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Attitude Accessibility as a Determinant of Object Construal and Evaluation

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Abstract

Attitude accessibility, the ease with which a given attitude comes to mind, has been demonstrated to affect attention. The current experiments focus on the construal of multiply-categorizable objects. They seek to provide evidence that (a) construals toward which individuals have more accessible attitudes, i.e., those that are more attitude-evoking, are more likely to influence the evaluation of related objects and that (b) this effect of attitude accessibility on construal processes can be extended to a whole series of objects which vary along multiple dimensions. Experiment 1 provides evidence that construals whose related attitudes were made more accessible via attitude rehearsal were more likely to influence the evaluation of a related target. Experiments 2 and 3 extend these findings to the domain of foods, which vary along two potential construal continua (healthiness versus tastiness), and demonstrate that if participant attitudes toward fitness are made more accessible, participants' judgments about eating a variety of specific foods are guided more by the healthiness of the foods.

Keywords: attitudes, attitude accessibility, construal, self-control

Attitude Accessibility as a Determinant of Object Construal and Evaluation

We often encounter objects, people, or events that can be categorized in multiple ways. Imagine for a moment two people waiting in line for a flu shot at the local pharmacy. The first person is completely relaxed at the prospect of the flu shot. She knows that getting a shot will immunize her for the rest of the season and keep her healthy while others are suffering miserably in their beds. The second person has quite a different reaction while waiting in line. His face is pale, he's sweating profusely, and he looks altogether like he's about to throw up. He can't focus on anything other than the fact that a cold, metal needle will soon be jabbed under his skin.

Both of these people are waiting for the very same event – a flu shot. But by their responses, it is apparent they are not viewing the event in the same way. This anecdote highlights two relevant issues. First, it suggests the possibility that seemingly objective events or objects may not be so objectively perceived or construed. What the perceiver brings to the table when viewing an event or object can be just as important as the objective qualities of that event/object. Second, it compels us to explore the possible processes by which one person views, or interprets, a given object or event (such as a flu shot) differently than another person. In other words, what factors contribute to these starkly different interpretations of the very same event/object?

The idea that objective events or objects may not be so objectively construed is certainly not a new one. Researchers who subscribed to the “New Look” movement in the 40s and 50s argued that even the seemingly impartial act of perception is not a truly objective process. Indeed, Bruner, one of the leaders of the movement, asserted that the way people view, or construe, real-world objects or events is necessarily colored by their own needs, desires, attitudes, etc. The perceiver, in other words, does not robotically take in objective information –

he or she is not, as Bruner and Goodman (1947) put it, a “passive recording instrument of rather complex design.” Rather, all perception is an inherently constructive process in which an observer identifies what he or she sees as something (Bruner, 1957). Bruner himself labeled this constructive process categorization, but his usage is synonymous for our purposes with the term construal. Both terms connote not only an identification process but also the idea that an individual’s experiences, needs, desires, and the like play a role in that identification.

Because object identification is constructive, Bruner argued, it is not merely a function of sensory input, but is also influenced by the accessibility of potentially relevant categories to which that object might be assigned. The greater this category accessibility (that is, the easier it is for a particular construal to be brought to mind), the less input is needed to identify the object as belonging to that category and the wider the range of input characteristics that are seen as ‘fitting’ that category. In other words, assuming a given object can be construed in multiple ways, the more accessible category will be more likely to be used to disambiguate the object.

Bruner postulated many possible determinants of category accessibility, among them expectancies based on context. A spherical object is more readily identified as a baseball in the context of Wrigley Field because the category baseball is made so accessible by the context. Similarly, the state of the observer can increase the accessibility of a given category. Studies have found, for example, that needs (e.g., hunger: Radel & Clément-Guillotin, 2012; or poverty: Bruner & Goodman, 1947) and desires (Hastorf & Cantril, 1954) can lead to very different construals of the exact same object or event. More recent research has demonstrated that the construal of even seemingly objective physical characteristics such as the slope of a hill (Bhalla & Proffitt, 1999) or one’s distance from a bottle of water (Balcetis & Dunning, 2010) are influenced by such things as one’s inherent ability to climb said hill or one’s level of thirst.

One of the basic principles to emerge from the last few decades of research on social cognition is that the frequency and recency of activation of a category also influences its accessibility. A large body of research in the realm of priming demonstrates this (Higgins, Rholes, & Jones, 1977; Srull & Wyer, 1980; see Higgins, 1996 for a review). Returning to our flu shot example, one reason the first person easily categorizes the shot she is about to receive as an immunization might be that the concept of immunization had been primed repeatedly earlier in the day (perhaps through advertisements or discussions with colleagues). Because the category ‘immunization’ is now more accessible for her, it is more likely to carry over to the specific ‘flu shot’ object and influence its construal.

More pertinent to the current research is the possibility that a person’s attitude toward a given object influences how he or she views that object. Historically, attitudes, especially those that are more accessible from memory, have been shown to function as a lens through which people see the attitude object and information related to it (e.g., Balcetis & Dunning, 2010; Fazio, 2000; Fazio, Ledbetter, & Towles-Schen, 2000; Hastorf & Cantril, 1954). In other words, once activated, attitudes toward an object can influence the construal of that object (and related information) directly. For example, Lord, Ross & Lepper (1979) found that participants who had positive attitudes toward the death penalty evaluated a study that claimed to provide support for the deterrent efficacy of the death penalty as of higher quality than a study that concluded the opposite. Houston & Fazio (1989) found that this effect of attitudes toward capital punishment on perceptions of the quality of empirical evidence was moderated by the accessibility of the attitudes. Attitudinally-biased processing was more evident for people with more accessible attitudes toward the death penalty. Thus, attitudes toward an object – particularly if they are easily brought to mind – affect our construals of information related to the object.

Consider again our flu shot example. According to this idea, the second, anxious person might be anxious because thinking about flu shots automatically activates a negative attitude. In other words, this person could have an accessible negative attitude towards flu shots. Because this attitude is activated whenever this person thinks about getting a flu shot, the person is more likely to consider aspects of a flu shot that imply negativity. Information that fits with a negative attitude (such as the pain associated with someone piercing one's arm with a needle) is more likely to influence the current construal – the person sees the flu shot through negative glasses.

Accessibility of Attitudes toward the Competing Categories

In the current research, however, the person's attitude toward the object itself is not the focus. Although it is true that the valence of one's attitude toward a given object has consequences for the way one construes that object, there is another potential mechanism by which attitudes influence construals: via the accessibility of one's attitude towards a particular category. As is the case with our flu shot example, objects or events are often "multiply categorizable" – that is, they can be construed in multiple ways. In cases such as these, potential categorizations or construals can be viewed as essentially competing for attention. Certainly, the accessibility of a particular category (injection versus immunization) will influence whether that category will be brought to bear in the construal process. However, another potential determinant of the use of one category over another is the accessibility of a person's attitude towards that category – in other words, how attitude-evoking the category (injection versus immunization) is.

In our flu shot example, the person who is anxious about getting a shot may have a highly accessible negative attitude toward one of the potential categorizations of that object (injection). This person may have a negative attitude toward the fact that a flu shot involves having a metal needle painfully pierce his skin. Because his negative attitude towards injections (one potential

categorization) is so accessible, “injection” is the category that dominates the construal process. Although both “immunization” and “injection” may receive some degree of activation upon the individual’s consideration of the flu shot, the attitude-evoking nature of the “injection” categorization calls attention to this construal. The person who is relaxed about the shot, on the other hand, might have a highly accessible positive attitude toward another potential categorization – the fact that the shot will immunize her against future sickness. Here, because it is attitude-evoking, “immunization” is the category that dominates the construal process.

To elaborate on our reasoning regarding the accessibility of attitudes toward the competing categorizations, it is useful to consider previous research concerning the effects of attitude accessibility on attention and categorization. Roskos-Ewoldsen and Fazio (1992) found that more attitude-evoking objects (either measured via the latency of participants’ responses to an attitude query or manipulated via attitude rehearsal) attracted attention when presented in the visual field. Given a brief presentation of an array of six objects, objects towards which participants had more accessible attitudes were more likely to be noticed. Moreover, even when these attitude-evoking objects were presented as distracters, they were more likely to be incidentally noticed and to interfere with participants’ performance on a visual search task.

Based on these results, Roskos-Ewoldsen and Fazio made the argument that if an object’s related evaluation is particularly accessible, then that evaluation is likely to be activated at an early stage in the processing of the visual information. Because this early attitudinal activation signals hedonic significance, visual attention is more likely to be directed toward that object, and that object is thus more likely to be noticed (even, as Roskos-Ewoldsen and Fazio (1992) found, when that object appears in an area of the visual field participants are explicitly instructed to ignore). Put another way, their findings suggest that attitudes (especially accessible ones) have a

functional value in directing attention. People are more likely to attend to and notice objects they care about – that is, objects that are hedonically relevant to them.

Given that attitude-evoking objects attract visual attention, might not attitude-evoking categories attract cognitive attention when they receive some degree of activation from memory? Smith, Fazio & Cejka (1996) addressed this question. Drawing a parallel between multiple visual objects and multiple cognitive categories (or construals), Smith, Fazio, and Cejka (1996) generated a series of triads consisting of a target (e.g., yogurt) and two potential categorizations of that target (e.g., dairy product, health food). Just as an object in the visual field draws attention if it is attitude-evoking, they hypothesized that a category in memory is more likely to draw cognitive attention if the category is attitude-evoking. As a result, the category should be more likely to govern consideration of the target.

