

The impact of attitudinal ambivalence on weight loss decisions: Consequences and mitigating factors

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ABSTRACT

This research takes a new look at individuals' attitudes and intentions towards losing weight. Study 1 examines the relationship among those interested in losing weight and individual self-evaluative ambivalence on attitude towards trying to achieve a weight loss goal and the intentions to achieve the weight loss goal. For Study 2, a between-subjects experimental design, where attitudinal ambivalence and prior outcome feedback were manipulated and self-efficacy was measured, is conducted to examine attitude towards eating healthier and intention to change eating behaviours. Findings across the two studies show that attitudinal ambivalence about the self and the individual's abilities and motivation to change the health behaviour produces a negative relationship between health-related attitudes and intentions. We provide implications of how self-efficacy and the provision of outcome feedback can alleviate the negative effect and improve the individuals' intentions to try to achieve a weight loss goal. Copyright © 2014 John Wiley & Sons, Ltd.

According to the Centre for Disease Control and Prevention (CDC, 2010), approximately 33.8 per cent of US adults and approximately 17 per cent (i.e. 12.5 million) of children are obese (body mass index (BMI) ≥ 30). In addition, the number of Americans considered overweight or obese (BMI ≥ 25) has increased from 55.9 per cent in 1994 to 68 per cent in 2008, which is the last time these data were collected at a national level. At the same time, the revenue generated by weight loss programmes has increased to approximately \$2bn in 2010 (First Research Industry Profile, 2011). Weight loss interventions typically involve participants changing their eating and exercise behaviours (i.e. eating an appropriate diet and increasing physical activity). Many strategies that consumers try in their behaviour change attempts prove to be successful if maintained over the long term. However, many consumers are unhappy with their small weight improvements or experience frustration with weight regain after stopping a weight loss programme and, therefore, abandon their diet and exercise regimen (Obesity, 2007). Similarly, many consumers indicate that they like the idea of losing weight but have negative feelings about following a weight loss programme (Williams *et al.*, 1996).

These findings suggest that changing health behaviours such as eating and exercising is more complicated than changing consumers' purchasing behaviours (Netemeyer *et al.*, 1991; Seiders and Petty 2004). Additionally, because eating behaviours are in many cases driven by habits, a different set of interventions may need to be crafted to interfere with an individual's habits and routines and cause the individual to try to change their food or exercise behaviours (Verplanken and Wood, 2006; Pino *et al.*, 2012). In prior

research, various approaches have been proposed to try to interfere with individuals habitual decisions, which can be categorized as psychosocial approaches (focused on changing individual behaviour through motivation, education, skill training and social support) and environmental/social policy approaches (aimed at modifying the environmental forces that promote weight gain; e.g. nutrition labelling, claims and disclosures in advertisements and banning unhealthy snacks in schools) (Seiders and Petty, 2004; Hill *et al.*, 2007; Mandal, 2010; Cook *et al.*, 2011; Stutts *et al.*, 2011; Kemp *et al.*, 2012). This research examines several individual-level factors that could cause a consumer to abandon their prior habits and make more mindful or intentional decisions about his or her eating and exercising behaviours.

Past research examined the influence of various individual and situational variables on health-related attitudes and intentions: (self-)attitudinal ambivalence (Sparks *et al.*, 2001; Locke and Braun, 2009), self-efficacy (Richman *et al.*, 2001; Linde *et al.*, 2004; White *et al.*, 2004; Bui *et al.*, 2011), cognitive dissonance (Stellefson *et al.*, 2006), current/prior behaviour change attempts (Bagozzi and Warshaw, 1990; Freund and Hennecke, 2012), social desirability and motivation (Carels *et al.*, 2006). Despite the wide variety of research that has been conducted on changing health behaviours, there are still several phenomena that are left unexplained and under-researched. Specifically, can a negative attitude towards losing weight be beneficial for an individual by increasing their behavioural intentions to try to lose weight and can attitudinal ambivalence impact this relationship? Further, are there any potential resolutions to help attenuate maladaptive outcomes of this attitude–intention relationship for those seeking to manage their weight? For example, if the individual is provided with strategies that increase their perceived control over the behaviours necessary to achieve their goal (i.e. have a higher level of self-efficacy about the weight loss attempt), will the individual express a higher intention to achieve the goal than someone who is

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lower in this characteristic? In addition, if the individual uses positive feedback about a prior weight loss attempt, will he or she express a higher intention to achieve the goal than someone who uses negative feedback?

We posit throughout this research that because of attitudinal ambivalence, when individuals are contemplating and engaging in behaviour change related to their weight (through both eating and exercise changes), there is a negative relationship between the individuals' attitudes and intentions towards achieving their weight loss goal. We seek to provide a unique contribution to the consumer research field because it further develops prior research regarding health-related behaviour change as we now show the influence of ambivalence (Armitage and Conner, 2001). The objectives of this research are to show that this negative effect exists, to investigate why it occurs and to uncover factors that can mitigate this negative relationship (see Figure 1 for a graphic depiction of the theoretical model). This research demonstrates that individuals seeking to attain an ideal weight goal may feel attitudinally ambivalent towards the goal because they hold positive evaluations of attaining their ideal weight goal, yet conflicting, negative evaluations of having to manage food consumption and exercise behaviours in a manner that is contrary to their prior habits and learned behaviours. Additionally, we show that this negative effect of attitudes on intentions can be mitigated by two specific differences between individuals—the individual's level of self-efficacy (in other words, the individual's perceived behavioural control (PBC)) and the provision of outcome feedback.

Implications of this research may provide marketers and consumer health advocates with a better understanding of how to more effectively promote behavioural change efforts for interested consumers through the promotion of building self-efficacy. Further, public policy makers may choose to strategically position health interventions centred on both the effects of ambivalence and how to overcome the forces of ambivalence when attempting to make better health decisions.

