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Evaluation of mass-reach physical activity campaigns: considering automatic processes

Introduction

The purpose of this paper is to argue that automatic processes should be taken into account when evaluating mass-reach physical activity promotion campaigns, which aim to communicate physical activity information to adults (Bauman & Chau, 2009). Physical inactivity in adults is a problem across the world (Guthold, Stevens, Riley, & Bull, 2018) and mass-reach campaigns play an important role in promoting physical activity and changing societal norms about active lifestyles (Bauman & Chau, 2009). Thus, the continued evaluation of mass-reach programs is needed. One way to advance evaluation efforts is to include the measurement of automatic processes. As will be further outlined, the measured outcomes of automatic processes can be moderators of campaign effects or can emerge as a result of a campaign. Hypotheses are proposed with the intention of prompting research in this area.

The inclusion of automatic processes within an evaluation framework is necessary as the majority of evaluation and research in this area has focused on reasoned (explicit) processes that represent effortful thinking about presented information that has been deliberately attended to (c.f., Berry, 2018). The automatic processes discussed in this paper, on the other hand, are based on associations that are created over time through learning and experience or exist outside of working memory (Gawronski & Bodenhausen, 2006). Marteau, Hollands, and Fletcher (2012) argued that automatic processes should be targeted

by health behavior change interventions. They also wrote that information-based interventions, of which mass-reach campaigns are an example, are limited because they rely on reasoning about the message. However, although mass-reach campaigns may be intentionally thought about, the current paper also outlines ways in which automatic processes may also be considered within mass-reach campaigns.

Reasoned and automatic processes are generally considered together within dual-processing models such as the associative-propositional evaluative model (Gawronski & Bodenhausen, 2006) or the reflective-impulsive model (Strack & Deutsch, 2004). Although there is some debate regarding the strict dichotomization of processes into either reasoned or explicit (c.f., Melnikoff & Bargh, 2018), there is no doubt that much of human cognition occurs automatically, the consequences of which should not be overlooked. For the purposes of this paper, “automaticity” refers to the unintentional or uncontrollable nature of processes: those that are activated without the intention to do so even if a person may be aware of the activation (Fiedler & Hutter, 2014). For example, associations between concepts (e.g., physical activity and health) can be automatically activated after encountering a related environmental cue (Gawronski & Bodenhausen, 2006) or attention can be automatically allocated to things that match one’s interest or motivation (Mogg, Bradley, Hyare, & Lee, 1998).

Mass-reach physical activity campaigns are usually evaluated based on the assumption that behavior change

is an outcome of higher-level cognitive operations such as intentions (Yun, Ori, Lee, Berry, & Sivak, 2017). Although limited attention has been paid to automatic processes in campaign evaluation research, several authors have highlighted the importance of including automatic processes within health behavior change interventions in general (e.g., Marteau et al., 2012). For example, Michie, van Stralen, and West (2011) situate automatic processes within their “behavior change wheel” of intervention development as motivation factors that can be influenced by communication and marketing. Papies (2016) also created a framework that illustrates how health interventions (albeit not mass-reach campaigns) can be created to change automatic health-related goals and behaviors such as habits and impulsive decisions. These are important frameworks that illustrate a shift away from only considering reasoned processes within health behavior interventions and marketing. However, there is limited guidance for the inclusion of measurement of automatic processes when evaluating mass-reach campaigns and advertisements.

Evaluators of physical activity promotion campaigns could follow the lead of consumer psychologists who do not rely on reasoned processing of advertisements and use measures that capture outcomes of automatic processes to better understand how to sell products (Perkins & Forehand, 2010). These processes could be considered within hierarchy-of-effects models, which are often used to assess the effects of advertising and communications (Eisend & Tarrahi,

2016). Hierarchy-of-effects models propose that advertising and communication effects unfold in a hierarchical way such that proximal outcomes, such as awareness, are needed before more distal effects (e.g., attitude change) occur, with behavior the most distal.

There are several automatic constructs that may augment evaluation of mass-reach physical activity promotion campaigns and advertisements. As outlined in the next sections, researchers have examined constructs such as attentional bias, automatic associations (often referred to as implicit attitudes), and the moderating role of exercise schema in the processing of physical activity messages. Although the majority of this research is experimental, there are a few examples of how automatic processes have been incorporated within evaluation research, and further research is needed to examine “real-world” applications of these processes. This paper is intended as a guide for those interested.