To test this, the researchers asked participants to rehearse their attitudes towards one category (e.g., dairy product) and make animacy judgments towards the other (e.g., health food). These animacy judgments served as a control task, allowing the researchers to assess whether attitude accessibility had effects over and above the effects of category accessibility itself (i.e., simply being exposed to the category label multiple times). Participants were later given the target word (e.g., yogurt) and told to use it as a memory cue to recall the earlier words. Those categories towards which participants' attitudes were made more accessible were more likely to be recalled. These effects were evident even when the cued-recall test was administered after a week-long delay. Thus, in memory, too, the accessibility of one's attitude towards a particular category can increase the likelihood of attending to that category given a related cue (again, beyond any effects of category accessibility). Although all potential categorizations may receive some degree of activation upon presentation of a related target, the more attitude-evoking

categorizations are more likely to dominate the construal process. Thus, the accessibility of one's attitudes toward competing categories can be seen as a determinant of the construal of an object (e.g., yogurt) in one way (e.g., dairy product) versus another (e.g., health food).

To summarize, there are three distinct mechanisms through which a flu shot might come to be construed as an injection. The first two, either that (1) the category 'injection' itself has been primed or that (2) a negative attitude towards the object 'flu shot' is accessible, have been well-elucidated in the literature. The third, based on the findings of Roskos-Ewoldsen & Fazio (1992) and Smith et al. (1996), holds that the flu shot may be seen as an injection because the negative attitude towards the category 'injection' is particularly accessible.

This third mechanism (attitude accessibility regarding a potential categorization) is distinct from the second (attitude accessibility regarding the object itself). It is not the case here that the attitude toward the object directly colors the construal of the object. Instead, because the more attitude-evoking category draws attention and dominates the categorization process, the very object being viewed has changed qualitatively. In the words of Solomon Asch (1940), the accessibility of one's attitude toward a potential categorization may promote "a change in the object of judgment" rather than in "the judgment of the object" (p. 458). If the category 'injection' is attitude-evoking, one should be more likely to view the flu shot as an injection rather than as an immunization.

The Current Goals

At an operational level, the previous research has demonstrated that if a given category is made more attitude-evoking, it is more likely to be brought to mind given a related cue. However, the findings of Smith et al. (1996) are limited in two respects. First, the experiments do not clearly demonstrate a shift in the construal of the target object (i.e., the yogurt) as a function

of a potential categorization having been made more attitude-evoking. If a participant is more likely to bring to mind the category 'dairy product' when presented with 'yogurt' due to 'dairy product's' relatively more accessible attitude, do they also think of, respond to, and behave towards yogurt as a dairy product rather than as a health food? Any such effect would provide stronger evidence that the object people are evaluating is being viewed differently.

Second, the findings of Smith et al. (1996) are limited to cases in which the accessibility of attitudes toward a potential categorization influences the response to a single object. The triads they selected consisted of a target very specifically related to two categories, and each triad was conceptually unrelated to the other triads (e.g., the target 'sunbathing' and the two categories 'cancer' and 'beach,' or the target 'Pete Rose' and the two categories 'baseball player' and 'gambler'). Would it be possible to increase the scope of the attitude accessibility manipulation? That is, might we find attitude accessibility effects not only for objects specifically related to two categories, but for broader, more general continua along which series of objects vary? Would it be possible, in other words, to shift which of two possible dimensions participants use to disambiguate a whole array of items? Any such effort would contribute to our theoretical understanding regarding the extent of the effects of attitude accessibility on construal. In addition, if we find evidence that manipulating the accessibility of individuals' attitudes towards general dimensions influences the construal of entire series of objects, our research has the potential to provide a much more efficient means of affecting the construal of a large number of objects and, hence, is likely to have value as a social influence technique.

Foods represent a useful domain for testing this hypothesis because there are two clear dimensions along which they vary – tastiness and healthiness – which are often in direct conflict with each other. Can either dimension be made more attitude-evoking via relevant attitude

rehearsal? If so, the more attitude-evoking dimension may more strongly influence construals of various foods, leading to clear differences in evaluative and behavioral responses to the foods. If, for instance, participants construe foods in terms of their healthiness, they should be much more likely to prefer healthy options to unhealthy ones. If, on the other hand, participants construe foods in terms of their tastiness, they should be more likely to prefer tasty options to less tasty ones.

Our goals, then, are: (a) to demonstrate empirically the link between the accessibility of attitudes toward a given potential categorization (e.g., the accessibility of attitudes toward ‘dairy products’) and shifts in the evaluation of the target object itself (e.g., ‘yogurt’), and (b) to provide evidence that this effect of attitude accessibility on construal processes can occur not only for a single stimulus but for a whole domain of objects that vary along the relevant dimensions. Experiment 1 addresses the first goal, testing whether once attitude accessibility boosts the likelihood of one construal over another upon consideration of a target object (relative to category accessibility), the favorability of that object changes accordingly. In other words, it focuses on whether the very same entity comes to be viewed more or less positively as a function of the effect of attitude accessibility on construal. Experiments 2 and 3 address the second goal, seeking to extend this effect to a whole series of objects (in this case, foods) that can be construed along one dimension (healthiness) versus another (tastiness).

Experiment 1

In this experiment, we tested the idea that if the accessibility of attitudes toward potential categorizations indeed influences the construal of a single object, the consequences of that construal should be evident in how that object is evaluated. In other words, the more attitude-evoking categorization should not only come to mind more readily compared to a categorization

that has merely been primed itself, as demonstrated by Smith et al. (1996), but also should influence the evaluation of that object. We sought to demonstrate this initial link before moving on to the more complicated question of whether the accessibility of attitudes towards an entire dimension might influence evaluations of a set of stimuli. Our method draws from that of Smith et al. (1996), with some modifications regarding the stimuli and the dependent measure.

Method

Participants. Sixty-eight undergraduates enrolled in introductory psychology at The Ohio State University participated for credit.

Stimulus materials. Like Smith et al. (1996), we generated triads consisting of a target object (e.g., flu shot) and two potential categorizations. However, in contrast to Smith et al., one potential categorization was positively-valued (e.g., immunization) and the other was negatively-valued (e.g., injection). We selected twenty-two such triads from an initial set of fifty-three based on pilot data from eighteen participants who rated each category label regarding how positive or negative they thought it was on a -5 (very negative) to +5 (very positive) scale. A triad was selected for use only if the positive category was sufficiently positive and the negative category was sufficiently negative (specifically, one standard deviation above or below the scale midpoint). We also attempted to select triads for which the category label ratings had relatively small standard deviations. The full list of stimulus triads can be perused in Appendix A. These triads were divided into two sets (A and B) for counterbalancing purposes. Each set had eleven of the twenty-two triads.

Procedure. Participants completed a number of tasks, the first two of which were counterbalanced with respect to order. One of these two initial tasks was the attitude rehearsal task. Here, participants saw one of the two category labels for each triad (e.g., immunization) and

were asked to rate it as positive or negative by clicking one of two buttons labeled ‘+’ or ‘-.’ In the other task, an animacy control, participants saw the second of the two category labels (e.g., injection) and were asked to classify it as either animate or inanimate by clicking one of two buttons labeled ‘Animate’ or ‘Inanimate.’ As was the case in Smith et al. (1996), the animacy task served to control for category accessibility, so any effects of the attitude rehearsal condition would be over and above those of priming the category itself.

The two sets of triads were presented such that during the attitude rehearsal task, participants in one condition rated their attitude regarding the eleven positive category labels from set A and the eleven negative category labels from set B, whereas participants in the other condition rated their attitude regarding the eleven negative category labels from set A and the eleven positive category labels from set B. During the animacy control task, participants classified those labels they had not rated in the attitude rehearsal task. Within each task, each category label was presented a total of four times in a random order. In this way, participants rehearsed their attitudes toward either the positive or the negative potential categorization for each triad, while being exposed to the alternative category equally often during the animacy task.

Following the manipulation, participants completed a ten-minute filler task consisting of a worksheet with spatial problems. This task was aimed at clearing short-term memory, presumably ensuring that the category labels participants rehearsed more recently would not be privileged in memory.

The dependent measure consisted of the twenty-two target words (e.g., flu shot), which participants had not seen prior to this moment. Participants were asked to rate the likeability of each target word on a scale from -5 to +5. They were then debriefed and dismissed.

Results

Before conducting our primary analysis, we noted that although we had attempted to select stimulus triads whose category labels were universally positive or negative, some participants still disagreed with our pilot participants on the valence of certain categories. We do not have the same predictions for a participant who rates a category label differently than we expect. If, for instance, a participant does not particularly like sports (one of our positive labels) and, against the norm, rates it as negative in the attitude rehearsal task, we do not expect that participant to, as a result, like the relevant target ‘skydiving’ more relative to participants who do like sports and who rehearse a positive attitude towards that category. For this reason, we eliminated any target ratings for which the participant rehearsed an ‘unexpected’ (that is, oppositely-valenced) attitude on at least two of the four opportunities. This effectively eliminated 140 of the 1496 data points, or 9.4% of the data. In addition, we eliminated the data from six apparently uncooperative participants entirely because, on average, they rated all categories in the ‘unexpected’ direction more often than not. This resulted in a sample size of sixty-two.

To test the hypothesis that the evaluation of a given target would change based on which of the two valenced categories had been made more attitude-evoking, we ran a 2 (triad set: A vs. B) X 2 (task order: attitude rehearsal first vs. second) X 2 (condition: attitude rehearsal toward set A positive and set B negative vs. attitude rehearsal toward set A negative and set B positive) mixed ANOVA. Triad set was a within-subjects factor, and task order and condition were both between-subjects factors. No order effects were significant ($p > .3$), suggesting that the filler spatial task was successful in countering any recency effects.

