Incremental theories of weight predict lower consumption of high calorie, high fat foods
Supplemental Material

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Implicit Theories of Weight Scale Validation Pretest

While implicit theories of attributes such as intelligence and personality have been advanced by decades of research (see Dweck, 2006 for review), comparatively little is known about implicit theories of weight. Burnette (2010) introduced a 6-item measure of Implicit Theories of Weight Management that featured general questions about whether weight can be changed, modeled after the measure of implicit theories of intelligence. In a validation pre-test, we introduced the Implicit Theories of Weight (ITW) scale, a new measure that incorporates into scale items factors that might inspire or limit changes in weight and fitness. For example, ITW items ask about the degree to which people view weight as fixed by one's genetics as opposed to changeable through one's diet and exercise practices. To capture a belief in the long-term stability of weight and fitness level, several items ask about degree to which people think that changes in weight tend to be merely temporary. The ITW scale also differs from the pre-existing related measure in that it includes items designed to distinguish minor daily fluctuations in weight from the larger changes of interest by referring to substantial changes in weight or to changes in one's body type (e.g., thin, average).

The purpose of this pretest was to assess reliability and concurrent validity for this new measure of Implicit Theories of Weight.

Method

Participants

Participants were recruited through Amazon's Mechanical Turk web service. Participation was restricted to U.S. citizens who were at least 18 years of age and qualified as "Master" workers. Two hundred-four participants completed the study. Data from seven participants were excluded for completing the study in fewer than five minutes (a time too fast for it to be plausible that they read all questions carefully before responding). The remaining 197 participants were 67.5% female, ranged in age from 18 to 81, Mean = 39.94 (SD = 12.31), and in Body Mass Index (BMI) from 15.19 to 56.14, Mean = 27.12 (SD = 7.34). The sample was

4.6% Hispanic/Latino and 95.4% non-Hispanic. Participants were 82.7% White, 8.1% Black, 7.1% Asian and 2% American Indian/Alaskan Native.

Procedure

Implicit theories of weight. Participants were asked to complete the 15-item Implicit Theories of Weight scale described in detail in the Methods section of Study 1 (for full scale, see Appendix A). To assess the convergent validity of the ITW scale, we also asked participants to complete the Implicit Theories of Weight Management scale (Burnette, 2010). This scale consists of 6-items based directly on items from the Implicit Theories of Intelligence scale (Dweck, 1999) in which the word "intelligence" has been replaced with "body weight." Participants rated their agreement, on a 1 (strongly agree) to 6 (strongly disagree) scale with items such as "Your body weight is something about you that you can't change very much" and "No matter who you are, you can significantly change your body weight."

Expectations in response to an imagined dieting setback. To assess the concurrent validity of the ITW scale, participants were asked to complete a set of measures used by Burnette (2010) to assess the effect of implicit theories of weight on participants' anticipated coping in response to a dieting setback. In this task, participants were asked to imagine that they had participated in a 12-week weight loss program through which people typically lose 1-2 pounds per week. They were then asked to imagine, further, that they had not lost weight by the end of the program and had, instead, gained three pounds. Participants were asked to write a few sentences, in an open-ended format, explaining how they would feel in this situation.

Next, they completed measures of their expected avoidant coping and effortful regulation in response to this setback and their imagined expectations for dieting success in the future. Participants' expectations for avoidant coping was measured through their rated agreement with 4 statements such as "I would have given up on dieting all together" and "I would avoid weighing myself for quite some time" on scales from 1 (*strongly agree*) to 6 (*strongly disagree*). Participants' expectations regarding the more beneficial coping strategy of effortful regulation were measured through their rated agreement with 4 statements such as "I would exert more effort to exercise regularly" and "I would find new ways to stay motivated and try to lose weight." Finally, participants were asked to answer 3 questions assessing their expectations for success in future diets (e.g., "I would feel that I was likely to succeed on future diets," "I would feel positive about reaching a new dieting goal that I set.") Participanst responded to effortful regulation and expectations for success items using the same 6-point scale as described above for avoidant coping items.

