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Resisting Everything Except Temptation:

Evidence for Domain-Specific and Domain-General Aspects of Impulsive Behavior

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Abstract

Impulsivity is often assumed to be stable across domains despite the common observation that individuals act impulsively in some situations but not in others. We propose a model of self-control that predicts both domain-general and domain-specific variance in behavior. Using a novel self-report measure of the frequency of engaging in a range of impulsive behaviors, we found impulsive behaviors clustered into six domains: work, interpersonal relationships, drug, food, exercise, and finances. In support of domain-general mechanisms in impulsivity, domain-specific subscales were moderately intercorrelated (average *r*s from .26 to .30) across three separate samples of adults. In support of domain-specificity, the variance of impulsive behavior across domains within individuals was six times greater than the variance in average impulsive behavior between individuals. The variance in behavior within individuals across domains was explained more by the degree to which they were tempted by the activity than by their assessment of the harm associated with it. In a fourth study, we recruited targeted subsamples to confirm that individuals highly tempted in one domain are not likely to be more tempted in others.

Resisting Everything Except Temptation: Evidence for Domain-Specific and Domain-General Aspects of Impulsive Behavior

"I can resist everything except temptation."

–Oscar Wilde (1893)

On March 12, 2008, Eliot Spitzer resigned as Governor of New York. Two days earlier, the *New York Times* had broken the story that Spitzer was a frequent client of a high-priced prostitute service. The news was particularly sensational given Spitzer's public commitment to ethics and integrity—and also his immaculate resume, which included graduating Phi Beta Kappa from Princeton University, serving as an editor for the *Harvard Law Review*, and prosecuting white collar crime as New York State Attorney General. By all accounts, Spitzer had a sound work ethic. He did not smoke, do drugs, or drink heavily. In physical appearance, Spitzer was neatly dressed, trim, and fit. Thus, it seems that Eliot Spitzer epitomized self-control in most domains. Yet, obviously, he was impulsive when it came to sex.

How do we explain Eliot Spitzer? Is he a paragon of self-control or the epitome of impulsivity? The example of Spitzer—and simple common observation—suggests that impulsive behavior varies dramatically by type of situation. An extreme view is that behavior depends *entirely* on the situation and that there are no domain-general individual differences in impulsive behavior. That is, individuals do not vary in their overall tendency to engage in behaviors that are gratifying in the short-term yet costly and regrettable in the long-term.

Three substantial bodies of empirical evidence argue convincingly against this extreme view. First, Baumeister and colleagues have shown that psychological resources that enable an individual to inhibit impulsive behaviors seem both finite and domain-general (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Baumeister, Vohs, & Tice, 2007; Muraven & Baumeister, 2000). In a typical experiment, exerting self-control in one domain is shown to impair

subsequent attempts to exercise self-control in other domains. For instance, suppressing emotions diminishes physical stamina, suppressing an unwanted thought decreases the ability to suppress emotions, and abstaining from warm chocolate chip cookies reduces persistence in working on problem-solving tasks (Baumeister et al., 1998; Muraven, Tice, & Baumeister, 1998).

Second, personality psychologists who study impulsivity have succeeded in predicting theoretically relevant outcomes using context-free questionnaire items such as "I am self-disciplined" (e.g., Duckworth & Seligman, 2005; Eysenck, Pearson, Easting, & Allsopp, 1985; Patton, Stanford, & Barratt, 1995; White et al., 1994). Moreover, responses of a target subject are relatively stable across time and tend to correlate positively and significantly with the responses of friends and other informants. Collectively, the evidence from the personality literature suggests that it is a legitimate enterprise to characterize people by individual differences in overall (i.e., domain-general) impulsive behavior (Buss, 1989; Epstein, 1979).

Finally, Mischel and colleagues have shown in a series of experiments that self-control in young children is facilitated by domain-general cognitive and behavioral strategies (Mischel & Mendoza-Denton, 2003). In the preschool delay of gratification task, strategies shown to make waiting easier include selectively attending to aspects of the situation that are not related to the temptation (e.g., looking away from the marshmallow) and transforming the mental representation of the temptation into a less arousing one (e.g., pretending the marshmallow is fluffy white cloud). These strategies reduce the hedonic pull of temptations and, at least in theory, should be deployable in any domain. More generally, strategies that allow the individual to manipulate the content or level of abstraction of mental representations make it easier to resist temptation (Carlson & Beck, in press; Fujita & Han, 2009; Fujita, Henderson, Eng, Trope, &

Liberman, 2006; Fujita, Trope, Liberman, & Levin-Sagi, 2006; Trope & Liberman, 2003) Hence, *ceteris paribus*, individuals equipped with these strategies would be expected to be more self-controlled across all domains.

If…then Situation-Behavior Signatures

And, yet, Elliot Spitzer and many less famous individuals defy easy categorization as either impulsive or self-controlled. Personality traits, including impulsivity, are typically defined as stable patterns of behaving, thinking, and feeling that are relatively consistent across time and situation. Whereas some psychologists specify that traits are stable patterns of behavior over certain *types* of situations, rather than *all* situations (Bandura, 2006), in practice, most personality questionnaire items do not, in fact, explicitly specify types of contexts. The omission of explicit target situations requires the respondent to consider his overall level of behavior. One can imagine a respondent whose self-control is prodigious when it comes to finishing work assignments on time but minimal when it comes to kicking a smoking habit; faced with a question on his overall level of self-control, this individual might say "moderate."

Mischel and Shoda (1995) have pointed out that such practices implicitly treat domain-specific deviations from mean levels of behavior as noise. Further, Mischel, Shoda, and Mendoza-Denton (2002) observe that "the data over the course of a century…[make] it increasingly evident that the individual's behavior on any dimension varies considerably across different types of situations" (p. 50). A gambler might not be as risk-loving in romantic relationships as he is with his money, the executive who is aggressive at the office may be docile at home, and the child who is sociable with friends may be reserved with her family. We agree with Mischel, Shoda, and colleagues that the search for consistency in behavior lies not in the negation of the situation but in its active study. Specifically, people can be characterized by

distinctive and stable patterns of situation-behavior relations; personality is to be found in patterns of behavior that are stable not across *all* situations but, rather, certain *types* of situations (Mischel, 2004). Domain-specific "if-then" profiles of behavior patterns (e.g., if Spitzer is in the sex domain, then he is likely to give into temptation, but if he is in the work-ethic domain, then he is likely to act self-controlled) should improve predictive validity and, more importantly, make possible a more nuanced and accurate understanding of individual differences in impulsivity.