We found the predicted set X condition interaction, $F(1,58) = 4.32, p = .04$. The interaction itself essentially signifies a main effect of the valence of the category whose attitude was rehearsed, and is only evident as an interaction because of the set A/set B counterbalancing.

Targets for which participants rehearsed their attitude toward the positive category were rated more positively (set A, $M = 1.17$; set B, $M = 1.08$) than targets for which participants rehearsed their attitude toward the negative category (set A, $M = 0.88$, set B, $M = 0.67$). These means are graphed in Figure 1. Note that targets for which participants rehearsed their attitude towards the positive category (the black bar in set A and the grey bar in set B) are rated as more likeable than the targets for which participants rehearsed their attitude towards the negative category (the grey bar in set A and the black bar in set B).

Discussion

This initial experiment provides evidence that attitude rehearsal not only increases the accessibility of one's attitude towards a given category and its likelihood of coming to mind when presented with a relevant target, but also makes that more attitude-evoking category more likely to influence the construal, and subsequent evaluation, of the target. While the Smith et al. (1996) findings hinted at such a link, this experiment provides a more definitive demonstration. Participants who rehearsed their attitudes towards the positive (negative) category of a particular triad appear to have used that categorization to inform their judgments about a related target, making those judgments relatively more positive (negative). Thus, attitude accessibility seems to be a clear determinant of which potential construal is likely to dominate when individuals are providing a judgment about a given object and, as a result, provides a means of swaying the evaluation of that object.

Depth of processing differences: A potential alternative account? One might make the argument that our manipulation does not so much reflect increased attention to a particular category due to the attitude's increased accessibility, but rather increased category accessibility due to the greater depth of processing (see Craik & Tulving, 1975) afforded by the attitude

rehearsal task compared to the animacy control task. The argument here is that in rehearsing attitudes towards various objects, participants are actually processing those objects in a more semantically-involved way and, as a result, are activating their representations of the objects to a greater extent than in a given control task (in which attitudes are not being rehearsed). According to a depth-of-processing explanation, this greater activation accounts for the greater influence of the attitude-evoking category above that of the control category.

In earlier research that has employed attitude rehearsal manipulations, it has been argued that differential depth of processing does not provide a plausible account for the findings (Roskos-Ewoldsen & Fazio, 1992; Smith et al., 1996). Roskos-Ewoldsen and Fazio, in particular, found that both response latencies and subjective difficulty ratings undermined any argument that the attitude rehearsal task involved more cognitive effort than the control task. They found, firstly, that participants did not take longer to perform the attitude rehearsal task than the control task. In fact, participants took significantly longer to perform the control task regarding animacy. Yet despite this, participants were more likely to notice and recall objects towards which they had rehearsed their attitudes. Secondly, they found that participants rated both tasks as equally difficult. Although we did not assess the subjective difficulty of each task, we did find that our participants did not take significantly longer to complete the attitude rehearsal task ($M = 1687$ ms) than the control task ($M = 1717$ ms), $t(67) = -.53, p = .60$. It does not seem, then, that a depth-of-processing account is a viable alternative.

Thus, it appears to be the case that attitude accessibility not only draws cognitive attention to a particular category, but it also affects the evaluation of related objects because those objects are construed in light of that attitude-evoking category. If I see a flu shot in terms of its role in immunizing people against disease, then I am more likely to view it in a positive

light than if I see it in terms of a needle puncturing my skin. Further, the reason I see the flu shot in terms of immunization rather than injection is that the first is more attitude-evoking. Thus, attitude accessibility influences construal and evaluation.

As mentioned earlier, both Experiment 1 and the experiments in Smith et al. (1996) are limited to cases where a single object can be construed in one way or another. We would now like to extend these findings to cases where multiple objects vary along various continua. Would it be possible to boost the accessibility of one's attitude towards an entire dimension, and as such affect the construal of (and behavioral intentions toward) a whole range of attitude objects so they are seen in terms of that now more attitude-evoking dimension?

As noted earlier, foods are an ideal domain to test this hypothesis. Unlike a flu shot, a single attitude object which can be construed either as an immunization or as an injection, any number of foods can be viewed in terms of multiple dimensions (e.g., the food's tastiness or healthiness). Shifting people toward greater use of one dimension over the other should affect their responses to a wide range of foods. However, this is all contingent on whether the accessibility of one's attitude towards an entire dimension (i.e., tastiness or healthiness) can be effectively enhanced by relevant attitude rehearsal.

In addition, assuming our rehearsal manipulation can affect the accessibility of one's attitudes toward a whole dimension (e.g., healthiness), we surely cannot expect every person to have the same initial healthiness-related attitudes to rehearse. Some individuals value sound health practices more highly than others do. Thus, we expect that only people who care about eating healthy foods will rehearse pro-healthiness attitudes, will make those attitudes more accessible, and will subsequently be more likely to construe food objects in terms of healthiness.

Experiment 2 seeks to provide initial evidence that we can, in fact, boost the accessibility of participant's attitudes towards whole dimensions, and as such, affect their responses to various attitude objects (foods). Experiment 3 further considers the structure of participants' attitudes (towards healthy eating, in particular), seeking to demonstrate that our dimensional attitude-rehearsal manipulation works best for participants whose health-related attitudes are predictably and clearly structured (that is, pro-healthiness).

Experiment 2

In Experiment 2, we decided to use our attitude accessibility manipulation to promote participants' construal of various foods in terms of one of two dimensions: perceived healthiness or perceived tastiness. Our primary question was whether our manipulation could be extended from stimuli consisting of item-category triads to stimuli which varied along multiple dimensions. We also shifted our dependent measure such that instead of assessing participants' evaluations, we assessed their behavioral intentions. To promote the use of the perceived healthiness dimension, we had participants rehearse their attitudes towards words related to body fitness. To promote the use of the perceived tastiness dimension, we had participants rehearse their attitudes towards words related to food taste and texture.

Our hypothesis was that having participants rehearse their attitudes towards taste versus fitness words would make either the dimension of food taste or the dimension of body fitness more attitude-evoking, and thus more likely to draw attention in memory upon consideration of various foods. As such, participants for whom food taste is more attitude-evoking should show stronger (weaker) behavioral intentions to eat a full serving of foods that taste relatively good (bad). Participants for whom body fitness is more attitude-evoking should show stronger

(weaker) behavioral intentions to eat a full serving of foods that are perceived to be relatively healthy (unhealthy).

Method

Participants. Eighty-four undergraduates enrolled in introductory psychology at The Ohio State University participated for credit.

Stimulus materials. We generated a list of twenty-four fitness-related words. Twelve of these words were related to an unhealthy body (e.g., pudgy, overweight) and twelve connoted a fit body (e.g., slender, healthy). We then generated a second list of twenty-four taste-related words. Twelve of these words connoted the flavor of a given food (e.g., sour, fruity) and twelve connoted texture (e.g., gummy, crunchy). Both word lists can be found in Appendix B.

We also selected forty-two common foods from a database which indexed foods by fat content per serving (Health Advantage, 2009). Foods were chosen such that they ranged in fat content per serving from zero grams (e.g., crackers) to thirty (e.g., big mac). The full set of foods can be found in Appendix C. Pilot participants rated these foods on two dimensions: perceived tastiness, from -5 (not tasty at all) to +5 (very tasty), and perceived healthiness, from -5 (very unhealthy) to +5 (very healthy). The mean ratings for these two dimensions were marginally negatively correlated ($r = -.27, p = .08$). A scatterplot displaying the forty-two foods along the two dimensions is presented in Figure 2.

Procedure. As with Experiment 1, participants' two primary tasks consisted of an attitude rehearsal and a control task. These were counterbalanced with respect to order. The task requirements varied with condition. In the "taste attitude rehearsal" condition, the attitude rehearsal task had participants rate each of the twenty-four taste words as to whether it represented a positive characteristic or a negative characteristic of a food on a seven-point scale

from -3 (very negative characteristic) to +3 (very positive characteristic). The control task in this condition asked participants to classify each of the twenty-four fitness words as to whether it referred to a person who is physically fit or physically heavysset. Importantly, these participants were exposed to the fitness-related words as many times as they were to the taste-related words, the only distinction being the fact that for the taste-related words, participants rehearsed their attitudes, and for the fitness-related words, participants made a non-attitude-related judgment.

In the “fitness attitude rehearsal” condition, the attitude rehearsal task directed participants to rate each of the twenty-four fitness words on the extent to which each represented a positive characteristic or a negative characteristic of a person on a seven-point scale from -3 (very negative characteristic) to +3 (very positive characteristic). For the control task, participants in this condition were asked to rate each of the twenty-four taste words as to whether it described the taste or the texture of food. Again, these participants saw taste-related words as often as fitness-related words. Thus, participants in the two conditions were exposed to the same list of taste-related and fitness-related words. The two conditions differed with respect to which of the two sets of words served as the items towards which participants rehearsed their attitudes.

After the first two tasks, participants completed a filler task consisting of spatial ability problems, as in Experiment 1. Again, this task was meant to clear short-term memory, with the hope that the dimension represented by the set of words that had been presented second would not enjoy a memorial advantage simply as a function of recency.

For the final task, the dependent measure, participants viewed each of the forty-two food labels (e.g., steak) and were told to rate how likely they would be to eat a full serving of this food if it was offered to them. They provided this information on an eleven-point scale from -5 (very unlikely) to +5 (very likely).