HEALTH BEHAVIOUR CHANGE

Prior research has demonstrated that health behaviours are incredibly difficult to change because health behavioural change is a process that is dynamic and involves a series of phases (Sutton, 2005). Research suggests that the greatest commitment to a change in behaviour, especially for physical

exercise, is when one is mindful about the change and holds favourable attitudes and beliefs towards performing this behaviour (Hausenblas *et al.*, 1997; Hoy and Childers, 2012) and/or volitional help is provided as a form of intervention (Armitage and Arden, 2010). One popular theory used to explain how individuals try to change health behaviours in a mindful and intentional way is the theory of planned behaviour (TPB; Jiang *et al.* 2013; Pino *et al.*, 2012; Wei and Brown, 2008). The TPB attempts to explain how individuals behave with respect to a goal by examining their pre-existing attitudes and intentions towards that goal, as well as the individual's perceived control over the behaviours necessary to achieve that goal. In effect, the TPB predicts that in order to assess consumers' willingness (or intentions) to lose weight, we must assess their attitudes towards losing weight (which is composed of their evaluations of the process as well as the outcome of losing weight; Gollwitzer and Brandstätter, 1997), their intentions to lose weight and their perceived control over losing weight (i.e. self-efficacy) before we can make a judgment about the actual achievement of their weight loss goal.

Research on the attitude–behaviour relationship and attitude change processes has recently acknowledged the role of attitudinal ambivalence, the simultaneous presence of positive and negative evaluations of the same attitude object or goal (Ajzen 2000; Armitage and Conner, 2000; Van Harreveld *et al.*, 2009). Numerous studies empirically support the moderation effect of ambivalence on the attitude–intention relationship (Costarelli and Colloca, 2007; Locke and Braun, 2009; Skar *et al.*, 2008; see Conner and Sparks, 2002; Jonas *et al.*, 2000, for a review and discussion). We study the moderating effect of ambivalence on the attitude–intention relationship in the context of health behaviours, with some modifications. First, we measure self-evaluative ambivalence (SEA) instead of attitudinal ambivalence towards a health behaviour. Second, we study the moderation effect of ambivalence when the positive and negative components of attitudes are examined separately. We discuss our rationale next.

ATTITUDINAL AMBIVALENCE TOWARDS THE GOAL

Attitudinal ambivalence has been defined in previous literature as the psychological conflict between the positive and negative components of an individual's attitude towards an object or behaviour (Hodson *et al.*, 2001; Conner and Sparks, 2002). Research indicates that attitudinal ambivalence is

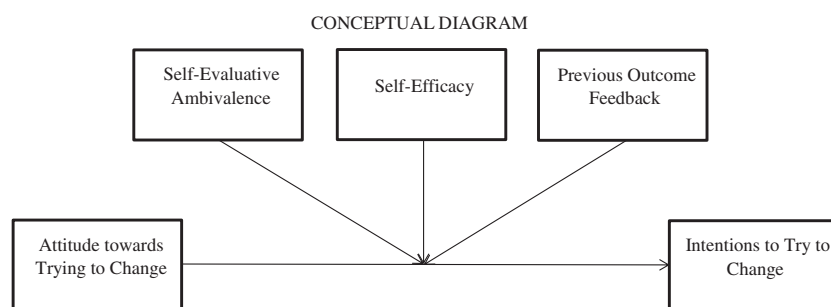


Figure 1. Conceptual diagram.

rather common in overall judgment (Conner and Sparks, 2002; Lawton *et al.*, 2009; Van Harreveld *et al.*, 2009). Recent attitude research shows that individuals' attitude towards a behaviour or goal consists of their evaluations of both the means to achieving the goal and the actual outcome of achieving the goal (Gollwitzer and Brandstätter, 1997; Boersma *et al.*, 2006; Aarts, 2007). These evaluations are made concurrently and may conflict such that someone has a positive evaluation of the outcome while also negatively evaluating the means for achieving that outcome, which as a result causes them to experience attitudinal ambivalence towards the respective behaviour or goal (Ajzen, 2000; Armitage and Conner, 2000; Richardson *et al.*, 2012). For example, if an individual wants to lose weight, he or she could hold a positive evaluation of the things he or she might be able to do once the weight loss goal is achieved, such as feeling better physically or being able to buy new clothes as a result of the weight loss. On the other hand, these positive evaluations could be counterbalanced by the individual's negative evaluations of what behaviours he or she might have to engage in to achieve that weight loss goal such as having to give up a certain food or exercising more, which might not be a pleasurable experience. The ambivalence created by the conflicting evaluations of these two components of the individual's attitude towards the goal influences the intention to pursue the goal.

ATTITUDINAL AMBIVALENCE TOWARDS THE SELF

When dealing with health behaviours in particular, in addition to this ambivalence towards the goal, recent research by Locke and Braun (2009) shows that individuals also hold conflicting evaluations of themselves, their abilities and their motives towards achieving their weight loss goal. These conflicting evaluations combine to compose an attitude towards oneself that also affects an individual's intentions to change their health behaviours. This individual attitude towards oneself commonly takes the form of an individual's self-esteem or self-efficacy in being able to achieve their weight loss goal. According to the TPB literature, PBC and self-efficacy are used interchangeably to address this topic and this conflict. In both cases, this PBC can be simultaneously positive and negative; as a result, the conflict between the positive and negative components of this perception can create SEA (Spencer-Rodgers *et al.*, 2004). Because these two components are held simultaneously and can be in conflict with each other, we argue that this SEA moderates the relationship between attitudes and intentions towards achieving the weight loss goal. In this research, the PBC or self-efficacy is treated as a two-dimensional construct, and the effects of each component (positive and negative) are examined separately on the attitude–intention relationship.

On the one hand, the positive component of one's PBC includes beliefs and feelings that the individual is a person of worth, has good qualities and is able to accomplish tasks at least as well as others. Prior research shows that the positive feelings about the self tend to encourage health-

promoting behaviours and to enhance the individual's belief that he or she can achieve a goal or objective (Baumeister *et al.*, 1993). Therefore, the positive components of one's PBC should enhance the relationship between the individual's attitudes and intentions towards the goal.

On the other hand, the negative component of one's PBC includes negative beliefs and feelings that the individual has about the self, such as the fact that he or she does not have much respect for himself or herself, does not have much to be proud of and sometimes fails at achieving a goal or objective. Prior research shows that these negative feelings about the self tend to influence the individual's overall outlook on goals and objectives and makes individuals envision the possible failures of their behaviour change attempts (Covin *et al.*, 2003). However, in order for a person to be driven to lose weight, one must have certain levels of negative attitudes towards the self in terms of one's weight given the discrepancies between one's actual weight and ideal weight (Carver and Scheier, 1981, 1982). Without the negative attitude towards the self, one is less motivated to try to lose weight. Notably, the degree of negative attitudes towards the self, as minimal negative attitude towards the self compared with more extreme levels of negative attitude towards the self can vary in effectiveness of encouraging weight loss, can impact weight loss intentions. The combination of both positive and negative attitudes towards the self thus produces attitudinal ambivalence. As such, the degree of negative components of one's attitude towards the self, as it contributes to attitudinal ambivalence, should attenuate the relationship between attitudes and intentions.