A model of impulsive behavior inspired by research on domain-specific risk-taking behavior

Our model of impulsive behavior begins with the assumption that the individual is faced with two mutually exclusive options. Typically, one choice brings immediate enjoyment with deferred harmful consequences (e.g., eating a big piece of chocolate cake right now brings immediate pleasure but also regret and worse health later on), whereas the other choice brings greater utility but only after some delay (e.g., not eating the cake brings no pleasure now but better physical health later on). Deciding between indulgence and abstinence requires a subjective evaluation of the pleasure associated with the available temptation as well as some consideration of the attendant long-term consequences (i.e., harm).

We suggest that both subjective temptation and subjective harm are domain-specific, whereas willpower resources and strategies are domain-general. Consistent with the theoretical and empirical work by Baumeister and colleagues, we assume the processes that underpin the inhibition of impulses to rely on resources that are finite and therefore judiciously allocated. The "cost" of resisting any temptation can be dramatically reduced by cognitive and behavioral strategies (e.g., mental transformation). Thus, our model predicts both domain-general and domain-specific variance in self-control. Individuals who are more self-controlled, generally,

than others have more self-control resources to deploy and more effective strategies for reducing the cost of resisting temptation. In contrast, an individual's observed level of self-control will vary across domains as a function of his or her idiosyncratic, domain-specific subjective evaluations of temptation and perceived harm:

$$\text{Impulsive behavior} = \beta_0 + \beta_1(\text{Temptation}) + \beta_2(\text{Perceived harm}) + \varepsilon \quad (1)$$

Returning to our early example, Elliot Spitzer might have a lot of self-control resources and effective strategies for reducing the cost of resisting temptation. But, relative to other temptations that Spitzer did successfully resist, the particular improprieties which were Spitzer's undoing must have elicited exceptionally strong urges and/or been evaluated as benign.

Our model is inspired by research on domain-specificity in risk-taking by Weber and colleagues (Weber, Blais, & Betz, 2002). Like most traits, risk aversion has traditionally been assumed by economists and psychologists alike to be domain-general, despite abundant empirical evidence that risk-taking behavior varies across domains (e.g., MacCrimmon & Wehrung, 1990). Weber and colleagues (2002) found that "domain differences in apparent risk taking seem to be associated primarily with differences in the perception of the activities' benefits and risks" (p. 282). Using multi-level modeling, Blais and Weber (2006) showed that within-participants variation in risk taking across 5 measured domains was about 7 times as large as between-participants variation.

The Present Studies

The goals of this investigation were to a) examine evidence for domain-specificity and domain-generality in impulsive behavior and b) explain within-individual variance across domains as a function of the perceived cost and benefit of impulsive behavior. In Study 1, we developed the Domain-Specific Impulsivity Scale (DSIS), administered the DSIS to a large

sample of undergraduates, and conducted exploratory and confirmatory factor analyses to assess the dimensionality of the scale. In Study 2, we refined the DSIS and replicated our findings in a national Internet sample of adults. In Study 3, we tested the hypothesis that variance in domain-specific impulsive behavior could be explained by temptation and perceived harm. In Study 4, we used targeted subsamples to confirm that individuals who are highly tempted in one domain (e.g., dieters in the food domain) are only moderately tempted in other domains (e.g., financial).

Study 1

In Study 1, we developed and validated a novel self-report questionnaire of domain-specific impulsive behavior called the DSIS. We used exploratory and confirmatory factor analyses to test the hypothesis that impulsive behavior is multi-dimensional. To establish convergent validity, we analyzed correlations between impulsive behavior in each domain and a domain-general self-control scale, and to test criterion-related validity, we analyzed correlations between domain-specific impulsive behavior and measures of academic achievement, social relations, and physical health.

We predicted that (1) exploratory factor analyses would produce domain-specific factors; (2) confirmatory factor analyses would demonstrate that a domain-specific model with multiple factors fits the data better than a domain-general one-factor model; (3) impulsive behavior within each domain would show convergent validity with a widely-used self-control scale (reverse-scored); (4) domain-specific impulsive behavior would show convergent validity with outcomes theoretically predicted to vary with specific domains (e.g., work ethic with GPA); and (5) domain-specific impulsive behavior would provide incremental predictive validity over domain-general self-control in predicting theoretically-relevant outcomes.

Method

Participants

In Fall 2007, 293 undergraduate students enrolled in psychology courses at a large, private university in the Northeast participated in this study for research experience credit (*M* = 19.5 years, *SD* = 1.3; 56.6% women). Approximately 64.5% of the participants were Caucasian, 18.1% were Asian, 5.5% were Latino, 4.4% were Black, and 7.5% were either of mixed or of other ethnic backgrounds.

Procedure and Measures

In November 2007, we posted this study online and advertised it on the psychology department's subject pool website as a survey of personality and behavior. To obviate order effects, we randomized the sequence of DSIS items for each participant. In addition to the DSIS items, participants completed a domain-general measure of self-control and answered questions about their physical health, social relationships, demographic characteristics, and GPA.

Domain-Specific Impulsive Behavior. Sixty-eight items were generated in ten domains of impulsivity: alcohol, emotion, exercise, finance, food, relationship, media, sex, smoking, and work ethic. Forty-six items were from an unpublished pilot study by Duckworth (2006). The additional 22 items and the identification of domains were based on a literature review and focus group discussions. The DSIS instructed participants to "indicate the likelihood of engaging in the following" on a 5-point scale ranging from 1 = *Very unlikely* to 5 = *Very likely* (see Appendix for the full set of instructions).

Domain-General Self-Control. The Brief Self-Control Scale (BSCS Tangney, Baumeister, & Boone, 2004) is a 13-item self-report questionnaire. Participants rate how well each item (e.g., "I am good at resisting temptation.") describes them on a 5-point scale ranging from 1 = *Not at all like me* to 5 = *Very much like me*. The observed internal reliability was .84.

Health and social relations. We included three questions to assess physical health—"I am healthy," "I am in great physical shape," and "Physically, I feel great"—and three questions to assess social relations—"People like me," "I have a lot of friends," and "I get along well with others." The three health items had an internal reliability coefficient of .86, and the three social relations items had an internal reliability coefficient of .83.