Results

Our data was structured such that participants' ratings were nested within each of the 42 foods they evaluated. Because of this nested structure (and the violation of the OLS assumption of independence), we employed Hierarchical Linear Modeling (HLM; Bryk & Raudenbush, 1992). HLM allows a researcher to assess statistical effects in a nested structure while taking into account the shared variance among ratings related to a particular group (food). We conducted a two-level HLM analysis with 3528 observations (84 participants) nested in 42 foods with the likelihood of eating a given food as the outcome variable. Robust standard errors were assumed. Participant condition (taste or fitness) was entered effects coded at level 1, and food tastiness and food healthiness were entered grand-mean centered at level 2¹. Based on a recommendation by Nezlek (2011), error terms were only included (and effects were only estimated as random) if they were significant at the .2 level or less. Results for this model are presented in Table 1. Coefficients in this table are analogous to those in linear regression and can be interpreted similarly.

As predicted, food tastiness interacted with participant condition, $\gamma_{11} = -.11$, $t(3483) = -2.17$, $p = .03$, such that participants in the taste condition discriminated more based on the tastiness of the foods ($\gamma = 1.16$, $t(39) = 8.12$, $p < .001$) than participants in the fitness condition ($\gamma = .94$, $t(39) = 13.41$, $p < .001$). More specifically, participants in the two conditions did not differ with respect to their expressed intentions to eat a full serving of the tastier foods (defined as one standard deviation above the mean), $p = .22$. However, those in the taste condition rated their likelihood of eating less tasty foods (defined as one standard deviation below the mean) significantly lower ($M = .79$) than did participants in the fitness condition ($M = 1.12$; $\gamma = .167$, $t(3483) = 2.07$, $p = .039$). See Figure 3 for a depiction of this cross-level interaction.

Also as predicted, food healthiness interacted with participant condition, $\gamma_{12} = .09$, $t(3483) = 2.37$, $p = .018$. Participants in the fitness condition discriminated based on the healthiness of the foods ($\gamma = .23$, $t(39) = 2.65$, $p = .012$), whereas participants in the taste condition did not ($\gamma = .05$, $t(39) = .43$, $p = .67$). More specifically, participants in the two conditions did not differ with respect to their expressed intentions to eat a full serving of less healthy foods (defined as one standard deviation below the mean), $p = .58$. However, participants in the fitness condition rated the likelihood to eat healthier (defined as one standard deviation above the mean) foods significantly higher ($M = 2.29$) than did participants in the taste condition ($M = 2.00$; $\gamma = .14$, $t(3483) = 2.94$, $p = .003$). See Figure 4 for these means.

Discussion

The results indicate that that we were, in fact, able to encourage participants to pay heed to one entire dimension over another through attitude rehearsal of a series of items that reflected that dimension (taste words versus fitness words). As a result, participants used the dimension that had been made more attitude-evoking to a greater extent when providing judgments regarding a series of items (foods) that varied along both the attitudinally-rehearsed dimension and the non-attitudinally rehearsed dimension. In other words, participants were more likely to construe foods in terms of their healthiness if the ‘fitness’ dimension had been made more attitude-evoking, and more likely to construe foods in terms of their tastiness if the ‘taste’ dimension had been made more attitude-evoking. These findings extend those of Experiment 1 by demonstrating that an entire dimension can be made more attitude-evoking through attitude rehearsal and can therefore affect behavioral intentions towards a whole series of objects which vary along that dimension.

Experiment 3

In our third and final experiment, we sought to identify people who would be likely to have predictably-structured (that is, clearly positive) attitudes toward fitness and health. Participants who rehearse positive attitudes regarding fitness related words should be especially responsive to the dependent measure. It is they who should come to prefer healthier foods more strongly. Participants cannot rehearse positive attitudes towards fitness if their attitudes are not positive in the first place. To assess this potential moderating variable, we introduced items which measured the extent to which participants regularly controlled the food they ate in the service of losing weight (in other words, the extent to which participants dieted). People who care about controlling what they eat should be more likely to possess underlying positive attitudes regarding fitness, to rehearse them, to make them more accessible, and to therefore use the healthiness dimension (rather than the tastiness dimension) more extensively when making decisions about how much of a given food they would eat.

Experiment 2 also has a few limitations that warrant further examination. First, the experiment did not include a control condition. As a result, it does not allow for inferences regarding which condition (the taste attitude rehearsal condition and/or the fitness attitude rehearsal condition) contributed to the observed differences. Perhaps rehearsal of attitudes towards fitness words resulted in a preference for healthier foods, whereas the rehearsal of attitudes towards taste words was more of a baseline condition. In order to elucidate the effect, we included a control condition in Experiment 3. We hypothesize that relative to this control condition, participants who have rehearsed their attitudes towards physical fitness will be more likely to take into consideration the healthiness of a given food when reporting their behavioral intentions to eat that food. We also hypothesize that participants who have rehearsed their attitudes towards food taste will be more likely than participants in the control condition to take

into consideration the tastiness of a given food when reporting their behavioral intentions to eat that food.

In addition, we wanted to see if our attitude accessibility manipulation would show similar effects on more realistic food stimuli. If a photograph of a food, rather than simply the food name, was presented to participants, would the accessibility of their attitudes towards tastiness versus healthiness have similar effects? A photographed food is much more hedonically salient than a food label – a photograph of steak suggests its juiciness, its flavor, and its texture in a way the word ‘steak’ cannot. Can our attitude accessibility manipulation encourage participants to care about the healthiness of steak if its taste-relevant qualities are so salient?

This modification also has relevance to the individual difference measure on which the experiment focuses. People who do not care about the calories they consume may be less likely to (a) hold and, hence, rehearse the desired healthiness attitudes in the first place, and (b) use any such attitudes when making a likelihood judgment regarding a more hedonically salient stimulus like a photographed food. That is, it may prove very difficult to induce non-dieters to adopt a healthiness construal of a food that is presented in such a way as to render its tastiness salient.

Method

Participants. One-hundred and forty three undergraduates enrolled in introductory psychology at The Ohio State University participated for credit.

Stimulus materials. The two word lists for the attitude-accessibility manipulation (fitness words and taste words) were the same lists used in Experiment 2. The same 42 common foods used in Experiment 2 were again employed here. A photograph of each food was also included, displayed below the food label on the computer screen. We were concerned that the position of each food along the dimensions of tastiness and healthiness might be affected by the

photograph format, so the food photographs were rated by pilot participants on the same two dimensions as in Experiment 2: perceived tastiness (on an eleven-point scale from -5 (not at all tasty) to +5 (very tasty)) and perceived healthiness (on an eleven-point scale from -5 (very unhealthy) to +5 (very healthy)). These two dimensions were moderately negatively correlated with each other, $r = -.32, p = .04$.

Photo healthiness ratings were highly correlated with food label ratings (photo and label healthiness, $r = .99, p < .0001$), and both the overall averages (label healthiness $M = 5.21$, photo healthiness $M = 5.25, t(41) = .553, p = .58$) and the standard deviations of the mean ratings (label healthiness $SD = 2.92$, photo healthiness $SD = 2.80, F(41,41) = 1.08, p = .40$) were statistically equivalent for the two types of stimuli, suggesting that the change in the dependent measure did not substantially affect the perception of these foods with respect to their healthiness. However, using photographs instead of labels did seem to shift the perception of these foods on the basis of their tastiness. While the correlation was still strong (photo and label tastiness, $r = .84, p < .0001$) and the overall averages equivalent (label tastiness $M = 2.22$, photo tastiness $M = 2.17, t(41) = -.357, p = .72$), the variance was significantly smaller for food photographs ($SD = .91$) than for food labels ($SD = 1.4$), $F(41,41) = 2.36, p < .01$.

Procedure. The taste attitude and fitness attitude rehearsal manipulations proceeded as in Experiment 2. The condition unique to the current experiment was the control condition, in which participants completed the control tasks from the other two conditions. That is, a participant in the control condition was asked to rate each of the twenty-four taste words as to whether it described the taste or the texture of food. They were also asked to rate each of the twenty-four fitness words as to whether it referred to a physically fit or a physically heavysset

person. The order of these two tasks was counterbalanced. As before, after completing these two initial tasks, all participants completed a filler task consisting of spatial problems.

The dependent measure for this experiment again involved scalar ratings by participants of the likelihood they would eat a full serving of each of the 42 foods if given the opportunity. Again, these ratings were on an eleven-point scale from -5 (very unlikely) to +5 (very likely). The main change to this dependent measure was the inclusion of food photographs along with food labels as participants considered the likelihood of eating each food.

Following the dependent measure, participants completed a number of questions. Pertinent to our analyses were the three items, discussed earlier, which assessed what we will refer to as ‘caloric concern.’ These three items were gleaned from a larger, more diverse set (Cappelleri et al., 2009) because they pinpoint not simply whether individuals consider themselves to be dieting, but whether they behave like a dieter (“I deliberately take small helpings to control my weight,” “I don’t eat some foods because they make me fat,” and “I consciously hold back on how much I eat at meals to keep from gaining weight”). The items are internally consistent ($\alpha = .77$) and were averaged to form an index for analyses.

We chose to include these items at the end of the experiment so the obvious content would not tip our participants off as to the nature of the experiment. However, we conducted analyses to determine whether responses to the caloric concern items were influenced by our manipulation. As expected, participants in the taste attitude rehearsal condition were no different in terms of caloric concern ($M = 2.02$ on a 4-point scale from 1 to 4) than participants in the fitness attitude rehearsal condition ($M = 2.22$), $t(92) = -1.17$, $p = .25$.

