# Differential Construal of Exercise versus Diet and Implications for Weight Control

ERICA MINA OKADA

Successful weight control is a challenge for many consumers, but in principle, it is a simple arithmetic combination of increasing caloric expenditure and/or decreasing caloric intake. We call the former "exercise" and the latter "diet." A field survey, three behavioral lab experiments, and a national weight loss field study show that (1) people tend to construe exercise at higher levels and diet at lower levels, (2) activating people's focus on the high-level purposes versus low-level processes of their behavior may improve the odds of weight control success by exercise and diet, respectively, and (3) people who effectuated exercise plans that were high in desirability in terms of bringing about greater net caloric cuts, and diet plans that were high in feasibility in terms of ease of compliance, had the greatest weight reduction over a three-month period. Understanding the theory of how contrasting mental models underlie exercise versus diet may help consumers control their weight with more success, and marketers position their weight control products and services more effectively.

*Keywords*: exercise, diet, weight control, construal level, gain/loss focus

The perennially most popular New Year's resolution that people make is to lose weight (Haiken 2013), reflecting that weight loss is a meaningful goal for many individuals. Weight control is also a relevant topic for society, as the burdens of obesity are significant. In the US obesity costs an estimated $147 billion a year in health care (Finkelstein et al. 2009), and another $73 billion in lost productivity (Pappas 2010). According to a study supported by the National Institute on Aging, average life expectancy could decline by as much as five years unless the rising rate of obesity is curbed aggressively (Dollemore 2005). Worldwide, there are over 1.6 billion overweight people, and that number is increasing (Worldometers.info 2013a).

Erica Mina Okada (eokada@ics.hub.hit-u.ac.jp) is Professor at Hitotsubashi University, School of International Corporate Strategy, Tokyo, Japan. The author thanks Yoshiko Ishikawa, Eric Mais, Dan Port, Brian Wansink, and participants in a research workshop at Hitotsubashi University, School of International Corporate Strategy for their help. She also appreciates Jaideep Sengupta, Gita Johar and Amna Kirmani who provided guidance as AE and Editors, and three anonymous reviewers.

*Editors: Gita V. Johar and Amna Kirmani*

*Associate Editor: Jaideep Sengupta*

*Advance Access publication December 19, 2018*

In principle weight control is a simple arithmetic combination of increasing energy expenditure and/or decreasing caloric intake. We call the former "exercise" and the latter "diet." In addition to losing weight, dieting and exercising are separately two more of the perennial top five New Year's resolutions (Haiken 2013), which suggests that people understand the importance of exercising and managing diet for weight control (thus, these goals make it into the top five), and also how difficult they are to do (thus, these goals recur year after year). We propose an original theoretical framework that contrasts the two weight control modes, exercise versus diet, in terms of the differential construal levels that they activate. Building on the existing literature that links high- (low-) level construal to positive (negative) states and events (Baumeister et al. 2001; Bless et al. 1990; Schwarz and Bless 1991), we identify the relative gain (loss) focus of exercise (diet) as one factor that differentially activates high- (low-) level construal.

Existing research in marketing has studied the relationship between food consumption and weight control (Chandon and Wansink 2007; Cheema and Soman 2008; Wansink and Chandon 2006), while other research in behavioral economics has examined how to motivate exercise (Milkman, Minson, and Volpp 2014). Our research takes the new approach of studying both weight control modes,

 • Vol. 46 • 2019
DOI: 10.1093/jcr/ucy080

and contrasting exercise versus diet in terms of the differential construal levels that they activate.

Weight control requires some combination of exercise and/or diet: each in turn is challenging, and neither offers immediate results. Understanding the theory of how contrasting mental models underlie exercise versus diet may help consumers control their weight with more success, and marketers position their weight control products and services more effectively.

Theoretically, we present a novel concept that construal level varies by the nature of different behaviors: one tends to construe exercise at relatively higher levels, and diet at relatively lower levels. In so doing we add to the literature on how construal of a given behavior varies across situations (Liberman and Trope 1998) and individuals (Vallacher and Wegner 1987). Substantively, we build on work that suggests that matching a message's framing and the mindset that it activates in terms of construal level results in stronger consumer intentions of engaging in desired behaviors (White, MacDonnell, and Dahl 2011). We explore two practical implications: (1) activating people's focus on the high-level purposes versus low-level processes of their behavior may improve compliance to and outcomes of exercise and diet, respectively, and (2) people who effectuated exercise plans that were high in desirability in terms of bringing about greater net caloric reductions, and diet plans that were high in feasibility in terms of ease of compliance, had the greatest actual weight reduction over a three-month period. Please see figure 1 for a schematic diagram of our theoretical framework, its implications, and how a series of five studies examines our topic.

## EXERCISE CONSTRUED AT HIGH LEVELS, DIET CONSTRUED AT LOW LEVELS

*Construal level* refers to the level of abstraction in the mental model that people create in representing actions (Vallacher and Wegner 1987, 1989). For example, an action such as "writing a paper" can be construed at a high level like "expressing thoughts," or at a low level like "pushing keys on a keyboard." We make the novel prediction that people tend to construe exercise at relatively higher levels, and diet at relatively lower levels. We test this prediction in an observational study in study 1A, and more robustly by experimental manipulation in studies 1B and 2. Please see figure 1.

The existing literature examines how construal of a given behavior varies across situations and individuals. Situations that involve greater psychological distances activate a higher-level construal of an activity, while situations that involve more proximate psychological distances activate a lower-level construal of the same activity (Liberman and Trope 1998; Trope and Liberman 2010). Some people by trait tend to think of actions in terms of high-level implications and consequences, while others tend to think of the same actions in terms of low-level mechanics and details. People who identify actions at relatively lower or higher levels may be characterized in terms of broad personality dimensions. Low-level thinkers are more inclined to take impulsive action, and high-level thinkers are more inclined to take deliberate action. Low-level thinkers tend to be more perceptive to outside feedback, and high-level thinkers tend to be more impervious (Vallacher and Wegner 1989).

In contrast to the extant literature that examines how a given event or behavior can be construed at different levels depending on situational context and/or individual differences, we propose that across situations and individuals, different behaviors by their nature tend to be construed at different levels. Exercise tends to activate relatively higher construal levels, while diet tends to activate relatively lower construal levels. Existing research would predict that either exercise or diet can be construed at higher or lower levels by certain people, and/or when psychological distance is greater or more proximate. The gist of our argument is that across situations and individuals, exercise by its inherent nature tends to be construed at a relatively higher level, and diet by its inherent nature tends to be construed at a relatively lower level. We introduce the inherent nature of different behaviors as a third factor that influences the relative construal level that is activated.

### Exercise Has a Relative Gain Focus; Diet Has a Relative Loss Focus

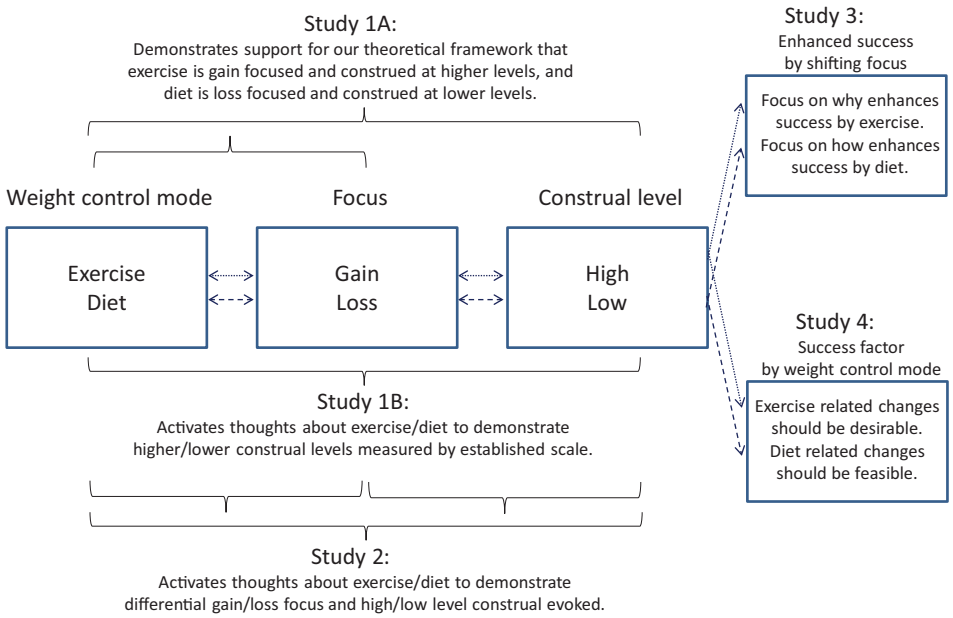
Until two centuries ago malnutrition was the leading cause of death even in a first-world country of today, such as the US (Jones, Podolsky, and Greene 2012). Calories were extremely scarce, and our behavioral tendencies evolved over countless generations of adversity to seek out densely caloric foods and conserve energy expenditure. However, in today's age of abundance and convenience, those behavioral tendencies that evolved to help survival now promote weight gain and obesity.