Results and Discussion

Factor Analyses

We reduced the number of items to 50 (see Table 1 for the final set of items) by removing items that either had less than a .40 corrected item-total correlation within their subscale or were theoretically expected to load in more than one domain (e.g., "watching pornographic movies" was related to both sex and media). Exploratory factor analyses on this set of 50 items suggested six domain-specific factors, which were interpretable as impulsive behavior in the work ethic, relationship, drug, food, exercise, and finance domains. We used the squared multiple correlation (SMC) method to compute the prior communality estimates, set the factor loading criteria at .40, and used an orthogonal varimax rotation. We used a combination of scree and parallel tests, the Kaiser criterion, the Minimum Average Partial (MAP) criterion, and interpretability of the factors to determine the number of factors to extract. The final solution is shown in Table 1, and subscale means, standard deviations, and intercorrelations are in Table 2.[1]

We used confirmatory factor analysis to compare the fit of a six-factor model to a one-factor model. In the six-factor model, items were allowed to load freely on their respective factor (domain), the factor loadings with other factors were set to zero, and the covariances among the factors were freely estimated. In the one-factor model, all items were allowed to load freely on a single factor. In both models, the factors were scaled by setting the variance to equal 1.0.

Fit indices suggested acceptable fit to the data for the six-factor model: $\chi^2(1160, N = 293) = 3{,}057.09$, $p < .001$; RMSEA = .075 (90% confidence interval = .072 to .078); CFI = .78; and SRMR= .08 (see Kline, 2004 for a discussion of fit indices).[2] All of the fit statistics were substantially worse in the one-factor model: $\chi^2(1175, N = 293) = 6{,}662.09$, $p < .001$; RMSEA = .126 (90% confidence interval = .124 to .129); CFI = .36; SRMR = .13. A chi-square difference test indicated that a domain-specific six-factor model fit the data better than a domain-general one-factor model, $\chi^2(15, N = 293) = 3{,}605$, $p < .001$.

DSIS Criterion and Incremental Predictive Validity

As predicted, domain-general self-control was significantly negatively correlated with impulsive behavior within each of the six domains, *r*s from -.26 to -.64, *p*s < .001. (see Table 2). We also predicted that impulsive (lack of) work ethic behavior would correlate negatively with GPA, impulsive relationship behavior would correlate negatively with social relations, and impulsive (lack of) exercise and food behavior would correlate negatively with health. As shown in Table 2, the results supported our predictions.

Partial correlations demonstrated that domain-specific impulsive behavior provided incremental predictive validity over domain-general self-control in predicting theoretically relevant outcomes in three out of four analyses. Domain-specific impulsive relationship, *pr* = -.14, $p < .05$, food, *pr* = -.17, $p < .01$, and exercise behavior, *pr* = -.43, $p < .001$, predicted social relations (for the relation domain) and health (for the food and exercise domains) when controlling for domain-general self-control. Impulsive (lack of) work ethic behavior did not predict GPA when controlling for domain-general self-control, *pr* = .01, *ns*. This occurred because of the relatively large amount of variance shared between the work ethic subscale and the self-control scale ($r^2 = .41$).

Study 2

Study 1 provided preliminary support for both domain-specific and domain-general individual differences in impulsive behavior. In Study 2, we replicated and extended our findings in a large sample of adults recruited through the Internet. We revised the DSIS instructions so that participants were asked to "indicate how often you do the following" on a 5-point scale ranging from 1 = *Never* to 5 = *Very often* instead of the more hypothetical "indicate the likelihood of engaging in the following." We revised the DSIS so that the remaining items represented more concrete or observable behavior and were less ambiguous and complex. When possible, we revised common initial verbs (e.g., "eating" for the food items) to decrease inflated common source variance. The full set of revised items is presented in Table 3.

Method

Participants

From February 2008 to June 2009, 1486 adults participated in this study (M = 41.1 years, SD = 12.7; 79.2% women). Approximately 79.9% of the participants were Caucasian, 7.5% were Asian, 5% were Latino, 3.6% were Black, and 4% were either of mixed or of other ethnic backgrounds.

Procedure and Measures

In February 2008, we posted this study online and set up a link on the www.authentichappiness.com website inviting visitors to participate in research on domain-specific self-control. This noncommercial website provides free information about psychology research, access to self-report measures, and opportunities to participate in research. To obviate order effects, the sequence of DSIS items were randomized for each participant. In addition to the DSIS items, participants filled out the BSCS (observed α = .83) and a demographic

questionnaire, which included items about gender, ethnicity, year of birth, height, and weight. We used the height and weight information to compute Body Mass Index (BMI) scores.

Results and Discussion

Factor Analyses

Exploratory factor analysis revealed the same six factors found in Study 1 (see Table 3). Fit indices suggested an adequate fit to the data for the six-factor CFA model: $\chi^2(1209, N = 1486) = 7{,}740.65$, $p < .001$; RMSEA = .060 (90% confidence interval = .059 to .062); CFI = .82; and SRMR= .06. The fit statistics were substantially worse in the one-factor CFA model: $\chi^2(1224, N = 1486) = 23{,}130.04$, $p < .001$; RMSEA = .11 (90% confidence interval = .109 to .111); CFI = .40; and SRMR = .11. The chi-square difference test indicated that the domain-specific six-factor model fit the data better than a domain-general one-factor model, $\chi^2(15, N = 1486) = 15{,}389.39$, $p < .001$.

DSIS Criterion and Incremental Predictive Validity

Domain-general self-control was negatively correlated with impulsive behavior in each of the six domains (see Table 4). We predicted that impulsive (lack of) exercise and food behavior would correlate with BMI. As shown in Table 4, the results supported our predictions. Partial correlations demonstrated that impulsive food, $pr = .33$, $p < .001$, and exercise behavior, $pr = .32$, $p < .001$, predicted BMI when controlling for domain-general self-control.

Study 3

Studies 1 and 2 provided evidence for domain-specificity in impulsive behavior. In Study 3, we tested our theory that within-individual differences in domain-specific impulsive behaviors could be largely explained by domain-specific differences in their subjective temptation and perceived harm.

Method

Participants

In Spring 2008, 353 undergraduate students enrolled in psychology courses at a large, private university in the Northeast participated in this study for research experience credit (M = 20.3 years, SD = 2.7; 64.6% women). Approximately 59.8% of the participants were Caucasian, 19.8% were Asian, 5.9% were Latino, 4.8% were Black, and 9.7% were either of mixed or of other ethic backgrounds.

