diet	Municipal	Children	Theory of planned behavior
Faulkner (2011)	The Long Live Kids	Canada	Physical activity	Diet	National	Children	Hierarchy of effects model
Gainforth (2016)	Think Again, ParticipACTION	Canada	Physical activity	Parental behavior for children's PA promotion	National	Children (parents)	Hierarchy of effects model
Gebel (2011)	Wheeling Walks	USA	Physical activity (walking)	N/A	Municipal	Adults (aged 50-65)	N/A
Grunseit (2015)	Measure-Up	Australia	Physical activity	Measuring waist circumferences	National	Adults	N/A
Jo (2010)	The Gangwon Province Health Day Walking Campaign	Korea	Physical activity (walking)	N/A	Provincial	General	Transtheoretical Model
Huhman (2010)	VERB	USA	Physical activity	N/A	National	Children	Social cognitive theory, theory of planned behavior

Kamada (2013)	The COMMUNICATE	Japan	Physical activity (exercise)	N/A	Municipal	Older adults (40–79 yrs)	N/A
Kamada (2015)	The COMMUNICATE	Japan	Physical activity (exercise)	N/A	Municipal	Older adults (40–79 yrs)	Hierarchy of effects model
King (2013)	Measure-Up	Australia	Physical activity	Waist circumferences/ obesity	National	Adults	N/A
Leavy (2013)	Find Thirty Every Day	Australia	Physical activity	N/A	Provincial	Adults	Social cognitive theory
Leavy (2014)	Find Thirty Every Day	Australia	Physical activity	N/A	Provincial	Adults	Social cognitive theory
Reininger (2015)	Tu Salud, ¡Si Cuenta! (Your health matters)	USA	Physical activity	Diet	Municipal	Adults	Social cognitive theory, transtheoretical model
Rogers (2013)	Let's Go! 5-2-1-0	USA	Physical activity	Diet	Municipal	Children	Social ecological model

Sharpe (2010)	Step Up. Step Out!	USA	Physical activity	N/A	Municipal	Female adults	Social cognitive theory
Van Acker (2012)	10,000 Steps	Belgium	Physical activity	N/A	Provincial	Adults	Socio-ecological approach, RE-AIM, Diffusion of Innovations
Verheijden (2012)	Maak je niet dik ('Don't get fat!')	Netherlands	Physical activity	Diet	National	General	Theory of planned behaviour and self-regulation theories

Table 2.2. Description of promotional activities

Author (Year)	**Campaign description (duration, channels, GRPs if explained)**	**Community-based and online promotion**
Barnes (2013)	1) Duration: phase 1 May to June 2008, phase 2 July to November 2008, phase 3 March 2009 2) Channel: television advertisement 3) Media reach: phase 1 (TARPs 1,465), phase 2 (TARPs 1,156), phase 3 (TARPs 916)	N/A

Boardman (2011)	1) Duration: spring, 2003 2) Channel: Print advertisement, radio, Bonus radio spots (PSAs), Bonus radio interview, collateral (brochure dissemination) 3) Media reach/exposure/buying: N/A	Fitness Fair: expert speakers, free access to gym facilities, demonstrations of local AF classes Walk and Talk: public relations events Post walk health lectures for older adults
Buchthal (2011)	1) Duration: phase 1 (physical activity): April to June 2007; phase 2 (healthy eating): July to September 2007 2) Media Channel: television commercials, collateral materials in public venues, weekly newspaper column, television and radio coverage of campaign activities 3) Media reach: $100,000 was spent on television advertising, $50,000 was spent on radio advertising; received earned media valued at $51,000	Health fairs and other community events, youth-focused events, school walking campaign
Craig (2015)	1) Duration: campaign ran intermittently over a period of 33 weeks ending March 31, 2010 2) Channel: television advertisement 3) Media reach: GRPs 1200 in English media and 864 in French media	N/A
Croker (2012)	1) Duration: January 2009 to 2011 2) Channel: television, print and poster advertisements, website, helpline, accompanying resources 3) Media reach: N/A	A helpline and a website

Evans (2011)	1) Duration: N/A 2) Channel: television PSA 3) Media reach: N/A	Intervention group parents received counseling, brochure, bottle, or magnet; control group parents did not receive any materials.
Evans (2015)	1) Duration: N/A 2) Channel: television PSA 3) Media reach: N/A	Intervention group parents received the counseling, brochure, bottle, or magnet, whereas control group parents did not.
Faulkner (2011)	1) Duration: Phase 1 launched in 2004; phase 2 launched in April 2007 2) Channel: Television PSA 3) Media reach: PSA reached 49.2% of children (2–11 years) in English-speaking Canada at a frequency of 6.2 times per year; 38.2% of teens aged 12–17 years were reached 5.7 times	N/A
Gainforth (2016)	1) Duration: January 2011 - March 2012 2) Channel: television, print advertisement 3) Media reach: N/A	N/A
Gebel (2011)	1) Duration: April 2001 - April 2002 2) Channel: local television, radio stations, local newspapers 3) Media reach: N/A	Worksite wellness walking challenge, Website, physician prescriptions for walking, community presentations

Grunseit (2015)	1) Duration: October 2008 to April 2009 2) Channel: Paid television and radio messages, magazines, online, out of home media 3) Media reach: Phase 1 in 2008 had 600 Target Audience Rating Points (TARPS) over four weeks; Phase 2 - March to April 2009 had 150 TARPS in the first week and 100 TARPS in the subsequent three weeks	N/A
Jo (2010)	1) Duration: event took place April 7, 2007; radio and newspaper announcements aired 162 times for 2 weeks prior to event 2) Channel: radio announcement, 10 print advertisements in two main regional newspapers 3) Media reach: N/A	20,000 health education leaflets on walking distributed to community health centers; 2,500 campaign posters and placards were posted, official memoranda sent to 32 community organizations
Huhman (2010)	1) Duration: June 2002 - September 2006 2) Channel: paid television advertising 3) Media reach: 119 GRPs per week for television in the first year and about 108 GRPs per week in the second through fourth years of the campaign	School-based programs implemented in 2nd-4th years. Community engagement: play areas, street games at the community recreation centers, camps, schools, festivals, sporting events. Community-based VERB Summer Scorecard emerged in a few communities in the final 2 years of VERB; ~ 20 communities hosted a

		VERB-related program.
Kamada (2013)	1) Duration: from November 2009 to October 2010 2) Channel: local audio broadcasts, Flyers, leaflets, community newsletters, posters, banners 3) Media reach: N/A	Outreach health education program, mass and individual encouragement by professionals Support delivery, i.e., videotapes and DVDs, social or peer support through community leaders
Kamada (2015)	1) Duration: November 2009 - October 2012 2) Channel: local audio broadcasts, Flyers, leaflets, community newsletters, posters, banners 3) Media reach: N/A	Outreach health education program and mass- and individual encouragement by professionals Support delivery, i.e., videotapes and DVDs, social or peer support through community leaders
King (2013)	1) Duration: Wave 1: October 2008 - April 2009, Wave 2: March 2009 2) Channel: television, magazine, radio 3) Media reach: Wave 1: 150 TARPS; Wave 2: 150 TARPS in the first week, 100 TARPS in the subsequent 3 weeks. Estimated TV reach was 72–77% of the target population, estimated magazine reach was 77% and estimated target audience reach via radio was 70–75%.	Distribution of campaign messages and materials, public relations and media activities, co-branding of local events and groups.

	Campaign represented approximately $AUD30 million investment over a 4-years.	
Leavy (2013)	1) Duration: May 2008 - March 2010 2) Channel: Television, Radio, print advertising, billboards 3) Media reach: Wave 1: 1460 TV TARPS; Wave 2 : 2072 TV TARPS; Waves 3-4: 581 TV TARPS; Wave 5-7: 1840.6 during the fifth through seventh wave. Campaign represented approximately $AUD1.8 million over 2.5 years.	Website and online resources, range of activities targeting communities and workplaces.
Leavy (2014)	1) Duration: May 2008 - March 2010 2) Channel: Television, Radio, print advertising, billboards 3) Media reach: Wave 1: 1460 TV TARPS; Wave 2 : 2072 TV TARPS; Waves 3-4: 581 TV TARPS; Wave 5-7: 1840.6 during the fifth through seventh wave. Campaign represented approximately $AUD1.8 million over 2.5 years.	Website and online resources, community 'Run for a Reason', range of activities targeting communities and workplaces.
Reininger (2015)	1) Duration: 2005-2010 2) Channel: TV, newspaper, radio 3) Media reach: daily TV shows in 2005 and 2006 (20,000 viewers/day); weekly newspaper articles in 2007 (15,000 readers/week in 2007 in one paper; 19,000 readers/week in two largest papers by end of 2007 - 2015). Spanish radio segments on 3 stations (20,000 listeners/day through 2013).	Newsletter, community health workers outreach, free exercise classes in community locations, walking trail, website, free community wide weight loss challenge
Rogers (2013)	1) Duration: 2007 - 2011	Child care programs, afterschool

	2) Channels: television, signs on the city buses, ads aired in movie theaters, web-banner at local news website 3) Media reach: N/A	programs, health care practices, worksites and community sites programs, environmental and policy supports
Sharpe (2010)	1) Duration: April 2004 - April 2005; 24-week behavioral intervention rolling enrollment period from April 2004 - November 2004. 2) Channel: newspaper, radio, billboards, television 3) Media reach: radio (135 spots on 3 local stations), billboards (five billboards, 1 per month at high-traffic location), television (273 spots of 2-minute commercial, 2 TV station morning and evening news coverage for a month)	Full intervention group: pedometer, goal setting guides, tote bag, 24 weeks of emailed/mailed behavioral tips, monthly group events (i.e., guided group walks, dance, strength training), incentive prizes (t-shirt or water bottle, drawing for gift certificate).
Van Acker (2012)	1) Duration: initiated in the last quarter of 2007 until the second quarter of 2010 2) Channel: local media campaign (not specified) 3) Media reach: N/A	Pedometer sale/loan, organization of community events, community street signs
Verheijden (2012)	1) Duration: 2007 through 2010; Wave 1: began November 2007; Wave 2: began June 2008. 2) Channel: commercials/advertisements (not specified) 3) Media reach: not specified	N/A

Table 2.3. Description of evaluation design and sampling

Author	Formative or process	Outcome evaluation design	Sampling strategy	Recruiting method	Sample size description

	evaluation				
Barnes (2013)	N/A	Cross sectional (pre- vs. post-campaign)	Random	Phone	n ≈ 1,000
Boardman (2011)	Formative: messages were pretested in five pilot sites across the nation before the campaign was launched.	Cross sectional (pre- vs. post-campaign)	Random	Phone	Group 1 pre= 109, post = 403, Group 2 pre = 186, post = 403
Buchthal (2011)	Formative: The Healthy Hawaii Initiative conducted extensive formative work before launching the campaign that explored surface and deep structure constructs (Resnicow, Braithwaite, Ahluwalia, & Baranowski, 1999) related to diet and exercise behavior in the target populations	Cross sectional (post only)	Stratified random	Phone	n = 3,607

Craig (2015)	Formative: messages were developed from target population	Cross sectional (post only)	Random	Panel via email	n = 1110
Croker (2012)	N/A	Quasi experimental (intervention vs. control)	Stratified random	Mail	n = 3774 families(with 4419 children) at baseline and n = 1419 families at follow up
Evans (2011)	N/A	Quasi experimental (pre- vs. post-campaign)	Random	Recruit via mail, and interview via phone or in-person	n = 524
Evans (2015)	N/A	Quasi experimental (pre- vs. post-campaign)	Random	Recruit via mail, and interview via phone or in-person	n = 246
Faulkner (2011)	N/A	Quasi experimental (pre- vs. post-campaign)	Random	Panel interview via phone	n = 500 at baseline and n = 331 at follow up
Gainforth (2016)	N/A	Cross sectional (multiple cohort)	Random	Panel via email	n = 702 at T1 (3 months post campaign launch) and n =670 at T2 (15 months post launch)

Gebel (2011)	N/A	Quasi experimental (intervention vs. control)	Random	Phone	Intervention group n = 719, control group n = 753 at baseline, intervention group n = 517, control group n = 571 at follow up
Grunseit (2015)	Formative: Formative qualitative research indicated broad appeal of information about a "healthy waist circumference" as a compelling, credible and easy to understand goal and the salience of the consequences for the Measure-Up characters regarding their progressive weight gain over time.	Cross sectional (post only)	Random	Phone	n = 2812
Jo (2010)	N/A	Quasi experimental (pre- vs. post-campaign)	Random	Pre-survey was self-administered,	n = 400 at pre-campaign 297 post-campaign

				the post-survey was via a telephone	
Huhman (2010)	Formative: the campaign was based on formative evaluation but was not described in this study	Cohort/longitudinal (baseline, post_1, post_2)	Random	Phone	n = 3114 at baseline, n = 2729 at T1, n = 2256 at T2, n = 1946 at T3, n = 1623 at T4
Kamada (2013)	Process: the dose of the implemented information, education, and support delivery	A clustered RCT	Randomized Clustered	Mail	n= 4500 participants (9 clusters) in the intervention group, and n = 1500 (3 clusters) in control group
Kamada (2015)	Process: the dose of the implemented information, education, and support delivery	A clustered RCT	Randomized Clustered	Mail	n= 4500 participants (9 clusters) in the intervention group, and n = 1500 (3 clusters) in control group
King (2013)	Formative: Formative qualitative research prior to the campaign indicated the broad appeal of information about a healthy waist	Cross sectional (pre- vs. post-campaign)	Random	Phone	total n = 1006 at pre and post-campaign

	circumference as a compelling, credible and easy to under- stand goal				
Leavy (2013)	Formative: A 10-stage formative process informed the media cam- paign creative and the development of the message, theme, and images for the television advertisements	Cross sectional (multiple cohort , pre, post1, post2)	Random	Phone	Total n = 2847, n = 972 at baseline; n = 938 at T1, n = 937 at T2
Leavy (2014)	Formative: Find Thirty every day1 comprised formative research and message pretesting, campaign development, and seven waves of media.	Cohort/longitudinal	Random	Phone	n = 405 at baseline (T1) ; n = 220 at T2; n = 164 at T3; n = 123 at T4
Reininger (2015)	Formative: stakeholder needs assessment (Organizational members	Cross sectional (post only)	Random	In person	n = 1438

	were originally invited to the CAB through snowball recommendations and evolved based on gap analyses or expressed interests by entities)				
Rogers (2013)	No	Quasi experimental (pre- vs. post-campaign)	Random	Phone	n = 801 at baseline, n = 800 at T1, n = 802 at T2
Sharpe (2010)	Formative / process: Extensive participatory community assessment and community engagement activities have taken place before, during, and after the social marketing intervention described in this article.	Quasi experimental (intervention vs. control)	Non-randomized	Phone	A full intervention group n = 430 at pre- and n = 224 at post-campaign; media exposure only group n = 245 at pre- and n = 234 at post-campaign, control group n = 845 at pre- and n = 843 at post-campaign
Van Acker (2012)	No	Quasi experimental (pre- vs. post-campaign)	Random	Phone	n = 755 at pre- and n = 483 at post-campaign
Verheijden (2012)	No	Cohort/longitudinal (four	Participants were	Online panel	Ranged from n = 1030 to n

		times)	recruited through a panel service agency		= 816 over the four time points of measurements

Table 2.4. Summary of campaign impacts

Author (year)	Proximal impact (awareness / recall)	Intermediate impact (knowledge, attitude, intention etc.)	Distal impact (behavior change of physical activity & other distal changes)
Barnes (2013)	Lower walkable community (LWC): 35.1% at pre-campaign, 50.7% at post-campaign, p<.001. High walkable community (HWC): 28% at pre-campaign, 52.3% at post-campaign, p<.001.	1) Message comprehension: 26.4% in LWC and 25.9% in HWC at pre-campaign, 41.5% in LWC and 44.3% in HWC at post-campaign 2) Message acceptance: 25.9% in LWC and 18.6% in HWC at pre-campaign, 40.8% in LWC and 42% in HWC at post-campaign, p<.05. 3) Behavioral intention: 12.9% in LWC and 7.6% in HWC at pre-campaign, 23.2% in LWC and 19.3% in HWC at post-campaign	In LWC: 62.1% at pre-campaign, 69.9% at post-campaign, p<.05. No difference was found in HWC.
Boardman (2011)	27.3% at pre-campaign, 45.2% at post-campaign (only in the city with the enhanced program among the primary audience, but not in the city with the standard intervention)	No differences of knowledge between the pre- and post-campaign.	No significant increase in walking participation within either the enhanced intervention (2.8% vs. 8.0%) or the standard intervention (4.8% vs. 7.0%). A significant

			improvement among primary audience members in the number of people who exercised 3 or more days per week (77.4% vs. 90.1%), but not in the secondary audience (92.1% vs. 86.3%) in the enhanced intervention city.
Buchthal (2011)	Two messages (88.9%, 70.3%) showed higher levels of prompted recall than the campaign itself (51.7%)	Perceptions of the campaign messages (i.e., believability, trustworthiness, favorability) was higher when respondents were more educated, female, and Native Hawaiians ($p<.05$).	N/A
Craig (2015)	Prompted awareness rate was 43.9% and unprompted awareness rate was 6.1% of those recalled the campaign when prompted.	The mean self-efficacy score among participants was 12.2, which is the midpoint of the scale (3-21). Participants had a high level of intention, with 40.6% citing full and 37.3% moderate intention.	27.9% reported already being active. Cognitive engagement and high campaign-related self-efficacy to be more active were predictors of behavior ($p<.05$).
Croker (2012)	75% of families in both intervention and control group at pre-campaign; 96% in intervention and 87% in control group at post-campaign ($p<.05$).	A significant negative effect of the importance of physical activity with the intervention group (4.58 at pre-, 4.19 at post-campaign), not in control group 4.63 at pre-, 4.28 at post-campaign).	No main effects were found in diet score, physical activity and TV watching behaviors.
Evans (2011)	N/A	N/A	Only vigorous physical activity positively

			increased among physical activity outcomes at follow-up (2.43) when compared with baseline (1.74, p<.01).
Evans (2015)	N/A	No difference in the importance of physical activity between pre- and post-campaign. Perceived safety of neighborhood significantly increased at post- (84.4% during the day, 30% at night) compared with pre-campaign (75.1% during the day, 21.4% at night).	No difference in getting enough physical activity active between pre- and post-measures was found.
Faulkner (2011)	Prompted awareness of the campaign increased from pre-campaign: 0.1% (unprompted) and 49% (prompted) to post-campaign: 4% (unprompted) and 60% (prompted), p<.01.	Intentions were not a significant predictor of the campaign awareness.	Children who recalled the campaign were significantly more active in their free time, than children who had no recall (OR = 1.96, p<.05).
Gainforth (2016)	No difference of the campaign recall between T1 (41%) and T2 (42%) was found, p>.05.	Parents aware of the campaign had greater outcome expectations (d=.16) toward their child engaging in physical activity, perceived behavioral control (d=.22) and intentions (d= .18) to support their child's physical activity compared with parents not aware of the campaign at both T1 and T2 (p<.05).	Parents who were aware of the campaign engaged in more parental support behaviors compared with unaware parents (p<.01). No significant associations between parents' awareness and children's physical activity were found.

Gebel (2011)	90.3% of respondents in the intervention community recalled the campaign.	N/A	50.9% of the participants met physical activity recommendations by walking at pre- and 59.8% at post-campaign (p<.01).
Grunseit (2015)	Unprompted awareness rate was 41% and prompted awareness rate was 46%.	Knowledge was higher among unprompted recallers (66.1%) than prompted recallers (54.7%) or no recallers (52.%), p<.01. Intention was higher among unprompted recallers (63.7%) than prompted recallers (61.8%) or no recallers (55.4%), p<.05.	Trialling to increase physical activity was higher among unprompted recallers (55.8%) than prompted recallers (50.5%) or no recallers (44.2%), p<.01.
Jo (2010)	N/A	Importance of walking increased from 4.46 at pre- to 4.59 (out of 5) at post-campaign (p<.05). Knowledge and intention did not increase at post-campaign compared to pre-campaign.	Days of walking increased from 3.90 days at pre- to 4.38 days at post-campaign (p<.01).
Huhman (2010)	Total awareness increased from 2003 (67%) to 72% in 2004, and to 75% in 2006. Unprompted awareness also increased from 17% in 2003 to 21% in 2004 and 28% in 2006, p<.05.	Frequency of campaign exposure was positively associated with outcome expectation, self-efficacy, social influence, p<.05.	Engaging in any physical activity before the interview was related to the degree of campaign exposure; 62.4% no campaign exposure to 68.4% saw it every day, p<.05. Organized physical activity was not different by the campaign exposure and time points.