The conflicting effects of the positive and negative components of the individual's PBC or self-efficacy have been shown to combine and give the individual a sense of ambivalence about the self. Locke and Braun (2009) describe ambivalence about the self, due to the conflict between the positive and negative components of PBC or self-efficacy, as SEA. Thus, we propose the following hypothesis:

H1: SEA will moderate the effect of attitudes towards behaviour change on intentions to change, such that

- (a) when the positive component of PBC is measured and ambivalence is low, attitudes towards the goal will have a positive effect on intentions to achieve the goal, and
- (b) when the negative component of PBC is measured and ambivalence is high, attitudes towards the goal will have a negative effect on intentions to achieve the goal.

STUDY 1

Study 1 is designed to capture the conflicting effects of the positive and negative components of the individual's PBC in a real-world sample of people trying to lose weight by changing their eating and exercise behaviours. A field survey of people was conducted with participants who were recruited from a national online database and screened on the basis of whether or not they had a weight loss goal and were either working with a doctor, nutritionist, trainer or

weight loss programme to lose weight. A total of 305 participants completed the survey and met the screening guidelines (i.e. individuals participating in some form of weight loss programme).

Participants were split about evenly between the two genders (150 men, 151 women and four who did not indicate a gender on either survey). Participants in this research ranged in age from 16 to 79 years, with an average age of 40.78 years. The majority (83%) of the participants in this research were Caucasian. This skew towards Caucasian participants was inadvertent and may be a result of the population represented in the online panel. Additionally, the majority (54.3%) of this sample was married.

Measures

Attitude measures

Attitudes were measured using a four-item measure of individuals' attitude towards trying to achieve their weight loss goal. For each item, participants were given a set of seven response choices with polar opposite adjectives describing each end of the scale. Similar to the method employed by Bagozzi and Warshaw (1990), two of the scale items were reverse coded such that two items contained negative adjectives (unpleasant and disgusting) and two contained positive adjectives (good and satisfied). Once the data were collected, the two negatively worded items were reverse coded and added to the positively worded items to create an attitude index for each respondent.

Self-evaluative ambivalence measures

Similar to the measurement procedure used by Locke and Braun (2009) and Spencer-Rodgers *et al.* (2004), participants completed the Rosenberg (1979) self-esteem scale, which is a 10-item measure of an individual's subjective feelings towards the self. This scale was then broken down into the two components (positive and negative) with five items measuring each. An average score was computed for each component, and then, from subtracting the score for the negative score from the score for the positive component, a SEA score was calculated.

Intention measures

The measures of a respondent's intentions to attempt to change their behaviour were adapted from Bagozzi and Warshaw (1990). Participants responded to two questions about their intentions to achieve their weight loss goal and their plans to continue trying to achieve their goal. For both questions, respondents were presented with a 7-point scale with *very unlikely* and *very likely* as endpoints. The scores for the two items were summed to create an intention score for each participant.

Results

In order to show the conflicting effects of the positive and negative components of one's PBC on the relationship between attitudes and intentions to achieve their weight loss goal, we conducted two analyses. First, we regressed the individual's attitudes towards achieving their goal, the individual's positive PBC score and the individual's negative

PBC score on the individual's intentions to achieve their weight loss goal. The results show that all three factors had significant effects on the individual's intentions to achieve their goal. The individual's attitudes towards the goal have a negative effect on the individual's intentions to achieve the goal ($\beta = -0.484$, $p < 0.001$). In addition, the results demonstrate the conflicting effects of the positive and negative components of one's PBC and the creation of SEA as predicted in H1a and H1b. The positive component has a positive effect on the individual's intentions to achieve their goal ($\beta = 0.193$, $p = 0.001$), whereas the negative component has a negative effect on the individual's intentions to achieve their goal ($\beta = -0.264$, $p < 0.001$).

The second analysis was conducted using the SEA scores computed from the difference between the positive and negative component scores for the individual's PBC or self-efficacy. When the individual's attitude towards achieving their goal and the SEA scores are regressed on the individual's intentions to achieve their goal, the results show significant effects of both factors on the individual's intentions. In the case of the individual's attitudes towards achieving their goal, we find a significant negative effect on intentions ($\beta = -0.476$, $p < 0.001$). In addition, we find a significant positive effect of SEA on intentions ($\beta = 0.233$, $p < 0.001$).

In order to further explain these results, these SEA scores were split into three groups on the basis of their distance from the mean. The group that was one standard deviation above the mean was described as dominated by the positive component of PBC, whereas the group that was one standard deviation below the mean was described as dominated by the negative component of PBC. Those individuals within one standard deviation of the mean are described as those who are ambivalent towards the self. Table 1 presents the means and standard deviations for each of these scores as well as for the other independent variables examined in this study. In this analysis, the moderation of SEA on the attitude-intention relationship was tested using analysis of variance (ANOVA). The results show that attitudes towards achieving their goal, SEA and the interaction between attitudes and SEA all had significant effects on the individual's intentions to achieve their goal (Figure 2). In this analysis, the attitudes towards achieving their goal ($F(19, 260) = 2.851$, $p < 0.001$) and the SEA scores ($F(2, 260) = 4.845$, $p < 0.01$) have a significant effect on intentions to achieve their goal. In addition, the interaction between the individual's attitude towards achieving their goal and SEA has a significant effect on the intentions to achieve their goal ($F(23, 260) = 1.539$, $p < 0.06$). The results of this

Table 1. Study 1: descriptive statistics for attitudes and self-evaluative ambivalence

Independent variable	Mean	Standard deviation
Attitude towards behaviour change	10.61	4.56
Self-evaluative ambivalence	0.53	1.53
Positive self-evaluative ambivalence score	8.46	0.71
Ambivalent self-evaluative ambivalence score	9.01	0.32
Negative self-evaluative ambivalence score	11.15	0.54