Theoretical background

Mass-reach physical activity campaigns are designed to deliver messages about physical activity to a large population across different media including print, television, radio, and websites (Bauman & Chau, 2009). These messages are often in the form of advertising, the effects of which have received considerable research attention in the commercial advertising, marketing, and communication literature (Eisend & Tarrahi, 2016). The effectiveness of physical activity promotion advertisements and messages can be considered in light of possible outcome variables outlined by Eisend and Tarrahi (2016; Table 1, p. 521). The advertising output measures, including attitude, behavior, emotion, cognition, memory, credibility, and processing, are relevant to research examining physical activity promotion efforts.

Hierarchy of effects

Many of the output measures outlined above are included in models that have been used to evaluate mass-reach physical activity campaigns such as Cavill and

Bauman's (2004) physical activity-specific hierarchy-of-effects model. Their hierarchy of effects model, like more general advertising hierarchy-of-effects models, conceptualizes physical activity communication impact as a series that connects proximal factors (awareness of the campaign brand and key messages) to intervening variables related to the communication message (knowledge of physical activity, attitudes, and beliefs, self-efficacy, and intentions to be active), and finally to distal factors (physical activity behavior). Cavill and Bauman contend that rather than focus on behavior change as the only possible outcome of a physical activity mass-reach campaign, desirable change may occur in more proximal factors to exposure starting with awareness (e.g., brand recognition), through changes in physical activity-related knowledge, or attitudes, to behavior.

Cavill and Bauman's hierarchy-of-effects model has been used to guide the evaluation of mass media physical activity campaigns created by organizations such as VERB in the United States (Bauman et al., 2008) and Canada's ParticipACTION (Craig, Bauman, & Reger-Nash, 2010), although some studies have found limited support for the sequence of effects outlined in the model such that awareness and understanding led to behavior change, independent of attitudes (Bauman et al., 2008). This model also does not include automatic processes, the addition of which may provide additional information about campaign effectiveness or about the sequence of campaign effects. Of course, there are other frameworks developed to incorporate automatic processes into health behavior interventions (e.g., that developed by Pappas, 2016, in which a mass reach advertisement could be a situational cue that automatically activates a goal, leading to behavior) but none are specific to the evaluation of mass-reach campaigns. Therefore, the hypotheses proposed in the current paper build on Cavill and Bauman's (2004) hierarchy-of-effects model to provide points at which automatic processes can be included into the evaluation of mass-reach physical activity promotion campaigns. In an attempt at parsimony,

variables such as source credibility or mood that are known to influence message processing (Petty, Priester, & Brinol, 2002) are not considered here. Rather, broader hypotheses are offered as starting points for the investigation of the effects of mass-reach campaigns on both automatic and reasoned processes. The hypotheses are summarized in **Table 1** in conjunction with corresponding levels within hierarchy of effects.

Automatic associations and affect

Eisend and Tahari (2016) conducted a meta-meta-analysis (i.e., a meta-analysis of meta-analyses), which provided broad findings regarding how hierarchies of advertising effectiveness change depending on which input and output variables are considered. For example, they found that advertising characteristics can directly trigger cognition and/or affect before influencing attitudes. According to Eisend and Tahari, cognitions (i.e., thinking about information) and emotions can have equally strong effects and precede attitudes. That is, depending on conditions, a person may be persuaded because he or she is thinking about information or may be influenced by an affective response.

The affective-reflective theory (ART; Brand & Ekkekakis, 2018) of physical inactivity and exercise postulates that external (e.g., a message) or internal (e.g., a memory) stimuli automatically activate related associations, which, in turn, activate automatic affective valuations of the behavior. The affective response is the source of automatic action impulses or controlled, reflective evaluations, resulting in reflective action plans. The ART includes the possibilities of approach-avoidance conflict. For example, although the action plan may be to exercise, the affective impulse may be to maintain the current pleasurable inactive state. According to this model, the affective valuation of physical activity or exercise is created by repeated experiences of emotions or physical sensations during activity or when perceiving related stimuli. Importantly for the current paper, the ART concentrates on the moment when a person perceives