Kamada (2013)	79.3% in the intervention and 58.7% in the control group were aware of at least one component of the campaign.	Significant differences were observed in knowledge between the control (84.7%) and intervention (88.2%) group, p<.05, whereas belief and intention were not significantly different.	% of respondents who engaged in regular physical activity decreased from 64.6% to 60.3% in the control group and from 63.9% to 58.7% in the intervention group in the intervention year. No changes of physical activity were found by each intervention group (i.e., Group A, FM, and AFM) with the control group.
Kamada (2015)	N/A	N/A	The campaign did not increase the overall physical activity over the 3-year period. The proportion of adults doing flexibility activities increased in Group FM from 19.8% at baseline to 23.6% at 3-year follow up (p<.05).
King (2013)	Unprompted awareness increased from 1.1% at pre- to 38.2% at post-campaign, p<.01. 90% reported prompted awareness (post-campaign only).	A significant increase of the knowledge was found, from 50.3% at pre- to 56.5% at post-campaign, p<.01 . No change was seen in perceived confidence to make lifestyle changes.	Meeting physical activity recommendations did not change significantly. However, measuring their waist increased from 30.4% at pre- to 36.6% at post-campaign.
Leavy (2013)	Total awareness increased from 30.4% at baseline to 45.1% at T1 , p<.05, and 48.5% at T2, p<.05.	Intention toward physical activity significantly increase from 10.3% at baseline, to 18.4% at T1, p<.05, and to 21.0% at T2, p<.05.	Walking increase of 30 minutes per week (p = .047); vigorous activity increase of 20 minutes per week (p = .022); and total physical activity

			increase of 50 minutes per week (p = .004). There was an increase in physical activity for adults at T2 compared with baseline (AOR = 1.22, p<.05).
Leavy (2014)	Respondents who were never aware of campaign decreased from 100% at baseline, to 54.% at T2, 40.5% at T3, and 30.4% at T4. Respondents who were always aware of the campaign increased from 0% at baseline to 45.7% at T2, but decreased to 30.6% at T3 and 9.6% at T4.	N/A	Walking increase by 19 min between T1 (185 min) and T3 (204 min) but this was not sustained at T4 (173 min). Total physical activity increased by 11min between T1 (330min) and T3 (341min), however, this was not sustained at T4 (300min).
Reininger (2015)	37% of participants reported exposure to the campaign. 42.5% of respondents who met physical activity guideline were aware of the campaign whereas 35% of respondents who did not meet physical activity guideline were aware of the campaign (p<.01).	N/A	Meeting physical activity guidelines was most strongly associated with exposure to both the discussion session and radio messages, p<.01.
Rogers (2013)	The awareness increased over time (10% at T1, 45% at T2, and 47% at T3, p<.01).	% of parents who correctly identified each of the specific campaign recommendations increased over time (41 at T1, 42 at T2, and 45 at T3,	Child adherence to limit screen time and to engage in physical activity did not significantly change over time, p>.05.

		p<.05). Parents' intentions to support child's healthy choices showed no significant differences over the three time points.	
Sharpe (2010)	N/A	Self-efficacy was higher in full-intervention group (58.2%) compared to media intervention group (54.3%, p<.05) and no-intervention group (52.7%, p<.05). Social support (2.4 at pre-, 2.6 at post-campaign, p<.05) and knowledge of walking (54 at pre-, 73 at post-campaign, p<.01) increased among full intervention group.	Walking and MVPA participation increased from pre-measure (MVPA, 31min, walking, 36min) to post-measure (MVPA, 130min, walking 106min) in full intervention group. Significant increase of walking and MVPA minutes at post-measure (MVPA 160min, walking, 80min) were also found in no intervention group when comparing with pre-measure (MVPA, 104min; walking, 52min). No significant difference between pre-post measures (MVPA and walking) among media-only intervention group was found.
Van Acker (2012)	63% of respondents were aware of the campaign.	N/A	Respondents who aware of the campaign reported significantly more minutes of leisure time (aware, 227 min/w vs. unaware, 176 min/w), household (aware, 464min/w vs.

			unaware, 389min/w), and moderate physical activity (aware 664min/w vs. unaware 586min/w) than those not aware of the campaign, p<.05.
Verheijden (2012)	19% of the participants had seen the campaign at T2; 29% had seen the campaign at T3.	N/A	Self-reported physical activity remained unchanged over the four measurements time points, p>.05.

Table 2.5. Assessment of study quality

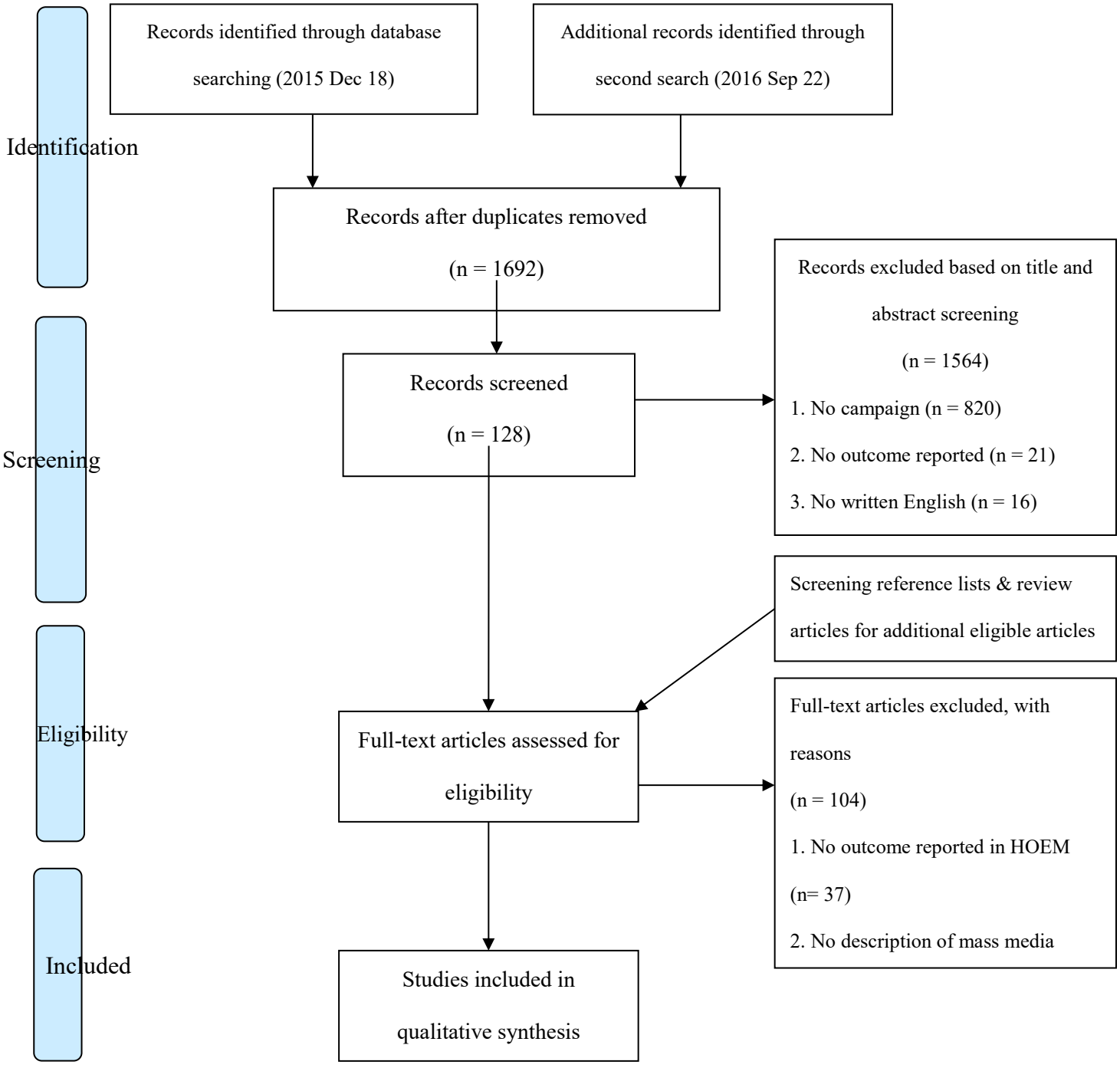
Author (year)	Item 1[1]	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Total score	Assessment criteria
Barnes (2013)	0	0	1	1	0	1	1	1	1	6	Medium
Boardman (2011)	0	1	1	1	1	1	1	1	1	8	High
Buchthal (2011)	0	1	1	1	0	1	1	0	0	5	Medium
Craig (2015)	1	1	1	1	0	1	1	1	1	8	High

[1] Item 1: the theory of change used in the campaign is clearly described; Item 2: the role / input of formative or process research is reported; Item 3: key elements of the campaign are discussed; Item 4: media channels used in marketing execution are described; Item 5: marketing techniques to increase message adoption are reported; Item 6: sample size and sample characteristics are described; Item 7: a response or completion rate is reported; Item 8: explicit measure of outcomes are described; Item 9: hypotheses/research questions are clearly stated and matched outcome measured

Croker (2012)	0	0	1	1	0	1	1	1	1	6	Medium
Evans (2011)	0	0	1	1	1	1	1	1	1	7	High
Evans (2015)	1	0	1	1	0	1	1	1	1	7	High
Faulkner (2011)	1	0	1	1	0	1	1	1	1	7	High
Gainforth (2016)	1	0	1	1	0	1	1	1	1	7	High
Gebel (2011)	0	0	1	1	0	0	1	0	0	3	Low
Grunseit (2015)	0	1	1	1	0	1	1	1	1	7	High
Jo (2010)	1	0	1	1	0	1	1	1	1	7	High
Huhman (2010)	1	1	1	1	1	1	1	1	1	9	High
Kamada (2013)	0	1	1	1	1	1	1	1	1	8	High
Kamada (2015)	1	1	1	1	1	1	1	1	1	9	High
King (2013)	0	1	1	1	0	0	1	1	1	6	Medium
Leavy (2013)	1	1	1	1	0	1	1	1	1	8	High
Leavy (2014)	1	1	1	1	0	1	1	1	1	8	High
Reininger (2015)	1	1	1	1	1	1	0	1	1	8	High
Rogers (2013)	1	0	1	1	0	1	1	1	1	7	High
Sharpe (2010)	1	1	1	1	1	1	1	1	1	9	High
Van Acker (2012)	1	0	0	1	0	1	1	1	1	6	Medium
Verheijden (2012)	1	0	1	1	0	1	1	1	1	7	High

2.7. Figures

Figure 2.1. PRISMA flow diagram



Chapter 3. Study 2: Examining Implicit Cognitions in the Evaluation of a Community-wide Physical Activity Campaign

This paper is accepted: Yun, L., & Berry, T. R. Examining Implicit Cognitions in the Evaluation of a Community-wide Physical Activity Program. *Evaluation and Program Planning*.

3.**1. Background**

3.1.1. A Community-wide Media Campaign

Media campaigns to promote health behaviors such as physical activity have been applied to try to reach a large number of people to disseminate policy initiatives, increasing the importance of issues about the behavior and changing social norms among members of society (Abroms & Maibach, 2008; Cavill & Bauman, 2004; Finlay & Faulkner, 2005). Recent media campaigns have included a variety of media delivery platforms including traditional media channels as well as online social media (Abroms & Maibach, 2008; Maibach, 2007). The diversification of media communication channels has changed the notion of "mass media communication", which can possibly influence the effectiveness of media campaigns (Valkenburg, Peter, & Walther, 2016). Traditional mass media communication referred to delivering uniformed production to uniformed and anonymous mass audiences via mass media channels such as radio, television, and magazines (Valkenburg et al., 2016). The advent of the Internet and social media channels, however, changed the notion of mass media communication to be more personalized. Recent media campaigns have included a variety of media delivery platforms and channels beyond traditional media channels (e.g., TV, radio, billboards, print media) to now include the World Wide Web and multiple types of social media such as

Facebook, Instagram, and Twitter, which enable interpersonal interaction between campaign producers and receivers.

3.1.2. Evaluation of Community-wide Media Campaigns - The Hierarchy of Effects Model

An evaluation of a community-wide media campaign is the systematic assessment of its effects that provides information to identify whether the campaign has achieved its goals and how to improve its effects (Valente, 2001). Community-wide campaigns are implemented in a broadly defined population under a real world setting; thus, the focus of the outcome evaluation is to test the effectiveness of the campaign (Flay et al., 2005). Evaluating the effectiveness of the intervention can provide evidence to determine whether the expected outcomes, from short- to long-term are achieved (Cavill & Bauman, 2004). Recent reviews support the idea that media physical activity campaigns are effective in changing proximal outcomes, i.e., awareness of campaign brands and messages whether they are assessing the effectiveness of a single mass media component alone (Brown et al., 2012) or with other components such as support groups, self-help packages, or community events (Leavy et al., 2011). However, the campaign effects of changing cognitive and behavioral factors in an intended direction have declined increasingly when the outcomes move from proximal to distal levels (Cavill & Bauman, 2004; Brown et al., 2012; Levay et al., 2011). What remains unexamined is how increased awareness of the campaign can influence positive changes in cognitive determinants of behavior among target audiences as well as how these changes can be sustained to make distal behavioral level of change (Finlay & Faulkner, 2005). Previous review has also highlighted the need to understand the feature of media effects and appropriate measures to assess the campaign outcomes (Yun, Ori, Lee, Sivak, & Berry, 2017).

As community-wide campaigns continue to grow in scope and apply multi channel communication actions as well as interpersonal supports, the task of evaluating interventions becomes increasingly complicated; thus, a theory-based approach is needed as a way to deal with this complexity and define the scope of the evaluation (Grembowski, 2016; Hornik, 2002). Applying a theoretical framework in the evaluation can help increase the accuracy and objectivity of judgments about the campaign success and unintended consequences (Hornik, 2002; Michie, van Stralen, & West, 2011).

One theoretical framework called the "hierarchy of effects model (HOEM)" has been widely applied in the evaluation of community-wide media campaigns as it provides a road map of hierarchical sequences of individual level changes from short- to long-term (Cavill & Bauman, 2004). The HOEM was originated from McGuire (1984)'s communication/persuasion matrix that incorporates communication input resources (source, message, channel, receiver, and target factors) and intended communication outcomes. Communication outcomes are described in sequence, i.e., being exposed to the new information in the campaign, attention to the information presented, storage of the new information and attitude change, translating the new attitude into a behavioral response, making a decision to act on it, and finally performing the appropriate action. The HOEM distinctively portrays the communication outcomes that McGuire's propose into a hierarchical level from the proximal to distal (Cavill & Bauman, 2004). The model assumes that campaigns are primarily meant to increase awareness, such as the perception of the campaign brand and understanding of key messages, categorized as proximal variables. The next level of change includes cognitive and affective variables related to the message, such as knowledge of a target behavior, attitudes, and beliefs, self-efficacy, and intentions to perform the behavior. These variables are also called mediators or intermediate

causal variables, given that they are positioned between proximal variables and distal behavioral factors. The final distal level of change includes behavioral trialing and maintenance of the change. What the HOEM emphasizes is that behavioral change is not the only significant or measurable outcome of a campaign; rather, a positive change in any of the antecedent (both proximal and intermediate) variables is sufficient to identify the effectiveness of the campaign. It is, therefore, critical to identify whether the communication activities have any impacts on raising awareness of the intervention and changing beliefs and attitudes toward the behavior (Bauman, Smith, Maibach, & Reger-Nash, 2006; Cavill & Bauman, 2004).

The HOEM has been applied in the evaluation of population or community-wide mass media campaigns to promote physical activity (e.g., VERB in the United States; ParticipACTION in Canada). The findings from evaluations of the VERB campaign demonstrated that increased awareness was the key proximal effect associated with improved attitudes and beliefs, which ultimately led to behavior change in the target population (Bauman et al., 2008; Price, Huhman, & Potter, 2008). ParticipACTION evaluation research also illustrated that campaign awareness was associated with intermediate variables such as outcome expectations and attitudes, which played a mediating role between awareness and physical activity behavior (Craig et al., 2009; Craig et al., 2015; Gainforth et al., 2016). Overall, the HOEM has been suggested as a useful framework for examining individual-level changes resulting from campaign exposure. Yet, little is known about how to refine campaigns to affect proximal and intermediate antecedents that lead to behavior change. Furthermore, challenges in measuring individuals' cognitive changes that predict behavior have been reported (Yun, Ori, Lee, Sivak, & Berry, 2017). The following section describes the two major factors: 1) awareness as a proximal factor and 2) attitudes as an intermediate factor examined as a part of campaign

evaluation and how these constructs have been understood and what challenges have been reported in order to measure the constructs.

3.1.2.1. A Proximal factor in the HOEM - awareness

The role of the brand awareness has conventionally been discussed in marketing literature where it has been often used to predict consumer behavior (Keller, 1993; Laurent, Kapferer, & Roussel, 1995). Brand awareness is the salience of the brand and ease in recognizing the brand name stored in memory (Percy & Donovan, 1991; Romaniuk, Sharp, Paech, & Driesener, 2004). Keller (1993) defined the term "brand awareness" as two different dimensions, brand recognition and brand recall (Keller, 1993). Brand recognition refers to a consumer's ability to identify a brand when given the brand name as a clue, while brand recall is defined as a consumer's ability to recall a brand when given the product category (Keller, 1993). Brand recall is the first thing to come to the mind when the category is cued as it is saliently stored in respondents' memories. Conversely, brand recognition only requires consumers to report the recall when the brand is seen or heard previously (Du Plessis, 1994; Lu, Chang, & Chang, 2014). In other words, brand recall requires less cognitive effort to retrieve it from memory. Laurent et al. (1995) developed different brand awareness measures: spontaneous, top of mind, and aided awareness. Spontaneous awareness is unprompted recall of the brand name in response to the product category cue; it is measured by asking consumers, without any prompting, to name the brands they know in the product category. Top of mind awareness is the first brand recalled, which is measured using the same question of measuring spontaneous awareness. Aided awareness is recognition of the brand name when prompted (Laurent et al., 1995).

Awareness of the brand can influence subsequent cognitive and behavior change. Consumers have a strong tendency to use brand awareness as a heuristic when choosing a

product, and they are more likely to show positive attitudes toward the advertisement of the product when the level of brand awareness is high (Macdonald & Sharp, 2000). This would, in turn, affect consumers' willingness and intention to buy the product as the advertisement intended (Lu et al., 2014). The awareness of the brand has also been discussed as the most comparable short-term outcome of mass media campaigns (Bauman & Chau, 2009; Cavill & Bauman, 2004; Leavy et al., 2011). Whether the campaign awareness, either prompted (or aided) or unprompted (or unaided), had any impacts on subsequent cognitive and distal changes comparing outcomes has been a common research question of the evaluation research (Leavy et al., 2011). Furthermore, previous research has revealed there are subtle but significant differences in campaign effects by the degree of the awareness. The evaluation of the obesity prevention campaign (called "Measure-Up") in Australia has support this argument by identifying higher level of knowledge about the targeted behavior among unprompted recallers than both promoted and no recallers (Grunseit, O'Hara, Chau, Briggs, & Bauman, 2015).

Challenges have also been reported when measuring awareness using self-reports. For example, it is difficult for researchers to measure the awareness of a particular campaign since there is normally more than one competing campaign related to the same health behavior (Leavy et al., 2011). Respondents are more likely to mention other campaigns that have been highly recognized for a long time, even if they have heard of a targeted campaign (bias of unprompted awareness). Furthermore, when respondents are provided with a description of advertisements and asked if they have heard about a health promotion campaign, the responses are more likely to be biased by social desirability (bias of prompted awareness, Van de Mortel, 2008). Health-related research often covers socially sensitive topics and responses may be biased toward what is socially acceptable, e.g., incorporating physical activity into daily life to enhance health status

(Sudman, Bradburn, & Schwarz, 1996). Consequently, people are more likely to answer that they have heard about the campaign even though they have not (Kelly, Hoehner, Baker, Ramirez, & Brownson, 2006). Overall, measuring campaign awareness using either technique is problematic: unprompted recall may produce results that are underestimated and prompted recall may lead to overestimated results.

Meanwhile, dual processing theorists contend that human behavior is also determined by cognitions that cannot be measured by self-report questionnaires (Gawronski & Bodenhausen, 2006; Sheeran, Gollwitzer, & Bargh, 2013). The main argument is that automatic and unconscious cognitions guide human behavior and these cognitions cannot be measured if the measurement requires respondents' cognitive metal processes to respond to the question or stimuli (Gawronski & Bodenhausen, 2006). The importance of incorporating automatic cognitions in the outcome evaluation of physical activity campaigns is described later in this chapter.

3.1.2.2. An intermediate factor in the HOEM - attitudes

The concept of attitude was initially viewed as favorable or unfavorable predispositions that individuals hold when they evaluate objects or issues (Petty, Brinol, & Priester, 2009). As attitude is presumed to influence behavior, the success of media campaigns has been determined based on whether messages mediated via communication channels are effective in changing the attitudes in the desired direction. Nevertheless, a significant amount of evidence has shown that modified attitudes of the recipients due to the exposure of the campaign messages have failed to influence their behaviors as the campaign advocates. The weak and inconsistent relationship between attitude and behavior led social psychologists to seek to answer how attitudes are actually formed and how they need to be measured (Ajzen, 2001; Ajzen & Fishbein, 2000).

Ajzen and Fishbein (2005) revealed attitude measures could be systematically biased when the measure requires verbal representation, e.g., self-report questionnaires. Respondents are likely to respond to the attitudes questionnaires to be evaluated as a normal and rational person, rather than respond based on the true attitude they hold (Ajzen & Fishbein, 2005). Furthermore, recent psychologists have revealed that beliefs that are readily accessible at any given moment in memory among all beliefs about an object influence attitudes (Ajzen & Fishbein, 2000). Attitude is also considered as the outcome of two different routes of processing; attitudes are formed based on individuals' subjective values of the attributes that the object holds "in a spontaneous manner" or based on "careful and effortful consideration" toward the issue before making a decision (Howe and Krosnic, 2017). For example, when individuals take a habitual or impulsive behavior they do not actively and deliberately consider all relevant information to evaluate the object or issues, but cues in the environment majorly trigger them to take action. Attitudes vary in their strength; only strong attitudes affect individuals' thoughts, intentions, and behavior (Howe & Krosnic, 2017).

In sum, individuals' attitudes are cognitions that individuals can control and consciously aware but also automatic predispositions that they may not be aware or not able to control. If only measuring attitudes that require individuals conscious and controlled processing of information such as self-report questionnaires, information of attitude formation via automatic processes will be missed. The next section will describe dual-processing theories, which propose that human behavior is influenced by two different route of mental processing when exposed to a stimulus in the environment. This will help us to understand the importance of incorporating the outcome measure of automatic cognitions, "attentional bias" and "implicit attitudes," in the evaluation of a community-wide campaign.

3.1.3. Dual-processing in Health Behavior

Dual process theorists assume human behavior as an outcome of two routes of mental processes either operated automatically or in a controlled way (Sheeran et al., 2016). Automatic processes are generally characterized as elicited "unintentionally," requiring few cognitive resources. Conversely, controlled processes are characterized as those that are initiated intentionally, requiring considerable amounts of cognitive resources (Moors & De Houwer, 2006). These controlled processes operate within the conscious awareness and, therefore, they can be stopped voluntarily (controllable) whereas automatic processes are uncontrollable as they occur outside of conscious awareness. Dual processing theories applied in social psychology research involve combinations of those features rather than conceptualized in an all-or-none fashion (Gawronski & Creighton, 2013).