Diet has a loss focus because it centers on doing less of a "bad" behavior: eating. We do not mean "bad" in an absolute sense, as eating is necessary for life. But in our modern first world, the overall level of caloric consumption is excessive and has contributed to the current obesity epidemic. In our culture losing weight is generally a desirable weight control goal, and for the narrowly defined goal of losing weight, eating is a negative behavior in the sense that it gets one further away from that goal.

Negative events and states signal that there is some threat or problem that needs to be addressed (Baumeister et al. 2001; Bless et al. 1990; Schwarz and Bless 1991), which leads to mobilization toward concrete action (Taylor

**FIGURE 1**

LINKING DIET TO LOW-LEVEL CONSTRUAL AND EXERCISE TO HIGH-LEVEL CONSTRUAL: THEORETICAL FRAMEWORK AND IMPLICATIONS




1991). Thus, a focus on negatives should activate lower construal levels. In order to lose weight specifically, one should eat less *ceteris paribus*; therefore, diet has a loss focus. For the broader goal of general well-being, eating too little can result in adverse health effects. In fact, a pathologically strong belief that eating is "bad" can become an underlying cause for eating disorders.

One *could* think of controlling one's diet in terms of gains (e.g., eating more fruits and vegetables). However, eating more of anything per se has no other effect than to increase one's weight. Eating 1,000 calories of organic carrots or 1,000 calories of premium ice cream would have the exact same effect on one's weight. Eating more fruits and vegetables can help in weight control only if it can satiate hunger with fewer calories, and crowd out more densely caloric foods from one's diet. That is, eating more healthy foods can be a means to reducing total caloric intake, but it is certainly not per se a means to reducing weight.

Exercise has a gain focus because it centers on doing more of a "good" behavior. More exercise is not universally better, as too much exercise could result in injuries and overexertion. But in our modern first world, the overall level of physical activity is inadequate, and has also contributed to the obesity epidemic. For the narrowly defined goal of losing weight, exercise is a positive behavior that gets one closer to that goal.

Positive events and states signal a benign environment (Baumeister et al. 2001; Bless et al. 1990; Schwarz and Bless 1991) in which people can afford to think more broadly and with a longer horizon (Bless et al. 1996; Schwarz and Clore 1983). Thus, a focus on positives should activate higher construal levels. In order to lose weight specifically, one should exercise more *ceteris paribus*; therefore, exercise has a gain focus.

One *could* likewise think of exercise in terms of losses (e.g., *not* being sedentary). However, the fact of the matter is that people don't think of exercise in such a contrived manner. As we demonstrate in study 1A and later replicate in study 4, the natural tendency is to think of exercise as doing something, rather than not doing something.

Our theoretical framework linking a gain versus loss focus to higher versus lower construal levels shares some similarities with regulatory fit theory, which links a promotion versus prevention focus to higher versus lower construal levels (Lee, Keller, and Sternthal 2010). The difference is that a promotion or prevention focus has to do with motivation: whether people are motivated to achieve gains and/or avoid losses (Higgins 1997, 2000). In contrast, our theory centers on actions. Regardless of how people are motivated—whether it be for getting healthier and feeling better, or for preventing health problems and avoiding negative self-image—they can achieve the given goal of weight control through a combination of doing more

positive actions that get them closer to that goal (i.e., exercise) and/or doing less of those negative actions that get them further away from that goal (i.e., diet).

Our theory also aligns with the research finding that gain (loss) framed messages work more effectively when matched with the activation of high- (low-) level construal (White et al. 2011). In the sense that gain (loss) framed messages shift the positives (negatives) into focus (Block and Keller 1995; Maheswaran and Meyers-Levy 1990; Shiv, Edell, and Payne 2004), we build our theory on the matching theory (White et al. 2011), but the two are distinct. A gain versus loss frame contrasts two alternative ways to represent a given difference between two alternatives (e.g., if you choose to act you save a million trees, and if you choose not to act you lose a million trees). In contrast, our theory compares two alternative actions for achieving a given goal.

We examine the basic relationship among (1) exercise, a gain focus and high-level construal, and (2) diet, a loss focus and low-level construal, in an observational study in study 1A. In study 1B we examine more cleanly and directly the association between exercise and high-level construal, and diet and low-level construal, by using a well-established scale for measuring construal level. In study 2 we study those associations more robustly by activating thoughts about either exercise or diet, then comparing the gain versus loss focus, and construal levels between the exercise and diet conditions. Please refer to figure 1.

## Matching Construal Level by Weight Control Mode

The matching hypothesis (White et al. 2011) suggests that desired behavior can be induced when the construal level that is activated by the message frame (gain frame is high level, and loss frame is low level) matches the construal level that is activated by the question asked in the message (*why* is high level, and *how* is low level). We build on that hypothesis and propose that matching the construal level that is activated by diet versus exercise, respectively, to the construal level that is activated in individuals at the time of action facilitates weight control. We present that (1) matching exercise versus diet to the high-level purposes versus low-level processes of one's behaviors enhances the prospects of weight control success, and (2) planning exercise-related changes that are desirable in terms of cutting more net calories, and/or diet-related changes that are feasible in terms of ease of compliance, results in greater weight loss success ex post.

*High-Level Purposes versus Low-Level Processes.* High-level construal specifies why an action is performed (Freitas, Gollwitzer, and Trope 2004; Vallacher and Wegner 1987). If exercise tends to be construed at a higher level, focusing on the high-level purposes when planning or engaging in exercise should facilitate weight control. In contrast, low-level construal specifies how an action is performed (Freitas et al. 2004; Vallacher and Wegner 1987). If diet tends to be construed at a lower level, focusing on the low-level processes when planning meals or choosing foods should also facilitate weight control. Exercise and diet are both important in weight control, but at any given point in time, one is doing either one or the other. Activating construal levels to match what one is currently doing should enhance the chances of weight control success. We test this prediction in study 3. Please see figure 1.

*High-Level Desirability versus Low-Level Feasibility.* The desirability of an action is why one enacts that action, and is associated with high-level construal (Liberman and Trope 1998). The feasibility of an action pertains to how one enacts the action, and is associated with low-level construal (Liberman and Trope 1998). Cutting net calories is *why* one enacts weight control plans, so desirable plans are those that cut significant net calories. Compliance is *how* one enacts weight control plans, so feasible plans are those that are easy to comply with.

Ideal weight control plans are both desirable and feasible, but there tends to be a trade-off between the two, and desirable plans that cut more net calories are generally difficult to adhere to. Feasible plans that are easier to comply with typically do not cut significant calories. An analogy may be an ideal purchase for a consumer, which would be an item of good (i.e., high) quality for a good (i.e., low) price. However, there is typically a trade-off, and high-quality items tend to be high-priced, and low-priced items tend to be lower quality. Based on the theoretical link between exercise and high-level construal, and diet and low-level construal, the desirability of a plan should be relatively more important for exercise, while the feasibility of the plan should be relatively more important for diet.

We predict that people will have greater success in weight control by enacting exercise plans that bring about more significant net caloric cuts, and/or diet plans that are easier to comply with. We test this prediction in a national weight loss study in study 4. Please see figure 1.

# STUDY 1A: WEIGHT CONTROL MODE, GAIN-LOSS FRAME, AND CONSTRUAL LEVEL

The purpose of study 1A was to test the premise of our theoretical framework contrasting how people construe the two weight control modes differentially. We predict that diet is linked to low-level construal, and exercise to high-level construal.

## Design

We conducted study 1A as an online survey of 202 participants recruited through the Amazon Mechanical Turk (MTurk) platform. All participants either were currently trying to lose weight and/or had tried to lose weight in the past.

The study comprised four parts. First, we asked participants to offer suggestions for weight control. This was an open-ended question. The purpose here was to confirm that, unaided, people would indeed suggest diet and exercise specifically, and to see if there would be any contrasts in their suggestions for diet versus exercise.

In the next part, we randomly assigned participants to either a diet or exercise condition and asked them to read a short passage about either diet or exercise, respectively, for weight control. The passage in the exercise (diet) condition read as follows:

> According the Centers of Disease Control and Prevention more than one-third of American adults are considered obese, and another one-third are overweight. Carrying around too much weight can look and feel uncomfortable, but it also causes a number of serious health problems, including heart disease, diabetes, stroke, and some types of cancer.
>
> One method that can help a person lose weight is to manage their exercise (diet) and increase caloric expenditure (reduce caloric intake). Exercising (Dieting) can prevent or even reverse the effects of certain diseases, lower blood pressure and cholesterol, which may prevent a heart attack, and lower your risk of developing certain types of cancers such as colon and breast cancer. Exercising (Dieting) is also known to help contribute to a sense of confidence and well-being, thus possibly lowering rates of anxiety and depression.
>
> Exercising (Dieting) offers no immediate results, so the key is commitment. To help you with your exercise (diet) plan, list three things, even small things, that you will do differently today to expend more calories (take in fewer calories) compared to the day before. Exercising (Dieting) is an important part of life, so continue making the list of three items every day, and exercise (diet) becomes a part of your daily routine.

The purpose of this manipulation was to get participants thinking specifically about diet or exercise. Our prediction is that thinking specifically about diet will activate low-level construal, while thinking specifically about exercise will activate high-level construal.