Procedure and Measures

In February 2008, we posted this study online and advertised it on the psychology department's subject pool website as a survey of personality and behavior. To avoid order effects, we randomized the sequence of DSIS items within each scale for each participant. In addition to the DSIS items, participants filled out the BSCS described in Study 1 and a demographic questionnaire.

We used the DSIS revision described in Study 2 in this study. However, in addition to the behavior scale (DSIS-B), the same set of 51 DSIS items was presented two more times with different prompts each time to gauge temptation and perceived harm. For the temptation scale (DSIS-T), participants were asked to "please rate how tempted you would be to do the following" on a 5-point scale ranging from 1 = *Not tempted at all* to 5 = *Very tempting*. For the perceived-harm scale (DSIS-H), participants were asked to "rate how bad you think the following activities are" on a 5-point scale ranging from 1 = *Not bad at all* to 5 = *Very bad*. See Appendix for the full set of instructions and anchors.

Results and Discussion

Factor Analyses

Exploratory factor analyses again produced factors interpretable as relationship, work ethic, food, exercise, finance, and drug domains (see Table 5).[3] See Table 6 for subscale means, standard deviations, and intercorrelations.

The fit indices suggested adequate fit to the data for the six-factor CFA model: $\chi^2(1209, N = 353) = 3{,}054.44$, $p < .001$; RMSEA = .066 (90% confidence interval = .063 to .069); CFI = .80; and SRMR= .07. The fit statistics were substantially worse in the one-factor CFA model: $\chi^2(1224, N = 353) = 7{,}058.43$, $p < .001$; RMSEA = .116 (90% confidence interval = .114 to .119); CFI = .36; and SRMR = .13. The chi-square difference test indicated that the domain-specific six-factor model of impulsive behavior fit the data better than a domain-general one-factor model, $\chi^2(15, N = 353) = 4{,}003.99$, $p < .001$.

Hierarchical Linear Models

Hierarchical linear models (HLM) revealed that the variance in domain-specific impulsive behavior within individuals was substantially larger (more than six times) than domain-general impulsive behavior between individuals and that temptation predicted substantially more variance in within-individual domain-specific impulsive behavior than did perceived harm. At Level 1, the outcome variable was the domain-specific behavior subscales of the DSIS, with six measures (one for each domain) nested within each participant ($N = 353$) for a total of 2,118 data points. Participants were the level-two units. Model 1 provided an estimate of the proportion of total variance within and between individuals in impulsive behavior and served as a baseline model to compare the reduction in variance among the more complex models. Subsequent models examined the amount of within-individual variance in impulsive behavior across domains explained by temptation (Model 2), harm (Model 3), and temptation and harm (Model 4). In Model 5, we added domain-general self-control as a Level 2 predictor to explain

between-individual variance in domain-general impulsive behavior and to examine whether domain-general self-control moderated the within-individual effects of temptation and perceived harm. We individual-mean centered the Level 1 predictors and grand-mean centered the Level 2 predictors (see Raudenbush & Bryk, 2002 for a discussion of centering). A summary of the five models is shown in Table 7.

In Model 1, domain-specific impulsive behavior was the outcome variable (Y_{di}) with no predictor variables. In this model, behavior in domain d for individual i (Y_{di}) is a function of the grand mean (γ_{00}), deviation from the grand mean by individual i (ζ_{0i}), and deviation from individual i's mean (β_{0i}) by domain d (ε_{di}).

Level 1 – Within individual: $Y_{di} = \pi_{0i} + \varepsilon_{di}$ (2a)

Level 2 – Between individual: $\pi_{0i} = \beta_{00} + \zeta_{0i}$ (2b)

Combined model: $Y_{di} = \beta_{00} + \zeta_{0i} + \varepsilon_{di}$ (2c)

This baseline model provides estimates of the grand mean, variance between individuals, and variance within individuals. The grand mean estimate was 2.65, which indicates that the average amount of impulsive behavior was slightly below the midpoint (3) of the 5-point scale. The intraclass correlation (ICC; $\rho = .13$) revealed that the within-individual variance in behavior across domains (.54; 87% of the total variance) was over six times larger than the between-individual variance (.08; 13% of the total variance), which indicates that most of the variance in impulsive behavior is within individuals and provides further evidence that impulsive behavior is domain-specific.[4]

In Model 2, we included temptation as a Level 1 predictor of impulsive behavior to examine the amount of variance explained by temptation alone.

Level 1 – Within individual: $Y_{di} = \pi_{0i} + \pi_{1i}(\text{Temptation}) + \varepsilon_{di}$ (3a)

Level 2 – Between individual: $\pi_{0i} = \beta_{00} + \zeta_{0i}$ (3b)

$\pi_{1i} = \beta_{10} + \zeta_{1i}$ (3c)

Combined model: $Y_{di} = \beta_{00} + \beta_{10}(\text{Temptation}) + \zeta_{0i} + \zeta_{1i}(\text{Temptation}) + \varepsilon_{di}$ (3d)

The pseudo-R^2_ε (see Singer & Willett, 2003) was .57, which indicated that adding temptation as a Level 1 predictor accounted for 57% of the within-individual variance in impulsive behavior across domains. This model also provided an estimate of the average slope (across individuals) of temptation: .58, $t(352) = 32.15$, $p < .001$, $r_{effect} = .86$.[5]

In Model 3, we removed temptation and added perceived harm as a Level 1 predictor of impulsive behavior.

Level 1 – Within individual: $Y_{di} = \pi_{0i} + \pi_{1i}(\text{Perceived harm}) + \varepsilon_{di}$ (4a)

Level 2 – Between individual: $\pi_{0i} = \beta_{00} + \zeta_{0i}$ (4b)

$\pi_{1i} = \beta_{10} + \zeta_{1i}$ (4c)

Combined model: $Y_{di} = \beta_{00} + \beta_{10}(\text{Perceived harm}) + \zeta_{0i} + \zeta_{1i}(\text{Perceived harm}) + \varepsilon_{di}$ (4d)

The pseudo-R^2_ε was .19, and the estimated average slope (across individuals) of perceived harm was -.35, $t(352) = -11.54$, $p < .001$, $r_{effect} = -.52$.

In Model 4, we added temptation and perceived harm simultaneously as Level 1 predictors of impulsive behavior.