Among many dual-process models that have been applied to understand social information processing, Gawronski and Bodenhausen (2006)'s associative and propositional evaluation (i.e., APE) defines two distinct information processes that explain individual attitude change, i.e., associative and propositional processes. First, individuals construct attitudes toward stimuli via associative processes when a situational or contextual cue automatically triggers preexisting structure of associations in the memory (Gawronski & Bodenhausen, 2006, 2011). The outcome of associative activation processes generally provides a basis for evaluative judgments about the object. Associative activation processes do not require much cognitive capacity and are independent of the validation of truth. In other words, individuals evaluate an object irrespective of whether these evaluations are accurate or inaccurate. On the other hand, propositional processes require individuals to transform inputs from the associative store into a propositional format. Propositional processes require individuals to validate the truth and the

consistency of this proposition with other relevant propositions for a respective judgment (Gawronski & Bodenhausen, 2006, 2011).

In the APE model, cognitive elaboration, the degree of active thought focused on an attitude object, is a parameter of attitude change (Gawronski & Bodenhausen, 2006, 2011). Individuals form or modify attitudes based on how many judgment-relevant propositions (cognitive elaboration) one considers in addition to one's automatic affective reaction. Evaluation of an object is dependent on associative processes when there is no or low level of cognitive elaboration; the outcome of automatic affective processes is called "implicit attitudes." Otherwise, propositional processes dominate evaluation processes when there is a high level of cognitive elaboration (constructing "explicit attitudes"). The APE model explains the relationship between explicit and implicit attitudes based on the information added via cognitive elaboration. The correlation between explicit and implicit attitudes is reduced when increased cognitive elaboration provides additional information that does not confirm the validity of one's automatic affective reaction. Once cognitive inconsistency between implicit and explicit attitudes is recognized, an individual is likely to change the truth-value of one proposition or find an additional proposition to resolve the inconsistency to evaluate an object or issue. On the other hand, the explicit and implicit attitudes are highly correlated when additionally considered propositions confirm the validity of one's automatic affective reaction. The consistency between the implicit and explicit attitudes will be used for future judgments and behavior decisions.

The APE model is different from other dual processing theories in that the model does not propose that associative affective reactions are entirely unconscious. Rather, the model assumes individuals generally have some degree of conscious access to their automatic affective reactions. Therefore, once individuals are instructed to focus on their introspective feelings to

make an evaluative judgment, the correlations between explicit and implicit attitudes significantly increased (Gawronski & Bodenhausen, 2006). Differences between attitudes from associative and propositional processes are not about (un)consciousness of the attitudes, but the consideration of validation for an evaluative judgment.

The APE model can be useful in explaining the effects of media campaigns because it proposes how implicit attitudes might be affected, for example, through a change in pattern activation that occurs when a situational or contextual cue influences activation of associations for something that is already stored in memory (Gawronski & Bodenhausen, 2006). As these associations may be created by exposure to media advertisements to encourage physical activity, the success of a physical activity campaign may depend on its effectiveness in strengthening positive automatic associations toward physical activity among targeted community members. Other theorists have argued that situational representations of these experiences are stored in memory as cognitive and affective states when individuals perform health-relevant behaviors (Papies, 2016a, 2016b; Papies, Barsalou, & Press, 2015). When cues are encountered in the environment, they trigger situational representations, which can make conscious reasoning or long-term goal pursuit less accessible and less influential on behavior. From this perspective, campaign components can serve as environmental cues and are more likely to be successful if they help participants form a situated conceptualization in memory, any element of which may be activated on later occasions and affect behavior. This indicates that such cues do not affect behavior directly, but rather by accessing cognitive structures that have been formed by previous experiences in similar situations more easily and readily, and lead to perform the behavior (Papies & Barsalou, 2015; Papies, 2016a). In other words, interventions (including campaigns) for health behavior change can serve as environmental cues and are more likely to be successful

if they help participants form a situated conceptualization in memory, any element of which may be activated on later occasions and affect behavior.

3.1.4. Implicit Cognitions in the Evaluation Framework

Dual processing theories suggest that human behavior is an outcome of not only propositional and deliberative processes but also associative and automatic processes based on spontaneous associations automatically activated in memory. Based on this premise, measuring implicit cognitions is expected to help researchers and practitioners to evaluate the outcomes of media campaigns. The present thesis study specifically measured two distinct implicit cognitions, "attentional bias" and "implicit attitudes," in order to identify how campaign advertisements are noticed and how information in the messages is processed, which is critical in identifying campaign effects. As most of the research in this area is experimental, the present study is the first application of automatic processes in a real world setting, which has been shown to be valid and reliable when administered over the Internet to a large group of the population (Nosek, Banaji, & Greenwald, 2002).

3.1.4.1. Attentional bias

Concept. Attentional bias is the tendency to allocate attention toward cues stored in memory that match one's interest, at the expense of other stimuli in the situation (Moors, 2016). Or, once committed to pursuing a goal, individuals are responsive to cues relevant to those goals with the expectation of potential emotional and cognitive outcomes (Field & Cox, 2008). In other words, stimuli in environment activate an automatic selection of information based on ones' interests, goals, and needs. Previous research has supported the idea that automatic attention for cues associated with the intervention leads to an implicit preference for the cues, which, in turn,

provide an opportunity to perform the behavior. For example, addictive behavior or substance use, such as smoking and drinking has been predicted by attentional bias such that smokers (or heavy drinkers), compared to non-smokers (non-alcoholic), showed attentional bias for cues relevant to their addictive behaviors (Bradley, Field, Mogg, & De Houwer, 2004; Field & Cox, 2008). Researchers have also found exercisers showed attentional bias for exercise related stimuli, whereas nonexercisers showed attentional bias for the stimuli related to a sedentary lifestyle (Berry, 2006; Calitri, Lowe, Eves, & Bennett, 2009). This is because schemas, referred as representations of situations, conditions, consequences one holds from past experiences of doing behaviors repeatedly, lead to greater processing of domain-specific information, and to perform the behavior congruent to schematic information (Strack & Deutsch, 2004). This supports the idea that examining automatic allocation of attention may be important in determining the success of physical activity campaigns. If campaign cues (e.g., brand logos, keywords) attract the attention of the target audience, this provides an opportunity to automatically retrieve evidence related to the behavior and ultimately affect behavior as the campaign promotes.

Measurement. Attentional bias can be measured by computer tasks that require automatic and unconscious processes. This is different from awareness cognition in that awareness measured using self-reported prompted or unprompted questionnaires requires individuals' controlled or intentional processes. In other words, attentional bias is a similar but independent cognition of awareness and therefore, provides additional information when evaluating the campaign effects. The current study applied a visual dot-probe task (MacLeod, Mathews, & Tata, 1986) to measure attentional bias toward the stimuli relevant to the physical activity campaign. In this task, two stimuli, one topic-related and one generic, are shown briefly and

disappear on each trial, followed by a probe that replaces either of the stimuli. Participants are required to respond as fast as possible to indicate where the probe appears. Response latencies on the dot-probe task are considered as the allocation of participants' attention, with faster responses to probes presented in the attended relative to the unattended location. In other words, attentional bias is revealed when participants are faster to respond to probes that replace topic-related than neutral stimuli. Previous research confirmed the reliability of the dot probe task (Bar-Haim et al., 2010).

A dot probe task was selected in the present study as it has several advantages over other measurement tools (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & Van Ijzendoorn, 2007). First, a dot probe task is advantageous over a Stroop task (MacLeod, 1991). In the Stroop task, participants are required to name the color that words are printed in the difference in color-naming task between word-printed color congruent (e.g., the word "yellow" printed in yellow) and incongruent (e.g., the word "yellow" printed in blue). If respondents' response in color-naming task is slower in stimuli related to physical activity than in generic stimuli, they are considered to have attentional bias toward physical activity. However, the Stroop task has been criticized because delayed response latencies with topic-related stimuli could be due to late processes unrelated to attention. Whereas, in the dot probe task, delayed latencies result from response bias or general arousal because respondents are required to respond to the probe, which is a neutral stimulus. In addition, a dot probe task is a manipulation of the time interval between presentation of the stimuli and presentation of the probe. It can be concluded that the latency time and response accuracy is evidence of respondents' attentional bias toward the target because it measures whether respondents have automatic connection with the topic-related stimulus or a difficulty to disengage from it (Bar-Haim et al., 2007; MacLeod, Mathews, & Tata, 1986).

Dot probe task is also advantageous over eye tracking technology, measuring eye movements in order to provide a continuous measure of attentional selection performed via eye movements (Armstrong & Olatunji, 2012). The use of eye-tracking requires a controlled laboratory setting; therefore, it is not feasible for campaign evaluation studies that requires a large and representative sample. Therefore, the present study selected a visual-dot probe paradigm as a measure of attentional bias toward the campaign stimuli. Implementation of an online visual-dot probe task allows for measuring attention bias from a large sample of the target population.

3.1.4.2. Implicit attitudes

Concept. Implicit attitudes are defined as attitudes toward stimuli via associative processes when a situational or contextual cue automatically triggers preexisting structure of associations in the memory (Gawronski & Bodenhausen, 2006, 2011). Implicit attitudes in the current study are similar to the concept of automaticity in that they share several functional properties, e.g., effortless, goal-independent, and uncontrollable (Bargh, 1992). Individuals do not require much cognitive capacity or an intention when they evaluate an object via associative activation processes (effortless). They cannot control the automatic cognitive processes (uncontrollable). Therefore, outcomes of the automatic cognitive processes reflecting implicit attitudes do not necessarily ”unconscious” from individuals’ awareness. This study contrasts with implicit attitudes to explicit attitudes that are compatible with the fast-learning system and can change quickly (Kahneman, 2003) and often require some degree of deliberative reasoning to process information that are available in memory (Fazio, 1990), reflective and dependent on the consideration of truth values (Gawronski & Bodenhausen, 2006; Strack & Deutsch, 2004).

Previous research showed that people who were positively predisposed toward physical activity (holding positive implicit attitudes toward physical activity) reported higher levels of physical activity than inactive counterparts. Calitri et al. (2009) reported that higher levels of physical activity were associated with positive implicit attitudes and attentional bias towards exercise cues. Conroy, Hyde, Doerksen, and Ribeiro (2010) found implicit attitudes positively predicted unplanned physical activity even after controlling for explicit attitudes towards and intentions to perform the behavior. Markland, Hall, Duncan, and Simatovic (2015) examined the effects of exercise imagery on implicit attitudes toward exercise and found that pleasant exercise imagery led to more positive implicit attitudes toward exercise than a comparison imagery. Furthermore, exercise status was positively associated with implicit attitudes, with more positive attitudes for more frequent exercisers (Markland, Hall, Duncan, & Simatovic, 2015). In short, previous studies highlight the importance of measuring implicit attitudes in relation to physical activity interventions. Incorporating implicit attitudes in the campaign evaluation framework can provide information about the media campaign effects such as how exposure to a media campaign can strengthen automatic associations, independent of self-report responses.

Measurement. A variety of different implicit measurement techniques have been developed to measure implicit attitudes (Fazio & Olson, 2003). A common feature of these measurements is that they all seek to provide an estimate of the construct of interest without having to directly ask the participant for a verbal report. Measurement also involves priming procedures to assess what is automatically activated from memory without respondents' control (Nosek & Banaji, 2001). Therefore, these indirect measures are likely to be free of social desirability concerns.

The Go/No-Go Association Task (GNAT) was selected in this study to measure implicit attitudes. The GNAT assesses the strength of association between a target category and two valences of an attribute dimension (Nosek & Banaji, 2001). Individuals are asked to press the space bar in a keyboard to items that belong to a given category and a particular evaluative attribute (referred as "go" response). When items appear that do not belong to the given category and attribute, they are required not to press any key, referred as "no-go" response. The extent to which the target category and attribute comprising the signal are associated determines sensitivity. This sensitivity between pairing conditions reflects the association between the concept and evaluation. If there are fewer errors when categorizing physical activity relevant stimuli with positive attributes than with negative attributes, this indicates a respondent holds positive implicit attitudes toward physical activity.

The GNAT is flexible in the contextual characteristics of the evaluative situation as well as relatively independent compared to other implicit measurement tasks such as Implicit Association Test (IAT). IAT compares the relative strength of the association between a target concept (e.g., physical activity) versus a comparison concept and favorable versus unfavorable valence. Respondents with more unfavorable attitudes toward physical activity than comparison concept possessed stronger automatic associations of "physical activity" with "favorable" than with "unfavorable." In other words, the IAT only measures the relative strength of associations (the relative liking or disliking of a respondent's attitudes toward the two compared target objects but not their absolute favorableness, Brunel, Tietje, & Greenwald, 2004). The IAT is not appropriate when there is no contrasting target concept and researchers want to measure an attitude toward a single object. The GNAT was, therefore, found to be more appropriate in the

present study, which examines implicit attitudes toward a single target concept (i.e., physical activity) without having a directly related contrast category.

Various physiological approaches have also been employed as implicit measures of attitudes. For example, facial electromyography (EMG) and functional magnetic resonance imaging (fMRI) have been applied to examine implicit attitudes and prejudice toward race (Hart et al., 2000; Vanman, Paul, Ito, & Miller, 1997). Cardiovascular reactivity measures have been employed to examine implicit attitudes with blacks and other stigmatized individuals (Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001). Measuring physiological responses, however, requires devices that can only be applicable in a laboratory-based setting. The GNAT can be implemented web-based research that allows participants to complete the task any place they desire. Furthermore, the GNAT has been found to be reliable and valid in previous studies (Houben & Wiers, 2008; Nosek et al., 2002); therefore, it was selected in this campaign evaluation research.

3.1.5. Purpose Statement

The purpose of this study was to evaluate the effects of a community-wide physical activity campaign, UWALK. Guided by the HOEM, which portraits the media campaign outcomes from the proximal to intermediate and ultimately to distal level (Cavill & Bauman, 2004), the study examined whether proximal awareness of the campaign brand was associated with attitudes toward physical activity. Furthermore, the study incorporated measures of attentional bias and implicit attitudes with the addition to self-reported measure of awareness and explicit attitudes. Human behavior is the outcome of not only conscious and propositional processes based on validation of the truth (i.e., explicit attitudes) but also unconscious and associative processes based on spontaneous associations automatically activated in memory (i.e.,

impicit cognitions). If media components serve as environmental cues to trigger automatic attention, it will ultimately provide an opportunity to process the information in the message and associate it with schematic information stored in memory. Furthermore, examining whether the campaign has been effective in strengthening automatic associations between physical activity and the attributes stored in long-term memory and leading to subsequent propositional processes will provide additional information when evaluating a community-wide media physical activity campaign.

3.1.6. Hypotheses

Based on the HOEM and dual-processing theories (APE model in the present study), five hypotheses were tested. H1: It was hypothesized that those who showed unprompted awareness of UWALK would show attentional bias toward UWALK-relevant stimuli. H2 & H3: those who showed unprompted awareness of UWALK would show positive implicit attitudes toward UWALK-relevant stimuli (H2) as well as positive explicit attitudes toward physical activity (H3). H4: leisure time physical activity would be higher among participants who were aware of UWALK compared to those who were not. H5: awareness, attentional bias, and attitudes (both implicit and explicit) would add to the predicted variance of leisure time physical activity.

3.1.7. Context: UWALK

UWALK is a multi-strategy, multi-sector, and community-wide physical activity brand in the Canadian province of Alberta (Jennings et al., 2016). A partnership between the Government of Alberta and the Faculty of Physical Education and Recreation at the University of Alberta was initiated in 2012; funding from the government ($2.2 million CAD) was committed to the University to develop and implement a population-level health promotion campaign. UWALK

was officially launched on April 2013 and ceased in March 2016. The aim of UWALK was to encourage individuals to use activity-monitoring devices (e.g., pedometers, smart phone applications) and to track their activities by registering the UWALK website. The development and evaluation of UWALK was guided by a Community Advisory Board and a Research Evaluation and Advisory Board. For the effective implementation of the campaign, partnerships with key stakeholders including municipal providers, communities, libraries, workplaces, and private corporates. Existing physical activity promotion programs in the communities were also supported to deliver a variety of UWALK activities.

Marketing and communication strategies were also employed to increase the awareness of the UWALK brand and to deliver physical activity messages. This focused on branding and messaging through various promotional materials (e.g., videos, posters, banners, SWAGs including hoodies, t-shirts, hats) and mass media (e.g., TV, radio, billboards) and social media campaign advertisements (e.g., Facebook). Marketing material ended with the call to action to register on the UWALK website to track and monitor activities and possibly engage in challenges with other users. The expected outcomes include increased awareness of the UWALK brand, knowledge about and favorable attitudes toward physical activity, and ultimately increased physical activity participation among Albertans.

3.2. Methods

3.2.1. Sample

A convenience sampling strategy was applied to recruit the study participants. Participants ($N = 127$) were recruited from UWALK when they registered with the campaign ($N = 88$) and from communities in Alberta ($N = 39$) using posters, Facebook advertisements, and e-

mails. Those recruited through UWALK were newly registered UWALK participants who had very limited engagement with UWALK at the time of participation in this study.

3.2.2. Experiment Procedure

When the experiment began, participants first reported their unprompted awareness of UWALK followed by their prompted awareness. Then, they completed the visual dot probe task to measure attentional bias and the Go/No-go task (GNAT) to measure implicit attitudes. Next, they watched a 30-second UWALK video, "UWALK in your community" (available at https://uwalk.ca/resources/videos/). After watching the video, they did the thought listing task followed by self-report questionnaires about attitudes toward walking (explicit attitudes), participation of physical activity during leisure time and demographics. The experiment was developed and presented using Inquisit 4.0 software.

3.2.3. Measures

Unprompted and prompted awareness. Unprompted awareness of UWALK was assessed with the question: "Are you aware of any programs or campaigns that promote walking or physical activity in Alberta? If yes, name the programs or campaigns." The question, "Have you ever heard of UWALK Alberta?" measured prompted awareness of UWALK. These questions were derived from previous similar evaluations (Craig et al., 2015; Spence et al., 2009).

Attentional bias. Participants completed a dot probe task to measure attentional bias toward UWALK images. In the task, two types of images, ten images related to UWALK (e.g., the UWALK logo) and ten images related to HealthyU (a comparison campaign also sponsored by the government of Alberta which promoted physical activity and healthy eating), were paired with each other. The Healthy U campaign was chosen because it was a comparable health

promotion campaign in Alberta in terms of presentation (e.g., drawings, no real people). This is similar to work done by others such as Field, Mogg, and Bradley (2004), in which images of smokers (e.g. a cigarette beside an ashtray) were paired with images that were matched as closely as possible but were not about smoking (e.g., a pen beside a bowl). Twenty filler images irrelevant either to UWALK or to HealthyU (e.g., desk) were paired as controls in the task. Each of the image pairs was presented for 500 milliseconds four times in a random order, twice with the UWALK relevant image on the left and with the UWALK relevant image on the right. When the image pair disappeared, a single dot probe appeared in the location that one of the stimuli occupied. Participants were instructed to respond rapidly by pressing one of the two keys marked "left (alphabet *E* on the keyboard)" or "right (alphabet *I* on the keyboard)" as quickly as possible to indicate where the probe was. The task was combined with two blocks: one practice block consisting of 20 trials and one test block consisting of 40 critical trials and 40 filler trials. Faster responses occur to probes that appear in the area on the screen to which a person attends (Ehrman et al., 2002). Therefore, response times served as the measure of attentional bias such that a faster response when the probe is behind the UWALK images (UWALK congruent) compared to the HealthyU images (UWALK incongruent) indicates attentional bias toward UWALK. All images used in the dot probe task is illustrated in the Appendices.

Implicit attitudes. A "Go/No-go" task (Nosek & Banaji, 2001) was used to measure implicit attitudes. This task is designed to measure categorization mistakes made when asked to respond to a given stimulus as quickly and accurately as possible. Four types of words were presented: nine words each related to UWALK (e.g., walking, steps, move), control words matched for length and frequency of use to the UWALK words (e.g., wrapping, identify, shrub), good (e.g., enjoyable, healthy, important) and bad (e.g., boring, unhealthy, unimportant). There

were 36 practice trials and four blocks of 36 test trials each (144 total test trials). The categories in the blocks were “UWALK and good,” “UWALK and bad,” “Generic and good”, and “Generic and bad.” Participants were reminded of the word stimuli that belonged to each category before starting the next block and the category labels were presented on the screen throughout each trial. Block order was counter-balanced and stimuli were randomly sequenced in equal ratios and presented in the center of the screen. Participants were instructed to hit the spacebar as fast as they could to categorize words that belong to a target category, or to ignore the word if it does not belong to the category. A green “O” appeared in the center of the screen after correct responses whereas a red “X” appeared after incorrect responses. The length of time the words were presented was 500 msec. Sensitivity to categorizing the stimuli in the block when “UWALK” and “good” were paired and when “UWALK” and “bad” were paired was calculated according to criteria outlined by Nosek and Banaji (2001). Positive implicit attitudes toward UWALK was determined if there were fewer errors when categorizing UWALK and good (i.e., d’ good) than when categorizing UWALK and bad (i.e., d’ bad).

The reliability of the measures was assessed prior to the current study. A sample of participants ($N = 111$), independent of those recruited for the UWALK evaluation, completed the GNAT and the visual dot probe tasks twice: once online and once in a lab setting, with random assignment of the session participation; therefore, half of the participants completed the online session first and the other half of the participants completed the lab session first. The result of two repeated measures analysis of variance showed that there were no significant differences ($p > .15$) between the response data collected at the lab and the online data for either task. The intra-class correlations were between .56 and .87 within the same category of the GNAT tasks indicating good reliability and suitability for use in the present UWALK evaluation.

Several validity studies of Implicit Association Tasks, of which the GNAT is a variant (e.g., Brunel, Tietje, & Greenwald, 2004; Nosek, Greenwald, & Banaji, 2005; Nosek, Hawkins, & Frazier, 2011), showed the that while implicit and explicit constructs are correlated which allows interpretation of the measures as assessing a common core construct (convergent validity), but both measures are distinct and that implicit measures can provide information to uniquely predicts behavior (discriminant validity).