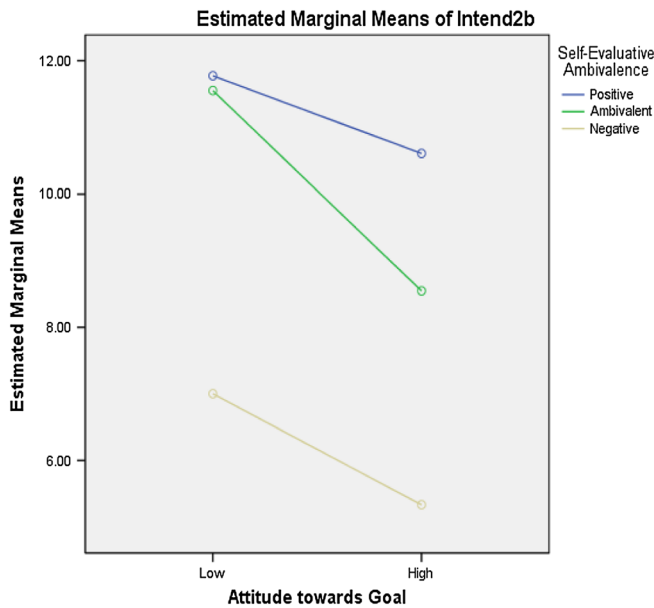


Figure 2. Study 1: interaction between ambivalence and attitude on intentions. This figure is available in color online at wileyonlinelibrary.com/journal/cb

interaction effect show that individuals who are dominated by the positive component show a positive effect of attitudes on intentions, whereas those individuals who are dominated by the negative component as well as those who are ambivalent about themselves show a negative effect of attitudes on intentions.

Discussion

Study 1 demonstrates a negative effect of attitudes on an individual's intentions to try to achieve their weight loss goals. The results of this study show that respondents were demonstrating SEA in that they were expressing mixed feelings about themselves and their abilities to achieve their weight loss goals (Otnes *et al.*, 1997; Priester *et al.*, 2007). As a result of this conflict between positive and negative PBC evaluations, individuals experience ambivalence about their decision and demonstrate a negative attitude about achieving their goal even though they express positive intentions towards achieving their goal. As a result, in Study 2, we further investigate attitudinal ambivalence by manipulating the level of ambivalence towards achieving their goal that participants' felt and then measuring their PBC using a measure of self-efficacy in order to test the robustness of this effect.

STUDY 2

The purpose of Study 2 is to replicate the findings from Study 1 and to demonstrate that ambivalence about the self is the cause of the negative attitude–intention relationship with respect to achieving a weight loss goal. Moreover, we study two variables that may mitigate this effect: health-related self-efficacy and feedback about a prior behaviour change attempt.

Predicting health behaviours: influences of self-efficacy, past experience and ambivalence

Accordingly, PBC or self-efficacy is defined as one's belief or ability in performing a behavioural task (Bandura, 1997). Specifically, self-efficacy pertains to an individual's estimations of his or her capabilities in accomplishing a goal; therefore, individual self-efficacy plays a major role in one's performance towards achieving a set goal. The TPB suggests that PBC or self-efficacy influences both intentions and behaviour; however, the PBC or self-efficacy construct is intended to help explain why individual intentions do not necessarily predict actual behaviour in all cases. Specifically, under situations where circumstances inhibit the action (i.e. those not under complete volitional control), PBC or self-efficacy explains the variation in the relationship between attitude towards the means necessary to achieve the goal and behaviour (Armitage and Conner, 2001).

As PBC or self-efficacy produces such variation in predicting behaviour, we attempt to better understand its influence by specifically examining PBC or self-efficacy in reference to a more clearly defined construct of self-efficacy. Specifically, according to Bandura (1982), the greater the perceived self-efficacy, the more likely the individual is motivated to continue working towards successfully performing the behaviour and achieving the goal. Self-efficacy consists of four major components: *attainment*, *experience*, *persuasion* and *physiological feedback* (Bandura, 1997). Attainment refers to the individual performance of the behaviour; experience refers to evaluation of one's performance of the task compared with others; persuasion refers to others' communication of one's ability to perform the task; and physiological feedback refers to one's own evaluation of one's progress. Bandura's (1997) self-efficacy theory posits that an individual's judgment of his or her capabilities predicts actual behaviours such that prior success, imitation of another individual's performance, persuasion from others and positive states are components of individual self-efficacy.

On the basis of self-efficacy theory, the degree of individual self-efficacy influences overall evaluations and motivation levels impacting actual engagement in a particular behaviour. For example, an individual with high (low) self-efficacy is more (less) likely to engage in healthier snacking and increasing exercise in an effort to manage his or her weight. Research pertaining to self-efficacy has been conflicting when examining issues regarding health. For example, some research shows that greater health-related self-efficacy is associated with successful health maintenance attempts (Henry *et al.*, 2006; Hagler *et al.*, 2007; Bui *et al.*, 2011), and self-efficacy has a strong correlation with overall intentions as it represents internal motivations (Zhou *et al.*, 2013). However, other research suggests that high self-efficacy is not related to greater weight loss results (Linde *et al.*, 2004; White *et al.*, 2004). Martin *et al.* (2003) suggest that high self-efficacy in the initial stages could signify inexperience or overconfidence with weight loss attempts to explain the negative self-efficacy and behavioural intention relationship.

In predicting health attitude and behavioural intentions, consideration of past behaviour must be included. Research

shows that many attempts to change an individual's eating behaviours and weight loss are unsuccessful and that many people make repeated attempts at changing these behaviours (Polivy and Herman, 2002). Recent findings show that individuals use feedback about their pursuit of a goal in order to form intentions to behave in a certain manner (Fishbach and Dhar, 2005; Cheema and Bagchi, 2011; Finklestein and Fishbach, 2012). Moreover, research shows that past behaviour influences the relationship between attitudes and intentions by explaining unique variance in the attitude–intention relationship (Trafimow, 2000). Research further shows that individuals who frequently repeat a behaviour that produces a negative outcome eventually quit trying to pursue the behaviour, demonstrating a decrease in favourable attitudes towards trying to change the behaviour (Betsch *et al.*, 2004).

The existence of both negative evaluations (e.g. unfavourable outcomes from trying to lose weight) and positive evaluations (e.g. favourable outcomes in managing a healthy weight) of past experiences can produce attitudinal ambivalence towards a behaviour. As a component influencing attitude formation, ambivalence can thus impact the intention to engage in the health behaviour. According to Locke and Braun (2009), ambivalence inhibits an individual's attitudes and intentions to engage in healthy behaviours. As a result, people who are ambivalent towards trying to eat healthy foods should have less favourable attitudes towards eating healthier than those who are not ambivalent.