The third part was a behavioral identification form (BIF) questionnaire (Vallacher and Wegner 1987). The BIF is a forced-choice questionnaire that asks participants to choose between superordinate and subordinate representations of 25 focal activities. For example, "making a list" is restated in superordinate form as "getting organized," or in subordinate form as "writing things down," and respondents are asked to choose their preferred restatement of the item. Superordinate restatements fit the structure "[restatement] by [item]," and subordinate restatements fit the structure "[item] by [restatement]." A respondent's BIF score is the number of superordinate choices s/he makes. It ranges from 0 to 25, and higher numbers indicate higher levels of construal. Our prediction is that those in the exercise condition would indicate higher BIF scores compared to those in the diet condition.

We then asked for participants' basic demographic information. They marked their gender as either male or female. They indicated their age by choosing from one of six age groups: 18–24, 25–34, 35–44, 45–54, 55–64, and 65 and over.

## Results

The 202 participants comprised 106 (52.5%) men and 96 (47.5%) women. Twenty-six (12.9%) were in the 18–24 age group, 72 (35.6%) were ages 25–34, 47 (23.3%) were ages 35–44, 26 (12.9%) were ages 45–54, 25 (12.4%) were ages 55–64, and 6 (3.0%) were 65 and over.

We analyzed the suggestions that participants offered for weight control. Three independent coders separately categorized the participants' responses as diet-related suggestions, exercise-related suggestions, and/or other-related suggestions. In cases where there was no agreement among all three coders, the categorization of the majority (i.e., two coders) was used. There was no case where all three coders produced three different categories. One hundred eighty-four (91.1%) participants made suggestions that were diet related, 143 (70.8%) made exercise-related suggestions, and 133 (65.8%) made suggestions that included both diet- and exercise-related elements. Only eight (4.0%) of the suggestions included neither an exercise nor a diet component (e.g., "have discipline," "make modification and changes," "do all good things"). This confirms that people generally have a good understanding of the importance of both diet and exercise for weight control. In fact, 28 (13.9%) said verbatim "eat less, (and) exercise more."

In comparing the diet- versus exercise-related suggestions that people made, we observed two interesting contrasts. First, we observed patterns that were consistent with our conceptual premise of exercise being more gain focused, and diet being more loss focused. Exercise-related suggestions tended to be about doing more of something and thus were gain focused. In contrast, diet-related suggestions tended to be about doing less of something and thus were loss focused. The word "more" was used in 37 (25.9%) of the exercise-related suggestions and in only 13 (7.1%) of the diet-related suggestions. In comparison, the word "less" was used in 45 (24.5%) of the diet-related suggestions and not once (0%) in any of the exercise-related suggestions. A higher proportion of exercise- versus diet-related suggestions included the word "more" ($Z = 4.69$, $p < .001$), while the directionality was opposite for the

word "less," where a higher proportion of diet- versus exercise-related suggestions included the word ($Z = 6.37$, $p < .001$). Furthermore, negative imperatives such as "do not (don't)" (16), and verbs such as "avoid" (9), "cut" (7), "stop" (6), "limit" (4), "reduce" (3), "eliminate" (2), and "remove" (2), were used in diet-related suggestions, but not once (0%) in any of the exercise-related suggestions. As negatives tend to activate low-level construal (Baumeister et al. 2001; Bless et al. 1990; Taylor 1991), while positives tend to activate high-level construal (Bless et al. 1996; Schwarz and Clore 1983), the relative loss focus of diet-related suggestions, compared to the relative gain focus of exercise-related suggestions, supports our theoretical framework that exercise tends to be construed at relatively higher levels compared to diet.

In addition, diet-related suggestions tended to include more specifics than exercise-related suggestions. Only 13 participants (9.1%) offered specifics for exercise, in terms of type (9; e.g., "walk" [4], "run" [2], "swim" [1], "taking stairs" [1], "unloading trucks" [1]); timing (3; e.g., "a few times a week"); and manner (1; e.g., "gym"), while 98 (68.5%) simply used the general term "exercise" in their suggestions. The percentages in parentheses are out of all 143 exercise-related suggestions, and the numbers are the frequencies of suggestions. In comparison, diet-related suggestions tended to include more specifics: 63 (34.2%) offered specifics in terms of types of food (57; e.g., "sugar," "carbs," "meat," "fruit," and "vegetables"); manner (6; e.g., "join weight watchers" [3], "use small plates" [2], and "cook at home" [1]); and timing (4; e.g., "not after 6 pm" [2], "before meals" [1], and "5–6 times a day" [1]). General terms such as "diet" or "food" were used by only 32 (17.4%) and 30 (16.3%) of the diet-related suggestions, respectively. The percentages in parentheses are out of all 184 diet-related suggestions, and the numbers are the frequencies of suggestions. A higher proportion of exercise-related suggestions conveyed general advice to "exercise," while a lower proportion of diet-related suggestions conveyed general advice about "diet" or "food" ($Z = 6.25$, $p < .001$). One contrast between high- and low-level construal is a focus on the general versus specifics (Liberman and Trope 1998), so the higher frequency of specifics offered for diet- versus exercise-related suggestions is consistent with our theoretical prediction that exercise tends to be construed at relatively higher levels compared to diet.

In part due to the higher level of specificity of diet-related suggestions, there was a wider variety of means for dieting as well. Participants in the exercise condition collectively suggested only five distinct exercise forms: "walk," "run," "swim," "taking stairs," and "unloading trucks." In contrast, a wider variety of food types was suggested for consuming (e.g., "water," "fruit," "vegetables," and "fibers") as well as avoiding (e.g., "sugar," "carbs," "meat," and "processed foods") as means for dieting. A wider variety of means entails a higher level of complexity, which in turn is linked to lower construal levels (Vallacher and Wegner 1987). This is again consistent with our prediction that diet tends to be construed at relatively lower levels compared to exercise.

We then directly measured construal levels in terms of BIF scores, comparing the two weight control modes. We found that participants in the exercise condition had higher BIF scores than those in the diet condition ($M_{exercise} = 16.7$ vs. $M_{diet} = 14.1$; $t = 2.92$, $p < .01$). This lends direct support to our theoretical framework that diet activates relatively lower-level construal, and exercise activates relatively higher-level construal. The next two studies further explore the theoretical framework, and are followed by two more studies that explore the practical implications.

## STUDY 1B: EXERCISE, DIET, AND CONSTRUAL LEVEL

Our main theoretical contribution is to link contrasting weight loss modes to varying levels of construal, and a gain versus loss focus is the premise upon which we build our theoretical framework. The purpose of study 1B was to more robustly examine the central association between weight control modes and construal level, by directly and cleanly manipulating weight control mode, then measuring the difference in construal level using a well-established scale.

### Design

We conducted study 1B as an online survey of 130 university students taking introductory business classes at a state university in the western US. All participants either were currently trying to lose weight and/or had tried to lose weight in the past.

The first part of the study primed diet for half of the participants, and exercise for the other half, by assigning differential word scramble tasks. Participants randomly assigned to the exercise (diet) condition were asked to unscramble the following three sentences in order: (1) "Exercise (Diet) is an important part of weight management"; (2) "A good exercise (diet) plan is the key to success"; and (3) "I now present my own exercise (diet) plan."

The second part was a BIF questionnaire (Vallacher and Wegner 1987), as in study 1A. We predict that participants in the exercise condition would score higher than those in the diet condition.

This study was in part a replication of the last part of study 1A. The redesign here was that (1) the weight control manipulation entailed a more actively engaging word scrambling task, rather than just a passive reading task about the respective weight control modes, (2) we used the wording "weight management" instead of "weight loss" to remain gain/loss neutral, and (3) in order to rule out a

confound with gains in the exercise condition and losses in the diet condition, which may have facilitated our desired associations between weight loss mode and construal level in study 1A, in this study we made no reference to "increasing" caloric expenditure in the exercise condition or to "reducing" caloric intake in the diet condition.

Wtf

## Results

Out of the 25 BIF questions, participants chose the abstract restatement on average 15.4 times, ranging from a low of 0 to a high of 25. In a comparison between the two weight control conditions, those in the exercise condition scored higher on the construal scale ($M_{exercise} = 17.0$ vs. $M_{diet} = 14.4$; $t = 2.35$, $p = .01$). A simple regression of BIF score on weight control mode (0 = diet, 1 = exercise) showed a significant coefficient ($\beta = 2.59$, SE = 1.09). This is consistent with our theoretical prediction that people tend to construe exercise at higher levels and diet at lower levels.

# STUDY 2: WEIGHT CONTROL MODE, GAIN-LOSS FRAME, AND CONSTRUAL LEVEL—AN EXPERIMENTAL APPROACH

That exercise has a relative gain focus, while diet has a relative loss focus, is the conceptual premise upon which we build our theoretical framework linking exercise to high-level construal and diet to low-level construal. Indeed, the results of the first part of study 1A corroborated the premise. Unaided, people generated exercise-related suggestions that were gain focused, and diet-related suggestions that were loss focused. Studies 1A and 1B also showed that higher (lower) construal levels were measured after thoughts of exercise (diet) were activated. In study 2 we test the association more robustly by activating thoughts about exercise versus diet, then comparing (1) the extent of a gain versus loss focus, and (2) construal level, evoked in the two conditions. We predict that when thoughts about exercise (diet) are activated, we will observe a greater extent of a gain (loss) focus, as well as higher (lower) levels of construal.