Results

The Implicit Theories of Weight scale – Internal Analyses.

We conducted a principal components analysis using direct oblimin rotation to explore the factor structure of the Implicit Theories of Weight (ITW) scale. The scree plot and eigenvalues suggested two factors. The first factor had an eigenvalue of 7.40 that explained 49.33% of the variance and the second factor had an eigenvalue of 1.65 that explained 11.02% of the variance. Examination of the two factors showed that the two factors were differentiated

primarily by method artefacts, such that, with few exceptions, the fixed items were loading on the first factor and the growth items were loading on the second factor. Thus, we re-ran the principal components analysis constraining extraction to a single factor. The loadings on this single factor ranged from .55 to .84 with a mean of .70 (SD = .08). In addition, the Cronbach's alpha for this single factor is .92. Thus, after concluding that these items tap a unidimensional underlying construct of a person's implicit theory of weight, we calculated a mean score for each participant across the 15 items, reverse-scoring as necessary. Higher scores on the resultant Implicit Theories of Weight scale could range from 1 (strong endorsement of an entity or fixed view of weight) to 6 (strong endorsement of an incremental or malleable view of weight.

Descriptive statistics

In the current sample, theories of weight scores ranged from 2.73 to 6.00. The average theory of weight score, Mean = 4.58 (SD = 0.73), was significantly higher than the midpoint of the scale (3.5), $t(196) = 20.68$, $p<.001$, suggesting that, on average, participants hold views on the incremental end of the theory of weight spectrum. Consistent with this conclusion, average scores on the Burnette (2010) Implicit Theories of Weight Management scale were also significantly higher than the midpoint of the scale (3.5), Mean = 4.922 (SD=.95), $t(196) = 20.06$, $p<.001$.

We next examined whether participants' implicit theories of weight were predicted by demographic characteristics that past research has demonstrated to predict eating behavior (e.g., Block, Rosenberger, & Patterson, 1988). We found that male participants held more entity theories of weight, Mean = 4.77 (SD = .74), than female participants, Mean = 4.49 (SD = .72), $t(192) = 2.48$, $p = .014$, $d = .38$, 95% CI [.50, .06]. Before examining the relationship between theories of weight and BMI, we log-transformed BMI to correct for positive skew. Participants' theories of weight did not correlate significantly with their age, $r(193) = -.07$, $p = .319$ or log-transformed BMI, $r(194) = -.09$, $p = .215$. Additional descriptive statistics are presented in Tables 1 and 2.

Convergent and Criterion Validity of the Implicit Theories of Weight Scale

We explored the convergent validity of the Implicit Theories of Weight scale by examining its correlation with the Implicit Theories of Weight Management scale (Burnette, 2010). As predicted, the Weight Implicit Theories scale correlates highly with the Implicit Theories of Weight Management scale, $r(197)=.77$, $p<.001$, suggesting that the two scales tap a related construct.

To examine the concurrent criterion validity of the Implicit Theories of Weight scale, we drew upon past research suggesting that participants with more incremental views of weight management show less avoidant coping and more effortful regulation in response to an imaginary dieting setback than those with more entity views of weight management (Burnette, 2010). Replicating those findings using the Implicit Theories of Weight scale, participants with more incremental theories of weight reported a lower likelihood of avoidant coping, $\beta = -.47$, $t(192) = -7.32$, $p < .001$, $pr = -.47$, and a higher likelihood of effortful regulation, $\beta = .37$, $t(192) = 5.43$, $p < .001$, $pr = .37$, relative to those with stronger entity views of weight. In addition,

participants with stronger incremental views of weight were more optimistic regarding the success of future weight loss attempts after imagining a dieting setback than those with more entity views, $\beta = .39, t(189) = 5.86, p < .001, pr = .39$.

Thus, the Implicit Theories of Weight scale showed adequate reliability as a single 15-item construct with high convergent and concurrent validity, suggesting that it is an appropriate measure for use in the present investigation.