Results

The data from two participants were eliminated from analyses based on a regression of caloric concern, condition (dummy coded), and the interaction on likelihood to eat high health, high taste foods because they were outliers on both Cook's distance (.28 and .14; next highest value = .09) and on a residual plot (standardized residuals were -5.00 and -4.47; next lowest value = -2.58). No other regressions (on either high health, low taste or low health, high taste foods – no foods were both low in health and low in taste) yielded outliers on both Cook's distance and a residual plot.

The two-level HLM analyses to be reported involved 5922 observations (based on 141 participants) nested in 42 foods (mean likelihood rating across the 5922 observations = 1.99, $SD = 3.16$). The model predicted the likelihood of eating a full serving from a participant's condition (taste, control, or fitness, which we coded sequentially using two dummy variables labeled TasteControl and FitControl), caloric concern (entered group-mean centered), and the interaction of the two at level 1, as well as food healthiness and food tastiness (entered grand-mean centered) at level 2². Coefficients were modeled as fixed if the associated error term was not significantly different from zero. We again used a generous cut-off p -value of .2, as recommended by Nezlek (2011). As in Experiment 2, the coefficients for this model are interpreted in the same way coefficients in linear regression are interpreted. In the following analyses, all simple effects were estimated at one standard deviation above and below the mean.

Caloric concern and the attitudes rehearsed. We suggested earlier that participants high in caloric concern may be more likely to hold and rehearse positive attitudes regarding fitness and therefore boost the accessibility of those attitudes in such a way as to promote healthier food choices. To test whether this was the case, we conducted an internal analysis on participants in the fitness condition ($N = 46$) which focused on their responses to the attitude

rehearsal task. Fitness words were divided into the six related to ‘heaviness’ and the six related to ‘fitness.’ Ideally, participants should be rating the fitness words positively and the heaviness words negatively – in other words, clearly differentiating between the two.

Responses to the words in each of the two sets were averaged and then correlated with caloric concern. Attitudes rehearsed for ‘fitness’ words were not related to participants’ caloric concern ($p = .79$), suggesting that all participants valued and responded positively to the fitness words ($M = 2.05$ on a scale from -3 to $+3$, $SD = .55$). In contrast, attitudes rehearsed for ‘heaviness’ words were significantly correlated with caloric concern, $r = -.37$, $p = .01$.

Participants lower in caloric concern (defined as one standard deviation below the mean) rated the set of ‘heaviness’ words relatively more positively ($M = -.89$) than participants higher in caloric concern (defined as one standard deviation above the mean, $M = -1.4$). This relationship was especially apparent for the words ‘heavyset,’ ($r(46) = -.56$, $p < .0001$), ‘large,’ ($r(46) = -.46$, $p = .001$) and ‘big’ ($r(46) = -.44$, $p = .002$). In addition, the predicted value for those low in caloric concern was often actually positive (e.g., for ‘big,’ $M = 1.26$, for ‘large,’ $M = 1.11$; for ‘heavyset,’ $M = .47$). In other words, participants lower in caloric concern did not hold and consistently rehearse health-related attitudes that would be expected to lead to a preference for healthy over unhealthy foods, but participants higher in caloric concern did.

Further evidence that participant attitudes vary as a function of caloric concern was provided by control participants’ responses to the dependent measure. HLM analyses demonstrated that control participants high in caloric concern (defined as one standard deviation above the mean) discriminated between foods based on both food healthiness ($\gamma = .574$, $t(39) = 4.293$, $p < .001$) and food tastiness ($\gamma = .963$, $t(39) = 6.501$, $p < .001$). In contrast to this, participants low in caloric concern (defined as one standard deviation below the mean) showed

no evidence of discriminating between foods on the basis of food healthiness ($\gamma = .076$, $t(39) = .124$, $p = .540$). They did, however, discriminate between foods based on their tastiness ($\gamma = .916$, $t(39) = 8.378$, $p < .001$). These varying simple effects led to a caloric concern X healthiness interaction ($t(5826) = 4.427$, $\gamma = .258$, $p < .001$) but no evidence of a caloric concern X tastiness interaction ($t(5826) = .512$, $\gamma = .029$, $p = .609$) for control participants. Participants higher versus lower in caloric concern, therefore, not only had very different underlying attitudes, but they also made very different food decisions at baseline.

Attitude accessibility, caloric concern and behavioral intentions: The primary analyses.

Food healthiness. Our first primary hypothesis involved a comparison of the fitness attitude rehearsal condition and the control condition. Participants in the fitness condition were expected to discriminate more based on the healthiness of foods than participants in the control condition. In other words, participants who rehearsed their attitudes towards physical fitness were expected to exhibit a greater disparity between their rated likelihood of eating higher health versus lower health foods compared to control participants who did not rehearse those attitudes. (See Table 2 for the HLM statistics.) Though this was not true overall (γ_{22} (the healthiness X FitControl interaction term) = .02, $t(5865) = .23$, $p = .82$), the relevant interaction was moderated by participants' caloric concern, γ_{52} (healthiness X FitControl X caloric concern) = .31, $t(5865) = 3.50$, $p < .001$.

As expected, for participants high in caloric concern (defined as one standard deviation above the mean), we found a FitControl X healthiness interaction, $\gamma = .33$, $t(5865) = 2.81$, $p = .005$, such that these participants preferred high-healthiness foods to low-healthiness foods to a greater extent in the fitness condition ($\gamma = .90$, $t(39) = 7.25$, $p < .001$, mean difference = 1.80)

than in the control condition ($\gamma = .57, t(39) = 4.29, p < .001$, mean difference = 1.15). For participants low in caloric concern (defined as one standard deviation below the mean), on the other hand, the pattern was quite different. Although they too displayed a FitControl X healthiness interaction, $\gamma = -.30, t(5865) = -2.77, p = .006$, the simple slopes suggested that participants did not respond to the manipulation as would be predicted if they had rehearsed negative attitudes toward physical heaviness. They preferred low-healthiness foods marginally more than high-healthiness foods in the fitness condition ($\gamma = -.22, t(39) = -1.72, p = .09$, mean difference = -.44) and preferred neither type of food in the control condition ($\gamma = .08, t(39) = .12, p = .54$, mean difference = .15). The relevant means are displayed in Figure 5.

Food tastiness. Our second hypothesis was that participants in the taste condition would discriminate more using the taste of foods than participants in the control condition – this involved a comparison of the taste attitude rehearsal and control conditions. Again, though this was not true overall ($\gamma_{11} = -.05, t(5865) = -.65, p = .52$), the effect was moderated by participants' caloric concern, $\gamma_{41} = .27, t(5865) = 2.91, p = .004$. This time, participants high in caloric concern (one standard deviation above the mean) did not respond to our taste attitude rehearsal manipulation, not preferring either type of food to a greater or lesser extent in the taste condition relative to the control condition, $\gamma = .213, t(5865) = 1.39, p = .165$. However, participants low in caloric concern (one standard deviation below the mean) did respond to our taste attitude rehearsal manipulation (γ (tastiness X TasteControl) = $-.32, t(5865) = -3.90, p < .001$), preferring high-tastiness foods more relative to low-tastiness foods in the taste condition ($\gamma = 1.23, t(39) = 10.02, p < .001$, mean difference = 2.47) than the control condition ($\gamma = .92, t(39) = 8.38, p < .001$, mean difference = 1.83). The means for these conditions are displayed in Figure 6.

Replication of Experiment 2. In order to see if these findings replicated those of Experiment 2, we also conducted analyses to compare the taste attitude rehearsal condition to the fitness attitude rehearsal condition. To do so, we recoded the two condition dummy variables (TasteControl and FitControl) such that they allowed a direct comparison of the taste attitude and fitness attitude rehearsal conditions. The primary dummy variable we were now interested in was labeled TasteFitness. While the overall food healthiness X TasteFitness interaction was not significant ($p = .80$), it was moderated by caloric concern ($\gamma = .476$, $t(5865) = 6.17$, $p < .001$) such that participants high in caloric concern who rehearsed their attitudes towards fitness words displayed a greater discrepancy in preference for high (one standard deviation above the mean) versus low (one standard deviation below the mean) healthiness foods ($\gamma = .90$, $t(39) = 7.25$, $p < .001$, mean difference = 1.80) than participants who rehearsed their attitudes towards taste words ($\gamma = .45$, $t(39) = 4.24$, $p < .001$, mean difference = .90). We did not, however, find a tastiness X caloric concern X TasteFitness interaction ($p = .34$). Thus, statistical comparison of the two attitude rehearsal conditions replicates the findings from Experiment 2 with regard to food healthiness but not with regard to food tastiness. This issue receives further attention in the Discussion section.

Does attitude rehearsal of one dimension attenuate the use of the alternative dimension? The inclusion of a control condition also provided us with the opportunity to test whether having participants rehearse their attitudes towards one dimension might also reduce their use of the dimension related to the alternate construal. Perhaps rehearsing attitudes toward fitness words, for instance, not only results in a greater preference for high-health relative to low-health foods, but also produces a lesser preference for high-taste over low-taste foods.