Level 1 – Within individual: $Y_{di} = \pi_{0i} + \pi_{1i}(\text{Temptation}) + \pi_{2i}(\text{Perceived harm}) + \varepsilon_{di}$ (6a)

Level 2 – Between individual: $\pi_{0i} = \beta_{00} + \zeta_{0i}$ (5b)

$$\pi_{1i} = \beta_{10} + \zeta_{1i} \quad (5c)$$

$$\pi_{2i} = \beta_{20} + \zeta_{2i} \quad (5d)$$

Combined model: $$Y_{di} = \beta_{00} + \beta_{10}(\text{Temptation}) + \beta_{20}(\text{Perceived harm}) + \zeta_{0i} + \zeta_{1i}(\text{Temptation}) + \zeta_{2i}(\text{Perceived harm}) + \varepsilon_{di} \quad (5e)$$

The pseudo-R^2_ε was .59. The average slopes (across individuals) of temptation controlling for perceived harm, and perceived harm controlling for temptation were .53, $t(352) = 27.69$, $p < .001$, $r_{effect} = .83$, and -.10, $t(352) = -4.82$, $p < .001$, $r_{effect} = -.25$, respectively. The pseudo-R^2s, slopes, and effect sizes in Models 2, 3, and 4 confirmed that temptation was a stronger predictor of impulsive behavior than perceived harm.

In Model 5, we added self-control as a Level 2 predictor of the intercept, temptation slope, and perceived harm slope. Because the Level 1 predictors were individual-mean centered, the intercept represented each individual's average (or domain-general) level of impulsive behavior.

Level 1 – Within individual: $$Y_{di} = \pi_{0i} + \pi_{1i}(\text{Temptation}) + \pi_{2i}(\text{Perceived harm}) + \varepsilon_{di} \quad (6a)$$

Level 2 – Between individual: $$\pi_{0i} = \beta_{00} + \beta_{01}(\text{Self-control}) + \zeta_{0i} \quad (6b)$$

$$\pi_{1i} = \beta_{10} + \beta_{11}(\text{Self-control}) + \zeta_{1i} \quad (6c)$$

$$\pi_{2i} = \beta_{20} + \beta_{21}(\text{Self-control}) + \zeta_{2i} \quad (6d)$$

Combined model: $$Y_{di} = \beta_{00} + \beta_{10}(\text{Temptation}) + \beta_{20}(\text{Perceived harm}) + \beta_{01}(\text{Self-control}) + \beta_{11}(\text{Self-control x Temptation}) + \beta_{21}(\text{Self-control x Perceived harm}) + \zeta_{0i} + \zeta_{1i}(\text{Temptation}) + \zeta_{2i}(\text{Perceived harm}) + \varepsilon_{di} \quad (6e)$$

The pseudo-$R^2_{\zeta 0i}$ of .62 indicated that adding self-control as a Level 2 predictor of the Level 1 intercept accounted for approximately 62% of the domain-general variance in impulsive behavior between individuals. The slope of self-control was -.49, $t(351) = -18.84$, $p < .001$, $r_{effect} = -.71$. Between-individual domain-general self-control moderated the within-individual effects of temptation, -.08, $t(351) = -2.37$, $p < .05$, $r_{effect} = -.13$, and perceived harm, -.19, $t(351) = -5.90$, $p < .001$, $r_{effect} = -.30$, on impulsive behavior, indicating that temptation has a greater effect and perceived harm has less of an effect on impulsive behavior for individuals with low self-control.

Study 4

Collectively, the first three studies provided evidence for both domain-specific and domain-general aspects of impulsive behavior. In Study 3, we found that individuals vary dramatically in their ability to exercise self-control across domains primarily because they find some temptations more enjoyable than others. To confirm the hypothesis that temptation is highly domain-specific (i.e., that what is tempting to one individual can hold no appeal whatsoever to another), in Study 4, inspired by Hanoch, Johnson, and Wilke's (2006) study on domain specificity in participant recruitment, we recruited targeted subsamples from www.facebook.com, a social networking website.

Facebook is a free online community with over 200 million users that provides its members with tools for interacting with friends, colleagues, and family members. In addition, it allows members to connect with other individuals who share specific common interests through 30 million special interest groups. Members can find and join groups by searching their names and descriptions using key words or phrases. We expected members of targeted interest groups to deem relevant temptations to be particularly attractive or enjoyable. For instance, shopaholics

should be more tempted to engage in impulse buying but not more tempted to drink or avoid exercise.

In sum, we hypothesized that (1) targeted subsamples would be more tempted in the hypothesized domain relative to the other groups; (2) subsamples would not differ in their overall levels of temptation or on a domain-general measure of self-controlled behavior.

Method

Participants

From January to June 2009, 393 adult participants (M = 24.7 years, SD = 7.7; 77.2% women) were recruited from the work ethic domain (n = 152), the food domain (n = 61), the finance domain (n = 102), and the drug and alcohol domain (n = 78).

Procedure and Measures

We used key words and phrases[6] to identify special interest groups in four domains: work ethic (e.g., "Experts of Procrastination"), food (e.g., "Losing Weight Together"), finance (e.g., "Addicted to Shopping"), and drug and alcohol (e.g., "Wreckless Drinking"). We invited members of targeted special interest groups to participate in our study "on personality, lifestyle, and behavior" and directed them to four separate (but identical) websites. Importantly, we did not mention in our invitation or on the study website itself our interest in domain-specificity or impulsivity per se. Participants completed the DSIS-T and BSCS scales, as well as a demographic questionnaire.

Results and Discussion

As predicted, within each domain, the target group was more tempted to engage in domain-specific impulsive behavior relative to the other groups but not more tempted overall. Specifically, a 4 (domain) x 4 (group) mixed-design ANOVA predicting temptation revealed a

significant main effect for domain, $F(3, 1167) = 155.90$, $p < .001$, and a significant domain by group interaction, $F(9, 1167) = 16.51$, $p < .001$, but no effect for group, $F(3, 389) = 0.20$, $p = .90$. As summarized in Figure 1 and Tables 8 and 9, the differences between target groups and other groups were all significant and ranged from small to large in effect size.