## Design

One hundred one students taking introductory business courses at a state university in the western US participated in a behavioral lab study. Only those students who indicated they were interested in weight control participated in the study. The study employed a 2 (weight control mode) × 2 (order) between-subjects design and involved three parts.

The first part of the study manipulated weight control mode by priming either diet or exercise through different word scramble tasks. This manipulation was the same as in study 1B.

In a following part of the study, we measured the extent of a gain versus loss focus through a word association task. The goal was to create a group of words by association with the theme word "vacation." There were 20 words placed in an oval below the theme word in capitals, and 20 more words in a list placed beside the oval. The participants' task was to group all the words that they associated with vacation in the oval by (1) adding to the oval any words they associated with vacation from the list beside the oval by circling them, and (2) deleting from the oval any words they did not associate with vacation by crossing them out. Please refer to the appendix for the words inside and beside the oval. The extent that participants would add to (delete from) the oval would suggest a gain (loss) focus. Our prediction was that those in the exercise condition would circle more words from the list to add to the oval, while those in the diet condition would cross out more words to delete from the oval.

Another part of the study asked the participants where, when, and with whom they would like to go on vacation. This measured the psychological distance between the participants and their vacations. People construe events that are spatially, temporally, and socially more removed (proximate) at higher (lower) levels (Liberman and Trope 1998), and likewise, when higher (lower) construal levels are activated, people tend to evoke events that are psychologically more distant (proximate) spatially, temporally, and socially (Semin and Smith 1999). We predict that the desired vacation would lie spatially and temporally further (closer) and involve more (fewer) people in the exercise (diet) group.

The literature suggests that activation of a certain type of mindset in a prior task spills over to subsequent tasks (Wyer and Xu 2010). In this study, the gain/loss mindset evoked by the exercise/diet prime should spill over to the ensuing word association and imagination tasks.

Order was the second experimental factor, and it determined the sequence of parts 2 and 3 of the study. Everyone did the word scramble first. Then those in order 1 did the vacation word association task next, followed by the questions about where, when, and with whom they wanted to take their vacations. Those in order 2 answered the where, when, and with whom of their desired vacations right after the word scramble, then completed the word association task. There was no difference between orders 1 and 2, and we exclude discussion thereof in our further analysis.

## Results

Fifty participants were in the exercise condition and unscrambled the three sentences with the word "exercise," and 51 were in the diet condition and unscrambled the three sentences with the word "diet." In the word association task, participants associated 23.3 net words overall to

the theme word "vacation." They added on average 9.3 words from the list to the oval and deleted on average 6.0 words from the oval.

With the participants' responses to where, when, and with whom they wanted to go on vacation, we first converted the "where" responses to direct distances (as the crow flies) in kilometers (km) between the city where the study was conducted and their desired destinations. When a country was named (e.g., Japan), we measured the distance to its capital (i.e., Tokyo). When a region was named (e.g., Europe), we took the largest country in the region by GDP (i.e., Germany), and measured the distance to its capital city (i.e., Berlin). Next, we converted the "when" responses to the number of days from the date the study was conducted. "Next week," "next month," and "next year" were approximated as 7 days, 30 days, and 365 days, respectively. When the response was a month (e.g., August), we counted the number of days between the date of the study and the 15$^{th}$ of that month. When the response was a season, we counted the number of days until July 15$^{th}$ for "summer," October 15$^{th}$ for "fall/autumn," January 15$^{th}$ for "winter," and April 15$^{th}$ for "spring." Then we counted the number of people "with whom" they wanted to go on vacation. "Alone" or its equivalent was 0. We approximated groups such as "family" and "friends" as 3 each. On average the desired vacation lay 5,293 km away, was 170 days in the future, and included 1.9 companions.

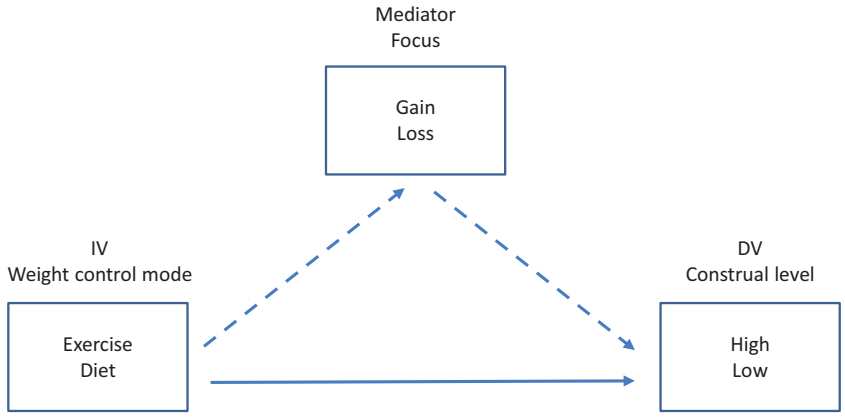
In a comparison between the two weight control modes, the exercise group associated more net words with the theme word, compared to the diet group ($M_{exercise}$ = 25.7 vs. $M_{diet}$ = 20.9; $t = 3.56$, $p < .001$), which supports our prediction that exercise (diet) is associated with a relative gain (loss) focus. Participants in the exercise condition added more words ($M_{exercise}$ = 10.5 vs. $M_{diet}$ = 8.0; $t = 2.46$, $p < .01$) and deleted fewer words ($M_{exercise}$ = 4.8 v. $M_{diet}$ = 7.1; $t$ = -2.66, $p < .01$) compared to those in the diet group. A simple regression of the number of words added on weight control mode (0 = diet, 1 = exercise) revealed that when thoughts about exercise were activated, participants added more words to the oval to create a set of associated words ($\beta$ = 2.5, SE = 1.0), which indicates a relative gain focus. Another simple regression of the number of words deleted on weight control mode revealed that when thoughts about diet were activated, they deleted more words from the oval to attain the same goal ($\beta$ = 2.3, SE = 0.9), which indicates a relative loss focus.

We also compared the construal levels evoked in terms of psychological distances between the two weight control modes. In the exercise condition, the average distance to the desired vacation destination was 6,310 km, and farther ($t = 2.56$, $p < .01$) than 4,295 km in the diet condition, which supports our theoretical prediction that the spatial distance evoked would be greater (closer), indicating higher (lower) construal levels when thoughts about exercise (diet) are activated. Temporally, the exercise group's vacations were 235.8 days in the future on average, compared to only 106.2 days for the diet group. People in the exercise group imagined vacations in the more distant future ($t = 3.31$, $p < .01$), which is also consistent with our theoretical prediction that the temporal distance evoked would be greater (closer), indicating higher (lower) construal levels when thoughts about exercise (diet) are activated. In terms of social distance, the exercise group wanted to travel with on average 2.2 other people, compared to 1.7 in the diet condition. Though directionally it was consistent with our theoretical prediction, this difference was only marginally significant ($t = 1.54$, $p$ = .07). All three dimensions of psychological distance that we measured—spatial, temporal, and social—at least marginally supported our prediction that exercise (diet) evokes relatively higher (lower) levels of construal as measured by greater (closer) psychological distances. To aggregate all three dimensions into one measure of psychological distance, we converted each of the spatial, temporal, and social distances into the respective $Z$-scores, then added up the three $Z$-scores for each individual. A comparison between the two weight control modes showed that the psychological distance to their vacations was greater for participants in the exercise condition, and closer for those in the diet condition ($M_{exercise}$ = 0.6 vs. $M_{diet}$ = –0.8; $t = 3.81$, $p < .001$), which gives support to our theoretical prediction that links exercise to high-level construal and diet to low-level construal. A simple regression of the sum of the $Z$-scores of psychological distances on weight control mode showed that people imagined more psychologically distant (proximate) vacations when thoughts about exercise (diet) were activated ($\beta$ = 1.5, SE = 0.4).

We conducted a mediation analysis with weight control mode (0 = diet, 1 = exercise) as the independent variable, gain/loss focus (the net number of words associated with the theme) as the moderator, and construal level (the sum of the $Z$-scores of the spatial, temporal, and social dimensions of psychological distance) as the dependent variable, as schematically represented in figure 2. We used the bootstrapping procedure of 5,000 samples with replacement (Preacher and Hayes 2004, 2008) to generate a 95% confidence interval around the indirect effect of weight control mode on construal level, and found that the effect of weight control mode on construal level was mediated by a gain/loss focus ($a \times b$ = .27, 95% confidence interval [CI] = .039 to .619). There was also a significant effect of weight control mode on construal level after we controlled for a gain/loss focus ($\beta$ = .1.19, $t = 2.97$, $p < .01$), suggesting a complementary mediation (Zhao, Lynch, and Chen 2010) or partial mediation. A relative gain versus loss focus for exercise versus diet is one explanation for the relatively higher (lower) construal levels evoked by exercise (diet), as represented by the two dotted arrows in figure 2. In addition, there is a direct effect of weight control mode on construal level, as illustrated by the solid arrow in figure 2.