To test this, we first looked at participants who rehearsed their attitudes towards taste words. Did they focus less on food healthiness? This seemed not to be the case. The overall food healthiness X TasteControl interaction was not significant ($p = .77$), and introducing caloric concern as a moderator yielded a marginal three-way interaction ($\gamma_{42} = .15$, $t(5865) = 1.79$, $p = .07$) such that for participants high in caloric concern (one standard deviation above the mean), rehearsing taste attitudes did not reduce their focus on healthiness ($\gamma(\text{healthiness X TasteControl}) = .12$, $t(5865) = .98$, $p = .33$). Participants low in caloric concern (one standard deviation below the mean) exhibited a marginal healthiness X TasteControl interaction ($\gamma = -.17$, $t(5865) = -1.68$, $p = .09$) such that those in the taste attitude rehearsal condition preferred high-healthiness foods marginally more than low-healthiness foods ($\gamma = .25$, $t(5865) = 1.88$, $p = .07$, mean difference = .49), whereas those in the control condition preferred neither, $\gamma = .08$, $t(39) = .12$, $p = .54$, mean difference = .15. Given these marginal effects, we can only conclude that our taste attitude rehearsal manipulation did not seem to influence participants' use of the healthiness dimension in assessing the likelihood of eating the various foods.

What about participants who rehearsed their attitudes towards fitness words? Did they, in turn, focus less on food tastiness? Again, we found no evidence for this. The interaction of FitControl and food tastiness was not significant overall ($p = .44$), and although it was moderated by caloric concern ($\gamma_{51} = -.18$, $t(5865) = -2.12$, $p = .03$), participants high in caloric concern (one standard deviation above the mean) exhibited no interaction between the condition they were in (control vs. fitness) and their tastiness ratings, $p = .23$. Participants low in caloric concern (defined as one standard deviation below the mean), on the other hand, did exhibit a significant tastiness X FitControl interaction, $\gamma = .23$, $t(5865) = 2.10$, $p = .04$, preferring high tastiness foods to low-tastiness foods to a greater extent in the fitness condition ($\gamma = 1.15$, $t(39) = 6.77$, $p < .001$,

mean difference = 2.30) than in the control condition ($\gamma = .92$, $t(39) = 8.38$, $p < .001$, mean difference = 1.83). Our fitness attitude rehearsal manipulation, then, did not seem to influence participants' use of the tastiness dimension in assessing the likelihood of eating various foods. Again, the means for the three conditions are displayed in Figure 6.

Dimension use as a function of caloric concern: Making the dieter's decision easier.

Recall that the control participants' food ratings indicated that individuals high in caloric concern discriminated on the basis of both food healthiness and food tastiness, whereas those low in caloric concern discriminated only on the basis of tastiness. The implication is that those high in caloric concern are more likely to experience competing construals.³ Given this, does our attitude rehearsal manipulation, which focuses people more on either taste or fitness, make it easier for participants high in caloric concern, who have two competing construals active at baseline, to make their food decisions? To test this, we predicted participants' response time to the 42 foods from a 2-level HLM model that was essentially the same as our earlier model predicting likelihood ratings. Again, caloric concern and condition (sequentially coded using dummy variables TasteControl and FitControl) were entered at level 1, and food tastiness and healthiness were entered at level 2.

This analysis revealed a significant caloric concern X FitControl interaction ($\gamma = -96.85$, $t(5865) = -2.87$, $p < .01$). As expected, participants high in caloric concern (defined as one standard deviation above the mean) were faster to decide how likely they would be to eat a full serving of foods in the fitness condition ($M = 2013.40$) than in the control condition ($M = 2172.92$; $\gamma = -159.52$, $t(5865) = -3.71$, $p < .001$). The caloric concern X TasteControl interaction was not significant ($\gamma = 52.51$, $t(5865) = 1.62$, $p = .11$, but again, participants high in caloric concern (defined as one standard deviation above the mean) were faster to rate foods in the taste

condition ($M = 2016.03$) than the control condition ($M = 2172.92$; $\gamma = 156.89$, $t(5865) = 3.53$, $p < .001$). Participants low in caloric concern (defined as one standard deviation below the mean) did not receive a boost in speed in either the taste condition ($M = 2148.92$) relative to the control condition ($M = 2200.79$; $\gamma = 51.87$, $t(5865) = 1.074$, $p = .28$) or in the fitness condition ($M = 2234.97$) relative to the control condition ($\gamma = 34.18$, $t(5865) = .716$, $p = .47$). In a sense, then, regardless of whether the attitudes they rehearsed were related to taste or to fitness, participants high in caloric control were able to make their decisions more quickly. Participants low in caloric control, however, received no such facilitation. See Figure 7 for an illustration of these interactions.

It seems, then, that the attitude rehearsal of either taste words or fitness words increases the accessibility of one or the other of two construals that are both active for people high in caloric concern, making the ultimate decision faster, and, presumably, easier. For participants low in caloric concern, only one construal is active in the first place – that focusing on the tastiness of foods. In their case, attitude rehearsal of taste words may increase their use of that dimension in making food likelihood judgments, but, as they seem not to have two competing construals to deal with, does not significantly speed up their food choices.

Discussion

Focus on food healthiness. The data demonstrate that for participants high in caloric concern, who may possess more clearly-structured attitudes regarding food healthiness and physical health in general, boosting the accessibility of those attitudes resulted in a greater preference for healthy over unhealthy foods. Recall that at baseline (in the control condition), participants high in caloric concern discriminate between foods based on both food healthiness

and food tastiness. This suggests that both construals are active for such individuals, and our fitness attitude rehearsal manipulation is able to focus them all the more on healthiness.

What about participants low in caloric concern? These participants do, in fact, respond to the taste attitude rehearsal manipulation, using food tastiness more to inform their judgments relative to control participants low in caloric concern. They do not, however, respond predictably to the fitness attitude rehearsal manipulation. Recall that in the control condition, these participants did not discriminate between foods on the basis of food healthiness, but they did discriminate on the basis of food tastiness. These participants do not seem to care about food healthiness when making food likelihood judgments. Because they may not hold clearly-structured attitudes regarding fitness and health, there is no sound basis for offering predictions about the impact of fitness attitude rehearsal. Our internal analysis of the attitudinal responses of the participants provided support for this reasoning. Participants low in caloric concern were not, in fact, rehearsing the same kinds of attitudes as participants high in caloric concern.

Indeed, within the fitness condition, this difference in attitudes rehearsed had clear effects on food choices. In a second internal analysis, we predicted the likelihood that participants in the fitness condition would eat each of the 42 foods from participants' response to the 'heaviness' words at level 1 and food tastiness and food healthiness at level 2. This yielded a significant 'heaviness' attitude rehearsed (more positive vs. more negative) X food healthiness interaction, $\gamma = -.38$, $t(1887) = -7.63$, $p < .001$. As Figure 8 illustrates, it was only participants who rehearsed relatively more negative attitudes towards 'heaviness' words (again, these tended to be participants higher in caloric concern) who later preferred high healthiness to low healthiness foods ($\gamma = .79$, $t(39) = 6.15$, $p < .001$). Participants who rehearsed relatively more positive

attitudes towards ‘heaviness’ words (and who tended to be lower in caloric concern) did not show any particular preference ($\gamma = .03$, $t(39) = .29$, $p = .77$).

It seems to be the case, then, that at least one reason participants low in caloric concern do not show the predicted effect of attitude rehearsal is that the attitudes they are rehearsing are relatively more positive towards unhealthiness. They appear not to consider the attribute of physical heaviness to be as negative as do individuals higher in caloric concern.

What about participants high in caloric concern? Although they responded as predicted to our fitness attitude rehearsal manipulation, showing a greater distinction in food likelihood ratings on the basis of healthiness than those in the control condition, they did not respond to our tastiness attitude rehearsal manipulation (although participants low in caloric concern did). However, though these participants did not focus more than controls on food tastiness in terms of their overt food judgments, they did receive a boost in the speed with which they made those judgments. Work by Kleiman and Hassin (2011) on goal conflict suggests that faster judgments are indicative of less of a struggle. Their findings suggest that if two goals are in tension (for instance, if a health goal is pitted against a taste goal), participants take longer to make goal-relevant decisions (even when the conflict is outside conscious awareness). That our high-caloric-concern participants, for whom both healthiness and tastiness are theoretically in conflict, exhibited a boost in speed after rehearsing attitudes toward either taste or health suggests that their conflict was reduced, even if their actual food judgments did not substantially shift. In a sense, they did not experience as much of a struggle between health concerns and taste concerns when making decisions regarding foods.

Food labels versus food photographs. A major difference between Experiment 2 and Experiment 3 is the use of photographs instead of food labels. For certain people, our attitude

rehearsal manipulation was effective even in the face of a more hedonically salient stimulus (a photographed food rather than a food label). However, one might wonder why, in the second experiment, we found a main effect of condition such that those who rehearsed their attitudes towards tastiness used food tastiness to a greater extent when making food judgments than participants who rehearsed their attitudes towards fitness, whereas in the third experiment, we found that this effect was moderated by participants' caloric concern.

This is likely attributable to the distinction between a food label and a food photograph. When foods are presented as words, neither the taste nor the health of a food appears to be inherently more powerful. One is distanced from the hedonic qualities: the smell, the juiciness, the texture, all of which suggest tastiness. One can look at a picture of a steak and feel one's mouth start to water in response. Reading the word 'steak' on a page is much less likely to cause such a reaction. Indeed, this is used as a self-control strategy – people who distance themselves from hedonic objects, either by transforming the 'hot,' appetitive characteristics into 'cool,' symbolic terms (Mischel, Shoda, and Rodriguez, 1989) or by putting a physical barrier between themselves and the object, are better able to resist that object.

Mischel et al. (1989), for example, found that the way children represented food (pretzels or marshmallows) affected their responses to the food. If, rather than focusing on the food's concrete, arousing qualities (such as the pretzel's crunchy, salty taste), they focused on its more abstract qualities (such as the fact that pretzels were 'loglike'), they were able to wait significantly longer to eat it. In a sense, if children focused on the concrete aspects of a food, they were less able to exert self-control – the tastiness of the food dominated their behavior.