Contrary to our prediction, the groups differed in their ratings of a domain-general self-control scale, $F(3, 356) = 7.57$, $p < .001$. Post-hoc Tukey's HSD analyses revealed that the work ethic group had significantly lower domain-general self-control scores than the finance group ($p < .001$, $d = -.60$) and the drug group ($p < .01$, $d = -.47$). The domain-general self-control scale might be biased toward the work ethic domain as four of the thirteen items are related to work ethic ("I am lazy," "I have trouble concentrating," "I am able to work effectively toward long-term goals," and "Pleasure and fun sometimes keep me from getting work done."), and the scores in the work ethic domain tended to have the largest correlation with the domain-general self-control scale (see Tables 2, 4, and 6).

Overall, these results suggest that individuals are in "impulsive-problem" groups because of domain-specific temptation. Moreover, except for the work ethic group, domain-general self-control did not distinguish the domain-specific groups.

General Discussion

This investigation provides evidence for both domain-specific and domain-general aspects of impulsive behavior. Some individuals are more self-controlled than others on average, and the tendency to be impulsive in one domain (e.g., finances) correlates with the tendency to be impulsive in other domains (e.g., food and drugs). But, it is also true that any given individual varies dramatically in how enjoyable he or she finds particular temptations, and consequently, in the relative frequency with which he or she indulges in them. In contrast, within-individual

differences in the perceived harm associated with indulging explain only minimal unique variance in within-individual differences in impulsive behavior.

When submitted to exploratory factor analysis, the scale we developed for this investigation produced distinct, interpretable factors. Likewise, domain-specific confirmatory factor models fit the data better than did domain-general (i.e., one factor) models of impulsive behavior. The DSIS subscales demonstrated convergent validity with a widely-used domain-general measure of self-control and incremental predictive validity above and beyond this domain-general measure for theoretically-relevant outcomes (e.g., impulsive behavior in the food domain predicted BMI over and beyond a domain-general self-control questionnaire). In Study 3, the ICC from the baseline HLM revealed that the within-individual variance in impulsive behavior across domains (i.e., domain-specific behavior) was more than six times larger than the domain-general variance across individuals.

Our findings also provide evidence of a domain-general aspect of impulsivity. The average correlations among the six DSIS behavior subscales were positive and moderate in effect size, *r*s from = .26 to .30. Consistent with the prediction that standard personality questionnaires essentially ask respondents to mentally "average" their behavior across situations and make a summative judgment, DSIS behavior subscales were each correlated with a domain-general measure of self-control, *r*s ranged from -.26 to -.69, average $r = -.44$.

Individuals behaved more impulsively in domains that they found tempting and, to a much lesser extent, resisted vices they perceived as harmful. Specifically, domain-specific temptation explained 40% of the unique within-individual variance in impulsive behavior across domains compared to 2% for perceived harm. As expected, temptation had a weaker effect and perceived harm had a stronger effect for individuals with higher self-control. That is, more self-

controlled individuals are better at overcoming their idiosyncratic temptations and refraining from behaviors they deem harmful.

Why does perceived harm account for relatively little variance in impulsive behavior? Metcalfe & Mischel (1999) proposed that there are two systems that influence impulsivity: a *hot* emotional system that is fast and reflexive and a *cool* cognitive system that is slow and reflective. Visceral hot influences can have powerful effects that overwhelm the cool system (Loewenstein, 1996), so if temptation reflects the hot system and perceived harm reflects the cool system, then temptation may have a greater influence on impulsive behavior than does perceived harm. Another explanation is that individuals may generally be more consistent in evaluating harm versus temptation. Thus, there may be relatively little variance in perceived harm to explain variance in impulsive behavior. Indeed, in Study 3, estimates for the within-individual variance across domains were .82 for temptation and .46 for perceived harm (in separate HLM models analogous to Model 1 but with temptation and perceived harm as outcomes instead of behavior; results not reported).

While it is conceivable that there are domain-specific impulse-control systems, this study suggests that domain-general self-control combined with domain-specific temptation can give rise to domain-specific impulsive behavior. This is congruent with Mischel's (1973) proposal that an individual's "inconsistent" behavior across domains is a function of the individual's construal of the situation. If an individual subjectively perceives temptation to be high (or harm to be low), then that individual is more likely to engage in impulsive behavior.

Limitations

Three major sets of limitations must be noted. First, this investigation relied exclusively on self-report questionnaires, which are susceptible to response biases, such as social desirability

and acquiescence (Paulhus, 1991). Although these biases could inflate correlations between scales, they could also increase the difficulty of finding distinct factors as EFA depends on differential variance. Another issue is that the relationship between self-report behavior and attitudes may be inflated (Bem, 1967). For example, if an individual says that she eats fried food often, and then is asked if she likes fried food, then she might decide (perhaps unconsciously) that she must like fried food if she eats it often. Finally, the scale anchors (e.g., "very tempting") were subjective and open to interpretation. Because these are common limitations to questionnaire-based research, further studies should investigate domain-specific impulsivity through alternative methods, such as the temporal discounting paradigm.

The second major set of limitations pertains to content-related validity. Although we strived to include a broad sample, the items in this investigation were not an exhaustive set of impulsive behaviors, and domains might have been excluded. Because the results of exploratory factor analyses are dependent on the included items, researchers with different items might obtain different results. Consequently, these results must be interpreted with caution as a study using a different set of items might not find coherent domain-specific factors.

Finally, these studies were cross-sectional and correlational in design. Future studies should use longitudinal designs to establish true predictive relationships between the DSIS and theoretically-relevant behavior. Likewise, experimental studies that manipulate temptation or perceived harm should be conducted to establish causal relationships with impulsive behavior.

Implications

In their landmark study addressing domain-specificity, Mischel and colleagues asserted, "By addressing not only the average level of behavior (e.g., overall agreeableness) but also when, where, and with whom it occurs, one can see the individual's distinctive coherent, and

systematic patterns of behavior variation and glimpse the psychological processes and person variables that underlie them" (Shoda, Mischel, & Wright, 1994, p. 686). As Shoda et al. (1994), Weber et al. (2002), and the current investigation have demonstrated, psychologically-salient aspects of the domain can to a large extent explain variance in domain-specific behavior. Whereas the standard practice of averaging across domains can obscure important individual differences (Mischel et al., 2002), examining the domains as variables of interest can provide a more nuanced view of personality. Instead of viewing domain-specific variance as error, personality researchers should seek to quantify and explain variance across domains.