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Abstract

Mass-reach physical activity campaigns are usually evaluated based on the assumption that behavior change is an outcome of higher-level cognitive operations such as intentions. However, elements in a mass-reach physical activity promotion campaign may automatically attract attention or activate associated concepts; these, in turn, can influence targeted attitudes, intentions, or behavior. Repeated exposure to campaigns may also create physical activity associations. However, there is limited guidance for the inclusion of measurement of automatic processes when evaluating campaigns. The purpose of this

article is to argue that automatic processes should be considered when evaluating mass-reach physical activity promotion campaigns, and to propose hypotheses regarding how automatic processes may relate to campaign effects. The proposed hypotheses build on the physical activity-specific hierarchy-of-effects model, which has been used to evaluate mass-reach campaigns. Points along the hierarchy of effects are suggested where automatic processes may be incorporated into the evaluation of mass-reach physical activity promotion campaigns. Thus, broad hypotheses are offered regarding how

automatic processes can be moderators of campaign effects or can emerge as a result of the campaign. By testing the proposed hypotheses, it is hoped that mass-reach physical activity promotion campaigns can be better understood with the goal of having more effective campaigns.

Keywords

Dual-processing · Evaluation · Physical activity · Hierarchy-of-effects model · Attentional bias · Automatic associations

Beurteilung von Werbeaktionen für körperliche Aktivität mit Breitenwirkung: Berücksichtigung automatischer Prozesse

Zusammenfassung

Auf Breitenwirkung abzielende Kampagnen für körperliche Aktivität werden gewöhnlich auf der Grundlage der Annahme beurteilt, dass Verhaltensänderungen das Ergebnis kognitiver Vorgänge auf höherer Ebene, z. B. Intentionen, sind. Allerdings können Elemente in einer auf Breitenwirkung abzielenden Werbeaktion für körperliche Aktivität automatisch die Aufmerksamkeit auf sich ziehen oder assoziierte Konzepte aktivieren; diese können umgekehrt gezielte Haltungen, Intentionen oder Verhalten beeinflussen. Die wiederholte Exposition gegenüber Werbeaktionen kann ebenfalls Assoziationen zu körperlicher Aktivität erzeugen. Es bestehen jedoch nur begrenzte Orientierungshilfen für den Einschluss der Messung automatischer Prozesse in die Beurteilung von Werbeaktionen. Der Zweck

des vorliegenden Beitrags besteht darin darzulegen, dass automatische Prozesse berücksichtigt werden sollten, wenn es um die Beurteilung von auf Breitenwirkung abzielende Werbeaktionen für körperliche Aktivität geht, und Hypothesen in Bezug darauf vorzustellen, wie automatische Prozesse mit der Wirkung von Werbeaktionen in Zusammenhang stehen. Die vorgestellten Hypothesen beruhen auf dem – hier speziell auf körperliche Aktivität bezogenen – Hierarchy-of-Effects-Modell, einem Modell zur hierarchischen Abfolge von Werbewirkungen, welches zur Beurteilung auf Breitenwirkung abzielender Werbeaktionen eingesetzt wird. Es werden Punkte in der Hierarchie der Wirkungen vorgeschlagen, an denen automatische Prozesse in die Beurteilung auf Breitenwirkung abzielender Promotion-

Aktionen integriert werden können. Somit werden weitreichende Hypothesen hinsichtlich dessen dargestellt, wie automatische Prozesse Moderatoren der Wirkungen von Kampagnen sein können oder als ein Ergebnis der Kampagne entstehen können. Durch Testung der vorgestellten Hypothesen ist zu hoffen, dass ein besseres Verständnis auf Breitenwirkung abzielender Werbeaktionen erreicht wird mit dem Ziel, wirksamere Werbekampagnen durchzuführen.

Schlüsselwörter

Separate Verarbeitung · Auswertung · Sportliche Betätigung · Hierarchie-von-Effekten-Modell · Aufmerksamkeitsverzerrung · Automatische Assoziationen

something related to exercise, which can be the moment a person sees an element of a mass-reach physical activity campaign. Similarly, Conroy and Berry (2017) proposed that when affect is automatically activated by environmental cues, it can lead to reasoning about physical activity or an automatic impulse to approach or avoid physical activity. For example, researchers have found that a physical activity promotion message effectively increased physical activity but only in participants with low-to-moderate intentions and low-to-moder-

ate impulsive approaches to sedentary behavior (Cheval, Sarrazin, Isoard-Gautheur, Radel, & Friese, 2015). In other words, the messages were ineffective in participants with strong impulses to approach sedentary behavior.