On the basis of self-efficacy theory and past research findings pertaining to the influences of past health behavioural experience and ambivalence regarding health behaviours, it is expected that these variables will interact to influence attitudes towards a particular health behaviour. Specifically, in the presence of ambivalence, individuals with low self-efficacy who have had past negative experiences with achieving health goals have less favourable attitudes towards eating healthier. We therefore propose the following formal hypothesis.

H2: A three-way interaction between ambivalence, self-efficacy and previous behaviour change outcome should affect the individual's attitude towards eating healthier, such that in the presence of ambivalence, low-self-efficacy individuals (vs high-self-efficacy individuals) have significantly less favourable attitudes towards eating healthier when they have encountered a failure outcome.

Further understanding of the influences of previous experiences with health-related goals and outcomes and their impact on intentions require advanced scrutiny of individual self-efficacy. According to Carver and Scheier (1981, 1982), a self-evaluative feedback system exists to help monitor progress towards achieving a set goal. For example, if one is actively trying to lose weight by eating less and exercising more, the individual will continually monitor his or her progress towards achieving this health goal until the goal is either achieved or is no longer an active goal. Rieskamp (2006) suggests that in certain contexts (e.g. losing weight and changing eating behaviours) individuals use their most recent experience as feedback for evaluation and basis for

making a judgment about the behaviour. Further, Bagozzi and Warshaw (1990) argue that the intention to try actually captures the individuals' expectations of whether or not they will succeed in changing their behaviours. Additionally, research shows that memory self-efficacy is significantly correlated with memory performance, further iterating the influences of self-efficacy and past experience outcomes on future behavioural intentions (West and Bramblett, 1990). As a result, if the individual is provided with feedback about a previous outcome, this should affect his or her expressed intentions to try to change the behaviour. Given that the intention to change is a product of individual expectations of impending success or failure, self-efficacy should moderate the effect of prior outcome on intentions. Individuals with low self-efficacy should express greater intentions to change eating behaviours when they have received success feedback because it enhances their belief in the ability to change, countering prior beliefs from unsuccessful experiences. For individuals with high self-efficacy, receiving success feedback only further confirms prior beliefs about their ability and, as a result, their intentions to change eating behaviours are not as strong as those of low-self-efficacy individuals. Thus, we formally hypothesize the following prediction:

H3: Self-efficacy and previous behaviour change outcome should interact and affect an individual's intentions to try to change again in the future, such that low-self-efficacy individuals report greater intentions to change eating behaviours when they have encountered a successful outcome relative to the high-self-efficacy individuals.

Regarding health practice adoption, previously desirable or undesirable consequences that are readily stored in memory are related to ambivalence (Conner and Sparks, 2002). Because ambivalence is defined as the conflict between positive and negative feelings about an activity (Conner *et al.*, 2002), the presence of ambivalence should impact the individuals who receive success or failure feedback on a prior behaviour change attempt similarly, such that ambivalence and (un)desired prior experience feedback should not significantly impact intentions to change a health behaviour. Further, research findings indicate that lower levels of ambivalence are associated with more positive feedback and behaviour (Armitage and Conner, 2000; Jonas *et al.*, 2000); thus, it can be inferred that the presence of ambivalence potentially extinguishes any influence of the previous health experience feedback on intentions. On the other hand, when the conflict of ambivalence is not present, there should be a significant difference in the intentions to try to eat healthier based on whether individuals received success or failure feedback about their prior attempts at behaviour change. Thus, the absence of ambivalence strengthens the influence of previous health experience feedback on intentions, particularly when it is a success feedback in reference to changing individual eating behaviours. In line with Rieskamp's (2006) findings, we predict the following hypothesis:

H4: Attitudinal ambivalence and previous behaviour change outcome should interact to affect an individual's intentions to try to change again in the future, such that

when ambivalence is absent, individuals encountering a successful outcome report greater intentions of changing their eating behaviours.

Method

To test these hypotheses, we conducted a 2 (ambivalence: control vs presence of ambivalence) \times 2 (outcome: success vs failure) \times 2 (self-efficacy: high vs low) between-subjects experimental design. The ambivalence and outcome factors were manipulated, whereas the self-efficacy personality trait variable was created using a median split. Attitude towards eating healthier and intention to change eating behaviours served as the dependent variables of interest for this study.

A total of 283 non-student subjects residing in the United States participated in the Qualtrics online survey study. The sample consisted of 58 per cent women and 42 per cent men with an average age of 39 years, ranging from 18 to 77 years. The participants were 70.4 per cent Caucasian, 7.8 per cent Hispanic, 8.1 per cent Asian/Pacific Islander, 8.9 per cent Black/African American and 4.8 per cent other race/ethnicity.

Participants received an email requesting their voluntary participation in a research study. After accepting to participate in the study, subjects were directed via a link to Qualtrics to participate in the survey. Subjects were randomly assigned to one of the four manipulated conditions (Appendix). Then participants rated their attitude towards eating healthier and intention to change eating behaviours and responded to the self-efficacy measure. Lastly, subjects were thanked for their participation in the survey.

Measures

Exercise self-efficacy

The self-efficacy for exercise measure was adapted from the scale used by Marcus *et al.* (1992). The use of the exercise self-efficacy scale is appropriate as the context of this research examines and measures change in health behaviours, in which case eating and exercise are relevant and linked. Reliabilities were appropriate ($\alpha = 0.94$). Respondents completed an 18-item measure of their current level of self-efficacy towards exercise. Each item was presented with a 5-point scale (5 = completely confident) asking the respondents to indicate how confident they were that they would exercise under various conditions (e.g. 'when I am under a lot of stress', 'when I am busy', 'when I am travelling', 'when my friends do not want me to exercise', 'when it is cold outside', etc.).

Attitude towards eating healthier

To measure attitude towards eating healthier, a 7-point bipolar multi-item scale anchored with *bad/good*, *dislikelike* and *unfavourable/favourable* was used to answer the following statement: 'My overall attitude towards eating a healthy meal (i.e. low in fat and calories) is ...' (Andrews *et al.*, 2001). Higher numbers indicate more positive attitudes. Cronbach's alpha for the attitudinal measure was appropriate at 0.93.