In Experiment 2, foods are already abstracted for the participants. Research from the psychological distance literature suggests that words are consistently represented more abstractly

than pictures (Amit, Algom, Trope, and Lieberman, 2009). Words are distant – the concrete, hedonic qualities of a given food in word form are removed from the perceiver’s current experience. Pictures, on the other hand, are more present – they represent objects proximal in time and space and are more analogous to their real-world referents than are words.

Our manipulation of the attitude accessibility of fitness versus tastiness may have worked so well for food labels because in word form, a given food is seen abstractly, and as such is related to a number of different characteristics – the tastiness, the healthiness, the color, the price, etc. None of these characteristics is particularly salient or more likely to inform a person’s construal and ultimately the decision to eat the food. However, if a food is made more “present” in the form of a photograph, the hedonic, concrete qualities of the food may have more influence on eating behaviors. The tastiness, texture, smell, etc. may dominate participants’ decisions.

But not in every case. Certainly, some people, in the face of a tempting food item, always go with their gut. An accomplished athlete who pursues a regular workout regimen (Michael Phelps, for example) may not have to take healthiness into consideration at all. Such a person need not care about how many calories a hamburger has, because he or she can burn them off easily during his or her rigorous exercise routine. He or she can eat like a horse and be perfectly healthy. Tastiness, then, may win the day for such a vigorous exerciser.

However, a person on a diet, a person who has to take into consideration the effect of a given food on his or her weight, will have two warring influences on his or her food choices – both the tastiness of the food and the healthiness of the food, even if said food looks particularly tasty. This is the person who cares about both healthiness and tastiness, and who our manipulation, even for a psychologically present food, will be more likely to affect.

General Discussion

The above studies demonstrate a) that attitude accessibility not only influences which of two possible construals comes to mind, but also how those construals change the evaluation of related objects; and b) that this attitude accessibility manipulation can be successfully extended from single categories to entire dimensions. In other words, this process applies both to singular objects which can be construed in multiple ways (e.g., a flu shot can be construed as either an immunization or as an injection) and to object arrays which can be construed along multiple dimensions (e.g., a series of foods can be construed in terms of their healthiness or in terms of their tastiness).

These experiments also provide additional evidence of the important role attitude accessibility plays in determining which potential categorization will dominate the construal process. As argued earlier, while Smith et. al (1996) provided evidence that the more attitude-evoking potential categorization (e.g., 'dairy product') is more likely to be activated by a relevant target cue (e.g., 'yogurt') in a memory task, the current work shows more directly that the target itself (the yogurt) is being construed differently. Our first experiment, in particular, suggests that if a more positive potential categorization is made more attitude evoking, then the target object is evaluated more positively than if a more negative potential categorization is made more attitude-evoking.

In addition, the experiments contribute to our understanding regarding the functional value of attitudes (accessible ones, in particular) in affecting the construal process. Again, Roskos-Ewoldsen & Fazio (1992) found that accessible attitudes are useful in that they direct visual attention toward things in the world we care about. Along with Smith et. al (1996), our experiments similarly demonstrate that we construe our world in terms of the categories towards

which we have attitudes that come to mind easily. This is a process that is, at its core, functional because it promotes construal in terms of what is hedonically relevant to us.

As we mentioned in our introduction, the current work is not the first to examine attitudinally-biased construal. Many studies on attitudinally-biased processing suggest that the attitude one has toward a particular object both influences the information one pays attention to upon consideration of that object and colors the interpretation of that information. For instance, those with negative attitudes toward a football team pay more attention to potential infractions that team commits and are more likely to interpret ambiguous actions as offenses meriting a penalty (Hastorf & Cantril, 1954). Those with positive attitudes toward a tennis player are more likely to judge a shot by that player that is near the line as “in” as that outcome accords with the attitude (Powell & Fazio, summarized in Fazio, Roskos-Ewoldsen, & Powell, 1994).

The current work, however, is distinct from this research in that it elucidates a different process by which attitudes can come to influence construals. As argued earlier, in our research, the attitude toward the object is not itself the focus, nor is it the mechanism by which our participants came to see (and evaluate) a flu shot, or a piece of chocolate cake, differently. We did not manipulate the attitude toward the object or the accessibility of this attitude – indeed, participants didn’t even encounter the attitude object until they completed the dependent measure. Instead, we manipulated the accessibility of attitudes toward potentially relevant categorizations of the multiply-categorizable object, and in so doing, influenced the identity of the object itself. After rehearsing attitudes toward injections, our participants are seeing and evaluating not the “flu shot” object, but the “painful medical procedure” object. After rehearsing attitudes toward healthiness, our participants are seeing not the “piece of cake” object, but the “potential diet-buster” object. The focal mechanism is not that the attitude toward the object

directly colors how the object is construed. The process that concerns us is different because it encourages people to change the attitude object they are assessing. To reiterate, we are promoting “a change in the object of judgment” not in “the judgment of the object” (Asch, 1940, p. 458).

This mechanism we have articulated should be most relevant for objects that are multiply categorizable and for which an individual associates two potentially relevant categorizations with opposing valences (for instance, a flu shot). In such a case, exactly which instantiation of the attitude object comes to mind (that is, whether one sees it as painful medical procedure or preventative health measure) will influence how the object is evaluated. This will depend on the ease with which the alternative categorizations evoke opposing attitudes. An individual who does not find injections in the least bit troubling will not be (easily) pushed to see flu shots as painful medical procedures. For this person, there is not as much potential for categorization in multiple, evaluatively opposite directions. For the individual who fears injections yet appreciates immunizations, differential categorization and evaluation is more likely, and the current findings indicate that the accessibility of that individual’s attitudes toward the two potential categorizations is a key determinant of how the object is construed and evaluated. Likewise, when an individual who cares about caloric intake is presented with cake, two attitude objects, one of which is positive (“cake the delicious dessert”) and other of which is negative (“cake the diet-buster”), are vying for attention. Through our attitude rehearsal manipulation, participants are being pushed to see one rather than the other of those two attitude objects, and behave towards it accordingly.

Put another way, if healthiness as a dimension is made more attitude-evoking, individuals should be more likely to see ‘health-related’ attitude objects in the world around them than

‘taste-related’ attitude objects. They should be more likely to construe foods in terms of healthiness than tastiness. In other words, in the process underlying the current research, the attitude toward the specific food does not color the construal. Instead, the attitude object (e.g., spinach) is now viewed as a different object (e.g., a healthy food).

Self-Control Conflict

Our paradigm and findings suggest a fairly effortless alternative to extant self-control strategies. Indeed, the self-control conflict a dieter normally experiences may, after attitude accessibility enhancement, become less of a conflict altogether. Recall that participants higher in caloric concern in Experiment 3 were much faster to respond to foods after either the healthiness dimension or the tastiness dimension was made more attitude-evoking. In a sense, the construal decision that constitutes a self-control conflict may have been preempted prior to the food decision. The conflict became less conflicting.

Contrast this with strategies geared towards the moment of self-control exertion. Mischel et al. (1989) found that children who construed marshmallows in terms of their non-appetitive characteristics (fluffy clouds) were better able to resist the temptation of eating them. Ainslie (1975) suggested that people were better able to resist temptation if they made side-bets with themselves. But note that these strategies (a) necessitate the conscious categorization of a situation as a self-control conflict to be overcome and (b) involve cognitive effort of some kind in the moment.

To the first point, our attitude accessibility manipulation does not require the categorization of a situation as a self-control conflict – indeed, it may reduce the likelihood that any conflict is experienced. Instead of a dieter recognizing the competing construals of healthiness versus tastiness upon consideration of a tempting food, that dieter can be predisposed

to see such foods in terms of their healthiness. They do not have to resist temptation, because the ‘tempting’ construal (tastiness) takes a back seat to the non-tempting one (healthiness). To the second point, although attitude rehearsal initially requires some effort on the part of the dieter, it does not require effort during the moment of truth. Thus a dieter who has rehearsed his or her attitudes towards healthiness may be able to make an optimal food choice without even having to consider whether such a choice is in line with his or her dieting goals. Of course, this discussion is speculative in nature, as it is somewhat removed from the current data. It is, however, a potential implication of the present findings. Future research will need to test these implications more directly.

Future research should also focus on actual eating behavior (rather than behavioral intentions), and beyond that, examine implications regarding other domains. For example, might this attitude accessibility paradigm affect consumer behavior? One could try to boost the accessibility of consumer attitudes towards either the ‘green-ness’ (eco-friendly characteristics) of a product or the inexpensiveness of a product. Perhaps if participants rehearse their attitudes towards the environment, they will make more environmentally-friendly purchase decisions, even though such products tend to be more expensive.

Conclusion

The above experiments demonstrate not only that attitude accessibility can be used to modify the evaluation of a particular object by changing the way that object is construed, but that entire dimensions can be made more or less attitude-evoking. The more attitude-evoking these dimensions are, the more likely they are to govern construals and decisions regarding a whole array of relevant objects.

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Footnotes

¹For interested parties, the level 1 and level 2 equations are as follows:

$$\text{Level 1, likelihood}_{ij} = \beta_{0j} + \beta_{1j} (\text{condition}) + r_{ij};$$

$$\text{Level 2, } \beta_{0j} = \gamma_{00} + \gamma_{01}\text{Tastiness} + \gamma_{02}\text{Healthiness} + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}\text{Tastiness} + \gamma_{12}\text{Healthiness} + u_{1j}$$

where r represents the error associated with level 1, u_{0j} and u_{1j} represent intercept (β_{0j}) and condition slope (β_{1j}) error, respectively, γ_{00} is the average intercept, and γ_{10} is the average condition slope. Coefficients γ_{01} and γ_{02} represent main effects of food tastiness and food healthiness on likelihood ratings. Coefficients γ_{11} and γ_{12} represent the interaction of food tastiness and food healthiness, respectively, with participant condition.