**FIGURE 2**

LINKING EXERCISE TO A GAIN FOCUS AND HIGH-LEVEL CONSTRUAL, AND DIET TO A LOSS FOCUS AND LOW-LEVEL-CONSTRUAL WEIGHT




Our study identifies the relative gain (loss) focus of exercise (diet) as one factor that differentially activates high- (low-) level construal of exercise (diet). In addition, exercise and diet may differ in the level of generality in the conceptualization. As we observed in study 1A, people tended to make more general suggestions to "exercise," while they tended to make more specific diet-related suggestions to "cut sugar" or "reduce carbs." Conceptualization in generalities (specifics) is also associated with higher (lower) construal levels (Liberman and Trope 1998). Another independent factor may be a lesser (wider) variety of means for exercising (dieting). Though there are theoretically almost countless forms of exercise, ones that reasonably come to mind are rather limited in variety. As we also observed in study 1A, only five different exercise forms emerged from people's exercise-related suggestions: walking, running, swimming, taking stairs, and unloading trucks. By comparison, our daily diet choices involve a much greater number of different food types. A lesser (wider) variety of means is also linked to higher (lower) construal levels (Vallacher and Wegner 1987). Also, people may be more accustomed to chasing greater numbers when exercising (e.g., "I walked X steps today") and smaller numbers when dieting (e.g., "I haven't had any [i.e., zero] dessert today"). These are just three examples of how weight control mode can have a direct effect on construal level, and there may be other factors.

## STUDY 3: EXERCISE AND DIET JOURNALS

People tend to think of why they do something more abstractly, and how they do something more concretely (Liberman and Trope 1998). We predict that focusing on why one engages in exercise, and how one manages one's diet, will match the construal level activated by the respective weight control modes to the construal level activated by a focus on the high-level purposes versus low-level processes, and thus help promote the desired behavior. Study 3 tests this prediction.

### Design

Two hundred one students taking introductory marketing classes at a state university in the western US kept journals for a week. Only those students who indicated they were interested in weight control participated in the study. The study employed a 2 × 2 between-subjects design.

One factor was weight control mode, and participants were randomly assigned to either the exercise or diet condition. Those in the exercise and diet conditions were asked to keep a record of their exercise and diet, respectively, over a one-week period.

The other factor was construal level. High-level construal specifies *why* actions are performed, and low-level construal specifies *how* actions are performed (Vallacher and Wegner 1987). In the high-construal-level condition, we asked people to indicate *why* they would either exercise or diet for weight control. In the low-construal-level condition, we asked them to indicate *how* they would either exercise or diet for weight control.

Participants were asked to make daily entries in their diaries for a week. Every day they completed one page by answering two questions. The first question was one of 2 × 2 variations by condition. On the first day, participants in the high-construal exercise (diet) condition were asked why they would manage their exercise (diet) for weight control. In the low-construal exercise (diet) condition, they

were asked how they would manage their exercise (diet) for weight control. In order to keep the manipulation fresh every day, on each of the six subsequent days they were asked to make a *new* suggestion as to why one would manage one's exercise/diet for weight control in the high-construal conditions, and how one would manage one's exercise/diet for weight control in the low-construal conditions. The second question varied by weight control mode. In the exercise (diet) conditions, participants were asked to describe their exercise (diet) that day.

At the end of the week, participants were asked two questions by weight control mode to recap the week. In the exercise (diet) conditions, they were asked (1) the extent to which they thought their exercise (diet) efforts during the week were effective for weight control, and (2) how likely it was that they would continue their efforts in exercise (diet) for weight control. They responded to both questions on a five-point scale, anchored at 1 = "not at all" and 5 = "extremely." These two measures were the dependent variables, which we predicted to be relatively higher in the exercise-high-construal and diet-low-construal conditions. Participants also indicated their gender and age.

## Results

Participants in the study were 95 males (47.3%) and 106 females (52.7%). The age ranged from 18 to 36, with an average of 22.6 years.

On average participants thought their exercise/diet efforts during the week were more than "fairly" and closer to "significantly" ($M = 3.6$) effective for weight control. There was no difference by gender or age, or by construal level ($M_{low} = 3.6$ vs. $M_{high} = 3.6$; NS). There was a difference by weight control mode ($M_{diet} = 3.4$ vs. $M_{exercise} = 3.9$; $t = 3.57$, $p < .001$), and participants in the exercise condition perceived their efforts over the week to have been more effective compared to those in the diet condition. This finding was neither central to our theory nor expected, but the difference may be attributable to the living situations of many college students. Those who live in dorms and/or are on meal plans may not have as much control over their diet as they do over their exercise.

They also indicated that it was a little more than "fairly" ($M = 3.1$) likely that they would continue their exercise/diet efforts for weight control. There was no difference by gender or age, or by construal level ($M_{low} = 3.1$ vs. $M_{high} = 3.2$; NS). There was again a difference by weight control mode ($M_{diet} = 2.9$ vs. $M_{exercise} = 3.4$; $t = 3.53$, $p < .001$), and participants in the exercise condition were more likely to continue their efforts compared to those in the diet condition. For the same aforementioned reason, college students may be more likely to continue their exercise because they may have more control over it in their current living situations.

We tested two different models. First, we regressed how effective participants thought their exercise/diet efforts during the week were for weight control (range from 1 to 5) on construal (0 = low, 1 = high), weight control mode (0 = diet, 1 = exercise), and the interaction between the two. The results are summarized in table 1 in the columns labeled "effective." The interaction was positive ($\beta = 1.1$, SE = 0.3), supporting our theoretical framework. The week's efforts were perceived to be more effective for weight control when participants focused on *why* they would exercise, and *how* they would diet.

**TABLE 1**

SUMMARY OF TWO REGRESSION MODELS

| | Effective | | Continue | |
|---|---|---|---|---|
| | $\beta$ | $t$ | $\beta$ | $t$ |
| Constant | 3.63 | 28.30 | 3.10 | 22.33 |
| Construal | –0.06 | –0.34 | –0.08 | –0.38 |
| Weight control mode | **–0.55**** | **–3.00** | **–0.42*** | **–2.12** |
| Construal x weight control mode | **1.10***** | **4.20** | **1.19***** | **4.21** |

*$p < .05$; **$p < .01$; ***$p < .001$.

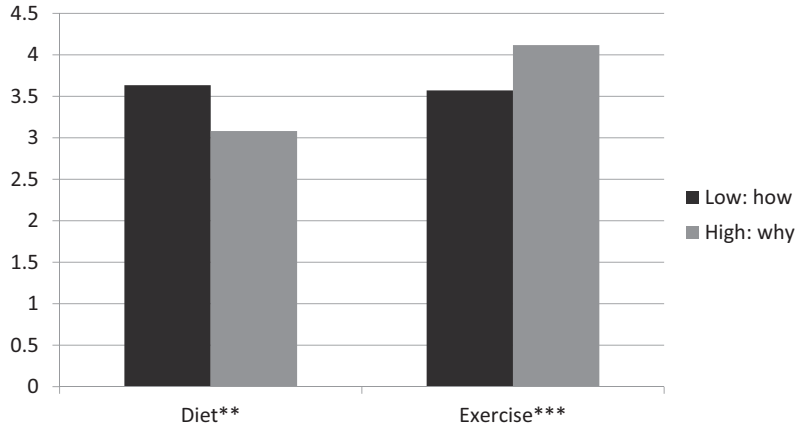
We further conducted a planned contrast that compared conditions in which the daily journal entry of how versus why and the weight control mode matched versus mismatched in construal level. We found that participants perceived their efforts to have been more effective when the how versus why question of the journal entry matched the weight control mode in the construal level activated ($M_{match} = 3.9$ vs. $M_{mismatch} = 3.3$; $t = 4.08$, $p < .001$). Supporting our theoretical framework, this contrast was driven by a higher perceived effectiveness when people wrote in their journals about the high-level why rather than the low-level how when they exercised ($M_{exercise\text{-}high} = 4.1$ vs. $M_{exercise\text{-}low} = 3.6$; $t = 3.56$, $p < .001$), but the low-level how rather than the high-level why when they dieted ($M_{diet\text{-}high} = 3.1$ vs. $M_{diet\text{-}low} = 3.6$; $t = –2.63$, $p < .01$). This provides further support for our theoretical prediction that links exercise to high-level construal and diet to low-level construal. The results are graphically represented in figure 3.

We performed another regression of how likely participants were to continue their exercise/diet efforts (range from 1 to 5) on construal (0 = low, 1 = high), weight control mode (0 = diet, 1 = exercise), and the interaction between the two. The results are summarized in table 1 in the columns labeled "continue." The interaction was positive ($\beta = 1.2$, SE = 0.3), supporting our theoretical framework. People were more likely to continue their efforts for weight control when they thought about *why* they would exercise, and *how* they would diet.

We again conducted a planned contrast that compared conditions in which the daily journal entry of how versus why and the weight control mode matched versus mismatched in construal level. We found participants were

**FIGURE 3**

"HOW EFFECTIVE WERE YOUR WEEK'S EFFORTS FOR WEIGHT CONTROL?"