Thought listing. Participants were asked to list up to five thoughts they had while watching the UWALK video in an open-ended format.

Explicit attitudes. Attitudes toward walking behavior were measured using seven point bipolar adjective scales, preceded by the statement "For me, walking regularly is…" as suggested by Ajzen (2002). Four out of eight items were related to instrumental attitudes (i.e., "beneficial – harmful," "valuable – worthless," "healthy – unhealthy," "important – unimportant") while the other four were related to affective attitudes (i.e., "pleasant – unpleasant," "good – bad," "enjoyable – unenjoyable," "pleasurable – painful"). Items were scored such that high scores indicate more positive attitudes toward physical activity. All of the explicit affective and instrumental attitudes exhibited acceptable internal consistency ($\alpha > .70$).

Leisure time physical activity (LTPA). The Godin Leisure Time Exercise Questionnaire (Godin, 2011) was used to estimate LTPA. Self-reported weekly frequencies of strenuous, moderate, and mild activities were multiplied by their estimated value in Metabolic Equivalents (METs; nine, five, and three respectively), and total weekly LTPA was calculated by adding the products of the separate components.

Demographics. Participants reported their gender, age, education, individual income and marital status.

3.2.4. Analysis

Regardless of how participants were recruited, those who named UWALK without prompting were categorized into the "UWALK aware" group whereas those who did not formed the "UWALK unaware" group. Prior to calculating reaction time and errors for attentional bias and implicit attitudes, extremely fast (<250 millisecond) responses were removed because it is very difficult to respond fast and generally an error. Also, responses slower than 1000msec were also removed as it means participants are not paying attention to the tasks. Errors excluded for the final analysis were less than 5% of the total responses.

The relationship between awareness and attentional bias was tested using a repeated measures analysis of variance test (RM ANOVA) with UWALK awareness group as the between-subjects factor and reaction time for UWALK-probe congruent compared to HealthyU-probe congruent as the within-subjects factor (testing H1). The relationship between awareness and implicit attitudes was tested using a RM ANOVA with UWALK awareness group as the between-subjects factor and d' good and d' bad as the within-subjects factor (testing H2). The differences in explicit attitudes by UWALK awareness group were tested using two independent t-tests, one with affective attitudes as dependent variable and the other with explicit instrumental attitudes as dependent variable (testing H3). The difference in physical activity participation in UWALK awareness groups was also tested using an independent t-test (testing H4).

A hierarchical linear regression was applied to test the relationship among factors in the HOEM with physical activity behavior regressed onto attentional bias, awareness, implicit attitudes, and explicit attitudes (testing H5). Attentional bias toward UWALK and UWALK awareness group was entered in the first and second step respectively. Implicit and explicit attitudes toward physical activity were entered in the third step. As there were multicollinearity

issues between explicit affective and instrumental attitudes and neither of the variables was significant, these variables were combined for the regression analysis by computing the mean of the two. To test possible moderating effects of awareness on the relationship between the attitudes and physical activity behaviors, the interaction terms (i.e., between UWALK awareness groups and attentional bias, implicit and explicit attitudes) were entered at the fourth step. All variables were mean centered and UWALK awareness group was dummy coded before calculating interaction terms for entry into the regression model.

The thought listing data were used to explore responses to the UWALK video and to determine if thoughts differed by awareness group. The coding framework was modified based on one used in similar research (Berry, McLeod, Pankratow, & Walker, 2013) and finalized with discussion between two investigators.

3.3. Results

Of the 127 participants who participated in the experiment, ten did not complete the dot probe task, seven did not complete the GNAT, and twelve did not complete the self-report questionnaires. Little's MCAR test showed data were missing at random (p = .63); some of these missing data were across the same participants, therefore, the missing values for 24 participants were replaced with the mean value. Of these 127 participants, 11 did not report their demographics. A Shapiro-Wilk's test (p >.05) showed that the LTPA scores were approximately normally distributed, with a skewness of 0.60 (SE = 0.23) and Kurtosis of -0.07 (SE = 0.45). For those who reported demographic information, 75% were female (N = 87) with a mean age of 40.53 years (SD = 13.26). Half of the participants completed undergraduate studies (N = 58) and the majority of the participants were married or living with a common law partner (N = 71, 61.2%). Participants' income level was relatively high; 47% of the participants' yearly income

greater than $ 80,000. There were significant differences between awareness conditions in age (aware $M = 43.46 \pm 12.49$ vs. unaware $M = 38.46 \pm 13.48$), t (114) = -2.05, $p = .04$, and gender $X^2 = 9.29$, $p = .002$, with more females than males aware of UWALK. Table 3.1 describes demographic characteristics of participants.

Fifty-four participants demonstrated unprompted awareness of UWALK, 52 from the UWALK recruitment group (thus, 41 % [$n = 36$] of the participants recruited from the UWALK website did not cite UWALK without prompting) and two community participants. When prompted, all participants recruited from the UWALK website and twelve participants from the community group were aware of UWALK (thus, 27 participants in the community group were not aware of UWALK even when prompted). There were 54 participants in the aware group and 73 in the unaware group for the following analyses.

3.3.1. Association Between Awareness and Attentional Bias and Awareness and Attitudes

The RM ANOVA examining differences in attentional bias showed a significant interaction between the awareness groups and the image congruency (UWALK-probe congruent vs. HealthyU-probe congruent), F (1, 125) = 9.09, $p = .003$, $\eta^2 = 0.07$. The main within-subject effect was significant, F (1, 125) = 6.80, $p = .01$, $\eta^2 = 0.05$, but not the main effect of between-subjects, F (1, 125) = 0.51, $p > .05$. A significant interaction between the awareness groups and the word type (d' good vs. d' bad) was also found, F (1,125) = 5.02, $p = .03$, $\eta^2 = 0.04$. The main within-subject effect was significant, F (1,125) = 182.29, $p < .001$, $\eta^2 = 0.59$, but not the main effect of between-subject, F (1, 125) = .04, $p > .05$. These results support the first and second hypotheses; participants who demonstrated unprompted awareness of UWALK showed attentional bias toward UWALK stimuli and a stronger automatic association with UWALK-related terms as good when compared to those in the unaware group. The means and standard

deviations for attentional bias reaction time (RT) and implicit attitude d' score for each group by type of stimulus are shown in table 3.2.

Table 3.3 shows the means and standard deviations for explicit affective and instrumental attitudes for each group. No significant group differences was found in explicit instrumental, t (125) = -1.28, p >.05, nor affective, t (125) = -1.22, p >.05, attitudes by awareness condition; therefore, the third hypothesis was not supported.

3.3.2. Association between Awareness and Physical Activity Behavior (LTPA)

There were differences in physical activity by awareness group, t (125) = -2.84, p = .005; respondents who were aware of UWALK reported higher LTPA (M = 48.34 ± 21.93) than those who were not aware of UWALK (M = 37.70 ± 20.04). As a further check, differences in LTPA between unprompted awareness groups were examined just among participants recruited from the UWALK website; respondents in the aware group (M = 49.53 ± 21.46) reported higher LTPA than those in the unaware group (M = 39.84 ± 19.11), t (86) = - 2.18, p = .03. The fourth hypothesis was, therefore, supported.

3.3.3. Testing of the HOEM

The correlations between predictors (i.e., attentional bias, awareness, implicit attitudes, explicit attitudes, and interaction terms) and the predicted variable (i.e., LTPA) entered into the regression model are presented in Table 3.4.

Tests to see if the data met the assumption of collinearity indicated that multicollinearity was not a concern after explicit instrumental and affective attitudes were entered as one construct (tolerance >.50 and VIF < 2.0 across all variables, see Table 3.5). The result shows that attentional bias significantly predicted LTPA and the first step of the model was statistically

significant ΔF (1, 125) = 8.73, p = .004. In the second step, awareness of UWALK significantly improved model fit, ΔR^2 = 0.03, and the model was statistically significant, ΔF (1, 124) = 4.61, p = 0.034. The model fit was improved in the third step, ΔR^2 = 0.08 and the model was statistically significant, ΔF (2, 122) = 5.97, p = 0.003. The coefficient of the implicit attitudes was significant (β = 0.24, p = 0.006), however, the coefficient of the explicit attitudes (p = 0.089) was not significant and entering implicit attitudes attenuated the effects of attentional bias and awareness. In the fourth block, none of the interaction terms were significant, and the model was not statistically significant, ΔF (3, 119) = 0.28, p >.05; therefore, the third model explained the most variance in physical activity (15.2%). Table 3.6 presents the final regression coefficients.

3.3.4. Thought Listing

The thoughts were firstly coded as physical activity-, UWALK campaign-, and video background-relevant. These were then, further specified as positive-, negative-, or neutral-valence and total valence was calculated by subtracting the number of negative thoughts from the number of positive thoughts. After the principal investigator created the codes, a second coder independently rated a random sample of 33% of the thoughts to check inter-rater reliability. The data demonstrated higher inter-rater reliability, kappa > 0.7, p < .05.

Out of 107 participants who completed the thought listing, 69 had more positive thoughts (e.g., “the music is catchy,” “cartoons made it easy to keep my attention,” “Walking is pleasant,” and “Love the thought of being able to see others step count or challenges”), 10 had more negative thoughts (e.g., “the music did not match the subject matter,” “I don't like that the people don't have faces,” and “It is aimed at city folk which doesn’t apply to me who I live in the country”) and 28 had the same number of positive and negative thoughts (e.g., “It is an animated video,” “assessing increase in physical activity using a pedometer,” and “physical activity for the

community") of which were categorized as the neutral valence group. There was no difference in the categorization of thought valence by awareness group, $X^2 = .04$, $p = .98$. Total number of thought valence was not also different by awareness group, $t\ (105) = -.20$, $p = .84$. The number of participants who provided more positive, negative, or neutral thoughts and the mean and standard deviation of the thought valence by awareness group are described in Table 3.7. Overall, respondents had positive responses to the video regardless of their awareness of UWALK.

3.4. Discussion

3.4.1. Summary of Findings

The present study evaluated a physical activity campaign, UWALK, applying the HOEM—a model that proposes a sequential chain of cognitive and behavioral effects. A novel contribution is the addition of measures of automatic associations as additional evaluation tools. It was found that those aware of the UWALK campaign without prompting had attentional bias for UWLK relevant stimuli. It is important to note, that even among participants recruited from the UWALK website, 41% did not cite UWALK when asked to name a campaign that promoted walking or physical activity. This is a critical point for evaluation research; physical activity promoters should not assume that visiting the campaign website does mean that the campaign is respondents' top of mind of or readily thought about. It is important to note that different level of campaign awareness affect subsequent cognitive and distal outcomes. Previous research supports this argument by identifying that higher level of knowledge about the behavior to prevent obesity was found among unprompted recallers than both promoted and no recallers of the campaign (Grunseit et al., 2015). Future campaign evaluators should understand subtle but significant differences in campaign effects by the degree of the awareness.

A positive relationship between unprompted awareness of the UWALK and attentional bias can be explained in brand awareness research. The measure of unprompted awareness used in the study can be regarded same as brand recall in marketing literature (Keller, 1993) in that both measure respondents' ability to recall a brand (a campaign name) when given the product category (physical activity campaign). Brand recall requires retrieval of the information that has been stored in one's long-term memory and readily accessible when there is an appropriate cue (Leigh, Zinkhan, & Swaminathan, 2006). This explains why those who were aware of UWALK without prompt showed attentional bias toward UWALK whereas those who did not name UWALK (although they all reported UWALK awareness when prompted) had no attentional bias toward UWALK.

Examining attentional bias will help researchers to understand who are actually performing the behavior after being exposed to the campaign advertisements. Attentional bias demonstrates how frequently and recently individuals are exposed to stimuli and whether they are influenced by the availability of the stimulus in long-term memory (Moors, 2016). There will be no campaign effects when there is no attentional bias toward the campaign cues because no attention given to campaign information precludes further processing that could have possibly affect attitudes toward, intentions to perform the behavior. On the other hand, who showed the attentional bias toward the campaign would be more likely to have further campaign affects such as attitudes, knowledge, and behavioral intention, which are ultimately linked to behavior uptake as the HOEM proposes.

Self-reported physical activity participation in leisure time was higher among participants in the UWALK aware group compared to the unaware group (even among those recruited from the UWALK website). This demonstrates that among participants for whom UWALK was "top

of mind," there was also more reported leisure-time physical activity. Of course, the research reported here is cross-sectional and was not able to identify if automatic attention toward UWALK resulted in activating the automatic association and led to physical activity behavior (Papies et al., 2015). However, the finding supports the role of schema in attracting attention toward schematic information. It may be because those who were automatically attracted to the campaign cues held schemas related to physical activity in memory from repeated experiences of physical activity in the past. Automatic attention toward the cues provides an opportunity to retrieve schematic information related to the behavior (Strack & Deutsch, 2004; Berry, 2006). Examining the degree and the direction of the attention paid to campaign-relevant stimuli is, therefore, crucial to identifying whether the intended outcomes of the campaign may be achieved. Future research should also consider examining the moderating role of schema because for attentional bias to affect further processing and behavior, schema should precede the association of current stimulus representation with later cognitive processing and behavior change (Strack & Deutsch, 2004).

Participants aware of UWALK also reported significantly more positive implicit attitudes for UWALK-relevant stimuli (e.g., walking) compared to unaware participants. These implicit measures were taken before the participants watched the UWALK video and the differences in implicit attitudes by awareness group are likely due to the activation of associations with UWALK stored in memory before new information in the video was provided. In other words, for those who were aware of UWALK, there were automatic associations of physical activity with positive affects toward (Gawronski & Bodenhausen, 2011). These automatic cognitions may increase the possibility to have a greater attention toward similar cues in the environment (e.g., other physical activity advertisements), which will trigger the whole conceptualization of

physical activity, possibly including positive affect (Papies, 2016b; Papies et al., 2015). This is an intriguing area for future evaluation research.

The strongest predictor of physical activity behavior in the regression model was implicit attitudes toward physical activity, as found in previous research (Conroy et al., 2010; Mark et al., 2015). The result that neither explicit affective nor instrumental attitudes predicted leisure time physical activity may be due in part to a ceiling effect in explicit attitudes. It is well established that engaging in physical activity is socially desirable and being more active is a good way of maintaining health across all age groups (Bauman, Merom, Bull, Buchner, & Singh, 2016; Lin et al., 2015; Saunders et al., 2016). Participants are, therefore, more likely to report their responses in ways that are consistent with this message. The bias of social desirability as a potential confounder of relationships between self-report measures of physical activity and energy intake with BMI was also found in previous research (Klesges et al., 2004). This further highlights the importance of measuring implicit cognitions in relation to physical activity campaigns.

The result demonstrates participants in UWALK awareness group held both positive implicit and explicit attitudes and reported higher physical activity participation in leisure time. This supports previous research that implicit attitudes that are consistent with explicit attitudes (i.e., implicit-explicit consistency) are used for behavior decision (Gawronski & Bodenhausen, 2006; Berry et al., 2016). In the experiment, among those who hold positive affective associations toward physical activity, relevant schematic information is triggered while watching a video (positive implicit attitudes) and information in the video that promote physical activity participation provided proposition to validate the truth of their automatically activated associations (explicit attitudes). Only strong attitudes affect individuals' thoughts, intentions, and behavior (Howe & Krosnic, 2017). If physical activity campaigns can strengthen their automatic

associations as well as reasoned prepositions, this can ultimately lead to perform physical activity behavior among targeted populations.

3.4.2. Strengths and Limitations

Strengths of the study include the application of a theoretical framework in the evaluation of the community-wide campaign, which guides the selection of outcome factors, measurement and data analysis accordingly. In particular, the application of reliable online implicit measurement in a natural setting can enhance both internal and external validity. However, this study is not without limitations that should be acknowledged. Firstly, with the majority of the sample reported as female and well-educated. This indicates using a convenience sampling strategy will not suffice to identify the effects community-wide physical activity campaign. Future research should apply a sampling method to generalize the findings. Given the cross-sectional design of the current study, the mediation effect of attitudes on the association between awareness and physical activity behavior could not be tested (Bauman et al., 2008). Future research needs to apply a longitudinal design to examine whether there is a causal relationship between awareness and attitudes toward physical activity and if a mediating role of attitudes between awareness and physical activity level exists. Yet the results provide a foundation for such work and indicate that attentional bias and implicit attitudes should be considered within evaluation frameworks.

A community wide media campaign is aimed to reach an entire population in the community. Nevertheless, it is likely that there are underserved groups in the population that are not exposed to the campaign activities nor evaluation efforts. Campaigns may not reach certain sociodemographic population segments or may be ineffective in these populations due to their normative beliefs in physical activity (Yancey et al., 2006). In order to develop effective physical activity promotion interventions, identifying potential underserved groups in the community is

the first step in the development of the campaign activities. Then, having group members provide their input on the content of the campaign messages, delivery platforms, and evaluation and the dissemination of findings is encouraged. Initiating a partnership with community-based organizations and community leaders may be an important strategy as it can assist with the development, implementation and evaluation process of the campaign. This can further bring support necessary for the sustainability of the campaign effects after it is completed.

3.5. Conclusion

This study supports previous work that the HOEM can be applied in planning and evaluating a community-wide physical activity campaign. It helps understand how such initiatives can influence community awareness of the existence of the campaign, contribute to positive cognitive changes and increased participation of physical activity. The role of automatic cognitions in the campaign effects was confirmed, which can be used in addition to controlled cognitions measured by self-report questionnaires. The findings also suggests that using indicators of conventional outcome measures such as the number of website visits can falsely jump to a conclusion: visiting a website indicates a campaign will be remembered and related cognitions will be affected. This contributes to a significant growth to both research and practice as the current study proves the feasibility of the application of an online implicit experiment when assessing the effects of a community-wide media campaign.

3.6. Tables

Table 3.1. Demographic characteristics of participants

	Frequency (*N*)	**Percentage (%)**
Group recruiting		
UWALK website	88	69.3
Community	39	30.7
Gender		
Female	87	75.0
Male	29	25.0
Missing	11	
Education		
Less than high school	1	0.9
Graduate high school	19	16.4
Current undergrad student	14	12.1
Graduate undergraduate	58	50.0
Graduate master or PhD	24	20.7
Missing	11	
Income		
Under $20,000	6	5.2
$20,000 - 39,999	6	5.2
$40,000 - 59,999	14	12.1
$60,000 - 79,999	10	8.6
$80,000 - 99,999	12	10.3
$100,000 or more	42	36.2
No response	26	22.4
Missing	11	
Marital status		
Married/common-law	71	61.2
Divorced/separated	13	11.2
Single/never married	30	25.9

No response	2	1.7
Missing	11	

Table 3.2. Mean (standard deviation) of attentional bias and implicit attitudes by group

Awareness Group	**Attentional bias RT mean (SD)**		**Implicit attitude d'score mean (SD)**	
	UWALK-congruence	**HealthyU-congruence**	**UWALK-good**	**UWALK-bad**
Unaware	431.74 (63.10)	430.96 (69.53)	2.29 (0.82)	1.34 (0.66)
Aware	434.50 (66.06)	445.20 (68.92)	2.51 (0.80)	1.17 (0.68)
Total	432.91 (64.13)	437.02 (69.36)	2.39 (0.81)	1.26 (0.67)

Table 3.3. Mean (standard deviation) explicit attitude scores by group

Awareness group	**Explicit attitude mean (SD)**	
	Instrumental	**Affective**
Unaware	6.10 (0.94)	5.91 (1.13)
Aware	6.30 (0.78)	6.14 (0.91)
Total	6.19 (0.88)	6.01 (1.05)

Table 3.4. Correlations between LTPA, attentional bias, awareness, implicit attitudes, explicit attitudes, and interaction terms

	1	**2**	**3**	**4**	**5**	**6**	**7**
1. Attentional bias	1	.276**	.232**	0.07	.595**	0.095	0.06
2. Awareness	.276**	1	.197*	0.117	.282**	.177*	0.121
3. Implicit attitudes	.232**	.197*	1	0.127	.108	.653**	0.087
4. Explicit attitudes	0.07	0.117	0.127	1	.060	0.076	.564**
5. Awareness * Attentional bias	.595**	.282**	.108	.060	1	.133	.082

6. Awareness * implicit attitudes	0.095	.177*	.653**	0.076	.133	1	0.12
7. Awareness * explicit attitudes	0.06	0.121	0.087	.564**	.082	0.12	1
8. LTPA	.256**	.246**	.322**	.200*	.196*	.218*	.182*

*$p < 0.05$, ** $p < 0.01$, *** $p < .001$

Table 3.5. Unstandardized and standardized regression coefficients for physical activity

Block	**Predictors**	**B**	**SE**	**B**	**Tolerance**	**VIF**	**R^2**	**Adjusted R^2**
Block 1	(Constant)	42.226***	1.847				0.065	0.058
	Attentional bias	0.252**	0.085	0.256	1	1		
Block 2	(Constant)	38.728***	2.443				0.099	0.084
	Attentional bias	0.2*	0.088	0.203	0.924	1.082		
	Awareness	8.227*	3.831	0.19	0.924	1.082		
Block 3	(Constant)	39.639***	2.365				0.179	0.152
	Attentional bias	0.149	0.086	0.151	0.891	1.123		
	Awareness	6.085	3.738	0.141	0.899	1.113		
	Implicit attitudes	5.351**	1.903	0.241	0.918	1.09		
	Explicit attitudes[2]	3.356	1.959	0.142	0.975	1.026		
Block 4	(Constant)	39.411***	2.412				0.185	0.137
	Attentional bias	0.122	0.106	0.124	0.594	1.682		
	Awareness	5.63	3.832	0.13	0.871	1.149		
	Implicit attitudes	5.366*	2.537	0.241	0.526	1.903		
	Explicit attitudes	2.318	2.382	0.098	0.671	1.49		
	Awareness * Attentional bias	0.082	0.186	0.047	0.614	1.628		
	Awareness * Implicit attitudes	0.075	3.892	0.002	0.548	1.826		
	Awareness * Explicit attitudes	3.306	4.271	0.078	0.671	1.491		

*p<0.05, **p<0.01, ***p<0.001

[2] Explicit attitudes variable was calculated by computing the mean of affective and instrumental attitudes

Table 3.6. Number of thoughts valence by awareness group

		Total thought valence	Number of participants by valence group		
UWALK awareness	**N**	**Mean (SD)**	**Positive**	**Negative**	**Neutral**
Unaware group	61	1.28 (1.71)	39	6	16
Aware group	46	1.35 (1.83)	30	4	12
Total	107	1.31 (1.76)	69	10	28

Table 3.7. Mean and standard deviation of attitudes score by valence group

	Valence group	**N**	**Mean (SD)**
Implicit d'score	Positive	69	1.19 (0.94)
	Negative	10	0.79 (1.30)
	Neutral	28	0.97 (0.93)
	Total	107	1.10 (0.98)
Explicit instrumental attitudes	Positive	69	6.34 (0.77)
	Negative	10	5.35 (1.34)
	Neutral	28	6.15 (0.89)
	Total	107	6.20 (0.90)
Explicit affective attitudes	Positive	69	6.24 (0.97)
	Negative	10	5.03 (1.39)
	Neutral	28	5.90 (0.93)
	Total	107	6.04 (1.06)

Chapter 4. Study 3: Examination of Participant Perceptions of a Public-Private Partnership in Implementing a Health Promotion Program

4.1. Introduction

4.1.1. Growth of Public-Private Partnerships in Health Promotion Initiatives

A large-scale health intervention generally requires cross and multi-sector approaches to help populations engage in health-enhancing behaviors. Individuals can make choices related to health behavior more easily once support from diverse sectors including government, and community and private sector engagement is accessible (Nikolic & Maikisch, 2006; Reich, 2002a). A Public-Private Partnerships (PPP) is one such support involving contracts or informal arrangements between a public (governments or nonprofit) organization and a private-sector corporation to achieve joint objectives in which all parties mutually benefit (Kraak & Story, 2010; Nikolic & Maikisch, 2006). PPPs for health promotion have been conducted in various initiatives such as partnerships for product development and distribution, partnerships for strengthening and delivering health services, partnerships for health program implementation, and private sector coalitions for health (Widdus, Holm, Chacko, & Currat, 2001). Partnerships for delivering health programs have been widely applied to create healthy communities that support their populations to engage in health-enhancing behaviors and ultimately reduce disease risk factors (Kraak & Story, 2010).