²For Experiment 3, the level 1 and level 2 equations are as follows:

$$\text{Level 1, likelihood}_{ij} = \beta_{0j} + \beta_{1j} (\text{TasteControl}) + \beta_{2j} (\text{FitControl}) + \beta_{3j} (\text{CalConc}) + \beta_{4j} \\ (\text{TasteControlXCalConc}) + \beta_{5j} (\text{FitControlXCalConc}) + r_{ij};$$

$$\text{Level 2, } \beta_{0j} = \gamma_{00} + \gamma_{01}\text{Tastiness} + \gamma_{02}\text{Healthiness} + u_{0j},$$

where likelihood_{ij} represents individual i 's likelihood rating for food j ; TasteControl and FitControl are sequentially-coded dummy variables indicating a comparison of either the taste condition to the control condition or the control to the fitness condition; CalConc refers to participants' caloric concern; $\text{TasteControlXCalConc}$ and $\text{FitControlXCalConc}$ represent the interaction of caloric concern with the respective dummy condition variables, and r_{ij} represents

the error associated with level 1. At level 2, each level 1 beta has its own equation, all of the same form. For brevity's sake, we have included only the equation for β_{0j} . Here, u_{0j} and represents the intercept (β_{0j}) error; γ_{00} is the average intercept; coefficients γ_{01} and γ_{02} represent main effects of food tastiness and food healthiness. The gamma coefficients for food tastiness and healthiness in the other four equations, $\beta_{1j} - \beta_{5j}$, represent cross-level interactions.

³Data from 19 pilot participants provides evidence for the existence of two competing construals among individuals higher in caloric concern. These participants completed a series of three items aimed at indexing their subjective ambivalence towards eating junk food, specifically. These items served as a sort of summary self-report of ambivalence ("Please consider all of your reactions with regard to eating junk food. I feel..." where the scale ranged from 0 ("Completely One-sided Reaction") to 10 ("Completely Mixed"); "With regard to eating junk food: I..." where the scale ranged from 0 ("Feel No Indecision at All") to 10 ("Feel Maximum Indecision"); and "With regard to eating junk food: I..." where the scale ranged from 0 ("Feel No Conflict at All") to 10 ("Feel Maximum Conflict"). These three items were reliable ($\alpha = .63$) and were averaged to create a single subjective ambivalence measure. Subjective ambivalence correlated significantly with participants' caloric concern, $r(19) = .59, p = .008$, suggesting that participants higher in caloric concern do tend to experience a higher amount of subjective ambivalence regarding, at the very least, high-fat, high-taste foods (junk foods).

Table 1.

HLM Regression Coefficients for Experiment 2.

Predictor	Coefficient		
Main effects			
Intercept (γ_{00})	2.01	(0.10)	***
Perceived Tastiness (γ_{01})	1.05	(0.10)	***
Perceived Healthiness (γ_{02})	0.14	(0.09)	
Condition (γ_{10})	0.05	(0.04)	
Cross-level interactions			
Condition X Perceived Tastiness (γ_{11})	-0.11	(0.05)	*
Condition X Perceived Healthiness (γ_{12})	0.09	(0.04)	*

Significance: + $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed test).

Standard errors in parentheses.

Table 2.

HLM Regression Coefficients for Experiment 3.

Predictor	Coefficient		
Main effects			
Intercept (γ_{00})	1.85	(0.11)	***
Food Tastiness (FT; γ_{01})	0.99	(0.09)	***
Food Healthiness (FH; γ_{02})	0.35	(0.11)	**
TasteControl (γ_{10})	0.37	(0.08)	***
FitControl (γ_{20})	-0.30	(0.07)	***
CalConc (γ_{30})	-0.05	(0.06)	
Interactions			
TasteControl X CalConc (γ_{40})	-0.33	(0.09)	***
FitControl X CalConc (γ_{50})	0.10	(0.10)	
FT X TasteControl (γ_{11})	-0.05	(0.08)	
FH X TasteControl (γ_{12})	-0.02	(0.08)	
FT X FitControl (γ_{21})	0.05	(0.07)	
FH X FitControl (γ_{22})	0.02	(0.07)	
FT X CalConc (γ_{31})	-0.24	(0.06)	***
FH X CalConc (γ_{32})	0.10	(0.05)	+
FT X CalConc X TasteControl (γ_{41})	0.27	(0.09)	**
FH X CalConc X TasteControl (γ_{42})	0.15	(0.08)	+
FT X CalConc X FitControl (γ_{51})	-0.18	(0.09)	*
FH X CalConc X FitControl (γ_{52})	0.31	(0.09)	***

Significance: + $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed test).

Standard errors in parentheses.

TasteControl = dummy variable representing the taste versus the control condition; FitControl = dummy variable representing the control versus the fitness condition; CalConc = caloric concern; FT = tastiness of a given food; FH = healthiness of a given food.

Appendix A

Stimulus Triads from Experiment 1

Set	Target	Positive Category	Negative Category
A	Pornography	Entertainment	Things that degrade women
A	Burping	Amusing behavior	Rude behavior
A	Anti-depressants	Effective drug	Drug with side-effects
A	Fast food	Satisfying meal	High in fat
A	Tattoos	Self-expression	Unsanitary procedure
A	Bill Clinton	U.S. President	Adulterer
A	Pop	Refreshing drink	Things that are bad for your teeth
A	Caffeine	Things that increase energy	Things that cause insomnia
A	IQ testing	Ability assessment	Things that are culturally biased
A	Skydiving	Sport	Risk of injury
A	Vegetables	Health food	Bland food
B	Martha Stewart	Cooking icon	Felon
B	Pit bull	Loyal pet	Vicious animal
B	Same-sex marriage	Equal rights issue	Sinful activity
B	John Nash	Nobel Prize winner	Schizophrenic
B	Affirmative action	Enhancing workplace diversity	Giving minorities unfair advantage

Set	Target	Positive Category	Negative Category
B	Dorm living	Convenient housing	Low-privacy residence
B	Flu shot	Immunization	Injection
B	Dentist	Prevent cavities	Painful health exams
B	Video games	Hobby	Time waster
B	Homeland security	Federal protection	Invasion of privacy
B	GPA	Measure of achievement	Cause for embarrassment

Appendix B

Taste and Fitness Words from Experiments 2 and 3

Fitness Words		Taste Words	
Heavy	Fit	Taste	Texture
big	slender	sour	crispy
bulging	slim	bland	crunchy
bulky	lean	rotten	moist
burly	healthy	bitter	chewy
corpulent	muscled	moldy	gummy
heavysset	toned	burnt	tough
hefty	trim	sweet	smooth
large	well	spicy	juicy
portly	strong	fruity	grainy
pudgy	athletic	tangy	warm
husky	well-built	salty	gooey
heavy	fit	buttery	slippery

Appendix C

The 42 Foods from Experiments 2 and 3, Sorted by Label Healthiness

Food	Label	Label	Photograph	Photograph
	Healthiness	Tastiness	Healthiness	Tastiness
big mac	-4.97	1.62	-4.36	2.45
donuts	-4.73	2.76	-4.00	2.41
french fries	-4.6	3.62	-4.09	2.86
fudge	-4.35	2.76	-3.77	2.73
potato chips	-4.29	3.71	-4.45	2.50
fried chicken	-4.14	3.10	-4.45	2.59
cheesecake	-4.12	2.52	-3.27	3.64
nachos	-3.85	3.24	-3.73	2.09
cheeseburger	-3.66	2.48	-3.41	2.45
bacon	-3.63	2.05	-4.00	2.36
milkshake	-3.51	4.29	-3.86	3.95
pepperoni pizza	-3.49	2.76	-3.18	2.77
hotdog	-3.35	2.14	-2.86	1.95
pecan pie	-3.24	0.62	-3.00	1.55
burrito	-3.24	3.52	-2.36	2.68
angel food cake	-2.98	3.00	-2.27	2.00
apple pie	-2.83	2.95	-2.73	3.18
sausage	-2.54	1.81	-3.55	2.45
taco	-2.53	3.10	-2.68	2.73

chicken pot pie	-1.68	2.62	-1.27	2.23
potato salad	-1.21	1.10	-1.59	0.73
crackers	-0.62	2.00	-1.45	1.32
steak	-0.41	3.57	-0.64	3.82
cottage cheese	0.10	-2.52	-0.23	0.00
puffed wheat	0.68	0.19	0.91	1.00
granola bar	0.80	2.95	-0.05	1.91
cheerios	0.86	2.19	1.55	1.41
shredded wheat	1.71	0.00	0.82	1.50
skim milk	1.79	0.90	1.82	1.91
yogurt	1.88	2.24	1.91	2.27
zucchini	2.41	1.00	2.32	1.00
cauliflower	2.45	-0.29	2.59	0.50
salad	2.47	3.10	3.05	2.27
celery	2.57	0.71	2.68	0.77
fruit salad	2.65	3.52	3.14	3.59
peach	2.71	3.43	2.64	2.64
grapefruit	2.80	0.95	2.59	1.59
orange	2.84	3.43	2.86	3.23
grapes	2.92	4.00	2.45	2.64
carrot	2.96	2.19	2.82	2.14
apple	3.02	3.48	2.86	2.68
spinach	3.09	0.38	2.73	0.82