Automatic processes and mass reach campaigns

There are existing reviews of how automatic processes can be considered in the context of mass-media messaging or marketing. Samson and Voyer

(2012) outlined three levels at which automatic processes are important in consumer behavior: persuasion and attitude change, judgment and decisions, and buying and consumption behavior. For example, when exposed to an advertisement, consumers are persuaded by and construct their attitudes through either central (high involvement of information processing) or peripheral (low involvement of information processing) routes, make decisions about product value and quality based on heuristic or analytic modes of thinking, and purchase

Table 1 Hypotheses and associated hierarchy-of-effects level

Hypotheses	Hierarchy-of-effects level ^a
H1. When there is no or negative attentional bias toward campaign items there will be no further campaign effects on attitudes, intentions, or behavior. For example, when a campaign highlighting reduced risk of disease through physical activity is overly threatening, a person may direct attention away from related stimuli	Awareness
H2. Exercise schema will moderate attentional bias such that a “preaching to the converted” effect will be found; only exerciser schematics will automatically attend to physical activity promotion campaign elements	Awareness
H3. When automatic associations between exercise and related concepts (e. g., health, appearances) are correlated with explicit attitudes, intentions and behavior will change in a corresponding direction, be it positive or negative, due to the combined strength of the processes	Attitudes, intention, or behavior
H4. When reflective and automatic associations between exercise and related concepts are discrepant, intention or behavior will change in the direction of the automatic association when self-regulatory resources are lacking	Attitudes, intention, or behavior
H5. A positive automatically activated affective response will lead to positive explicit behavior, but this relationship will be moderated by impulsive approaches to sedentary behavior cues. Behavior change will only be seen in those with weak-to-moderate impulsive approaches to sedentary behavior cues. A negative affective response will result in no further campaign effects on behavior	Behavior
H6. The greater the exposure to a mass reach campaign message, the stronger the automatic associations between physical activity or exercise and campaign elements (e. g., brand logos, messages)	Automatic associations (i. e., attitudinal process)

^aPossible effects of a mass reach campaign outlined in Cavill & Bauman's hierarchy-of-effects model

a product guided by impulse or self-regulation. These levels can be considered in terms of physical activity campaigns and advertising impacts. In terms of attitude change, elements in a physical activity promotion campaign may automatically attract attention or activate associated concepts; these, in turn, can influence reasoned attitudes, intentions, or other key variables necessary for behavior change. At the judgment level, heuristics (i. e., often incorrect assumptions or intuitive thinking that “shortcut” reasoned thinking; Tversky & Kahneman, 1974) may influence perceptions of disease risk due to inactivity or lead someone to be swayed by the many commercial messages that tout how being active will lead to an appearance ideal (Maibach, 2007). For example, the anchoring heuristic, where the reference point from which a person starts estimating something influences subsequent judgments, has been shown to result in large overestimations of breast cancer risk (Senay & Kaphingst, 2009). This may mean caution is needed when using disease risk to promote physical

activity because citing statistics about disease risk may cause anxiety. Physical activity behavior is analogous to the buying level whereby associations that are automatically activated by a message (e. g., the concept of “health” is activated by an image of someone being active) may influence behavior.

Samson and Voyer (2012) provide a detailed description of relevant models that include automatic associations such as the elaboration likelihood model at the persuasion and attitude level (ELM; Petty et al., 2002) and the reflective–impulsive model that extends to behavioral outcomes (RIM; Strack & Deutsch, 2004). Specific to physical activity messaging, Berry (2018) summarized the RIM in addition to the associative–propositional evaluation (APE) model (Gawronski & Bodenhausen, 2006) as models that incorporate automatic processes to consider for physical activity messaging research. A detailed description of these models is not within the scope of the current paper and interested readers are referred to these and other broad reviews (e. g., Evans & Stanovich, 2013), or to

Brand and Ekkekakis (2018) who drew on the RIM and APE when developing the ART model. However, one point that should be elaborated on is that when incorporating automatic processes into physical activity mass-reach campaign evaluation and research, there are likely differences in how messages or advertisements are processed between high-involvement and low-involvement conditions.