4.1.2. A Collaborative Partnership between a Public and Private Organization

Types of partnerships in delivering health promotion programs differ based on the strength of the relationship between the public and the private partner and the decision-making power. When

a government or a public sector organization seeks expert input and financial support in a non-collaborative manner from the private for-profit sector, the public partner has a dominant power in decision-making as well as the major responsibility for the program implementation (Boase, 2000). Conversely, a private organization can have a major responsibility for carrying out the program when a public organization plays the role of a funding partner. In both cases, the strength of the relationship between the public and private partner is fairly weak. On the contrary, in collaborative partnerships where there is joint responsibility for decision-making and the provision of resources, the strength of the relationship between the partners is much stronger. A collaborative partnership has the highest level of integration between partners and involves long-term commitment from both partners. Such a partnership is more likely to result in a closer engagement of both partners in creating mutually beneficial outcomes and sharing responsibility for the program delivery (O'Reilly & Brunette, 2014). Theoretically, a collaborative partnership has the greatest potential to achieve large-scale societal change (Herlin, 2015). However, a collaborative partnership has often failed to maximize the program effects due to challenges in building a proactive working relationship between partners (Boase, 2000). Assuring the accountability for achieving a partnership goal and monitoring the other party's activities is difficult in a collaborative partnership (Richter, 2004). It is, therefore, questionable whether potential benefits of a collaborative partnership are greater than risks in managing and implementing the partnership and whether it can enhance the effectiveness of the program (Brinkerhoff, 2002).

4.1.3. Gains of Public Organizations from the Partnerships

PPPs have been seen as innovative strategies for the public sector to achieve a specific public health goal (Nikolic & Maikisch, 2006; Kraak & Story, 2010; Reich, 2002b). A major motivation of the public organization to initiate a partnership is to create powerful mechanisms to deal with fiscal constraints and to leverage resources and expertise (Richter, 2004). Previous research revealed that partnerships invoke public awareness of health issues and encourage broader organizational involvement to achieve social, cultural and environmental objectives (Hamamoto, Derauf, & Yoshimura, 2009). This can consequently bring in grass root funding, in-kind, and expertise for partners to conduct partnership's initiatives (Babiak, 2009; Borstein, Pate, & Buchner, 2014; Feyerherm, Tibbits, Wang, Schram, & Balluff, 2014; Kemner, Donaldson, Swank, & Brennan, 2015). Via partnerships with diverse sectors including private companies, public organizations expect to increase the opportunities to communicate with diverse groups of decision makers and stakeholders to address complex and multifactorial problems (e.g., pandemic of unhealthy behavior within the community; Borstein et al., 2014; Feyerherm, et al., 2014; Kemner et al., 2015). It is hoped that organizational gains ultimately lead to create healthier environments to help community members to make easier choice of behavior (Durand et al., 2015; Feyerherm et al., 2014; Hawkins et al., 2009). Overall, public organizations anticipate that partnerships serve as a vehicle to mobilize organizations for collective actions at multiple scales and across sectors. However, little is known about the actual consequences of PPPs because most research on PPPs is descriptive (Herlin, 2015). Furthermore, previous researchers have taken the organizational perspective on initiating a collaborative partnership and the consequences of partnerships on participants have been overlooked (Brinkerhoff, 2002; Herlin, 2015). For PPPs to be considered as one way to address many public health challenges,

the impacts of the partnership need to be examined based on the program participants' or service recipients' perspectives.

4.1.4. Gains of Private Organizations from the Partnerships

The view of private partners on PPPs is understandably quite different from the view of governments or non-profit organizations. A for-profit company views a PPP as a way to capitalize on positive reputational benefits by fulfilling corporate social responsibility (CSR, (Seitanidi, 2008). There are various strategies for companies to directly support a social cause or help public organizations to achieve social welfare. First, companies can execute philanthropic activities, in which they contribute cash or in-kind without any specific expectation of a tied benefit. Philanthropic partnerships are characterized by one directional resource flow with companies acting as a donor and the public organization as a recipient (Herlin, 2015). A major outcome that the company expects from a philanthropic partnership is to be seen as a good corporate citizen (Herlin, 2015; Polonsky & Wood, 2001). Second, when a company becomes involved in sponsorship, the company provides either financial or in-kind support in order to achieve opportunities to associate the brand directly with the sponsored event or cause in return (Meenaghan, 2001). Sponsorship allows the company to commercialize, albeit limited, such giving activities when seeking to achieve any corporate, marketing, or media objectives (Sandler & Shani, 1993). Third, a cause-related marketing type of partnership involves a company's planning and execution to address a social issue (Varadarajan and Menon, 1988; Liu & Ko, 2011). Nowadays, CRM is a more collaborative effort between a company and a non-profit organization toward the development and implementation of a CRM campaign, named as a social alliance delivery type of CRM (Liu & Ko, 2011). Unlike sponsorship in which a company

can only have indirect opportunities to gain profit via marketing and communication, a cause-related marketing allows companies to commercialize its service provision and generate direct profit (Berger, 2004). For instance, a company can generate revue by charging smoking cessation program registration fees to participants. Furthermore, several indirect outcomes from CRM such as positive impact on brand awareness, brand image, and attitudes toward the company have been reported (Basil & Herr, 2003; Nan & Heo, 2007; Rifon, Choi, Trimble, & Li, 2004). This is primarily because consumers are likely to evaluate a private company's partnership as an activity to fulfill corporate social responsibility (Herlin, 2015). Many corporations, therefore, consider cause-related marketing as the most cost-effective strategy (Herlin, 2015).

4.1.5. Potential Risks of PPPs

There is a potential risk to a public organization when a private partner chooses CRM as the partnership strategy (Polonsky & Wood, 2001). Unlike in a philanthropic partnership where there is minimum interaction and communication between the private and public partner and the role of each partner is fixed (i.e., private partners as resource providers and public partners as resource receivers), CRM partnership enables the company to be flexible in utilizing activities to exploit public organizations. This leads the company to prioritize organizational goals of the company (i.e., financial gains) than partnership goals to which both public and private organizations mutually consent (i.e., social welfare, Polonsky & Wood, 2001). This may increase the likelihood of recipients to perceive CRM as companies' commercial motives providing no benefits to community or society. Once companies' commercialization of partnership activities are revealed by consumers, this can ultimately result in negative consequences for society or for public organizations such as questioning organizational legitimacy (Herlin, 2015). Thus, it is

important to get the perspective of program participants when trying to understand the effects of PPPs.

The third study of the thesis examined how participants perceive a collaborative partnership between a public and private organization in delivering a health promotion program. In this study, a company's implementation of a smoking cessation program is viewed as cause-related marketing in that it contributed to public health, at the same time generated revenue by selling the program. Program participants are one of essential stakeholders of the partnership; therefore, examining participants' perceptions of partnership is expected to provide recommendations for program implementers to improve partnership effects.

4.1.6. Implementation Process of the Program

The focus of the study was to look at program participant observations of the process dimensions of the partnership, i.e., whether both partners implement the program in a collaborative manner. Program implementation refers to what components of an initial program are actually delivered in a particular setting (Durlak & DuPre, 2008). This is determined by examining the extent to which the program corresponds to the originally intended program (program fidelity), how much of the elements of the initial program have actually been delivered (program dosage), and how clearly and correctly elements of the initial program are delivered (program quality). Examining how the program is implemented is essential to identify the program effects, because a program can only be effective when an efficacious program is sufficiently implemented in a manner, which is available and acceptable to target audiences (Flay et al., 2005). Previous research has reported several challenges in implementing partnership activities such as managing diverse interests, needs, and goals of each partner (Hawkins,

O'Garro, & Wimsett, 2009; Kihi et al., 2014; Yancey et al., 2009). When there is a high level of interaction between the public and private partner such as in a collaborative partnership, the power of decision making in managing and implementing the partnership activities are in favor of the private partner because the private partner is the one who brings financial resources to the table (Herlin, 2015). Examining the process and implementation dimensions of the program via a collaborative partnership will help researchers and practitioners to understand whether the partnerships had a positive impact on achieving intended outcomes while ensuring accountability and maintaining the quality of the program (Brinkerhoff, 2002).

4.1.7. Purpose Statement

The purpose of this study was to assess program participants' perspectives on a collaborative PPP to implement a health promotion program. This study qualitatively examined how the partnership affected participants' experience while participating in the program and how they view the partnering organizations in implementing the health promotion program.

4.1.8. Context: "Run to Quit"

Run to Quit (www.runtoquit.com) is a smoking cessation program to empower Canadians to permanently give up smoking and maintain a more active lifestyle. The program was initiated with funding from the Public Health Agency of Canada. The Canadian Cancer Society as a public partner and the Running Room as a private partner jointly collaborated in order to develop and implement the program. The Canadian Cancer Society is a public organization whose mission is to eradicate cancer and enhance the quality of life of people living with cancer (http://www.cancer.ca/). The Running Room is North America's largest retailer of running &

walking goods, apparel, and footwear (https://www.runningroom.com/). Run to Quit is a collaborative partnership where accountability, responsibility, and goals and values of the partnership are shared between the Running Room and the Canadian Cancer Society. Furthermore, the program applies combined marketing and communication activities from both organizations to maximize mutual benefits from the partnership.

A unique aspect of the program is to help smokers quit their smoking habit by engaging in walking and running. There are two ways for participants to join the program, either an in-person group clinic for ten weeks or an online "Do it yourself" program. A coach plays an important role as an in-class instructor at an in-person group clinic to support participants achieving the goals of quitting smoking and of walking or running five kilometers. Coaches utilize the Running Room Canada learn-to-run curriculum to guide participants to run and ultimately complete a five kilometer running event at the end of the program. They also use the facilitators' manual provided by the Canadian Cancer Society, which delivers information and resources on topics such as tobacco withdrawal symptoms, cravings, dealing with triggers, and quit methods. Participants are also informed about the free local Quit Line service so that they can receive a support call or email from a Quit Coach. In-person group clinic participants were also provided with a self-help guide booklet (called One Step at a Time, OSAAT), created by the Canadian Cancer Society. Furthermore, staff from the Canadian Cancer Society joined some of the clinic sessions to present helpful resources and monitor the program. For the further information about the program, see the design and evaluation protocol of the program (Priebe, Faulkner, & Atkinson, 2016).

4.2. Methods

A qualitative descriptive method (Sandelowski, 2000) guided the present study in order to comprehensively summarize participants' experiences of the Run to Quit program. In a qualitative descriptive study, researchers stay close to the data and strictly describe the phenomenon of interest using descriptive rather than interpretive terms. A semi-structured interview was selected to help understand essential aspects of a phenomenon from the perspective of study participants. Previous program evaluation literature also suggests that interviews ensure the privacy of conversation between an interviewer and interviewee, which may alleviate concerns of revealing negative statements about a program (Curry, Nembhard, & Bradley, 2009).

4.2.1. Sample

Participants were recruited from those who joined the Run to Quit in-person group program across Canada by applying a purposeful sampling technique (Patton, 2015). A purposeful sample technique offers insight about the common as well as unique phenomenon of researchers' interest (Patton, 2015). It is believed that the program participants would be able to provide us the most fruitful insight on the phenomenon of the public and private partnership in delivering a health promotion program. A total of 14 informants (12 females and two males, mean age = 52.14 years; ranged between 42 and 66) participated in a phone interview two months after the program ceased. Participants were from across Canada: eight participants joined clinics located in Ontario, two participants were from clinics in British Columbia, two participants joined in Newfoundland, and one participant each joined clinics in Nova Scotia and Alberta respectively. Except for two participants who joined the same clinic in Newfoundland, the other twelve participants were from different clinics in their provinces. Their participation in the interview

was voluntary and verbal consent was obtained prior to the commencement of the interview. Data saturation was determined using Bowen's (2008) guideline. After the data from new participants were compared and merged into the existing categories; the point when the researcher failed to uncover any new categorical ideas or relationships between concepts relevant to the phenomenon indicated that the data saturation was reached. The research ethic of the study was approved by the University of Alberta's Human Research Ethics Review Committee.

4.2.2. Phone Interview Procedure

The interview guide included open-ended questions within a predetermined set of topics around the program participation (i.e., how participants enjoyed the program) and the partnership awareness of the partnership between the public and private partner (i.e., whether they can name the public and the private partner who funded and implemented the program), opinions about the involvement of the partners (i.e., their thoughts on what each partner offered), overall opinions of the partnership (i.e., their thoughts on how the public and private partner jointly worked together to deliver the program) and recommendations for the future partnership. Furthermore, the interviewer used prompts to clarify answers and elicit detail in narratives to supplement the structured questions. The interview guide was piloted before the primary researcher conducted all semi-structured interviews to ensure consistency. The interviewer used neutral and nonjudgmental language in encouraging respondents to speak in detail while keeping control of the data gathering relevant to the purpose of the interview (Breakwell, 1995). Each interview lasted approximately twenty minutes.

4.2.3. Data Analysis

Qualitative content analysis was used to provide a comprehensive and broad description of the phenomenon of interest (Elo & Kyngäs, 2008). Qualitative content analysis is a research method used to make replicable and valid descriptions from data to their context (Elo & Kyngäs, 2008). Participants' perceptions of the health promotion program delivery and the public-private partnership were described by using categories attained from the data in an inductive way; identified categories were, therefore, strongly linked to the data themselves and captured the predominant reflection of the content of the entire data set. Categories were also identified based on semantic content, which only allowed themes to be identified within the explicit or surface meanings of the data, and not beyond what an informant has said.

4.2.4. Inductive Content Analysis Process

Three main phases, preparation, organizing and reporting, comprised the inductive analysis process. First, in the preparation phase, the analyst transcribed the audiotaped data, read them and noted down an initial idea for extracting interesting features in a systematic fashion. The second step was to organize the qualitative data through open coding, and create categories. In this organizing phase, the initial categories of items in the interview guide were used as labels and terms used by the informants were coded whenever available, or else simple descriptive phrases were used (open coding). Then, categories that were generated at the open coding stage were compared and grouped similar codes and finally collapsed into higher order headings. Each category was named and refined using content-characteristic words and clear definitions for each category were finalized. During the last step, selected extraction of the meanings from the categories was related back to the research question and the literature in order to generate a description of the phenomenon of the research topic, which was interpreted in the discussion.

Several factors were considered to ensure the trustworthiness and rigor of the study. First, the analysis process and the results were described in sufficient detail to ensure validity of results. To ensure the credibility of the data, two researchers were involved in the coding procedures independently and discussed later to acquire a consensus that all the codes and themes covered the data (ensuring the credibility). Furthermore, the researchers tested links between the findings reported as results and the data to increase the reliability of the study (Elo & Kyngäs, 2008). Lastly, a qualitative description approach guided the whole process from developing research questions, sampling, data generation (i.e., interviewing), and data analysis so that methodological coherence could be achieved (Sandelowski, 2000).

4.3. Results

4.3.1. Overall Perception of the Program

Eleven informants (71.42%) described their participation in the Run to Quit program with positive words. When asked to comment further on the program participation, their comments were about the group training sessions to be informative and supportive. Participants revealed that they had great support from their coaches. For example, Amy (female, 50 years old) revealed: *"A young fella, my coach, James, he was from the Running Room. He was good. He taught me some good running technique. I was motivated more after the program."* Similarly, Lara (female, 53 years old) said: *"I know they were really knowledgeable when it comes to that equation of the solution. They knew their expertise and their expertise are running, how to run properly with proper equipment how to prevent heart strokes. They were good."* They revealed that the group environment at most of the clinics was also helpful for participants to support each other to achieve individual goals. Helen (female, 52 years old) said: *"What was really good*

about was when we had a free time to discuss within a group. So you could share experiences and tips with each other." Similarly, April (female, 48 years old) reported: *"I found the groups for the social aspect on Wednesday and Sunday were very supportive and encouraging. Also there was very good atmosphere where I attended the program."* However, informants also described their experience with negative words. Participants' feelings of a disconnection between the running and quitting smoking components of the program were reported. Informants revealed the focus of the program as "training running" rather than the benefit of running for smokers to "quit smoking." Grace (female, 51 years old) reported:

> *"The running part was good, but the quit smoking part of it was not very good…... I hoped there was some kind of coach or support to help quit smoking who was trained. But there wasn't. There was somebody who has gone through this program before but we did not have any real training on the quit smoking aspect of it. He was focusing on running and that's it. The representative from the Canadian Cancer Society only came a couple of times and she did not offer anything that valued to be honest with you…... I would say 95% running 5% quit smoking."*

4.3.2. Perception on the Private Partner

Awareness. All of the participants mentioned the Running Room first when they were asked to name any organizations that implemented the program (i.e., top of mind awareness, defined as the first brand recalled without any prompting, to name the organization participants know as the partner of the program; Laurent, Kapferer, & Roussel, 1995). Not a single participant hesitated when naming the Running Room as the private partner. This indicates that

participants' evaluation of the program was significantly influenced by what was given at the Running Room store where they joined the program.

Involvement. Most participants described the involvement of the Running Room in the program delivery using positive terms. Their opinions on the Running Room's involvement was around the Running Room's expertise and competence in delivering the program, and various resources and information being easily accessible. Overall, the Running Room was viewed as a good place for the program to be delivered. Tyler (male, 49 years old) revealed: *"The Running Room involved in the program was a great idea because there is such a great resource and information for running. That integration is great I think. If anything that comes up that you are not sure of, somebody who works for the store, the knowledge was there."* Kacey (female, 50 years old) described: *"I like the Running Room a lot. It was a great support and it was worth to try the program they delivered. They were expert and they know how to interact and support people who are novice runners. I would say they were well trained and know exactly what they are doing and supposed to do.*" Implementing the program provided the Running Room with the opportunity to demonstrate its commitment to educating participants on a healthy lifestyle and to build a true sense of community.

Brand image. There was a connection between participants' positive experience of the program and the brand image of the Running Room. For example, Amy (female, 50 years old) reported: *"It was nice to have the Running Room. If I had gotten involved more, I would have continued with the running. If I did not get injured, I would have probably joined the Running Room later on. It was really that good."* Edward (male, 48 years old) said*: "I did not have personal experience with the Running Room before I joined the program. But it was really good. They were expert in running and walking. They taught me lots of techniques and gave me*

resources for beginners like me. Most smokers who try to quit smoking get easily triggered by smoking environments. The Running Room store helped me not to think of cigarettes. People there are all healthy and fit. You wish you want to look like them. That was good motivation and that's what I needed. It was a great environment." April (female, 48 years old) reported: *"I've heard about the Running Room through my husband. There was very good atmosphere that had at the location that I attended. All of the Running room staff and environment were really good I would say. The Running Room has expertise and they know what they do, it is a good company."*

Participants, who reveled their program experience with negative terms, did not associate it with to describe the Running Room brand. Nicole (female, 42 years old) revealed: *"I knew the Running Room before the program and it has not changed much (after joining the program). It was just the program that I was not happy about, not the Running Room."* Grace (female, 51 years old), another participant who was not satisfied with the program, reported that the program experience did not affect her view on the Running Room.

4.3.3. Perceptions of the Public Partner

Awareness. When they were asked to name the partnering organization of the program, none of them mentioned the Canadian Cancer Society first (i.e., top of mind awareness). Seven participants (50%) correctly named the Canadian Cancer Society when the interviewer asked the participant to name the "public" partner (i.e., spontaneous awareness; Laurent et al., 1995). Among participants who did not name the Canadian Cancer Society, two participants could only recall the Canadian Cancer Society when prompted (i.e., aided awareness, referred as recognition of the brand name when prompted; Laurent et al., 1995, see Table 1). Informants who could not recall the public partner named different organizations as the public partner. For instance, Ruby

(female, 50 years old) reacted*: "Oh my god, my mind is blowing. Oh, the smoker's helpline (as the public partner)?"* April (female, 48 years old) named: *"It (the public partner) was a university program for a study."* A couple of informants did not even know there was a public partner of the program. Isabel (female, 66 years old) said: *"I don't remember any organization other than the Running Room."* Camila (female, 45 years old) reported: *"I actually did not know the cancer society would be involved in the program. I assumed that it was just from the Running Room as a part of their promotion."* Even though it was both the Canadian Cancer Society and the Running Room who implemented the program with a collaborative manner, participants' awareness of the Canadian Cancer Society was not as prominent as that of the Running Room.