Tables 1 and 2: Descriptive and correlation tables for Pretest

Table 1: *Correlations between participants' implicit theories of weight, theories of weight management and their expected coping after an imagined dieting setback (Pretest)*

	1	2	3	4	5
1. Implicit Theories of Weight	___				
2. Theories of Weight Management scale	**.77***	___			
3. Avoidant Coping	**-.47***	**-.54***	___		
4. Effortful Regulation	**.37***	**.33***	**-.52***	___	
5. Future Expectations	**.39***	**.27***	**-.54***	**.58***	___

Note. Higher theories of weight scores indicate more incremental theories.
* indicates $p < .05$, † indicates $p < .10$

Table 2: *Descriptive statistics for participants' expected coping after an imagined dieting setback (Pretest)*

Variables	n	Mean	Std. Deviation
Avoidant Coping	194	2.99	1.42
Effortful Regulation	194	4.37	1.17
Future Expectations	194	3.81	1.54

Tables 3 and 4: Descriptive and correlation tables for Study 1

Table 3: *Correlations between participants' theories of weight, consumption of unhealthy and relatively healthy snacks, and demographic variables (Study 1)*

	1	2	3	4	5	6	7	8
1. Implicit Theories of Weight	——							
2. M&Ms calories consumed (SQRT)	**-.34***	——						
3. Raisins calories consumed (SQRT)	-.17	**-.59***	——					
4. Liking of M&Ms	-.11	**-.34***	**-.28***	——				
5. Liking of Raisins	.14	.18	-.11	-.13	——			
6. Gender	-.18	-.10	.04	-.22	-.08	——		
7. Age	.02	.08	.07	.16	-.09	.17	——	
8. BMI (Log)	.13	.06	-.13	.07	-.05	.14	-.14	——

Note. Higher theories of weight scores indicate more incremental theories. SQRT and Log refer to square root and log-transformed variables, respectively, to correct for skew. Males were coded as 1 and females were coded as 2. * indicates $p < .05$, † indicates $p < .10$

Table 4: *Descriptive Statistics for implicit theories of weight, liking of snacks, and caloric consumption variables (Study 1)*

Variables	n	Mean	Std. Deviation
Implicit Theories of Weight	73	4.49	0.61
M&M calories consumed (SQRT)	73	119.02	120.76
Raisin calories consumed (SQRT)	73	56.45	76.61
M&Ms Liking	73	3.62	1.00
Raisins Liking	73	2.90	1.15

Note. Higher theories of weight scores indicate more incremental theories.
SQRT refers to square root-transformed variables.

Tables 5 and 6: Descriptive and correlation tables for Study 2

Table 5: *Correlations between participants' theories of weight, consumption of unhealthy and relatively healthy snacks, and demographic variables (Study 2)*

	1	2	3	4	5	6	7	8	9
1. Experimental Condition	——								
2. Manipulation Check	**.34***	——							
3. M&Ms calories consumed (SQRT)	-.19†	.05	——						
4. Raisins calories consumed (SQRT)	.04	.18†	.09	——					
5. Liking of M&Ms	.17	.10	.19†	-.05	——				
6. Liking of Raisins	.14	.01	**-.20***	**.45***	.05	——			
7. Gender	-.03	-.04	.02	**-.24***	**.23***	-.15	——		
8. Age	-.10	.08	-.03	-.04	-.13	-.12	-.06	——	
9. BMI (Log)	.02	-.02	.05	.09	-.13	-.02	**-.22***	.07	——

Note. The incremental condition was coded as 1 and the entity condition as 2. Higher scores on the manipulation check item indicate more incremental theories. SQRT and Log refer to square root and log-transformed variables, respectively, to correct for skew. Males were coded as 1 and females were coded as 2. * indicates $p < .05$, † indicates $p < .10$

Table 6: *Descriptive Statistics manipulation check item, liking of snacks, and caloric consumption variables (Study 2)*

Variables	n	Mean	Std. Deviation
Manipulation Check	103	3.51	1.31
M&Ms calories consumed (SQRT)	103	121.60	118.22
Raisins calories consumed (SQRT)	103	33.59	31.71
M&Ms likability	104	3.64	.91
Raisins likability	104	3.00	1.14

Note. Higher scores on the manipulation check item indicate more incremental theories. SQRT refers to square root-transformed variables.