Intention to change eating behaviour

To measure intention to change eating behaviour, an adapted 7-point bipolar scale anchored with *not at all/definitely* was used to answer the following statements: 'I intend to change my eating behaviours in the next month', 'I plan to change my eating behaviours in the next month' and 'I want to change my eating behaviours in the next month' (Bagozzi and Warshaw, 1990). Higher numbers indicate stronger intentions to change. Reliabilities for the intention measure were appropriate at 0.96.

Results

Manipulation check for ambivalence

Respondents rated feelings of ambivalence on five 11-point scales anchored with *completely one-sided/completely mixed*, *not at all conflicted/completely conflicted*, *not at all indecisive/completely indecisive*, *not at all tense/completely tense* and *not at all ambivalent/completely ambivalent* (Priester *et al.*, 2007). Higher numbers indicate higher ambivalence. An ANOVA was performed to ensure that the manipulation of ambivalence was successful. There is a significant difference between the control condition ($M = 5.21$) and the ambivalence condition ($M = 6.66$; $F(1, 281) = 148.09$, $p < 0.001$), with means in the appropriate direction.

Manipulation check for outcome

Respondents indicated their perception of the outcome's success on an 11-point scale anchored with *very unsuccessful* to *very successful* (Riketta and Ziegler, 2007). Higher numbers indicate more success. There is a significant difference between the failure ($M = 4.14$) and the success condition ($M = 6.18$, $F(1, 281) = 37.151$, $p < 0.001$).

Because both manipulation checks were as we expected, we conducted ANOVAs to assess the effects of ambivalence, outcome and self-efficacy on attitude towards eating healthier and intention to change eating behaviour. Results are presented in Tables 2 and 3.

Table 2. Study 2: effect of ambivalence, outcome and self-efficacy on attitude towards eating healthier and intention to change eating behaviours

Independent variables	F-values	
	Attitude towards eating healthier	Intention to change eating behaviour
Main effects		
Ambivalence	1.74	0.15
Outcome	0.75	1.04
Self-efficacy	1.24	0.19
Interaction effects		
Ambivalence \times Outcome	0.58	5.36*
Ambivalence \times Self-efficacy	0.75	0.00
Outcome \times Self-efficacy	2.88	4.02*
Ambivalence \times Outcome \times Self-efficacy	3.91 ^a	0.32

* $p < 0.05$

Table 3. Study 2: means for attitude towards eating healthier and intention to change eating behaviour

Independent variable	Self-efficacy	Attitude towards eating healthier	Intention to change eating behaviour	
Control	Success	Low	7.43	5.44
		High	7.55	4.68
	Failure	Low	7.26	4.13
		High	7.25	4.46
Ambivalence	Success	Low	7.21	4.76
		High	6.83	3.99
	Failure	Low	6.50	4.77
		High	7.77	4.60

Attitude towards eating healthier

Supporting H2, the analyses resulted in a significant three-way interaction on attitude towards eating healthier ($F(1, 213) = 3.914, p < 0.05$). Follow-up contrasts indicate that in the presence of ambivalence, low-self-efficacy individuals have significantly less favourable attitudes towards eating healthier when they have encountered a failure outcome ($M = 6.50$) compared with high-self-efficacy individuals ($M = 7.77$, Figure 3). No two-way interactions or main effects were found on the dependent variable ($p > 0.05$).

Intention to change eating behaviour

There was no significant three-way interaction found on intention to change eating behaviour ($F < 1$). However, supporting H3, a significant two-way interaction of self-efficacy and outcome on the dependent variable ($F(1, 209) = 4.02, p < 0.05$) was found. Means indicate that low-self-efficacy individuals report greater intentions to change eating behaviours when they have encountered a successful outcome ($M = 5.13$) relative to high-self-efficacy individuals ($M = 4.43$, Figure 4). Follow-up contrasts show no significant difference ($p > 0.05$) for low and high self-efficacy for those encountering a failure outcome. Supporting H4, another significant two-way interaction of ambivalence and outcome on the dependent variable ($F(1, 209) = 5.36, p < 0.05$) was found. Means indicate that when ambivalence is not present, individuals encountering a successful outcome report greater

intentions of changing their eating behaviours, as compared with ambivalent conditions ($M = 5.44$ vs $M = 4.76$, Figure 5). Follow-up contrasts indicate no significant difference ($p > 0.05$) in the presence of ambivalence between success and failure outcome conditions. There was no significant two-way interaction of ambivalence and self-efficacy on the dependent variable. Additionally, no main effects on intention to change eating behaviours were found.

Discussion

The results of Study 2 support our conceptualization that self-efficacy interacts with ambivalence and past outcome to influence an individual's attitudes towards eating healthier. The three-way interaction showed that ambivalent individuals with low self-efficacy receiving information about a past failure indicated less positive attitudes compared with high-self-efficacy individuals receiving information about a past failure. Thus, ambivalence coupled with past failure does not necessarily hamper overall attitudes towards eating healthier, unless it is also accompanied by low levels of self-efficacy.

Further, consistent with our expectations, the interaction of self-efficacy and past outcome on intentions to change was significant such that low-self-efficacy individuals exposed to successful past outcomes expressed higher intentions to change their eating behaviour compared with individuals with high self-efficacy. This is in line with previous research that finds past behaviour to be a predictor of intentions (Bagozzi and Warshaw, 1990), especially when past behaviour is more salient in the individual's mind (e.g. if behaviour is performed frequently or has been performed recently).

Results also show a significant interaction of ambivalence and past outcome suggesting that, compared with individuals experiencing ambivalence, individuals in the control condition indicate higher intentions to change their eating behaviour after a successful past outcome. Again, past behaviour is more relevant for individuals' intentions to change their eating behaviours, but only for individuals who are not ambivalent about this behaviour.