Involvement. Several informants revealed that there was lack of involvement of the Canadian Cancer Society. They used negative tones to reveal their thoughts about the Canadian Cancer Society's involvement. For example, Alina (female, 63 years old) reported: *"No I did not meet anyone (from the Canadian Cancer Society) ……I don't have much impression of them other than I did not hear from them…… I think that is not something they would like to hear from the participants."* Rihanna (female, 63 years old) revealed: *"There was no information given from them (the Canadian Cancer Society). There was only one phone call, that was after the program was already finished."* Nicole (female, 42 years old) revealed: *"The Canadian Cancer society did not contact me at all. Just the booklet, that's all. They did not do anything so. I wish I got contacted by them or they could have come when we had a training at the Running Room."* Tyler (male, 49 years old) revealed:

> *"We had a visitor from the Canadian Cancer Society on the first night to help volunteers, other than that, we did not have anyone from them at any of the sessions. Oh no, pardon me there was one night that the lady stopped by to say hi before the session. Then we got*

going she took off. One time the lady stayed in for the session the other time she just stopped by and left. They headed out before the session. That was it in terms of the involvement of the Canadian Cancer Society. I would say there was much less than what I imagined."

Perceived quality. Most participants revealed the activities provided by the Canadian Cancer Society (including information, speeches, and surveys) less useful and not valuable. Ruby (female, 50 years old) reported: *"With regard to the Canadian Cancer Society, the evaluation that we filled out every week, I did not see how that was the benefit. They were really repetitive and long."* Grace (female, 51 years old) revealed: *"Even when there was a representative from the Canadian Cancer Society, she did not offer any valuable information at all. I still don't know much about the Cancer Society, as there was not much going on with them. They did not provide any information. The lady from the Canadian Cancer Society came and took a measurement of CO2, and that's it."* Participants' negative opinion of the activities provided by the Canadian Cancer Society affected the evaluation of the organization. Nicole (female, 42 years old) reported: *"I cannot tell how the Cancer society works in general, but as for the program, they should have done better……. I did not have any contacts from the Cancer Society so I did not realize that they were supposed to work together. They need to collaborate more."*

Accountability. Those who reported less support for quitting smoking during the program associated their negative experience with the Canadian Cancer Society. There was no awareness of the role of the coach who was originally supposed to deliver the smoking part of the program such as telephone counseling. Grace (female, 51 years old) revealed: *"If it is going to be the Cancer Society, people should be trained. Or wherever at the quit smoking part of it, they should*

be really trained, like a coach. Just like, in the running part, there was a coach, but in the quit smoking part, there was not. You are just on your own." Similarly, Alina (female, 63 years old) reported: *I think it is good partnership but the public sector should also work better. I mean, I don't know what the Cancer Society was supposed to do. I think that is not something they would like to hear from the participant."*

4.3.4. Perception on the Public and Private Partnership

Complementarity. All participants agreed that it is a great idea to have a partnership between the public and private sector in program delivery. They revealed the private partner's resources complemented the public partner's capacity. Edward (male, 48 years old) revealed: "*Well, I think it was good. If it were only the cancer society, the program would have been the same as many other smoking cessation programs that I joined previously. So it worked well that the Running Room was the partner of the program. You definitely get diverse information and resources (from the partnership). Otherwise, there will be a lack of something."* April (female, 48 years old) compared her previous experience of another smoking cessation program with Run to Quit by describing a positive aspect of the partnership:

> "*There was a program that I initially joined and I am still a part of it. It is through the heart institute in Ottawa. They have a quit smoking program. It is a monthly meeting with a nurse that kind of go through different medications and the different nicotine replacement products that are out there. I found their program, you only meet once a month, it did not really give me enough support that what I needed. So I found the Running Room three times a week is in a group that was very supportive. So I think the Running Room was better than the heart center program given that I was able to get*

enough support and I was more motivated. I wish they also have more support and a better environment for smokers like myself."

Fit. Perceived fit of the partners is an important factor in potential partnership success. There were contradictory comments on the fit of the partners in implementing the smoking cessation program. For example, Edward (male, 48 years old) reported the partnership between the Running Room and the Cancer Society was a good fit in implementing the program: *"I think it is a good to have both organizations on the same table. It was smart that the cancer society partnered with the Running Room because it was such a great fit. I don't know but it worked for me."* Lara (female, 53 years old) revealed: *"I think it is a good idea, maybe different organizations should collaborate as long as they fit together. Because I find it costly. I thought if you know how much you smoke and how much that costs. There is no comparison. Also, if you can't run you can walk, you have an option. I learned this, I came to think about it, during the program and both organizations worked well in that regards."*

On the contrary, several participants reported that they did not find the value of partnership between the Running Room and the Canadian Cancer Society. There was perceived disconnection about how running can help participants quit smoking. Alina (female, 63 years old) revealed: *"I don't know how much they know about smoking or smokers because runners are generally considering their health a lot and I haven't seen lots of runners smoke. The coach was the same. He was good at running but there was a lack of connection between running and quit smoking from him."* Rihanna (female, 63 years old) reported: *"I got support for running from the coach but I did not get motivation for quitting smoking from him. And there was no information given from the Cancer Society. There was only one phone call (from the Cancer Society) that was after the program was already finished."* In other words, the objective of the

program, “to support smokers to learn to run in order to quit their smoking habits,” was well implemented at some clinics and not others. How participants perceived the Running Room’s collaboration with the Canadian Cancer Society was dependent on how the program was implemented.

Implementation efficiency. Participants revealed that private companies’ financial and human resources could accelerate the public organization to launch the program. This showed positive outlooks on delivering the program by both partners. Tyler (male, 49 years old) reported: *“I think it is a good idea to mix the public and private right? Because sometimes with the public sector, things can be tied up in the bureaucracy maybe? With the government right? And with the private sector, they just make things, make it happen. Because money relies on it. Right? So given the two tied together, can make the things move forward a lot faster.”* Helen (female, 52 years old) reported the benefit of the public partner on the program promotion when they partner with the private sector: *“I think it is a great outreach for the Canadian Cancer Society. Via the Running Room store, community members can easily be accessible with the program and information. I don’t think it would be as successful as now if the Cancer Society implemented the program without the Running Room. The Running Room was a great hub.”*

4.4. Discussion

4.4.1. Summary of Findings

The current study evaluated the PPP efforts in implementing a smoking cessation program called Run to Quit. Overall, the findings demonstrate participants’ positive evaluation of the partnership in providing a variety of resources to achieve the goal of behavior change. Most participants reported the Running Room coaches’ support was beneficial for motivation to

keep engaged in the program participation. However, there were negative perceptions of the program including the lack of involvement of the Canadian Cancer Society and a perceived disconnect between running and quitting smoking support. Potential organizational gains and risks reported by the participants provide implications for future program facilitators who seek an opportunity to initiate a PPP.

It was found that the private partner gained benefits such as increased brand awareness and recognition of the company from the partnership. The Running Room's dedication to educating customers on an active lifestyle and providing good public services were also well-received by the participants, which increased a positive brand image. The findings are consistent with the findings of previous studies such that a strong record of partnership creates a favorable context that positively increases consumers' attitude toward the firm, customer loyalty, reputation, and brand image (Lichtenstein, Drumwright, & Braig, 2004; Sen & Bhattacharya, 2001). Moreover, the fact that the Running Room could broaden a customer pool to smokers who are fairly new to running is also a positive outcome that potentially increases profits (Durand et al., 2015; O'Reilly & Brunette, 2014). Even though participants were required to pay the registration fee, not a single participant reported the Running Room's program delivery as a pseudo-altruistic activity or evaluated its support as to fulfill the Running Room's self-interest. Furthermore, those who were not satisfied with the program did not associate negative experiences of the program with the Running Room brand. Overall, the gains of the private partner far outweighed any possible losses when jointly engaging in implementing the health promotion program.

Private partners should note several factors necessary to gain similar benefits from the partnership. First, they need to demonstrate expertise in implementing partnerships. The Running

Room has shown its ability to support smokers to start running and/or walking. A significant effect of the Running Room's coach in participants' evaluation of the brand was found. Participants who reported high competence and excellence of the Running Room's coach in his/her performances had more favorable evaluations of the Running Room brand. Second, ensuring the quality of the activities that the Running Room coaches are delivering is also important to ensure a positive brand image. The findings support previous literature such that consumers evaluate the brand based on individuals who represent the brand and perceived quality and value of the services provided (Keller, 1993, 2001). Proper human resource management, especially in the qualities needed for, and the roles of the program facilitators (i.e., Run to Quit coaches and the program implementers from the Canadian Cancer Society), have been also reported as an essential feature of successful partnership (Parent & Harvey, 2009).

From the public organization perspective, partnership with the Running Room provided grass-root support to initiate the program. The Run to Quit program wouldn't have existed without the partnership. It is, however, questionable whether the Canadian Cancer Society's alignment with the Running Room was a synergistic partnership. Few participants were aware of the involvement of the Canadian Cancer Society as the partner of the program. There was a perception of a lack of support for quitting smoking and that coaches concentrated on running. In other words, the partnership might not improve the quality of services and programs beneficial for participants. Synergy is the extent to which a partnership's combined engagement effectively brings its participants' perspectives, knowledge, and skills together to enhance the effectiveness of collaborative actions (Weiss, Anderson, & Lasker, 2002). Having both the Running Room and the Canadian Cancer Society may have brought more resources to the development of the program. But it may not have increased each organization's capability to successfully implement

the Run to Quit program. Public organizations need to ensure that partnership with a for-profit company is not just to increase the amount of support, but to bring more synergy to enhance the effectiveness of the program.

A public organization has the challenge of working hard to meet the public's demand. However, the public's blame falls disproportionately on the public organization when the program does not meet their expectations (Yancey et al., 2009). As it is believed that a public organization should ensure the quality of the program and proper management of the partnership, the accountability of the partnership mostly remains on the public organization (Boase, 2000). Furthermore, a public organization should maintain organizational legitimacy by taking actions that are desirable and appropriate within a society. Initiating a collaborative partnership with private sector should align with organizational missions, i.e., redistribute revenues in the benefit of a cause. A response from one participant, *"This is not something that they would like to hear from the participants,"* indicates the potential risk of the public organization in losing accountability when partnering with the private sector.

Successful partnerships exist when there are coordinated activities consistent across organizations targeted at mutual objectives (Parent & Harvey, 2009). Coordination reflects the set of tasks each party expects the other to perform in a timely manner. The findings demonstrate that participants' satisfaction of the program participation was greatest when the Canadian Cancer Society and the Running Room adequately performed its roles in delivering the program. Conversely, participants did not find the value of the partnership when there was a lack of coordination in delivering the activities of the program. The challenge in the fidelity of the Run to Quit program was reported such that a part of the Run to Quit program components, i.e., the Quit Smoking Line was poorly received by many participants (Priebe, Atkinson, & Faulkner,

2017). As the environment where the partnership is initiated is generally unpredictable, a greater coordination is important to implement the activities as intended and any planned mutual advantage to be achieved.

Partner complementarity and fit were also found to be important for successful partnership. The findings illustrated that participants who reported a positive thoughts of the Running Room's engagement believed that the Running Room's expertise in running complemented the Canadian Cancer Society's capacity to deliver the Run to Quit program. It may be because of their belief in the Canadian Cancer Society having expertise of how to help smokers quit smoking but not how to guide them to start running. Important to note is that perceived complementarity between partners was only found among participants who knew how running could help their quitting smoking habit. Those who reported the disconnection between running and smoking cessation did not find the value of the Running Room's involvement of the program. This also affected the perceived fit between the Running Room and the Canadian Cancer Society in delivering the program. When participants believed the partnership was effective to address the weakness of one partner by associating it with the other partner who could complement its competencies and resources, they also perceived that the partnering organizations were fit in implementing the program. Considering private organizations' resources and expertise and how these factors can complement public organizations' capacity is an important aspect when a public organization selects a private partner that fits to the objective of the project (Parent & Harvey, 2009).

The power balance is an important component in coordinating the program as it determines who has dominant power over certain activities and who is provided with more information during the partnership implementation (Parent & Harvey, 2009). An ideal

collaborative partnership is when an equal distribution between the partners exists (Tomlinson, 2005). The fact that the Run to Quit program was implemented in Running Room retail stores and it was the coach from the Running Room who facilitated the clinic sessions resulted in more perceived benefit for the Running Room while it was disadvantageous for the Canadian Cancer Society to be perceived as less engaged and less committed to the program by the participants. It is important to manage the power balance so that there is a properly distributed legitimate power over activities to accomplish a partnership goal.

4.4.2. Strengths and Limitations

Examining the partnership effects on an existing health promotion program based on participants' perspectives is a unique contribution of this study. How participants viewed the public and private partners involvement in the program and how to manage such partnerships in the future to enhance program effectiveness could be identified by looking at the process aspect of the partnership in program delivery. As the research was oriented as descriptive, it was possible to present the phenomenon of interest in its natural state without a priori theoretical preposition viewing of the phenomenon (Sandelowski, 2000). This study was based on real experiences across the participants who joined the program at different clinics; this helps us understand how implementation of the program can result in variability in the effectiveness of the program. A purposeful sampling technique chosen in the study offers a comprehensive as well as a unique phenomenon of interest; however, this limits the generalizability of the findings (Patton, 2015). Investigating the partnership effects in different contexts is suggested to empirically generalize the results to a population. Using telephone interviews ensured anonymity of the participants; participants were provided with the environment to elaborate their thoughts

without any concerns of being identified (Irvine, Drew, & Sainsbury, 2013). However, telephone interviews can cause loss of nonverbal data such as body language and facial expressions that help to understand interviewees' momentary emotions and attention paid to the interview. Conducting a face-to-face interview is suggested to address such limitations. Lastly, the current study examined participant perceptions of a public-private partnership in implementing a health promotion program. Public-private partnerships generally involve various stakeholders including program funders, partnering organization decision makers in each partnering organization, program developers and implementers (e.g., staff and coaches); interviewing other stakeholders such as coaches and key program staff are suggested to provide greater view on the partnership on the program delivery.

4.5. Conclusion

This study examined partnership effects on the implementation of a health promotion program by looking at how participants assessed the partners' joint efforts in implementing the program, which provides additional information in evaluating a large-scale health promotion program. The results show that potential challenges in managing the program can be greater than benefits when multiple organizations are engaged. This should be considered when conducting the process evaluation of the program. Actual delivery of all the program components is a prerequisite to achieve intended program outcomes (Bauman & Nutbeam, 2013). Even a program that is efficacious may not be effective when there is a lack of fidelity to intended program delivery and adaption (Flay et al., 2005). The outcomes of the study strongly demonstrate the need for practitioners to monitor how both partners perform to achieve the mutual goal of the program and bring synergy so as to achieve greater outcomes than when one party implements the program alone.

The private sector can anticipate positive brand evaluation by collaborating with the public sector. Implementing the program was a great opportunity for the Running Room to demonstrate excellence and competence in delivering the program and to provide public service while still charging people to register the program. Moreover, implementing the program was a great marketing and communication strategy for the Running Room as it helped broaden the customer pool, i.e., to smokers who are generally neither active nor interested in running. The findings suggest that ensuring the quality of the program and managing the staff is essential to gain such benefits.

The synergy of the partnership is likely to occur when all partners are committed to achieving the goals of the partnership, and the activities each partner delivers are well coordinated with a balanced power between the partners. Public partners should ensure how private organizations' resources and expertise and can complement public organizations' capacity when selecting a private partner that fits with the public organization and the objective of the project.

4.6. Tables

Table 4.1. Awareness of the partnering organizations

	Top of mind	**Spontaneous**	**Aided**
Running Room	14		
Canadian Cancer Society	0	7	2

Those who reported higher level of awareness were excluded in the next level of awareness.

Chapter 5. General Discussion

Community-wide interventions are multi-level and cross-sector approaches designed to promote public health (Baker, Francis, Soares, Weightman, & Foster, 2015). Interventions can be classified by their functional features such as persuasion, education, training, incentivization, and environmental restructuring (Michie et al., 2011). Interventions designed to "persuade" individuals to change their behavior for change among community members are referred to as "campaigns (Atkin & Rice, 2013; Michie et al., 2011)." Campaigns involve paid mass media advertisements or unpaid public service announcements (PSAs) to increase the awareness of issues and attitudes, contributing to the goal of changing behavior. Interventions can also function as "education" or "training." Often called community-wide programs, such interventions involve actions to increase knowledge, skills, and opportunities for behavioral trialing and maintenance (e.g., group training support for smoking cessation). Multiple interventions are generally combined into one large community-wide initiative to maximize the effectiveness. Exposure to campaign advertisements does not directly lead to behavior change especially when the target behavior is complex such as smoking cessation or exercise adoption (compared to when the target behavior is simple such as immunization); therefore, more back-up interventions are required to supplement a media campaign (Bauman et al., 2006). For example, campaigns to promote physical activity use paid mass media advertisements and unpaid public service announcements (PSAs) are supplemented by community-wide programs (e.g., senior walking groups and afterschool sports program for teens) to add value to the media components and to reinforce the primary messages (Bauman et al., 2006). A community-wide intervention

also requires supports from multiple organizations including public, non-profit, and private sector with a collaborative partnership.

Public-Private Partnerships (PPPs) are the specific types of social alliances involving contracts or informal arrangements between a public (governments or nonprofit) organization and a private-sector corporation to achieve joint objectives (Kraak & Story, 2010; Nikolic & Maikisch, 2006). A collaborative partnership between the public and private sector is expected to have the greatest potential to achieve large-scale societal changes because PPPs create powerful mechanisms to deal with fiscal constraints, to leverage the resources and expertise, and ultimately to achieve a specific public health goal (Herlin, 2015). Yet, little is known about the actual consequences of PPPs and most research on collaboration has been descriptive (Herlin, 2015). Furthermore, organizational perspectives on initiating a collaborative partnership has been widely discussed but the consequences of partnerships on participants have been overlooked. Program participants are essential stakeholders of the partnership. Examining participants' perceptions of partnerships will provide recommendations for government officials and program implementers to improve partnership effects.

Intervention outcomes can only be achieved when implemented as planned. Therefore, evaluating the process of the intervention, in addition to outcome evaluation of interventions, has been suggested to improve the effectiveness of the intervention (Bauman & Nutbeam, 2013). Outcomes of implementation (process) evaluation answers the extent to which the intervention components are carried out as planned, the quality of and satisfaction with components by the target audiences, and factors that assisted or hindered the success of its implementation. Examining the process of an intervention is significantly important when multiple organizations are involved in implementation of the intervention. Many PPPs hardly achieve their intended

public benefits due to poor implementation (Brinkerhoff & Brinkerhoff, 2011). Furthermore, each partner brings its own organizational goals; therefore, the goals of the partnership are shared between the public and private sector organization and organizational goals sometimes override the partnership goals (Madill, O'Reilly & Nadeau, 2014).

The purpose of this thesis was to expand the evaluation of community-wide health promotion interventions aimed at individuals, by firstly reviewing previous evaluation research of effectiveness of community-wide interventions and then incorporating new approaches in implementation and outcome evaluation. To achieve the goal, the first study of the thesis was to systematically review recent evaluation research that illustrated the effectiveness of community-wide media campaigns to promote physical activity. A review of recent research identifying intervention effectiveness is expected to provide guidance for health promoters to implement successful interventions and best practice (Michie et al., 2011). Furthermore, a comprehensive review is deemed important to identify limitations of previous research. Based on the first study of the thesis, it is proposed that future researchers and evaluators should consider including the measure of automatic cognitions in addition to self-reported controlled cognition that reflect media communication effects. The second study empirically tested the effects of the community-wide physical activity campaign (UWALK). By incorporating outcomes of automatic and associative processes (attentional bias and implicit attitudes) in addition to outcomes of controlled and propositional processes (self reported awareness and explicit attitudes), the effects of UWALK were tested. The results suggested that automatic cognitions provide additional information in campaign evaluation research, independent of controlled cognitions measured by self-report questionnaires. Furthermore, the applicability of online measures was supported; thus, incorporating the measurement of automatic cognitions in community-wide campaign evaluation

is proposed to better understand how a media campaign influences target audiences and how to improve its effects on cognitions that precede behavior.

While the first and the second studies were focused on outcome evaluation of community-wide media campaigns, the third study was to examine how a collaborative partnership between public and private organizations influences the program implementation process, which affects the program outcomes (Flay et al., 2005). A collaborative partnership requires a deeper involvement of both partners; therefore potential risks in a collaborative partnership are also greater in managing the implementation process of the program (Richter, 2004). Therefore, the third study identified how participants perceived the collaboration between the public and private organization in implementing the smoking cessation program (Run to Quit) and whether participants viewed the partnership helped to deliver the program components that correspond to the originally intended program. The findings demonstrate that examining how participants evaluated the partnering organizations is proposed to be important to examine in future intervention evaluation because it can affect whether participants pay attention to the intervention information and affect processing of the information in the intervention advertisements. Based on the outcomes of the study, it is hoped that a better understanding of the impact of the PPPs on health promotion program delivery is achieved.

5.1. Summary of Study 1

The first study of the thesis in chapter 2 illustrated that the number of evaluated media campaigns continues to grow and there was some progress in terms of applying stronger research designs and theoretical frameworks. The review data also illustrated the trend of utilizing formative and process evaluation before conducting the outcome evaluation, which has been

recommended by previous researchers (Bauman et al., 2006; Leavy, Bull, Rosenberg, & Bauman, 2011).