The idea of low- and high-involvement processing draws on the ELM, which includes two routes of message elaboration (peripheral and central processing) that exist on a continuum and dictate attitude change (Petty et al., 2002). A message may be peripherally processed when the message is not actively thought about or thought about very little (i. e., low involvement). In such cases, weak changes in attitudes may occur due to simple heuristic cues such as the attractiveness of the message source. Stronger attitude change occurs during central processing when there is motivation and ability to think about message content (i. e., high involvement). The ELM considers source (e. g., credibility of the sponsoring organization), message (e. g., argument strength), and recipient (e. g., personal relevance of the message) variables as factors that contribute to the amount of thinking about a message. For example, if a person is motivated to learn about physical activity, hears strong arguments on the topic, and believes in the expertise of the source, they are more likely to think about message content and have subsequent enduring positive attitude change. If, however, the source of the message is not considered an expert, the arguments are weak, or the person has little interest in the topic, no further elaboration will occur and there will be no or weak, short-lived, attitude change. Negative thoughts may also arise and attitude change may be negative. Although it is very difficult to know if receivers of a campaign message are engaged in low- or high-level processing, it is possible that many people in the target audience are not fully engaged with a campaign message for a number of reasons. They could be disinterested, lacking in time, or distracted. Therefore, it may be wise to assume low levels of

involvement when trying to understand campaign effects.

Automatic processes and related hypotheses

Attentional bias

Within hierarchies of effect models, awareness of a campaign or message is generally the first thing to assess (Cavill & Bauman, 2004). In physical activity campaign evaluation, awareness is most often assessed at the explicit level using questionnaires. “Unprompted” awareness is measured with an open-ended question such as, “Can you name any physical activity advertisements you recently saw on television?” Naming or giving a brief description of a campaign or advertisement before asking if a person is aware of it measures prompted awareness. However, attentional bias is an automatic process that precedes awareness that may moderate future campaign effects.

Attentional bias is the automatic attention paid to materials or stimuli that correspond with one’s interests or motivations (Van Bockstaele et al., 2014). As noted by Glockner and Witteman (2010, p. 17), “attention... should be distributed to the different outcomes or cues proportionally to their importance or probability.” Attentional bias is of interest because it may show who is attending to a campaign message or related cues (e.g., brand logos) and if the attention of the target audience is captured at the most basic (or proximal) level. Stimuli may activate automatic selection processes when the information is related to an individual’s goals or needs (Lang, 2000). Once committed to pursuing a goal, an individual may be automatically drawn to cues related to the goal or related interests (Field & Cox, 2008). Attention may also be automatically drawn to information that is unexpected or represents a change in the environment (thus, shocking or startling advertisements are more likely to automatically attract attention). Attentional bias can also occur when a person feels threatened; in such cases, attention may be given to the threatening cue, or the cue may be auto-

matically avoided in an attempt to mitigate the psychological threat posed by the cue (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007). The latter may occur, for example, when information about disease risk is considered highly threatening (Klein & Harris, 2009).

Within the hierarchy of effects, attentional bias can indicate if a given campaign has been able to capture basic attention, independent of prompted or unprompted awareness measured on a questionnaire. For example, exercisers showed stronger attentional bias and implicit attitudes than nonexercisers did toward exercise-related stimuli and those with more extreme implicit attitudes, whether positive or negative, showed more attentional bias (Calitri, Lowe, Eves, & Bennett, 2009). In other health research, attention was directed toward front-of-package nutrition symbols in people who were motivated by health (Turner, Skubisz, Pandya, Silverman, & Austin, 2014). Including a measure of attentional bias into the evaluation of a campaign designed to promote walking showed that participants who demonstrated unprompted awareness of the campaign also demonstrated attentional bias toward campaign-related stimuli (Yun & Berry, 2018). In sum, measuring attentional bias can help determine if a campaign is in danger of only attracting the attention of those already active or is successful in attracting the attention of inactive people, who are presumably the target audience of a mass-reach physical activity campaign.