NOTE.—People thought their week's efforts were more effective for weight control when they focused on *how* they would diet, and *why* they would exercise.

more likely to continue their efforts when the how versus why question of the journal entry matched the weight control mode in the construal level activated ($M_{match} = 3.4$ vs. $M_{mismatch} = 2.8$; $t = 4.02$, $p < .001$). Supporting our theoretical framework, this contrast was driven by a higher likelihood of continuing when participants wrote in their journals about the high-level why rather than the low-level how when they exercised ($M_{exercise\text{-}high} = 3.8$ vs. $M_{exercise\text{-}low} = 3.0$; $t = 3.98$, $p < .001$), but the low-level how rather than the high-level why when they dieted ($M_{diet\text{-}high} = 2.7$ vs. $M_{diet\text{-}low} = 3.1$; $t = –2.01$, $p < .05$). This provides further support for our theoretical prediction that links exercise to high-level construal and diet to low-level construal. The results are graphically represented in figure 4.

The duration of study 3 was only one week—too short for there to be any meaningful effect on actual weight. However, if people perceived their efforts to be more effective for weight control and had higher intentions to continue their efforts, the desired behavior would be more likely promoted, which would in turn lead to better chances of weight control success in the longer term.

## STUDY 4: GREATER WEIGHT LOSS EX POST WITH DESIRABLE EXERCISE PLANS AND FEASIBLE DIET PLANS

Study 4 provides empirical support of our theory that links exercise to high-level construal and diet to low-level construal, based on data from an existing online weight loss study that was conducted over a three-month period. The data were originally generated for an independent research study conducted by a researcher at an eastern US university and were made available for further analysis for this research.

### Design

Study 4 started out with 2,115 volunteers who consented to participate in an online weight loss study. They were all people who were interested in losing some weight. After enrolling they were asked to check in online for an update at the end of every month for three months.

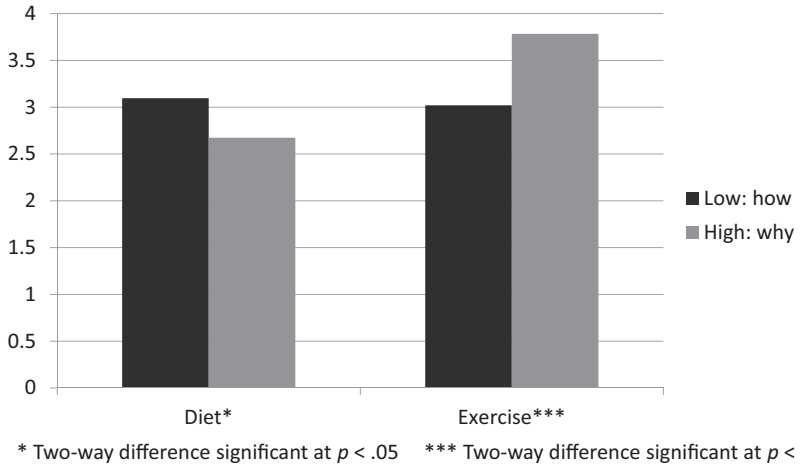
There were four parts to the study that are relevant for this research. One part asked for basic identification and demographic information.

Another part asked respondents to indicate one small change that they planned to make to help them lose weight. This was an open-ended answer. The changes could be diet related, exercise related, and/or other related. This question was similar but distinct from our question in study 1A, where we asked participants to make general suggestions for weight control, not specifying a single suggestion or indicating that it be something that they planned to do themselves.

The next part asked two questions about the planned change. One question was how easy respondents thought it would be to make the change. The response was on a nine-point scale, with 1 being "not very easy," and 9 being "very easy." This measured the feasibility of the change. Higher numbers indicated higher ease of compliance, and thus greater feasibility. Another question was how many

**FIGURE 4**

"HOW LIKELY IS IT THAT YOU WOULD CONTINUE YOUR EFFORTS FOR WEIGHT CONTROL?"




People thought they would be more likely to continue their efforts when they focused on how they would diet, and why they would exercise.

net calories respondents thought their suggested change would cut out of their average day. Respondents entered a number in this field. This measured the desirability of the change for both diet- and exercise-related changes. All things equal, changes that cut more net calories—whether it be substituting foods with lower caloric content, or clocking a higher caloric output for exercising on an elliptical machine—would be more desirable in terms of having a greater impact on weight loss. There are factors other than net calories cut that can make a planned change more desirable. For example, both exercise and diet can be more enjoyable, and thus desirable, when done with a group rather than alone. But for those who are serious about weight control, cutting net calories is the primary goal of their efforts, and the primary factor that makes an exercise or diet plan desirable. Companionship is a side benefit. Conceptually, this contrast between feasibility and desirability replicates the contrast between how and why in study 3.

The last part asked respondents their current weight in pounds. They entered a number in this field. After initial enrollment in the study, respondents were given an email reminder at the end of each month for three months to check back in online and update their current weight. The dependent measure is the difference between the starting weight and the ending weight after three months. Our prediction is that there will be more favorable changes in weight (i.e., greater weight losses) associated with exercise-related changes that cut more calories, and diet-related changes that were easier to comply with.

## Results

By the end of three months, there were 237 stalwarts who completed the study by checking in monthly to update their current weight. The high attrition rate may be, in part, yet another sign of how difficult it is to continue to try to lose weight, even among those who originally took the initiative to join a weight loss study. Among those who completed the study, there were 19 males (8.0%), 235 females (91.1%), and 2 (0.8%) who did not indicate their gender, weighing on average 168.9 lbs. at the start of the study. The gender distribution did not differ significantly from the group of 2,115 people who originally enrolled, which comprised 203 (9.6%) males, 1,888 (89.3%) females, and 24 (1.1%) unanswered. Neither was there a difference in the starting weight, which averaged 172.5 lbs. for the original group. The group that completed the study was older than the original group, averaging 43.7 years (vs. 39.7 years; $t = 4.61$, $p < .001$). We further discuss only the 237 who completed the study after three months.

On average people lost only 1.0 lb. after three months, ranging from a loss of 33 lb. to a gain of 28 lb. Again, this may be a testament to how truly difficult it is for many people to lose weight. As people started out at varying weights, ranging from a low of 103 lb. to a high of 300 lb., we took their weight change over three months as a percentage of their starting weight, which is a more meaningful measure of the extent of weight loss, as the dependent measure. The average weight change translates to a 0.5% loss, ranging from a loss of 20.6% of their starting weight to a gain of 18.7%.

We categorized the changes that participants planned to make. Three independent judges separately categorized each planned change as diet related (e.g., "cut back on sweets," "try not to eat in front of the TV"), exercise related (e.g., "go to the gym," "take the stairs more often") and/or other related (e.g., "go to bed earlier," "meditate"). In cases where there was no agreement among all three judges, the categorization by the majority was used. There was no case where all three judges produced three different categories.

Ninety-eight participants (41.4%) planned to make exercise-related changes, and 106 people (44.7%) planned to make diet-related changes. Replicating our findings from study 1A, exercise-related changes tended to be about doing more of something and gain focused, while diet-related changes tended to be about doing less of something and loss focused. The word "more" was used in 21 (19.8%) of the exercise-related changes, and in only eight (7.5%) of the diet-related changes. In comparison, the word "less" was used in 23 (23.5%) of the diet-related changes, and not once (0%) in any of the exercise-related changes. The word "more" appeared in a higher proportion of the exercise- versus diet-related changes ($Z = 2.84$, $p < .01$), while "less" appeared in a higher proportion of the diet- versus exercise-related changes ($Z = 4.90$, $p < .001$). These findings are also consistent with our findings in study 2, where a gain (loss) focus was heightened after thoughts about exercise (diet) were activated. Exercise tends to have a gain focus, while diet tends to have a loss focus.

On average, participants expected the changes they planned to be 4.9 on the feasibility scale, ranging from a low of 1 "not very easy" to a high of 9 "very easy." In terms of the desirability of their planned changes, they expected their changes would cut out on average 147.8 net calories, ranging from a low of 1 calorie to a high of 1,000 calories. All things equal, more feasible changes that bring about more desirable outcomes would be best, but as one may intuit, there was a trade-off between feasibility and desirability. The two measures of the suggested changes were negatively correlated ($\rho = -.18$, $p < .03$). Changes that bring about more desirable outcomes tended to be less feasible, while more feasible changes tended to bring about outcomes that were not as desirable.

The purpose of this study was to test our theoretical prediction that there would be more favorable weight outcomes (i.e., greater weight losses) associated with exercise-related changes that cut more calories, and diet-related changes that were easier to make. Basically, we wanted to see how the balance between changes that were diet versus exercise related interacted with the trade-off between the feasibility and desirability of the changes to influence actual weight loss after three months. The dependent variable was the difference between participants' weight at the end of the three months minus their starting weight, as percentage points of their starting weight. Negative numbers indicate weight loss, and greater absolute values indicate greater weight loss success. Positive numbers indicate weight gain, and greater numbers indicate a greater extent of failure in weight loss.

The explanatory variables in the regression model were: (1) whether (= 1) or not (= 0) the planned change was exercise related, (2) whether (= 1) or not (= 0) the planned change was diet related, (3) the desirability of the indicated change in terms of the expected net calories cut, (4) the feasibility of the indicated change on a scale of 1 (not very easy, i.e., not very feasible) to 9 (very easy, i.e., very feasible), and four two-way interactions between (1) × (3), (1) × (4), (2) × (3), and (2) × (4). Based on our theory, we predicted that the two interaction terms (1) × (3) and (2) × (4) would be negative: that exercise-related changes that are more desirable, and diet-related changes that are more feasible, would have the most favorable effect on weight loss.