Community-wide media campaigns have applied "multi-strategy" and "multi-channels," with the addition to other interpersonal supports such as programs. The effects of campaign activities have been assessed based on respondents' changes in their proximal and intermediate cognitions as well as distal behavioral changes. The review data supported previous research that the effect size of the campaign decreased when the level of the outcomes move from proximal to distal. In other words, campaigns are more effective to influence proximal (i.e., awareness) and intermediate antecedents (i.e., belief, attitude, and self-efficacy) that guided behavior than behavior itself. Furthermore, no one has yet considered the role of implicit cognitions when evaluating the campaign effects; rather, most research has incorporated explicit and controlled cognitions that are measured using self-report questionnaires. Few researchers have attempted to investigate how individuals respond to campaign advertisements and how information in the advertisement is processed that lead to cognitive and in turn, behavior changes.

To increase the effectiveness of community-wide media campaigns and to maintain the campaign effects from proximal to distal level, it is important to understand how media communication effects are determined. Communication effects are determined by respondents' selective mechanisms; respondents only attend to limited amount of information out of the abundant information via mediated messages and only those selected messages have the potential to influence subsequent cognitions and behavioral change (Valkenburg, Peter, & Walther, 2016). Respondents' selective mechanisms are determined based on dispositional factors including personal interests or goals (Valkenburg et al., 2016). Individuals are more likely to select specific information that automatically triggers personal goals stored in memory or match their interest

among abundant information transmitted via media channels (Lang, 2000). The selectivity is also determined by properties of mediated messages itself such as modalities, contextual and structural properties (Valkenburg et al., 2016). Individuals use sensory receptors such as eyes and ears when they react to campaign advertisements when accompanying diverse modalities, e.g., images, texts, and sounds (Lang, 2000). Furthermore, media contextual (e.g., lengths of texts and size of images) and structural properties (e.g., argument strength and delivery pace) also affect audiences' selectivity as well as psychological reactions they elicit (Slater et al, 2015). Inherent properties of the media interacting with personal dispositional factors affect respondents' storing process of the information in the message. Respondents associate the newly encoded information with existing information that had been already stored in memory; in this way, new mental representations are constructed and new information is stored (Lang, 2000). The more they think about the message the more thoroughly information is stored, and the readily accessible it is. Individuals refer to only accessible information that can be easily retrieved from memory when they evaluate an object or make a decision to perform a behavior. In sum, considering the features of media communication effects (e.g., individual's selectivity mechanism, inherent properties in the media) is needed in campaign evaluation research; it can help us predict how individuals, once exposed to the new information in the campaign, allocate attention to the information presented, store the new information in memory, potentially translate it into a new attitude and retrieve the new attitude from memory to make a decision to act on it, and finally to perform the appropriate action (McGuire, 1984; McGuire, Rice, & Atkin, 2001).

Once determinants of the media communication effects are considered and appropriate outcomes are selected, the next step is to determine how to measure such outcomes. Previous researchers have applied various measurements of proximal antecedents of physical activity and

physical activity behavior. In terms of measuring awareness, confusion around the definitions of "unprompted awareness," "prompted awareness" and "prompted recognition" exists, and the methods for computing such scores as overall awareness levels are inconsistent between researchers. Previous systematic review (c.f., Leavy et al., 2011) has reported the limitation of using self-report questions, i.e., the prevailing awareness of a particular campaign that has been promoted for a long time prior to measurements of unprompted awareness, and the bias of social desirability and ghost awareness when measuring prompted awareness. The problem using self-report questions still remain unsolved.

The first study of the thesis provides a rationale to propose campaign evaluators to incorporate a measure of automatic cognitions when determining the effectiveness of the campaign. Automatic cognitions have initially been discussed by dual-processing researchers who conceive human behavior as an outcome of two routes of mental processes either operated automatically or in a controlled way (Sheeran et al., 2016). Automatic processes are generally characterized as elicited "unintentionally," requiring few cognitive resources. Conversely, controlled processes are characterized as those that are initiated intentionally, requiring considerable amounts of cognitive resources (Moors & De Houwer, 2006). For example, dual processing theorists distinguish the attitude construct into two different cognitions: "implicit attitudes" as the outcome of automatic processes by activating affective associations in memory and "explicit attitudes" as the outcome of controlled processes based on the validation of prepositions. The review data revealed that effectiveness of the media campaign has been previously determined by changes in controlled cognitions that are measured by self-report questionnaires such as aided or unaided awareness, attitudes, and behavioral intentions. Not a

single evaluator has discussed how individuals' automatic cognitive processes are affected by the media campaign and how to measure outcomes of automatic processes.

Here, two important automatic cognitions are highlighted in order to better understand the effects of media physical activity campaigns. The first construct is attentional bias, which is defined as individuals' automatic attention paid to stimuli in the media advertisement that matches one's interest and motivation cannot be measured by self-reports (Moors, 2016). Attentional bias measures if campaign brand and keywords activate automatic selection processes that provide an opportunity to change further cognitions (such as beliefs, attitudes) and behaviors. Measuring attentional bias can provide evidence to identify whether media campaigns can serve as environmental cues to form a situated conceptualization in memory and any cognitive changes that may affect behavior.

The second important construct to be included in the campaign evaluation framework is implicit attitudes, defined as attitudes toward stimuli via associative processes when a situational or contextual cue automatically triggers preexisting structure of associations in the memory (Gawronski & Bodenhausen, 2006, 2011). Individuals construct attitudes toward stimuli based on automatically activated affective associations that exist in memory, i.e., implicit attitudes, and then validate such associations with reasoning and value of truth, i.e., explicit attitudes (Gawronski & Bodenhausen, 2006). Examining the strength and congruency between implicit and explicit attitudes are important because only congruent and strong attitudes are presumed to influence behavior (Gawronski & Bodehnausen, 2006; Howe & Krosnic, 2017). How mediated messages are attended and persuasive for individuals to change their attitudes to perform the behavior is a major goal of the campaign (Petty, Brinol, & Priester, 2009). Therefore, incorporating the measure of automatic cognitions such as attentional bias and implicit attitudes

in the campaign evaluation framework will provide evidence to help determine the success of a community-wide media campaign independent of self-reported awareness and explicit attitudes.

Based on the systematic review that identified the effectiveness of community-wide media campaigns, it is proposed that future evaluators should consider features of media communication effects and appropriate measures when developing an evaluation framework. The second study of this thesis empirically tested the effects of the community-wide physical activity campaign (UWALK). Guided by the hierarchy of effects model (HOEM), several constructs were selected as proximal and intermediate level individual factors. Furthermore, the study also applied a dual processing theory (i.e., the APE model) and incorporated outcomes of automatic and associative processes (attentional bias and implicit attitudes) in addition to controlled and propositional processes (self reported awareness and explicit attitudes) to test associations of implicit cognitions with explicit cognitions as well as the distal behavioral outcome of the campaign (leisure-time physical activity).

5.2. Summary of Study 2

The results of the second study showed a positive relationship between the unprompted awareness of the UWALK and automatic attention (attentional bias) toward UWALK relevant stimuli. This indicates those who are aware of UWALK when unprompted hold automatic attention paid to UWALK because what UWALK stands for matched these respondents' goals and interests. Furthermore, self-reported physical activity participation in leisure time was higher among participants in the UWALK aware group compared to the unaware group (even among those recruited from the UWALK website). This demonstrates that participants for whom UWALK was "top of mind" also reported more participation in leisure-time physical activity. This confirms the relationship between proximal and distal levels of the campaign outcome as

suggested in the HOEM. There were relationships among unprompted awareness of UWALK, attentional bias and physical activity participation. It may be that the UWALK awareness group stored a physical-activity relevant schema in memory. Therefore, when there is a cue that triggers behavior-relevant schema (i.e., UWALK logos and keywords), they pay automatic attention toward the cue. The research reported here is cross-sectional; it is, therefore, impossible to determine whether UWALK served as a cue that activated the automatic association in memory making attitude-consistent behavior more probable in later occasions after the exposure to the campaign (Papies et al., 2015). Or, they might have held schema relevant to physical activity from their repeated participation in physical activity; therefore, they paid automatic attention toward UWALK as it matched their schematic information about physical activity. Previous research supported that individuals are likely to automatically attend to behavior-relevant cues when they hold a behavior-relevant schema (e.g., exercisers showed attentional bias for cues related to exercise whereas nonexcisers showed attentional bias for cues related to sedentary lifestyles; Berry, 2006). In sum, attentional bias can predict behavior change when individuals hold a behavior-relevant schema; this construct needs to be included in campaign evaluation research because attentional bias provides additional information, independent of unprompted and prompted awareness measured on a questionnaire. Future research should apply experimental designs to test the causal relationship between the campaign exposure and behavior change because, as argued by others, cues associated with highly accessible attitudes may enable individuals to decide to partake in physical activity behavior more easily (Calitri et al., 2009).

Almost half of the participants who were recruited from the UWALK website did not cite UWALK when asked to name a program or a campaign that promoted walking or physical activity in the province Alberta. This is a critical point in the evaluation research because the

number of website visits are frequently used as a measure of campaign reach (Bauman et al., 2006). However, it can be problematic for physical activity promoters if they assume that the campaign brand is well-recognized by those who visit the campaign website. Only those who named UWALK without being prompted showed automatic allocation of their attention toward UWALK. Information that is top of mind and easily accessible is retrieved when individuals make a judgment toward an object (Lang, 2000; Howe & Krosnic, 2017); therefore, campaign evaluators need to be aware that not all website visitors are influenced by the campaign exposure and have potential to change behavior.

Participants aware of UWALK also reported more positive implicit attitudes for UWALK-relevant stimuli (e.g., walking) compared to unaware participants. These implicit measures were taken before the participants watched the UWALK video and the differences by awareness group are likely due to the activation of associations with UWALK stored in memory. In other words, for those who were aware of UWALK, the campaign was effective in automatically attracting attention and in activating positive associations toward related stimuli (Gawronski & Bodenhausen, 2011). Once individuals hold automatic preference to physical activity, it will trigger the whole conceptualization of physical activity stored in memory and further strengthen automatic associations between physical activity with positive affect (Papies, 2016). Implicit attitudes provide meaningful information to campaign evaluators as changes in implicit attitudes tells us how exposure to media campaign advertisements can strengthen automatic associations, independent of self-reported attitudes toward the campaign. This is an intriguing area for future evaluation research.

There were only differences in implicit attitudes by the UWALK awareness groups (aware vs. unaware) but not in explicit attitudes (both groups reported positive explicit attitudes

toward physical activity) and those who are aware of UWALK showed both positive explicit and implicit attitudes. This can be explained based on the contentions in the APE model (Gawronski & Bodenhausen, 2006). UWALK video increased cognitive elaboration but did not add new information in their propositional evaluation processes among participants in the awareness group. On the contrary, those who are not aware of UWALK showed positive explicit attitudes. Because the message in the video provided additional information, which might not align with their associative evaluation and the added information was considered as basis for an evaluative judgment (i.e., positive affective evaluation of physical activity; Gawronski & Bodenhausen, 2006). Campaign evaluators should examine both implicit and explicit cognitions because strong implicit attitudes that are congruent with explicit attitudes are used as reference for future judgments, behavioral intention, and ultimately affect behavior that is the most distal level outcome the campaign is intended to achieve (Berry, Rodgers, Markland, & Hall, 2016).

Unlike what the HOEM proposed, neither proximal awareness factor nor distal behavior factors were associated with explicit attitudes. This provides an important implication for campaign evaluators who generally measure attitudes using self report questions (i.e., explicit attitudes) to determine campaign effects. This could be because self reported attitudes toward physical activity reflect social desirability bias. It is well established that engaging in physical activity is socially desirable and being more active is a good way of maintaining health across all age groups (Bauman, Merom, Bull, Buchner, & Singh, 2016; Lin et al., 2015; Saunders et al., 2016). The bias of social desirability can be a potential confounder of relationships between self-report measures of physical activity (Klesges et al., 2004). Therefore, respondents are more likely to evaluate participating in physical activity in a positive direction due to their beliefs of participation in physical activity as being socially desirable. This further indicates the ceiling

effect on the self-reported attitudes scores. The baseline ceiling effects of high attitude scores makes it difficult for researchers to examine campaigns effects on attitudes among respondents because there is no room for change (Bauman et al., 2008). This further supports the importance of incorporating the measure of both implicit and explicit attitudes in the campaign evaluation framework.

Producing desirable outcomes of the campaign can be difficult in current media environments where abundant information is produced, disseminated, and consumed (Valkenburg et al., 2016). Campaign developers should consider how information in the campaign advertisement can attract the attention of target audiences, activate positive thoughts about the behavior, and retain these constructed mental representations in memory so that it can be easily retrieved when individuals make a choice of performing behavior (Lang, 2000). The preponderance of evaluation data suggests that campaigns have the potential power to influence cognitive outcomes (Atkin & Rice, 2013). The thought listing data demonstrated that respondents had overall positive thoughts about the video (including images, sounds, and content) regardless of their awareness of UWALK. This indicates a potential persuasive power of campaign messages to further affect individuals' behavior change. Identifying how to maintain campaign proximal impacts to distal level will enable improvement of the effectiveness of community-wide media campaigns.

5.3. Summary of Study 3

The focus of the first and the second study in this thesis was to examine the effectiveness community-wide interventions. Outcome evaluation demonstrates whether the interventions were effective or ineffective, rather than why the interventions were effective or ineffective. The

intervention being ineffective can be due to inappropriate design of the campaign activities or insufficient delivery, fidelity and adaption of the components. Therefore, the third study was to examine implementation process of a community-wide intervention when the intervention is delivered via a collaborative partnership between public and private organizations, which in turn affect the program outcomes. Unlike the first and the second studies of the thesis, which referred interventions as "community-wide media campaigns" to promote "physical activity" as target behavior, the intervention examined in the third study was "community-wide programs" that targeted "smokers to quit their habits" by joining in running group (called Run to Quit)." To deliver components for both quitting smoking supports and running supports, a collaborative partnership between public and private organization (PPP) was initiated. How participants viewed the collaboration between the public and private organization and its effectiveness to implement the program was examined to understand intervention fidelity. By answering the above questions, it is hoped that recommendations on how to initiate a collaborative PPP to effectively deliver a health promotion program are provided.

Overall, most participants recognized the Running Room's involvement in the program and reported the Running Room coaches' support was beneficial to keep them engaged in the program. However, there were negative perceptions of the program including the lack of involvement of the Canadian Cancer Society and a perceived disconnection between running and quitting smoking support. Participants tended to blame the Canadian Cancer Society on the lack of quit smoking supports although it was the Running Room coach who is responsible to deliver supports for both quitting and running. This can be the biggest concern of the public organization when collaborating with private sector to achieve social welfare. The results indicate that a power difference exists in the partnership, in favor of the corporate sector that brings resources to

the table (Herlin, 2015). The fact that the program wouldn't have existed without the Running Room's involvement supports previous research about the concern of power asymmetry between the partners. This also illustrates the public's blame falls disproportionately on the public organization when the program does not meet their expectation (Yancey et al., 2009). Public organizations should supervise to ensure the quality of the program and proper management of the partnership, because the accountability of the partnership mostly remains on a public organization (Boase, 2000). Furthermore, a public organization should maintain organizational legitimacy by taking actions that are desirable and appropriate within a society. Initiating a collaborative partnership with private sector should be aligning with organizational missions, i.e., redistribute revenues in the benefit of a cause. A negative view on the involvement of the Canadian Cancer Society's indicates the potential risk of the public organization in losing legitimacy.

Successful partnerships exist when there are coordinated activities consistent across organizations targeted at mutual objectives (Parent & Harvey, 2009). Coordination reflects the set of tasks each party expects the other to perform in a timely manner. The findings demonstrate that participants' satisfaction of the program participation was the greatest when the Canadian Cancer Society and the Running Room adequately performed its roles in delivering the program. Conversely, participants did not find the value of the partnership when there was a lack of coordination in delivering the activities of the program. Communicating with program facilitators from both the public and private organization to coordinate the roles and activities can help ensure implementation fidelity and consequently, the effectiveness of the program can be enhanced. The finding of the research indicates that there is a potential risk of public organizations to lose organizational legitimacy when collaborating with a for-profit company.

This should be considered when public organizations collaborate with the private sector to achieve social well-being. The findings also highlighted the need for practitioners to monitor how both partners perform to achieve the mutual goal of the program and bring synergy so as to result in achieving greater outcomes than when one party implements the program alone. Actual delivery of all the program components is a prerequisite to achieve intended program outcomes (Bauman & Nutbeam, 2013). Without implementation evaluation, the program becomes a black box where "situations for which inputs and outputs can be observed, but the connecting processes are not readily visible (Koepsell et al., 1992, p. 33)." By conducting a process evaluation based on theoretical consideration, program facilitators can open the black box and find methods to improve the program effects. What has been missing in previous literature is separating the evaluation of partnership outcomes from the program outcomes. Future research needs to test, although it would be challenging, a causal relationship between the PPPs and the program effects by applying an experimental or a quasi-experimental design, e.g., delivering the program through PPPs vs. through either a public or private organization.

Bringing the findings of the second and the third study together, it is anticipated that individuals' perception of the partnering organization may have a significant role when they evaluate information about the intervention such as program or campaign advertisements. Intervention materials and advertisements generally accompany information of partnering organizations (e.g., brand names and logos) in addition to main messages. This is the main objective of a private company to be involved in a partnership for public benefits (i.e., a partnering company gains the ability to leverage its connection to a campaign as its marketing and communication opportunities; Meenaghan, 2001). Repeated exposure to campaign advertisements that contain partners' information may lead respondents to store the whole

conceptualization of the partner with the campaign in memory (McDaniel, 1999). They are likely to allocate attention toward a cue that trigger the information stored in their memory, and it may influence attitudes and behavioral intention toward advertised brands and related marketing communication (McDaniel, 1999). In other words, those who store information of the partnering organization may automatically pay attention toward a campaign advertisement incorporating the partner name over other stimuli in environment. This will subsequently be transferred when evaluating the campaign and constructing cognitive (e.g., positive attitudes toward the campaign) and behavioral reactions (e.g., performing the behavior as the campaign promotes).

Sponsorship researchers have mainly focused on examining how sponsoring an event affects respondents' awareness of and attitudes toward the sponsors (McDaniel, 1999). Once sponsoring brand association with the event is salient to individuals, their positive valence for an event is transferred to a sponsor (Keller, 1993; McDaniel, 1999). Walker and colleagues (Walker, Hall, Todd, & Kent, 2011) also revealed a inverse relationship such that the sponsor's image is transferred to an evaluation of the event via sponsorship platform; the more positive perception the respondents had toward a sponsor, the higher the likelihood to attend the event and the higher the perceived quality of the event. Furthermore, the relatedness or the fit between the event and the sponsor has been found to influence consumer perceptions of event quality (Walker et al., 2011).

Underpinning sponsorship literature, it is proposed that how individuals view partnering organizations affect cognitive and behavior reaction toward the intervention. When individuals hold memory-based expectations of the partnering organization, they are more likely to allocate their automatic attention toward the advertisement of the intervention that incorporate cues (e.g., a logo, brand name) and information of the organization. Furthermore, attitudes toward the

partner can also be transferred to attitudes toward the intervention such that positive evaluations of the partner influence individuals in a positive direction when they process the campaign messages. This is because information of the company stored in memory is automatically activated when exposed to the advertisement and the association of the partner with an intervention will be provided as evidence when they evaluate the intervention.

All participants of the Run to Quit program recalled that the Running Room was the partnering organization of the program. This indicates the Running Room can potentially serve as a cue to trigger automatic attention to the Run to Quit advertisement in the media (posters or media advertisements) or future intervention that the Running Room sponsors. Once participants hold memory-based expectations of the Running Room, this triggers automatic associations with the Running Room brand. Automatic associations of the Running Room may in turn be referred when evaluating the intervention. For example, when one holds positive attitudes toward the Running Room constructed from previous experiences, he or she is more likely to automatically pay attention toward the advertisement about the intervention that the Running Room is involved in, at the expense of other stimuli in the environment. Once triggered by the Running Room relevant cue, he or she will automatically activate positive thoughts about the Running Room that exist in memory to construct implicit attitudes toward the intervention, and then validate such associations with reasoning based on information in the advertisement (constructing explicit attitudes toward the intervention; Gawronski & Bodenhausen, 2006). Conversely, the involvement of the Canadian Cancer Society was not well received by the participants. Therefore, the Canadian Cancer Society may not serve a cue to trigger automatic attentions toward the intervention. Furthermore, when a negative perception of the Canadian Cancer Society's involvement is stored in memory, the negative automatic associations will be provided

as evidence when individuals evaluate a future intervention implemented by the Canadian Cancer Society.

In sum, perceptions of the partnering organizations will possibly affect how individuals evaluate the intervention. A major question when assessing the effects the intervention especially, the campaign is how messages are attended and whether the arguments in the messages are persuasive for individuals to change their attitudes to perform the behavior (Petty, Brinol, & Priester, 2009). Identifying automatic attentions and associations toward a partnering organization will provide meaningful information when evaluating the intervention effects.

5.4. Strengths

The thesis is all based on empirical research: 1) the first study is a comprehensive review of articles that examined the effectiveness of media physical activity campaign implemented in real world setting, 2) the second and the third studies examined a community-wide campaign and program at the individual level. The findings of the three studies are applicable in real world settings and provided knowledge translation from academia into practice. The first study is the most updated review that synthesized recent campaign evaluation research. The results illustrated the current media campaign activities (campaign scale, duration, channels used, media exposure, and target audiences) as well as features of evaluation (outcome measures, evaluation design, and sample size). The review also achieved the rigor of the findings by assessing the quality of the articles included in the review. The greatest outcome is that the review summarized the effectiveness of the campaigns evaluated in each study, i.e., changing in respondents' proximal, intermediate and distal factors caused by the campaign; this provides health promoters with evidence of best practices to refer when they develop a community-wide physical activity campaign with a similar scale.

The second study is unique as it is the first attempt to incorporate the measure of automatic cognitions in the physical activity campaign evaluation framework. The result demonstrated that individuals who were aware of the campaign when unprompted showed automatic attention toward the campaign, implicit attitudes toward physical activity, and had higher level of physical activity participation compared to their unaware counterpart. Furthermore, the strongest predictor of physical activity behavior was implicit attitudes whereas explicit attitudes were not associated with participation in physical activity. In sum, the outcome of the research contributed to the evaluation literature by demonstrating that applying the automatic cognitions can provide additional information, independent of self-reported explicit cognitions. The application of a theoretical framework, the hierarchy of effects model, was another strength of the second study, which guides the selection of outcome factors, measurement and data analysis accordingly. Lastly, internal and external validity was achieved by applying reliable online implicit measurement in a natural setting. This shows the feasibility of testing automatic cognitions in a community-wide campaign evaluation that requires a population representative sample.