It is also important to consider that attentional bias can be toward something (i.e., positive attentional bias) or attention can be automatically directed away from something (i.e., negative attentional bias). For example, Klein and Harris (2009) found attentional bias away from cancer-related words among healthy women who were moderate alcohol drinkers after being informed that alcohol is a risk factor for breast cancer. It is likely that these women found the cancer words threatening and thus avoided the information.

Therefore, the first hypothesis (H1) is that when there is negative or no atten-

tional bias there will be no further campaign effects on attitudes, intentions, or behavior because campaign information is not attended to; in the case of negative attentional bias, this could occur because the information is too threatening. For example, if a person with a chronic disease is reminded of the consequences of their diseases by a campaign intended to increase their physical activity and is very anxious about their disease, they may automatically direct attention away from campaign elements.

Schema

Another construct to consider at the awareness level is exercise schema, which could be assessed as a possible moderator of attentional bias and further processing of campaign elements. Markus (1977) defined schemas as domain-specific (e.g., exercise-related schemas) generalizations about oneself, based on past experience. Having a strong schema should lead to greater processing of domain-specific information, retrieval of evidence relative to the behavior, prediction of one’s own behavior in the domain, and greater ability to resist counter-schematic information. Samson and Voyer (2012) argue that when a message is congruent with a receiver’s schema they will likely elaborate more on the message. Researchers have shown that implicit exercise schemas (measured with an implicit association task) and explicit exercise schemas are moderately correlated indicating they are related but distinct constructs (Banting, Dimmock, & Lay, 2009). These authors reported implicit and explicit schemas were independently related to exercise behavior but only explicitly measured schemas mediated the relationship between intentions and behavior. There is meta-analytic evidence that exercise schema is related to greater information processing in the exercise domain (Rhodes, Kaushal, & Quinlan, 2016). In such studies, a schema is usually measured with the “exercise schema questionnaire” (Kendzierski, 1988). Berry (2006) found that exerciser schematics, categorized according to the exercise schema questionnaire, showed attentional bias toward

exercise-related words whereas nonexerciser schematics showed attentional bias for words related to a sedentary lifestyle.

Thus, the second hypothesis (H2) is that exercise schemas will moderate attentional bias such that only those who hold an exercise schema will automatically attend to elements within a physical activity campaign (e.g., brand logos, associated words). If hypotheses 1 and 2 are supported, further research could be conducted to discover what might positively attract nonexercisers to campaign elements.

Automatic associations

Attitudes follow awareness in hierarchy-of-effects models, and attitudes can be measured at automatic and reasoned levels. Both the ART (Brand & Ekkekakis, 2018) and Conroy and Berry (2017) contend that exercise-related cues can trigger an automatic affective evaluation (i.e., an automatically activated attitude). Independent of affect, associations between concepts can be automatically activated (Gawronski & Bodenhausen, 2006). Automatic attitudinal processes are defined as automatically activated associations that reflect the associations one holds in long-term memory (Gawronski & Bodenhausen, 2006; Strack & Deutsch, 2004). It is important to note that these are not attitudes that are necessarily “unconscious” or “hidden” from a person’s awareness; one may be aware that an association held in long-term memory has been activated, but be unable to control the activation (Fiedler & Hutter, 2014).

Research that has examined automatic associations in relation to physical activity and exercise has shown that physical activity behavior is related to stronger automatic associations of physical activity as good or desirable (i.e., implicit attitudes toward physical activity; e.g., Conroy, Hyde, Doerksen, & Ribeiro, 2010). Others examined target audience responses to a television advertisement that challenged mothers to “think again” that their kids get enough activity, even if they are enrolled in sport (Berry et al., 2014). The mothers automatically agreed with the campaign message when the focus was on

children in general, but did not when the focus was on their own children. Participants for this study were recruited from recreation centers as their child participated in a sport program. Participation took place at that time on laptops at the recreation centers and the study represents a field evaluation that incorporated a measure of automatic associations. This study also illustrates how including implicit measurement can reveal more nuanced campaign effects. Another study incorporated a measure of automatic associations into the evaluation of a physical activity mass-reach campaign (that promoted walking at a population level); the strongest predictor of leisure-time physical activity behavior was the automatic association between physical activity and campaign related words such as “walk” (Yun & Berry, 2018).