These findings are in line with previous studies. A number of studies have applied the TPB to predict health behaviours intentions, and with a few exceptions, attitudes, subjective norms, perceived control and self-efficacy were all found to be significant predictors (see Armitage and Conner, 2001,

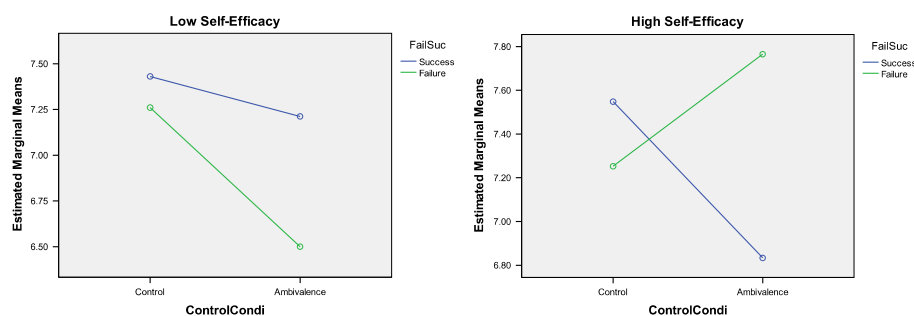


Figure 3. Study 2: attitude towards eating healthier. This figure is available in color online at wileyonlinelibrary.com/journal/cb

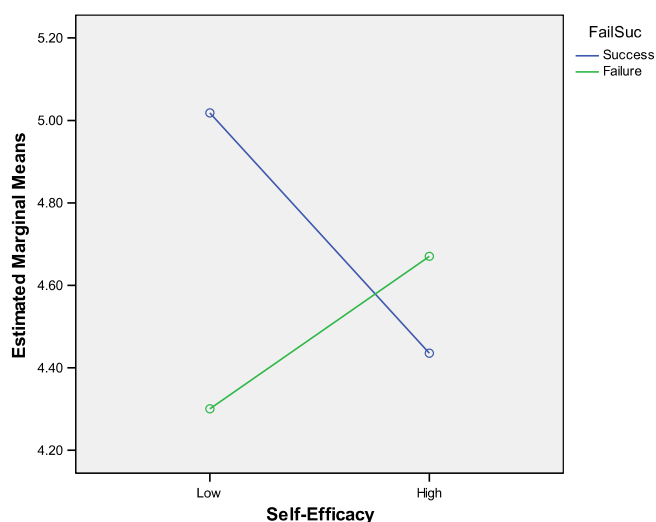


Figure 4. Study 2: intention to change eating behaviour. This figure is available in color online at wileyonlinelibrary.com/journal/cb

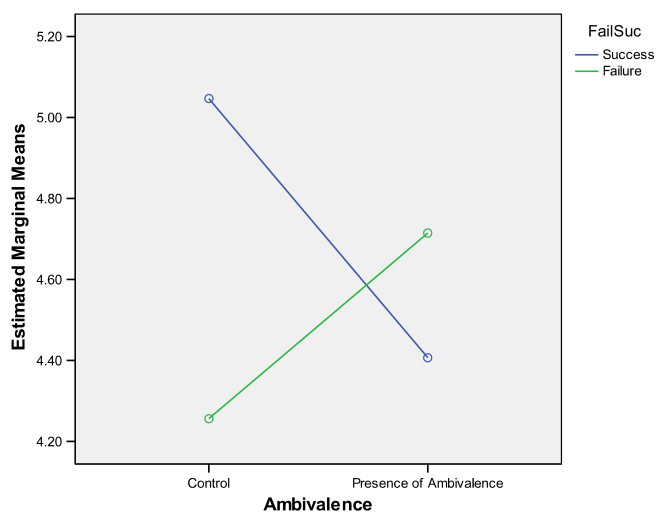


Figure 5. Study 2: intention to change eating behaviour. This figure is available in color online at wileyonlinelibrary.com/journal/cb

for a meta-analysis of TPB). Moreover, a few studies have found that the addition of past behaviour to the model improves its predictive power (Ouellette and Wood, 1998).

GENERAL DISCUSSION

In summary, this research attempts to provide insight into three important and under-researched areas. First, upon the basis of examinations of attitudinal ambivalence as an additional factor within the TPB framework, we demonstrate a negative relationship between an individual's attitude and intentions to achieve his or her weight loss goal. We posit that this is due to the fact that health behavioural change is difficult to accomplish because health behaviours are more complicated to change than individuals' product-purchasing behaviours. Second, we explore the reasons for this negative effect of attitudes on intentions and show that attitudinal ambivalence about the self and an individual's abilities and motivation to achieve the weight loss goal are the cause.

Lastly, we show that self-efficacy and the provision of outcome feedback can mitigate the negative effect and improve the individuals' intentions to try to achieve the weight loss goal.

Ambivalence has been defined in prior literature as the psychological conflict between the positive and negative components of an individual's attitude towards a behaviour or an object (Hodson *et al.*, 2001; Conner and Sparks, 2002). In this research, we show that an individual's attitude towards oneself significantly influences the individual's attitude towards achieving the weight loss goal, in line with the results of prior research by Locke and Braun (2009). We also show that it is the ambivalence in individual's self-evaluative attitudes that explains the negative effect of attitudes on intentions. In Study 1, we find that when an individual's self-evaluative attitudes are positive, there is a positive effect of his or her attitudes towards achieving the weight loss goal on his or her intentions to achieve his or her weight loss goal. However, when the individual holds ambivalent or negative attitudes towards the self and his or her abilities, the results show that there is a negative effect of attitudes on the individual's intentions to achieve his or her weight loss goal.

The findings of this research regarding the influence of level of PBC or self-efficacy highlight the importance of understanding when and how varying degrees of PBC or self-efficacy can interact with ambivalence and past behaviours to influence attitude and intentions towards eating healthier and changing eating behaviours. While contributing to self-efficacy theory (Bandura, 1997) and extending previous self-efficacy and behavioural control research, we show that depending upon the health-related context an individual is presented with, both low and high self-efficacy can be adaptive for individuals seeking to manage their weight. In Study 2, we find that having high self-efficacy is advantageous for those feeling ambivalent and having encountered a failure outcome, thus showcasing the power of self-efficacy dampening negative attitudinal responses to health behaviours. Further, we find that the level of self-efficacy can indeed serve as a unique trait to propel an individual into changing their eating behaviours, particularly in a situation where they encounter a successful outcome for those low in self-efficacy. Such outcome information is pivotal for those with low self-efficacy to make a change. This turn may be due to outcome feedback not expected by those with low self-efficacy.