The third study was an examination of how participants viewed a public-private partnership in implementing an existing smoking cessation program. A unique contribution of the research to both academia and practice is that the result is based on the empirical examination of an existing partnership. Previous research highlighted that specific objectives of the partnership (e.g., addressing public health problems) may not overlap with the organizational objectives of the partnership (e.g., increasing financial and in kind support to implement the intervention as public sector objectives and reputational and financial gains as private sector objectives; Madill et al., 2014). Therefore, the research focused on answering whether the

partnership was effective in achieving the partnership objective: improving the effects of the health promotion program, rather than focusing on whether the objectives of the partnering organizations were achieved from the partnership. Based on the results revealed in the third study, it was highlighted that PPPs may not bring synergistic outcomes if the activities each partner implements are not properly coordinated. Ensuring the accountability and organizational legitimacy and managing power asymmetry in a collaborative partnership were proposed to improve program effects in the future partnerships. Based on the findings of the second and the third studies, it is anticipated that individuals' perceptions of partnering organizations provide evidence when they evaluate the intervention. This is because the intervention advertisements containing the partner name or logo may trigger information of the partner stored in memory from previous experiences about the organization and be transferred to the intervention. Examining participants' attention toward the information as triggered by the partner cue (i.e., attentional bias) and activation of automatic associations (i.e., implicit attitudes) will provide additional information to evaluators of the intervention as these automatic cognitions precede further cognitions such as behavioral intentions and ultimately make a decision of performing a targeted behavior.

5.5. Limitations

As the thesis was based on empirical studies, this also limited the researcher's control over the evaluation of the intervention to provide more rigorous research outcomes. Recruitment of the participants in the second and the third study was out of the researcher's control; the representativeness of the sample was not achieved and this may hinder the generalizability of the findings. The second study applied a cross-sectional design, as it was the only feasible research design. Thus, it was not defined whether attentional bias and implicit attitudes resulted in

physical activity behavior or previous experience of engaging in physical activity preceded a schema and implicit associations. Future research is advised to apply a longitudinal design so that a causal relationship among proximal, intermediate and distal outcomes of the campaign can be tested.

In the third study, phone interviews was the only feasible data collection method to examine participants' perceptions of the partnership because participants were from across Canada; conducting a face-to-face interviews is suggested to address limitations of losing nonverbal data such as body language and facial expressions when using telephone interviews and provide interviewees' momentary emotions and attention paid to the interview (Irvine, Drew, & Sainsbury, 2013). Furthermore, the interview participant pool was limited to one stakeholder, i.e., program participants. Public-private partnerships generally involve various stakeholders including program funders, partnering organization decision makers in each partnering organization, program developers and implementers (e.g., staff and coaches). Having different stakeholders such as decision makers in the partnering organizations, program facilitators and coordinators, could have provided more comprehensive information to draw a conclusion of the partnership effects of the health promotion intervention implementation. Applying a mixed method design by collecting quantitative data from program participants (e.g., using self report questionnaires) in addition to a qualitative data will help to ensure both the breath and the depth of the findings of the research.

Moreover, the research questions of the second and the third study could have been tested under the same intervention context (either UWALK or Run to Quit) to achieve better understanding of process and outcome evaluation of the intervention. For example, it could have been tested whether participants showed automatic attention and strong implicit attitudes toward

Run to Quit and whether such cognitions were related there self reported awareness and attitudes toward Run to Quit, in turn affected their behavior change (quitting smoking via running). Conversely, implementation process of Run to Quit identified in the third study could have been tested in UWALK evaluation such that whether materials of UWALK were appropriately delivered as planned with sufficient reach.

The first study was limited to the outcome evaluations of the campaign effects. Several studies included the information of formative and process evaluation in addition to the results of the outcome evaluation, yet, the information reported in the articles are not sufficient to update the trend of recent formative and process evaluation researches. As found in the third study, understanding process and implementation of the intervention, how the intervention was delivered as planned, is deemed important to comprehend why the intervention has succeeded or failed to achieve the outcomes. Future review should be conducted that synthesizes articles of formative and implementation evaluation of community-wide interventions including not only peer-reviewed scholarly studies but also grey literature whose quality is assessed. Health promoters will be greatly benefitted when they develop, implement, and evaluate a community-wide health intervention in the future.

5.6. Implication and Conclusion

As public health becomes an important global and national agenda for populations, a great deal of effort has been invested to initiate large-scale interventions to address public health problems (Michie et al., 2011). Behavior change interventions are fundamental to the effective practice of public health. The evaluation of interventions can provide a learning opportunity for health promoters to enhance the effectiveness of future efforts (Madill et al., 2014). Testing the effectiveness of interventions that have been conducted in real world settings serves as guidance

for health promoters when they establish an evidence-based intervention. PPPs in implementation of community-wide health promotion interventions continue to engage the attention of public sector in search of strategies to mobilize resources beyond those available to public sector entities alone, and offering solutions to complex problems (Birkenhoff & Birkenhoff, 2011). PPPs are also gaining in popularity among the private sector that are looking for opportunities to differentiate themselves from other competitors and for increasing reputational or financial gains (Herlin, 2015). Examining the consequences of PPPs on the implementation and outcome of the intervention provide evidence whether the partnership has actually resulted in positive impacts on participants of the intervention (separate from achieving organizational objectives) and how to prevent negative consequences in future interventions.

The thesis was guided by the question "how should community-wide interventions be evaluated in order to provide better evidence to improve intervention effects in future interventions?" To answer this question, the thesis started with the comprehensive review, which identified scholarly articles from various databases to be screened, appraised, and synthesized. The findings of the first study illustrated that the effectiveness of community-wide media physical activity campaigns continued to grow based on the number of studies published. The studies included in the review made some progress in terms of applying stronger research designs, theoretical frameworks, utilizing formative and process evaluation before conducting the outcome evaluation). Furthermore, the advancement of media technology and growth of media consumption were reflected in the community-wide media campaign environment. Studies included in the review have all examined self-reported controlled cognitions as antecedents of behavioral changes; this indicates that there is room for improvement in terms of incorporating automatic cognitions and appropriate measures to determine the effectiveness of the campaign.

Examining automatic cognitions such as attentional bias toward the campaign and implicit attitudes toward the behavior is recommended for future campaign evaluators as it provides evidence how campaign advertisements are attended and information in the messages are processes, which in turn affect the target behavior. Overall, this updated review helps health promotion researchers and practitioners to develop, implement, and evaluate media campaigns by providing the most recent evidence of campaign effectiveness on multiple levels of perspectives.

The second study tested the effects of the community-wide physical activity campaign (UWALK). Guided by the APE model, the study tested associations of automatic cognitions (attentional bias and implicit attitudes) with explicit cognitions (self reported awareness and explicit attitudes) as well as the distal behavioral outcome of the campaign (leisure-time physical activity). The outcome of the research proposed incorporating the measure of automatic cognitions as a solution to better understand the campaign effects. Furthermore, the results support previous work that the HOEM can be applied in planning and evaluating a community-wide physical activity campaign, and helps understand how such initiatives can influence community awareness of the existence of the campaign, contribute to positive cognitive changes and increased participation of physical activity. This study provides unique insight through the incorporation of measures of implicit associations in the evaluation of the community-wide physical activity campaign, especially in a non-experimental setting. This contributes to a significant growth to both research and practice as the current study proves the feasibility of the application of an online implicit experiment when assessing the effects of a campaign.

The third study illustrated potential benefits of public-private partnerships as well as challenges in implementing the program when multiple organizations are engaged. Identifying

the consequences of the partnership on program implementation provides evidence whether the partnership has actually improved the program and whether it has positively affected participants' experiences of the program. This contributed to the partnership literature, as it is empirical evaluation of the partnership effects on the program. Furthermore, unlike previous literature that identified organizational gains from the partnership, this research examined how partnerships influenced on achieving specific objectives of the partnership (i.e., implementation of the community-wide health promotion intervention).

How individuals perceive the partnering organization needs to be examined in intervention evaluation research as it can influence how individuals process information in the advertisements of the intervention. Based on the results revealed in the second study, it is expected partner organization brand names and logos in the advertisement work as a cue to activate a relevant information and trigger affective associations stored in memory, which affect further cognitive processing of the advertisement. Those who hold information about the partner constructed from previous experiences in memory will pay attention toward the advertisement and automatic associations about the partner will be used as evidence when they make cognitive and affective judgments of the intervention. By looking at participants' perceptions of the partner, the intervention effects can be better predicted.

The findings from this thesis reveal several practical applications worthy of future health promotion interventions in the development, implementation, and evaluation process. First, it would be valuable to understand how human behavior is modified and affected. Behavior is not only the outcome of propositional, conscious, reasoning process but also the associative and automatic evaluation. How interventions can tackle both processes should be understood among the intervention developers as well as other stakeholders including the funders. This provides

overall direction for an intervention. Furthermore, this identifies achievable objectives and measurable outcomes based on the duration of the intervention and timeframe for the evaluation. Change in behavior of the whole population is not always achievable in the short or medium-term; rather, change in psychological antecedents may be the first to look to predict behavior. The environment also indirectly influences behavior; thus, understanding the repercussion effect of the intervention should be acknowledged. It is suggested that how campaign messages can be paid attention to by the target population and how the messages can automatically trigger positive association stored in memory is important to increase the campaign effects.

One possible strategy can be "branding" the intervention. Branding has been a widely used marketing strategy to create schemas and identities that guide consumption behavior (Evans, et al., 2015). Branding an intervention is a principle to promote and produce behavior change as a public good by specifying how brand associations and beliefs can in turn influence behavior. Successful branding is, therefore, expected to provide value to the consumer (whether it is worth an effort in return for the behavior recommended by the branded intervention). Branding provides a symbolic representation to communicate the value to the target audiences and strengthen the association with the brand. Successful branding of the intervention offers superior value and outstanding recognition in various social situation and environment. For example, if the UWALK brand creates a unique value to the target audiences, it can serve to influence attitudes, beliefs, and behavior as UWALK promotes. Such branding efforts can be measured by examining whether the target audiences pay attention toward the brand at the expense of other stimuli in the environment, and whether the brand provides schematic information that can automatically trigger positive associations stored in memory.

Not only the branding of the intervention itself, but also the brand of the partnering organization may influence the intervention effects. Exposure of the brand of the partner to the program participants (or potential participants) is expected no matter whether the partnership is philanthropic, sponsorship, or collaborative in nature. The main objective of advertising is to increase purchasing intention and behavior by firstly raising the awareness and the salience of a brand, and then forming positive attitudes toward it. When exposed to the advertisement of the intervention, individuals first allocate their automatic attention toward the advertisement of the intervention that incorporate cues (e.g., a logo, brand name) related to the partner. If the brand is salient in respondents' minds, it will automatically trigger relevant associations of the information stored in memory and provide evidence to further evaluate information in the message. If the brand is not salient to the respondents, the brand image and association will not provide any additional information. Therefore, understanding how perceptions of the brand of the partner can possibly affect the advertisement of the intervention, campaign messages, registration of the intervention, and experience of participating in the intervention will provide implications to practitioners when partnership is inevitable in delivering the intervention.

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Appendices

1. Chapter 2.

1. Search strategy

Medline search strategy

1. Concept 1: Communications
2. counter adj marketing or (counter adj advertis*)).ti,ab. or
3. social marketing.sh.
4. exp health communication/
5. (health adj marketing).ti,ab.
6. adverti?*.mp.
7. mass media/
8. ((media adj campaign*) or campaign* or (public adj education) or branding or brands or (diffusion adj information) or (diffusion adj innovation)).ti,ab.
9. or/2-8
10. Concept 2: Physical activity
11. ((physical adj activity) or fitness or exercise).ti,ab.
12. 9 and 11
13. Limit to 2010-current

2. List of electronic databases searched (records retrieved; date searched)

Medical

Medline (n=734; December 18, 2015; revised search April 27, 2016 and limited 2010-2015)
PubMed (n=711; December 18, 2015; revised search April 27, 2016 and limited 2010-2015)
PsycInfo (n=390; December 18, 2015; revised search April 27, 2016 and limited 2010-2015)
EMBASE (n=471; December 18, 2015; limited to humans, articles; revised search April 27, 2016 and limited 2010-2015)
CINAHL (n=228; December 18, 2015; revised search April 27, 2016 and limited 2010-2015)

Other (physical activity, sport, communications, business)

SportDISCUS (n=229; December 18, 2015; limited to academic articles; revised search April 27, 2016 and limited 2010-2015)
Current Contents (n=855; December 18, 2015; revised search April 27, 2016 and limited 2010-2015)

Web of Science (n=2445; December 18, 2015; revised search April 27, 2016 and limited 2010-2015)
Academic Search Complete (n=347; December 18, 2015; restricted to academic articles and scholarly journals;
NOT(animal* or insect* or tobacco or cigarette* or smoking or pain or supplement* or politic* or nutrition*) revised search April 27, 2016 and limited 2010-2015
Business Source Complete (n=56; December 18, 2015; limited to scholarly and academic articles; revised search April 27, 2016 and limited 2010-2015)
Health Source: Consumer Edition (n=5; December 18, 2015)

Total 6471, duplicate 5010 removed 1461

Updated search: December 18, 2015-September 22, 2016

Medical

Medline (n=105); limited by 2016
PubMed (n=6)
PsycInfo (n=22)
EMBASE (n=137; limited to humans, articles)
CINAHL (n=0)

Other (physical activity, sport, communications, business)

SportDISCUS (n=1; limited to academic articles)
Current Contents (n=0)
Web of Science (n=2)
Academic Search Complete (n=125; restricted to academic articles and scholarly journals;
NOT(animal* or insect* or tobacco or cigarette* or smoking or pain or supplement* or politic* or nutrition*)
Business Source Complete (n=19; limited to scholarly and academic articles)
Health Source: Consumer Edition (n=0)

Removed 44 duplicates; update = 231

Total initial included articles = 1692

2. Chapter 3.

1. Questionnaires

Please answer the following questions. There are no right or wrong answers.

Unprompted recall:

"Are you aware of any programs or campaigns that promote walking or physical activity in Alberta? If yes, please name.

Prompted recall:

"Have you ever heard of UWALK Alberta?" yes/no

Watching the UWALK video for 30 seconds

Thought listing.

Please list any thoughts you had while watching the UWALK video.

1.

2.

3.

4.

5.

Attitude:

Adults should walk at least 150 minutes a week because regular walking can improve health.

Please answer following questionnaires based on your thoughts about walking.

Walking is ---------- .

1	2	3	4	5	6	7
Very harmful			neutral			Very beneficial
1	2	3	4	5	6	7
Very pleasant			neutral			Very unpleasant
1	2	3	4	5	6	7
Very good			neutral			Very bad
1	2	3	4	5	6	7
Very worthless			neutral			Very valuable
1	2	3	4	5	6	7
Very enjoyable			neutral			Very unenjoyable
1	2	3	4	5	6	7

Very Healthy			neutral			Very unhealthy
1	2	3	4	5	6	7
Very pleasurable			neutral			Very painful
1	2	3	4	5	6	7
Very important			neutral			Very unimportant

Leisure time physical activity:

During a typical **7-Day period** (a week), how many times on the average do you do the following kinds of exercise for **more than 15 minutes** during your free time (write on each line the appropriate number).

Times Per Week

a) STRENUOUS EXERCISE (HEART BEATS RAPIDLY) _____

(e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)

b) MODERATE EXERCISE (NOT EXHAUSTING) _____

(e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)

c) MILD EXERCISE (MINIMAL EFFORT) _____

(e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking)

2. During a typical **7-Day period** (a week), in your leisure time, how often do you engage in any regular activity **long enough to work up a sweat** (heart beats rapidly)?

OFTEN	SOMETIMES	NEVER/RARELY
1	2	3

Describe your physical activity at leisure time. If the activities vary between summer and winter, try to give a mean estimate (check one box)

1	Very light: almost no activity at all
2	Light, e.g., walking, nonstrenuous cycling or gardening approximately once a week
3	Moderate: regular activity at least once a week, e.g., walking, bicycling, or gardening or walking to work 10–30 min day
4	Active: regular activities more than once a week, e.g., intense walking or

bicycling or sports

5 Very active: strenuous activities several times a week

Source credibility:

The message in the UWALK advertisement you just viewed is ----------.

unbelievable	1	2	3	4	5	6	7	believable
unconvincing	1	2	3	4	5	6	7	convincing
untrustworthy	1	2	3	4	5	6	7	trustworthy
Incredible	1	2	3	4	5	6	7	credible
unreasonable	1	2	3	4	5	6	7	reasonable
Dishonest	1	2	3	4	5	6	7	honest
unquestionable	1	2	3	4	5	6	7	questionable
Conclusive	1	2	3	4	5	6	7	inconclusive
Authentic	1	2	3	4	5	6	7	inauthentic

likely 1 2 3 4 5 6 7 unlikely

Attention paid to the experiment:

How much attention did you pay during the experiment?"

1 2 3 4 5 6 7

Not at all Very much

Finally, we just need some information so that we can describe, in general, the people who completed this experiment.

Age: _____ years

Gender: male / female

Ethnicity (e.g., causasian, aboriginal, southeast Asian) : _____

Highest level of education reached:

Less than high school	1
High school	2
College or technical school diploma	3
Undergraduate university degree	4
Graduate university degree (e.g., master's, PhD)	5

What is your marital status?

Married/Common-Law/Living with partner	1
Divorced/Separated	2
Widowed	3
Single, Never Married	4
No Response	5

What was your total household income, before taxes, last year?

Under $20,000	1
$20,000 - 39,999	2
$40,000 - 59,999	3
$60,000 - 79,999	4
$80,000 - 99,999	5
$100,000 or more	6
No Response	7

What is your postal code? ----------

How often do you use the Internet?

1	2	3	4	5
Never	1 – 2 days per week	3 – 4 days per week	5 – 6 days per week	everyday

2. Images used in the dot-probe task

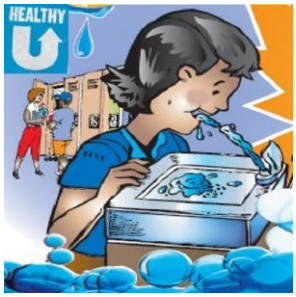
UWALK images

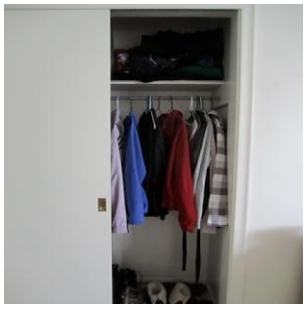
	

HealthyU images

Control images

3. Chapter 4.

1. Interview Guideline

<Semi-structured interview guide>

Facilitator's welcome, introduction and instructions to participants

Hello, is this OOOO?

My name is Lira Yun, a PhD student at the University of Alberta doing research. I am calling you because you agreed to be contacted by evaluation team of Run to Quit program. Is this good time for you to have a short conversation with me?

Thank you for volunteering to take part in this interview and I appreciate your time.

Introduction: The purpose of interviewing you today is to understand your thoughts and feelings about how a public and private organization works together to initiate a health promotion program. The interview will take about 20 minutes. May I tape the conversation to transcribe for the research purpose?

Anonymity: Despite being taped, our conversation will be anonymous. The tapes will be kept safely in a locked facility until they are transcribed, then they will be destroyed. The transcription will contain no information that would allow you to be identified. If there are any questions you don't want to answer, you don't have to. However, I encourage you to answer honestly and be as involved as possible. Are you feeling comfortable? Shall I start?

Opening questions

- Please think about your experience as a participant of the Run to Quit program. What is your impression of participating in the program?

Transition Questions

- Can you name all the partnering organizations who funded and implemented the program?

(If an interviewee names the Running Room (RR) and the Canadian Cancer Society (CCS))

- (If an interviewee names the RR and the CCS)

Do you think the collaboration between the Running Room and the Canadian Cancer Society had any influence on your impression about the program?

Probe: were you satisfied with the program more or less because the Running Room and the Canadian Cancer Society jointly initiated the program?

- (If an interviewee names the RR)

  How did the Running Room's sponsorship of the program affect what you thought of the Run to Quit Program?

  Probe: were you satisfied with the program more or less because it was the Running Room who implemented the program?

- (If an interviewee names the CCS)

  How did the Canadian Cancer Society's initiation of the program affect what you thought of the Run to Quit Program?

  Probe: were you satisfied with the program more or less because it was the Canadian Cancer Society who funded and initiated the program?

- (If an interviewee names the RR)

  After you have participated in the program, how much did your participation change your thought about the Running Room brand?

  Probe: Could you tell me whether you have more positive or negative thoughts about the Running Room brand or whether it has not changed after your participation?

- (If an interviewee names the CCS)

  After you have participated in the program, how much did your participation change your thought about the Canadian Cancer Society brand?

Probe: Could you tell me whether you have more positive or negative thoughts about the Canadian Cancer Society brand or whether it has not changed after your participation?

(If an interviewee names neither the Running Room nor the Canadian Cancer Society) Go to key questions.

Key Questions

- Are there other organizations you would prefer to offer the program (e.g., at the YMCA center, the complex at the university, and community recreation facilities)?
- What is the main reason for you to prefer ---------- ?
- How important is it for you which organization offers a program like Run to Quit?

  Probe: would you have participated no matter who offered it?
- What is your impression of a partnership between a public organization (like the Canadian Cancer Society) and a private corporate (like the Running Room) in initiating health promotion programs like Run to Quit?

  Probe: do you think private corporations should be involved? Public corporations? Does it make any difference to you?

Last Question

- Is there anything else that you want to tell us about the program that we haven't talked about already?

If you are okay, can I ask your age and marital status?

Thank you for sharing your experiences and opinions with me today! You've given me a lot to think about.

Hope you to enjoy the rest of your day!