The two interactions were indeed both positive. People lost more weight when they planned exercise-related changes that were more desirable and cut more net calories ($\beta = -.10$, SE = .04; $t = -2.46$, $p = .01$). As well, there were more favorable weight loss results when people planned diet-related changes that were more feasible and easier to comply with ($\beta = -.78$, SE = .28; $t = -2.85$, $p < .01$). The other interactions were not significant, nor were there any simple effects. This provides support for our theory. Please refer to the "Full model" section of table 2 for a summary of our regression analysis.

Though the effect sizes may seem small—barely one percentage point weight loss in the case of diet-related changes, and one-tenth of a percentage point for exercise-related changes—the average weight loss over the three-month period was less than one percentage point. Over a larger sample size and a longer time horizon, even a fraction of a percentage point can be consequential.

To mitigate possible multicollinearity, we also analyzed the data by running two separate regression models: one for exercise-related changes, and one for diet-related changes. The DV was the same as in the full model: the percentage point change in weight over the three-month period. In the exercise model, the explanatory variables were (1) whether (= 1) or not (= 0) the planned change was exercise related, (2) the desirability of the indicated change in terms of the expected net calories cut, (3) the feasibility of the indicated change on a scale of 1 (not very easy, i.e., not very feasible) to 9 (very easy, i.e., very feasible), and two two-way interactions between (1) × (2), and (1) × (3). In this model we predicted the interaction term (1) × (2) would be negative: that exercise-related changes that are more desirable would result in greater weight loss, which is what we found. There was greater weight loss when people planned exercise-related changes that were more desirable and cut more net calories ($\beta = -.12$, SE = .04; $t = -2.78$, $p = .01$). The other interaction was not significant. There were no other simple effects either.

**TABLE 2**

REGRESSION MODELS OF PERCENTAGE POINT CHANGE IN BODY WEIGHT OVER THREE MONTHS

| | Full model | | Exercise model | | Diet model | |
|---|---|---|---|---|---|---|
| | $\beta$ | $t$ | $\beta$ | $t$ | $\beta$ | $t$ |
| Constant | –2.01 | –1.28 | –0.27 | –0.20 | –1.65 | –1.23 |
| Exercise related | 0.74 | 0.38 | 0.59 | 0.29 | | |
| Diet related | 3.29 | 1.68 | | | 3.46 | 1.75 |
| Desirability | 0.00 | 0.62 | 0.00 | 1.66 | 0.00 | 1.11 |
| Feasibility | 0.19 | 0.82 | –0.19 | –1.00 | 0.21 | –1.34 |
| Exercise × desirability | **–0.10**** | **–2.46** | **–0.12***** | **–2.78** | | |
| Exercise × feasibility | 0.03 | 0.12 | 0.07 | 0.24 | | |
| Diet × desirability | 0.01 | 1.55 | | | **0.09*** | **1.99** |
| Diet × feasibility | **–0.78***** | **–2.85** | | | **–0.82***** | **–2.97** |

*$p < .05$; **$p = .01$; ***$p < .001$.

Please refer to the "Exercise model" section of table 2 for a summary of the analysis.

In the diet model, the explanatory variables were (1) whether (= 1) or not (= 0) the planned change was diet related, (2) the desirability of the indicated change in terms of the expected net calories cut, (3) the feasibility of the indicated change on a scale of 1 (not very easy, i.e., not very feasible) to 9 (very easy, i.e., very feasible), and two two-way interactions between (1) × (2), and (1) × (3). In this model we predicted the interaction term (1) × (3) would be negative: that diet-related changes that are more feasible would result in greater weight loss, which is what we found. There were more favorable weight loss results when people planned diet-related changes that were more feasible and easier to comply with ($\beta = –.82$, SE = .28; $t = –2.97$, $p = .01$). Curiously, other interaction was also significant, and in the opposite direction ($\beta = .09$, SE = .04; $t = 1.98$, $p < .05$). Though this was not a part of our prediction, it appears that people may have gained weight after planning diet-related changes that cut too many calories. The simple effects were not significant. These two models again support our theory that exercise-related changes that are more desirable, and diet-related changes that are more feasible, have the most favorable effect on weight loss. Please refer to the "Diet model" section of table 2 for a summary of the analysis.

Ex post feasible diet-related changes and desirable exercise-related changes ended up bringing about the most favorable weight loss results, but unfortunately people don't seem to plan their weight control programs accordingly ex ante. In comparing the exercise-related changes to the diet-related changes, there was no difference in terms of expected net calories cut ($M_{exercise} = 142$ vs. $M_{diet} = 158$; $t = –0.86$, NS), nor in ease ($M_{exercise} = 6.0$ vs. $M_{diet} = 5.9$; $t = 0.27$, NS).

Study 4 complemented the designs of studies 1A to 3 by focusing specifically on those people who were cataloging their own planned changes for weight loss, and recording how their real-time, self-reported weight changed over a three-month period. It also provided an opportunity to apply our theory to explain existing data.

## GENERAL DISCUSSION

Losing weight is difficult to do because it is a fight against our biological design to not be overweight in today's first world. The average weight of Americans has steadily risen over the years. In 1960 the average weight of adult men and women in the US were 166 pounds and 140 pounds, respectively, which rose to 191 pounds and 164 pounds, respectively, by 2002 (Ogden et al. 2004). Today's average woman is roughly the size of the average man of fifty years ago. Over the past four decades, the average waist size has grown from 35 inches to 39 inches for men, and from 30 to 37 inches for women (Spake 2005).

To combat this health, social, and economic problem, various marketers offer solutions—from Weight Watchers to 24 Hour Fitness—and they have seen their businesses prosper. 24 Hour Fitness generates $1.1 billion in revenue from more than 3 million members, opening a new location weekly on average (Hopkins 2006). Weight Watchers generates $1.4 billion in revenue, with 1.3 million members attending 50,000 meetings (finance.yahoo.com 2019). Marketdata Enterprises estimates the US weight loss market (including the 10 major weight loss segments: diet soft drinks, artificial sweeteners, health clubs, commercial diet chains, mail order and multilevel marketing diet plans, diet books and exercise videos, weight loss camps and facilities, medically supervised programs, retail meal replacements and diet pills, and low-calorie dinner entrées and low-carb foods) at over $60 billion (Worldometers.info 2013b).

Weight control is difficult, no doubt. Only one out of every six US adults who are overweight or obese can lose 10% of their weight and maintain the weight loss after one year (Kraschnewski et al. 2010). A healthy weight is achieved and maintained through a combination of eating low-fat, low-

sugar food in moderation, and regularly engaging in physically exerting activities. Neither is particularly enjoyable for many people. To those who want to lose weight, helpful advice is offered about how to eat less or exercise more, much of it based in biology and psychology. Eat more slowly. . .because it gives the body time to respond to food intake by secreting appetite suppressing hormones, and one ends up eating less. Join a gym. . .because after paying for the membership, one is more likely to use the gym to get one's money's worth. This research takes a new approach, and rather than focusing on either the diet piece or the exercise piece of weight control, we did a comparative study of the two weight control modes. Our hope is that the findings of this research may offer some insight for consumers to be more effective in their diet and exercise endeavors, and for marketers to be more effective in offering their diet and exercise solutions to their customers.

We presented a theoretical model that links exercise to high-level construal and diet to low-level construal, and explored a relative gain/loss focus as one factor that drives the differential construal levels. The premise that exercise (diet) has a gain (loss) focus rests on weight loss being a meaningful goal. In populations where weight loss is not meaningful, we do not see this relationship hold. We conducted the same study as study 2 in Vietnam, a country where less than 1% of the population is overweight. Among 50 participants enrolled in an English MBA program, we saw no difference between the exercise and diet groups in the number of net words they associated with the theme word "vacation" ($M_{exercise} = 23.7$ vs. $M_{diet} = 24.6$, NS). Presumably there is no differential gain (loss) focus associated with exercise (diet) when weight loss is not a relevant goal. Nor was there a difference in the construal levels evoked between the two groups ($M_{exercise} = -0.24$ vs. $M_{diet} = 0.21$, NS).

After demonstrating support for our theoretical framework, we explored some implications in studies 3 and 4. Ideally, people should engage in both healthy eating and regular physical activities. Doing both is indeed the most effective way to control one's weight, but at any point in time one is typically doing either one or the other (or neither), but not both. The participants in study 4 tended to prioritize one or the other in their weight loss plans. Based on the findings of study 4, one may strive to plan diet programs that are feasible and easy to comply with, and exercise programs that are desirable and cut more net calories. Based on the findings of study 3, one may differentially focus on the more abstract question of why one would engage in physical activity when planning and/or performing exercise, and the more concrete question of how one would maintain a healthy diet when shopping for, preparing, and consuming food.

Our biology is what makes us prone to obesity in today's world, and what makes weight control so difficult. Our hope is that by getting some insight into the psychology of exercise and diet, we will have a better chance of winning the fight against our biological tendencies.