Implications and directions for future research

The research presented has significant implications for marketing behaviour change efforts to consumers and those interested in changing health behaviours. From a public policy perspective, there seem to be two approaches to health behaviour change: emphasizing personal responsibility via healthy decision-making and developing interventions to implement in communities affected. Under the first approach of emphasizing personal responsibility, the results of this research could be of interest because the negative effect of attitude towards achieving a weight loss goal on intentions to achieve a weight loss goal could be seen as disheartening for individuals participating in behaviour change programmes

or trying to achieve a weight loss goal on their own. However, by understanding that the attitudinal conflict about oneself is what drives this negative effect and that a certain level of negative attitude about oneself might be necessary to encourage someone to try to change their behaviours, individuals have some insight into their own motivation and thought process. Further, individuals may be able to examine their ambivalence level and search out the benefits and find ways to navigate around the perceived disadvantages of changing a behaviour. For example, if the individual perceives that the goal of the health promotion programme is to lose weight and feel better about himself or herself, then making that goal easier to visualize should enhance the individual's positive component of attitudes towards himself or herself (Cheema and Bagchi, 2011), thus reducing the individual's SEA and leading to a positive effect of attitudes on intentions.

In addition, from an individual or consumer standpoint, the finding that level of self-efficacy mitigates the negative relationship between attitude and intentions could be of interest in terms of how individuals create expectations and monitor the outcome of their behaviour change attempt. For example, knowing that evaluative feedback is critical, those with low self-efficacy in particular should consider setting smaller goals rather than larger goals (e.g. wanting to lose 5 lb instead of 25 lb at a time), so that they can more easily manage the perceived outcome of their behaviour change attempt. Moreover, focusing on positive feedback should help low-self-efficacy individuals continue to work towards achieving their set goals. In line with research by Carver and Scheier (1981, 1982), not only do the individual's self-evaluative feedback systems work to monitor how one progresses towards his or her goal, but such monitoring of the feedback also impacts judgment of future behaviour (Rieskamp, 2006). Thus, managing evaluative feedback should positively encourage low-self-efficacy individuals to continue working towards their health goal.

Under the second approach of designing more effective health behaviour change interventions, the results of this research have a couple of important implications. First, our results indicate that new health behaviour change programmes should point out that health behaviour change is a difficult process that will involve a series of phases and may involve a series of attempts. Pointing out this difficulty and aiding participants in figuring out ways around possible roadblocks should reduce the individual's SEA and lead to a more positive attitude and positive intention towards attempting a health behaviour change. For example, if the individual recognizes that there could be roadblocks such as a lack of motivation or lack of belief in himself or herself, then the programme could provide an individual counsellor who could act as a touch point when the individual is losing motivation to exercise or does not feel like making a healthy food choice. This individual counsellor could prop up the individual by encouraging healthy decisions, and this support could enhance the participant's attitude towards making healthy decisions, which could lead to more positive intentions to change their health behaviours.

Additionally, policy makers and designers of public health interventions could emphasize smaller, short-term goals rather

than larger, long-term goals for health behaviour change as a way to monitor the individual's outcome. Because this research shows that outcome information and self-efficacy combine to play a pivotal role in helping those low-self-efficacy individuals succeed, feedback that demonstrates successful progress towards their short-term goal could prove to be an integral part of a health behaviour change. These smaller goals could take a variety of forms, and one could envision these ranging anywhere from trying to lose 5 lb to trying to exercise two to three times a week to taking the stairs instead of the elevator in buildings.

In addition, this research provides a framework for future research as well. This research contributes to the growing, but still under-researched, area of consumer ambivalence, by examining the consequences of ambivalence on consumer decision-making. In the future, research could examine how the different types of coping strategies that consumers can employ to deal with this ambivalence have further effects on decision-making. For example, a qualitative study by Otnes *et al.* (1997) examines different types of coping strategies that individuals who are planning weddings employ to deal with ambivalence. These include resignation, compromise and seeking assistance. Future research could further investigate how these specific strategies could be employed by marketers to assist consumers in lessening their ambivalence and thus leading to a positive effect of attitudes on intentions. Additionally, future research could further examine this behavioural change paradigm with the consideration of attitudinal ambivalence within the context of behavioural economics theory as this should provide better insight as to how consumer habits factor into day-to-day health decisions.

Finally, a limitation of this research is the use of an online panel in Study 1. An online panel was selected as the data collection method because of its broad reach (i.e. survey participants were from every region of the United States); however, by employing an online panel, the researchers had less control over the data collection procedure than might have been the case if participants were recruited locally (Evans and Mathur, 2005). However, the researchers employed a different data collection method for Study 2 and used attention checks and controls during the data collection period to ensure that online participants were paying attention to the study and providing consistent responses and to ensure that participants met the screening requirements for participation in the study.

APPENDIX STUDY 2 MANIPULATIONS

Control Information × Success Outcome

Studies have shown that people who regularly exercise and lose weight are at significantly lower risk for many diseases and live a longer life. Many recent studies have found that trying to lose weight by exercising may be successful because you often eat less after exercising and you may feel constrained to do so because you think you worked so intensely.

Imagine that Erin is trying to lose weight, and she or he is aware of this information. She or he believes that trying to lose weight will help her or him feel more energetic. She or he will do more exercise and play sports with her or his friends. She or he will have fun trying new tasty low-calorie recipes. Erin feels very positive about the weight loss attempt.

In the past, Erin has already had success at her or his weight loss attempts three times.

Control Information × Failure Outcome

Studies have shown that people who regularly exercise and lose weight are at significantly lower risk for many diseases and live a longer life. Many recent studies have found that trying to lose weight by exercising may be successful because you often eat less after exercising and you may feel constrained to do so because you think you worked so intensely.

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In the past, Erin has not had success at her or his weight loss attempts three times.

Ambivalence Information × Success Outcome

Studies have shown that people who regularly exercise and lose weight are at significantly lower risk for many diseases and live a longer life. Yet many recent studies have found that trying to lose weight by exercising may not be successful because you often eat more after exercising, and you may feel entitled to do so because you think you worked so intensely.

Imagine that Erin is trying to lose weight, and she or he is aware of this information. She or he believes that trying to lose weight will help her or him feel more energetic, yet she or he will not be able to eat foods that make her or him happy. She or he will do more exercise and play sports with her or his friends but will have less time to go to the movies with them. She or he will have fun trying new tasty low-calorie recipes, but she or he will also think about her or his weight more often.

In the past, Erin has already had success at her or his weight loss attempts three times.

Ambivalence Information × Failure Outcome

Studies have shown that people who regularly exercise and lose weight are at significantly lower risk for many diseases and live a longer life. Yet many recent studies have found that trying to lose weight by exercising may not be successful because you often eat more after exercising, and you may feel entitled to do so because you think you worked so intensely.

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In the past, Erin has not had success at her or his weight loss attempts three times.

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