We agree with Epstein and O'Brien's (1985) assertion that "behavior is unquestionably to some extent general and to some extent specific, and one can choose to study one aspect or the other" (p. 513). Unfortunately, researchers most often choose to study the first aspect and disregard the latter entirely. As demonstrated in this investigation, examining domain-specific aspects of behavior revealed that the influence of context on behavior is both substantial and systematic. In addition, domain-specific impulsive behavior provided incremental predictive validity in predicting theoretically-relevant outcomes over and beyond domain-general self-control.

Although we place special emphasis on domain-specificity, we do not wish to downplay the importance of domain-general processes. Indeed, in support of Baumeister's theory, this investigation demonstrated the value of domain-general self-control in predicting impulsive behavior over a diverse range of domains. Both aspects are important. We accentuate the domain-specific aspect because it has largely been ignored. Although interest in domain-specificity has been increasing (e.g., Goldstein & Weber, 1997; Shoda et al., 1994; Weber et al., 2002), empirical domain-specific studies are still rare. In order to obtain a more complete

understanding of personality, domain-specificity must be accounted for instead of ignored. While the existing research is enlightening, more studies that address domain-specificity are needed.

Conclusion

This investigation presented evidence for domain-specific aspects of impulsive behavior and showed that the average individual's impulsive behavior across domains is dramatically more variable than impulsive behavior among individuals. In addition, we provide an explanation for the variation in impulsive behavior within individuals across domains: domain-specific impulsive behavior is a result of domain-specific costs and benefits.

So, why was Eliot Spitzer impulsive when it came to sex but self-controlled in other domains? While there are several plausible explanations that are not mutually exclusive (e.g., Sternberg, 2004), this investigation suggests that Spitzer was more tempted to engage in impulsive sexual behavior than to procrastinate, lose his temper, or take drugs. As Oscar Wilde's quote suggests, Spitzer could resist everything but temptation.

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Appendix

Domain-Specific Impulsivity Scale Instructions

Domain-Specific Impulsivity Scale Instructions in Study 1

Please answer the following items as they apply to you. On a scale from 1 to 5—ranging from 1 being "Very unlikely" to 5 being "Very likely"—please indicate the **likelihood of engaging in the following**:

1	2	3	4	5
Very unlikely	Unlikely	Somewhat likely	Likely	Very Likely

Revised Domain-Specific Impulsivity Scale Instructions in Studies 2 and 3

On the following scale, please rate **how often you do the following activities**:

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

Domain-Specific Impulsivity Scale Instructions for Temptation and Perceived Harm Scales in Study 3

How much would you enjoy the following activities *if there were no long-term consequences for yourself or anyone else*? That is, how attracted are you to these activities regardless of how harmful you might think they are. On the following scale, **please rate how tempted you would be to do the following activities**:

1	2	3	4	5
Not tempted at all	| Somewhat tempted	Moderately tempted	| Tempted	Very tempted

How important is it to you to *avoid* the following behaviors? That is, how harmful to yourself or others do you think the following behaviors are? On the following scale, **please rate how bad you think the following activities are**:

1	2	3	4	5
Not bad at all	| Somewhat bad	Moderately bad	| Bad	Very bad

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Footnotes

[1]We replaced subscale (e.g., food behavior subscale) and outcome (e.g., GPA) outliers, defined as scores greater than 3.29 standard deviations from the mean, with the closest score that was not greater than 3.29 standard deviations from the mean (<1% of the scores). Kline (2004) noted that absolute values of the skew index greater than 3.0 is considered extreme and that a kurtosis index greater than 10.0 may suggest a problem. All of the subscales and outcomes had skew and kurtosis indices that were less than 2.0.

[2]CFI values over .90 indicate a good fit; however, Kenny and McCoach (2003) note that "the CFI tend[s] to demonstrate worse fit as the number of variables in the model increases…Therefore, it appears that the CFI…do[es] not function well with correctly specified models that include a large number of variables" (p. 349). Kenny and McCoach's "large" model had 40 variables; the current model had 50.

[3]On the DSIS-H, the exercise items failed to load on their own factor. Three items—"Being sedentary," "Avoiding physical exercise," and "Avoiding working out (e.g., jogging, going to the gym, etc.)"—loaded on the work ethic factor, and two items—"Avoiding physical exercise," and "Avoiding working out (e.g., jogging, going to the gym, etc.)—loaded on the food factor. We considered factor six to be the exercise factor because the exercise items as a group had the highest factor loadings (.24-.38) on that factor. Moreover, three of the four exercise items loaded on factor six in an oblique promax (k = 5) solution. The full factor loading tables are available from the first author.

[4]This estimate of the Level 1 (within-individual across domain) variance includes measurement error. To examine the effects of measurement error, we fit a structural equation model that corresponded to Model 1 but used a measurement model instead of the observed

subscale means. The Level 1 variance estimate from this model was .51 (compared to .54 for Model 1). The corresponding ICC of .14 (compared to ρ = .13 for Model 1) indicated that the within-individual variance in impulsive behavior across domains (.51; 86% of the total variance) was still over six times larger than the between-individual variance (.08; 14% of the total variance) after accounting for measurement error.

[5]Following Karney and Bradbury (1997), we used the following formula to compute the effect-size correlations: $r_{effect} = \sqrt{[t^2/(t^2 + df)]}$.

[6]Key terms used to identify special interest groups included the following -- work ethic: *procrastinators, procrastination*; food: *dieters, binge eaters, weight loss, I love eating, I eat too much*; finance: *shopaholics, shopping addiction, I love shopping*; and drug and alcohol: *alcoholics, drinking, binge drinking, alcohol, beer, shots, black out.*

Table 1

Factor Loadings, Subscale Corrected Item-Total Correlations, and Subscale Alphas for Six-Factor Solution with Orthogonal Varimax Rotation for the Domain-Specific Impulsivity Scale in Study 1

Item	Factor loading						Item-total *r*	Subscale α
	1	2	3	4	5	6		
Work ethic								.91
Procrastinating	**.80**	.05	.00	.14	.06	.07	.69	
Doing my work at the last minute	**.76**	.02	.05	.09	-.01	.08	.63	
Wasting time in general	**.76**	.13	-.01	.18	.22	.05	.76	
Letting responsibilities pile up	**.73**	.19	.14	.06	.09	.11	.70	
Sitting around when I have work to do	**.72**	.12	.05	.14	.33	.09	.77	
Being lazy when I have something to do	**.69**	.12	.06	.16	.33	.04	.75	
Being inactive when I have work to do	**.65**	.12	.04	.11	**.49**	.02	.74	
Giving in to distractions	**.64**	.16	-.01	.17	.12	.10	.66	
Giving up when I get bored	.39	.35	-.01	.05	.25	.07	.55	
Giving up when I get tired	.32	.34	-.01	.15	.26	.11	.51	