## DATA COLLECTION INFORMATION

The author supervised the collection of data for studies 1A and 3 by research assistants at the University of Hawaii, Shidler College of Business, in the fall of 2015 and fall of 2014, respectively. She analyzed these data jointly with research assistants at Hitotsubashi University, School of International Corporate Strategy. For study 1B, the author collaborated with faculty members and research assistants at the University of Hawaii, Shidler College of Business, for data collection in December 2017. She analyzed these data jointly with research assistants at Hitotsubashi University, School of International Corporate Strategy. The data for study 2 were collected under the supervision of Professor Eric Mais at the University of Hawaii, Shidler College of Business, in May and June 2018. The author analyzed these data jointly with research assistants at Hitotsubashi University, School of International Corporate Strategy. The data for study 4 was collected by Professor Brian Wansink in 2012 for an independent research project and made available to the author in the fall of 2013. She analyzed these data jointly with research assistants at Hitotsubashi University, School of International Corporate Strategy.

## APPENDIX

## REFERENCES


Baumeister, Roy F., Ellen Bratslavsky, Catrin Finkenauer, and Kathleen D. Vohs (2001), "Bad Is Stronger than Good," *Review of General Psychology*, 5 (4), 323–70.

Bless, Herbert, Gerd Bohner, Norbert Schwarz, and Fritz Strack (1990), "Mood and Persuasion: A Cognitive Response Analysis," *Personality and Social Psychology Bulletin*, 16 (2), 331–45.

Bless, Herbert, Gerald L. Clore, Norbert Schwarz, Verena Golisano, Christina Rabe, and Marcus Wolk (1996), "Mood and the Use of Scripts: Does a Happy Mood Really Lead to Mindlessness?" *Journal of Personality and Social Psychology*, 71 (4), 665–79.

Block, Lauren G. and Punam Anand Keller (1995), "When to Accentuate the Negative: The Effects of Perceived Efficacy and Message Framing on Intentions to Perform a Health-Related Behavior," *Journal of Marketing Research*, 32 (2), 192–203.

Chandon, Pierre and Brian Wansink (2007), "Is Obesity Caused by Calorie Underestimation? A Psychophysical Model of Meal Size Estimation," *Journal of Marketing Research*, 44 (1), 84–99.

Cheema, Amar and Dilip Soman (2008), "The Effect of Partitions on Controlling Consumption," *Journal of Marketing Research*, 45 (6), 665–75.

Dollemore, Doug (2005), "Obesity Threatens to Cut U.S. Life Expectancy, New Analysis Suggests," NIH/National Institute On Aging, https://www.sciencedaily.com/releases/2005/03/050321085233.htm.

Finkelstein, Eric A., Justin G. Trogdon, Joel W. Cohen, and William Dietz (2009), "Annual Medical Spending Attributable to Obesity: Payer- and Service-Specific Estimates," *Health Affairs*, 28 (5), 822–31.

Freitas, Antonio L., Peter Gollwitzer, and Yaacov Trope (2004), "The Influence of Abstract and Concrete Mindsets on Anticipating and Guiding Others' Self-Regulatory Efforts," *Journal of Experimental Social Psychology*, 40 (6), 739–52.

Haiken, Melanie (2013), "5 New Year's Resolutions You Won't Keep—And 5 You Will," *Forbes*, http://www.forbes.com/sites/melaniehaiken/2013/01/02/5-new-years-resolutions-you-wont-keep/.

Higgins, E. Tory (1997), "Beyond Pleasure and Pain," *American Psychologist*, 52 (12), 1280–300.

—— (2000), "Making a Good Decision: Value from Fit," *American Psychologist*, 55 (11), 1217–30.

Hopkins, Jim (2006), "CEO Bulked Up 24 Hour Fitness with Ideal Timing," *USA Today*, August 13.

Jones, David, Scott Podolsky, and Jeremy Greene (2012), "The Burden of Disease and the Changing Task of Medicine," *New England Journal of Medicine*, 366 (25), 2333–8.

Kraschnewski, Jennifer, Jarol Boan, James I. Esposito, Nancy Sherwood, Erik B. Lehman, Donna K. Kephart, and Christopher Sciamanna (2010), "Long-Term Weight Loss Maintenance in the United States," *International Journal of Obesity*, 34 (11), 1644–54.

Lee, Angela Y., Punam Anand Keller, and Brian Sternthal (2010), "Value from Regulatory Construal Fit: The Persuasive Impact of Fit between Consumer Goals and Message Concreteness," *Journal of Consumer Research*, 36 (5), 735–47.

Liberman, Nira and Yaacov Trope (1998), "The Role of Feasibility and Desirability Considerations in Near and Distant Future Decisions: A Test of Temporal Construal Theory," *Journal of Personality and Social Psychology*, 75 (1), 5–18.

Maheswaran, Durairaj and Joan Meyers-Levy (1990), "Influence of Message Framing and Issue Involvement," *Journal of Marketing Research*, 27 (3), 361–7.

Milkman, Katherine L., Julia A. Minson, and Kevin G. M. Volpp (2014), "Holding the Hunger Games Hostage at the Gym: An Evaluation of Temptation Bundling," *Management Science*, 60 (2), 283–99.

Ogden, Cynthia, Cheryl Fryar, Margaret Carroll, and Katherine Flegal (2004), *Mean Body Weight, Height, and Body Mass Index, United States 1960–2002; Advance Data from Vital and Health Statistics, No. 347*, Hyattsville, MD: National Center for Health Statistics.

Pappas, Stephanie (2010), "Obesity's Hidden Job Costs: $73 Billion," http://www.nbcnews.com/id/39571973/ns/health-diet_and_nutrition/t/obesitys-hidden-job-costs-billion/#.XC5n5M9KhAY.

Preacher, Kristopher J. and Andrew F. Hayes (2004), "SPSS and SAS Procedures for Estimating Indirect Effects in Simple Mediation Models," *Behavior Research Methods, Instruments, and Computers*, 36 (4), 717–31.

——. (2008), "Asymptotic and Resampling Strategies for Assessing and Comparing Indirect Effects in Multiple Mediator Models," *Behavior Research Methods*, 40 (3), 879–91.

Schwarz, Norbert and Herbert Bless (1991), "Happy and Mindless, but Sad and Smart? The Impact of Affective States on Analytic Reasoning," in *Emotion and Social Judgments*, ed. Joseph P. Forgas, Oxford, UK: Taylor & Francis, 55–71.

Schwarz, Norbert and Gerald L. Clore (1983), "Mood, Misattribution, and Judgments of Well-Being: Informative and Directive Functions of Affective States," *Journal of Personality and Social Psychology*, 45 (3), 513–23.

Semin, Gün R. and Eliot R. Smith (1999), "Revisiting the Past and Back to the Future: Memory Systems and the Linguistic Representation of Social Events," *Journal of Personality and Social Psychology*, 76 (6), 877–92.

Shiv, Baba, Julie Edell, and John Payne (2004), "Does Elaboration Increase or Decrease the Effectiveness of Negatively versus Positively Framed Messages?" *Journal of Consumer Research*, 31 (1), 199–208.

Spake, Amanda (2005), "The Belly Burden," *US News and World Report*, 139 (20), 72–4.

Taylor, Shelley E. (1991), "Asymmetrical Effects of Positive and Negative Events: The Mobilization-Minimization Hypothesis," *Psychological Bulletin*, 110 (1), 67–85.

Trope, Yaacov and Nira Liberman (2010), "Construal-Level Theory of Psychological Distance," *Psychological Review*, 117 (2), 440–63.

Vallacher, Robin R. and Daniel M. Wegner (1987), "What Do People Think They're Doing? Action Identification and Human Behavior," *Psychological Review*, 94 (1), 3–15.

——. (1989), "Levels of Personal Agency: Individual Variation in Action Identification," *Journal of Personality and Social Psychology*, 57 (4), 660–71.

Wansink, Brian, and Pierre Chandon (2006), "Can 'Lo-Fat' Nutrition Labels Lead to Obesity?" *Journal of Marketing Research*, 43 (4), 605–17.

White, Katherine, Rhiannon MacDonnell, and Darren W. Dahl (2011), "It's the Mind-Set That Matters: The Role of Construal Level and Message Framing in Influencing

Consumer Efficacy and Conservation Behaviors," *Journal of Marketing Research*, 48 (3), 472–86.

finance.yahoo.com (2019), "Weight Watchers International," https://finance.yahoo.com/quote/WTW?p=WTW&.tsrc=fin-srch.

Worldometers.info (2013a), "Overweight People in the World—Definitions, Sources and Methods," http://www.worldometers.info/weight-loss/.

——. (2013b), "Spending on Weight-Loss Programs and Products in the USA," http://www.worldometers.info/weight-loss/.

Wyer, Robert and Alison Xu (2010), "The Role of Behavioral Mind-Sets in Goal-Directed Activity: Conceptual Underpinning and Empirical Evidence," *Journal of Consumer Psychology*, 20 (2), 107–25.

Zhao, Xinshu, John Lynch, and Qimei Chen (2010), "Reconsidering Baron and Kenny: Myths and Truths about Mediation Analysis," *Journal of Consumer Research*, 37 (2), 197–206.