Given that associations are created through repetition (Gawronski & Bodenhausen, 2006; Strack & Deutsch, 2004) and it is likely unknown what a target audience has been previously exposed to, it is necessary to determine whether a mass-reach physical activity campaign or advertisement activates the desired associations. For example, it is possible that repeatedly seeing or hearing popular messages regarding how physical activity can make one “look better” will result in a physical activity campaign advertisement activating appearance associations rather than, or in addition to, advertisement-specific associations (e.g., being healthy) because of existing physical activity associations. The automatic associations may guide behavior. As noted by Kahneman (2011), people can easily mistake familiarity for the truth and it is this heuristic that guides decision-making. Arguably, the topic of physical activity is already familiar to most people targeted by mass media campaigns; that is, people have heard of physical activity and likely have some idea of what it is and therefore have existing associations regarding physical activity. However, what associations are activated should be considered. In a large study of middle-aged adults, there were strong automatic associations between physical activity and the desirability of both health and appearance

outcomes (Berry, Rodgers, Markland, & Hall, 2016).

When automatic associations are endorsed at an explicit level (e.g., there is an automatic positive feeling toward exercise; exercise is then considered pleasant, which translates as an affective explicit attitude) this leads to an intention to pursue a congruent goal (Strack & Deutsch, 2004). Further, when automatic associations and reasoned propositions are congruent (e.g., both automatic associations and reasoned propositions are positive toward physical activity), their consistency will be used for future judgments and behavior decisions (e.g., increase in intentions to perform physical activity and physical activity participation, Gawronski & Bodenhausen, 2014). But, intentions and behavior may not be in the direction advocated by the campaign if associations are negative (e.g., a “gut feeling” of not liking something).

Thus, the third hypothesis (H3) is that when automatic associations between exercise and related concepts such as health or appearance correspond with explicit attitudes, intentions and behavior will change in a corresponding direction, be it positive or negative. Campaign evaluators could also explore what associations are activated—whether campaign-related or not.

Automatic associations, which can reflect topics such as health, or emotions such as enjoyment, and explicit attitudes do not always correspond. Lack of congruence between automatic associations and reasoned, explicit, attitudes could arise when conscious goals do not align with associative evaluations. Brand and Antoniewicz (2016) reported differences in desired exercise frequency compared with actual exercise in participants who had greater discrepancy between implicit and explicit affective exercise evaluations. The authors attribute this finding to the possibility that participants may not have trusted or believed negative automatic evaluations resulting in a strong explicit endorsement of exercise, thinking that is how they should feel. Others have found that discrepant automatic associations of exercise and health and explicit health motives were negatively related to how long participants stayed in an ex-

ercise program (Berry, Rodgers, Divine, & Hall, 2018). According to the ART model, when automatic affective evaluations of physical activity or exercise are discrepant from reflective evaluations the behavior will follow the automatic affective response in the absence of self-regulatory resources (Brand & Ekkekakis, 2018). In support of this, executive functioning moderated the relationship between impulsivity toward sedentary cues and physical activity in participants living with obesity; participants with low-to-moderate levels of executive functioning and stronger impulsive approaches to sedentary behavior were less active (Chevance, Yannick, Heraud, & Boiche, 2018). Other researchers have also found that intentions to be active were related to moderate-to-vigorous physical activity in participants with low-to-moderate impulsive approaches to sedentary behavior (Cheval, Sarrazin, Isoard-Gautheur, Radel, & Friese, 2016). In another study, participants with lower implicit attitudes and effortful control exercised for shorter periods whereas implicit attitudes were not related to exercise bout length in participants with higher levels of effortful control (Padin, Emery, Vasey, & Kiecolt-Glaser, 2017).

Thus, it is hypothesized that when reflective and automatic associations are not congruent, intention or behavior will change in the direction of the automatic association when self-regulatory resources are lacking (H4). That is, in accordance with the ART model, the automatic affective response will be the default. If this is true, strategies such as evaluative conditioning could be employed to try to positively change the automatic association so that it aligns with the campaign message (Papies, 2016).