Tables 7, 8, & 9: Descriptive, correlation, and analysis comparison tables for Study 3

Table 7: *correlations between participants' theories of weight, nutrition self-efficacy, estimated percent energy from fat, and demographics variables. (Study 3)*

	1	2	3	4	5	6
1. Implicit Theories of Weight	——					
2. Nutrition self-efficacy	**.46***	——				
3. Percent energy from fat	-.10	**-.22***	——			
4. Gender	-.12†	-.06	.01	——		
5. Age	**-.26***	-.06	-.07	**.21***	——	
6. BMI (Log)	**-.18***	**-.25***	**.16***	.01	.13	——

Note. Higher theories of weight scores indicate more incremental theories. Log refers to a log-transformed variable to correct for skew. Males were coded as 1 and females were coded as 2.
* indicates $p < .05$, † indicates $p < .10$

Table 8: *Study 3: Descriptive Statistics for implicit theories of weight, nutrition self-efficacy, and estimated percent energy from fat.*

Variables	n	Mean	Std. Deviation
Implicit Theories of Weight	199	4.81	0.77
Nutrition self-efficacy	199	3.07	0.74
Percent energy from fat	199	31.53%	3.83%

Note. Higher theories of weight scores indicate more incremental theories.

Table 9: The total, indirect, and direct effect of theories of weight on participants' percent energy from fat in three analytic plans.

	Analyses Set A. covariate: none time exclusion: not applied n=199	Analyses Set B. covariate: none time exclusion: applied n=136	Analyses Set C. covariate: BMI (log) time exclusion: not applied n=194
The total effect of weight theories on percentage energy from fat. (H_1)	B = -.51, CI [-1.31, .24]	B = -.70, CI [-1.47, .02]	B = -.51, CI [-1.32, .23]
The indirect effect of weight theories on percent energy from fat through self-efficacy (H_3)	B = -.52, CI [-.96, -.17]	B = -.53, CI [-1.01, -.16]	B = -.45, 95% CI [-.88, -.13]
The effect of theories of weight on self-efficacy (H_2)	B = .44 CI [.32, .56]	B = .37, CI [.70, 2.03]	B = .40, 95% CI [.28, .52]
The effect of self-efficacy on percent energy from fat	B = -1.17 CI [-1.98, -.36]	B = -1.17, CI [-1.03, -.70]	B = -1.12 CI [-1.94, -.31]
Remaining direct effect of theories of weight on percentage energy from fat.	B = .01, CI [-.76, .78]	B = -.17, CI [-1.03, .70]	B = -.05, CI [-0.82, .71]

Note:

Analyses Set A shows the total, direct and indirect effects (with individual paths) of theories of weight on percent energy from fat using the analytic plan described in the main paper. The results in this column are identical to those reported in Study 3 and are included in this table for ease of comparison.

Analyses Set B: As explained in Footnote 2 of the paper, we chose not to apply one exclusion criterion from our preregistered plan—a plan to exclude participants who completed the study in less than 5 minutes—because doing so would have excluded nearly one third of our sample. Column B shows that we would draw identical conclusions from a parallel set of analyses in which the timing exclusion was applied.

Analyses Set C: As explained in Footnote 3 of the paper, log-transformed BMI correlated both with our IV (theories of weight) and our DV (percent energy from fat) in Study 3. Column 3 shows that controlling for BMI, in a sample without the timing exclusion applied, would lead to the same conclusions as those drawn from the analyses described in the main paper.

Supplemental Material References

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