Affect

The role of affect requires additional attention. Eisend and Tarrahi (2016) reported no differences between positive or negative affective responses on outcomes of advertising. However, this conclusion was largely based on studies with consumer products. Conversely, in the physical activity domain it has been ar-

gued that positive affect is important for physical activity whereas negative affective responses such as aversion can lead to motivation to *not* be physically active (Williams & Evans, 2014). They also review work showing that anticipation of enjoyment leads to more exercise behavior whereas anticipating not enjoying it will lead to less physical activity. The ART model highlights that automatic affective associations result from learned experiences of exercise as pleasurable or displeasurable and these drive behavior (Brand & Ekkekakis, 2018). Similarly, a systematic review found that positive reward is important for exercise behavior, and that automatic processes likely contribute to being active (Cheval et al., 2018). However, the authors also conclude that there is a paucity of research examining sedentary behaviors that minimize energy cost, which are also likely highly rewarding. They argue that humans, in general, have an inherent tendency to minimize energy expenditure and avoid unnecessary movement. Others have found that strong automatic tendencies to approach sedentary behavior nullified the effects of intentions to be active on physical activity behavior (Cheval et al., 2015). Thus, it is challenging to hypothesize possible outcomes if a mass-reach physical activity campaign triggers an automatic affective association to physical activity because an equally strong, or stronger, positive association to sedentary behavior could outweigh any positive physical activity associations. However, based on the work of Cheval et al. (2015), it is possible that if the automatic affective response to a physical activity message or response is positive, and there is no strong automatic impulse to approach sedentary cues, there could be positive changes in behavior. Regardless of sedentary associations, an automatic negative response should result in no changes.

Therefore, the fifth hypothesis (H5) is that a positive automatically activated affective response will lead to positive changes in behavior, but this relationship will be moderated by impulsive approaches to sedentary behavior cues. Changes in behavior will only be seen in those with weak-to-moderate impulsive

approaches to sedentary behavior cues. A negative affective response will result in no further campaign effects on behavior. If this hypothesis is supported, it would indicate that physical activity promoters should work to discover how to trigger a positive affective response among members of the target audience while reducing the possible pleasurable aspects of sedentary behavior (Brand & Ekkekakis, 2018).

A final point to consider is that exposure to repeated messages can create or strengthen automatic associations (Gawronski & Bodenhausen, 2014). Therefore, mass-reach physical activity campaigns could create or change automatic associations and measurement of automatic associations can provide information about the effects, whether intended or unintended, of mass-reach campaigns. For example, researchers have found that “exercise” was more strongly associated with images of young adults, and of sport or activities in gyms rather than active labor (Cope et al., 2018). Although speculative, these findings could reflect how “exercise” is typically portrayed in the media, thus leading to the automatic associations, a process known as associative learning (Gawronski & Bodenhausen, 2014). Others have demonstrated changes in automatic evaluations of exercise by repeatedly pairing exercise-related images with positive images unrelated to exercise (i.e., through evaluative conditioning); among participants who started with negative automatic exercise evaluations, there was a positive effect of this process on exercise behavior (Antoniewicz, & Brand, 2016). At a population level, positive associations have been found between exposure to the ParticipACTION brand (a long-standing, national, Canadian physical activity promotion organization) and brand awareness and strength (Jarvis et al., 2014). However, there is limited research examining repeated exposure to mass-reach physical activity campaigns and automatic processes and therefore the last hypothesis is offered to spur exploratory research in this area.

The sixth hypothesis (H6) is that the greater the exposure to a mass-reach cam-

paign message, the stronger the automatic associations between physical activity or exercise and campaign elements (e.g., brand logos, messages).

Conclusion

Given that automatic processes are considered within behavior change interventions (e.g., Michie et al., 2011) and that consumer psychologists know that advertising can have an influence on behavior through automatic processes (Perkins & Forehand, 2010), evaluators of physical activity mass-reach campaigns should also consider how automatic processes may be related to campaign success. As such, the literature and proposed hypotheses outline how automatic processes such as attentional bias, automatic associations, and affective responses may be related to mass-reach physical activity campaign effects. Given the paucity of research in this area, the included constructs and proposed hypotheses are suggested as a starting point. By further examining the role of automatic processes and testing the hypotheses it is hoped that evaluation research will be advanced such that mass-reach physical activity campaigns can be better understood with the goal of more effective campaigns.

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