Giving up when I am frustrated	.31	**.43**	-.04	.14	.26	.07	.53	
Giving up when I encounter problems	.18	**.47**	.00	.13	.33	.19	.45	
Relationship								.85
Getting angry easily	.05	**.67**	.05	-.08	.05	.03	.59	
Losing my temper	.08	**.62**	.05	-.05	.01	-.08	.53	
Being overly emotional	.00	**.61**	-.06	.10	.04	.25	.57	
Behaving inappropriately when I am emotional	.15	**.58**	-.02	.06	.01	.13	.54	
Saying things I later regret	.14	**.57**	.04	.15	-.05	.12	.56	
Speaking before thinking	.18	**.57**	.08	.16	-.01	.11	.56	
Telling secrets	-.08	**.55**	.15	.10	.07	.00	.52	
Interrupting people	.00	**.50**	.14	.16	.02	.15	.51	
Breaking promises	.05	**.49**	.15	.03	.16	.02	.46	
Lying	.14	**.49**	.20	.06	.05	.01	.49	
Being greedy	.01	**.48**	.14	.06	.09	.16	.49	
Envying Others	.12	**.47**	.10	.11	.02	.25	.50	
Drug								.88

Drinking alcohol in general	.22	.04	**.82**	.09	-.16	.07	.75	
Drinking beer	.16	.02	**.81**	-.02	-.10	-.09	.75	
Drinking hard liquor	.09	.14	**.79**	.03	-.10	.10	.73	
Binge drinking	.09	.12	**.74**	-.07	-.07	.04	.71	
Smoking in general	-.10	.15	**.64**	-.08	.28	.11	.60	
Drinking wine	.06	.05	**.60**	.03	-.18	.19	.56	
Doing marijuana	.05	.18	**.59**	-.10	.23	-.06	.57	
Smoking cigarettes	-.18	.14	**.54**	-.09	.27	.10	.51	
Smoking cigars	-.17	.08	**.43**	-.09	.07	-.10	.38	
Food								.85
Eating junk food	.23	.10	.03	**.74**	.18	-.03	.71	
Eating snacks	.27	.08	-.06	**.67**	.08	.05	.67	
Eating dessert	.00	.10	-.15	**.67**	.01	.13	.61	
Eating candy	.09	.07	-.08	**.66**	.09	.13	.62	
Eating chips and other salty snacks	.19	.16	.03	**.64**	.20	.00	.62	
Eating chocolate	-.01	.02	-.09	**.59**	.03	.15	.51	

Eating fried food	.11	.18	.12	**.55**	.23	-.17	.48	
Eating more than I should	.31	.12	.03	**.41**	.01	.25	.48	
Eating when I am not hungry	.26	.26	-.03	.38	-.02	.33	.46	
Exercise								.95
Being inactive instead of working out	.28	.12	.02	.20	**.80**	.16	.90	
Being inactive instead of doing aerobic exercise	.32	.10	-.03	.21	**.77**	.16	.88	
Being sedentary instead of exercising	.32	.11	-.01	.18	**.76**	.13	.87	
Staying home instead of going to the gym	.29	.09	.01	.17	**.75**	.14	.85	
Finance								.91
Buying things when I don't really need them	.09	.14	.04	.09	.19	**.81**	.81	
Buying too many things	.15	.22	.07	.14	.12	**.79**	.82	
Buying things on impulse	.12	.29	.06	.06	.13	**.73**	.77	
Spending too much money	.11	.29	.11	.14	.13	**.70**	.76	

Note. Factor loadings .40 and greater are shown in bold.

Table 2

DSIS Subscale and Self-Control Scale Means, Standard Deviations, and Intercorrelations in Study 1

Measure	*M*	*SD*	Correlations						
			1	2	3	4	5	6	7
1. Work ethic	3.18	0.73	-						
2. Relationship	2.47	0.60	.39***	-					
3. Drug	2.32	0.87	.13*	.25***	-				
4. Food	3.19	0.75	.46***	.31***	-.01	-			
5. Exercise	3.11	1.11	.58***	.26***	.04	.39***	-		
6. Finance	2.77	0.99	.36***	.42***	.16**	.32***	.35***	-	
7. Self-Control Scale	3.01	0.62	**-.64*** **	**-.42*** **	**-.34*** **	**-.26*** **	**-.40*** **	**-.31*** **	**-**
8. GPA[a]	3.32	0.35	**-.17***	-.09	.07	-.12	-.03	-.06	.28***
9. Social Relations	4.04	0.70	-.08	**-.17****	.05	.02	-.06	.00	.12*
10. Health	3.59	0.87	-.35***	-.26***	-.06	**-.26*** **	**-.52*** **	-.19**	.40***

Note. DSIS = Domain-Specific Impulsivity Scale. Correlations shown in bold were predicted to be significant.

[a]The number of cases for GPA was reduced to 188 because the freshmen in this study did not yet have a college GPA.

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

Table 3

Factor Loadings, Subscale Corrected Item-Total Correlations, and Subscale Alphas for Six-Factor Solution with Orthogonal Varimax Rotation for the Domain-Specific Impulsivity Scale in Study 2

Item	Factor loading						Item-total *r*	Subscale α
	1	2	3	4	5	6		
Work ethic								.92
Putting off work that needs to get done	**.81**	.09	.12	.06	.05	.12	.79	
Procrastinating	**.76**	.13	.11	.02	.05	.13	.74	
Letting responsibilities pile up	**.73**	.07	.16	.10	.07	.12	.72	
Delaying the start of big projects	**.73**	.07	.09	.13	-.01	.12	.72	
Doing my work at the last minute	**.72**	.06	.17	.06	.03	.10	.71	
Doing nothing when I have work to do	**.72**	.11	.17	.11	.03	.15	.73	
Wasting time	**.71**	.12	.11	.14	.03	.20	.73	
Getting distracted from my work	**.68**	.09	.13	.18	.07	.02	.69	
Quitting when I am frustrated	**.55**	.04	.05	.33	.06	.10	.60	
Giving up when I encounter problems	**.52**	.08	.03	.31	.07	.10	.57	

Quitting when I get bored	**.50**	.06	.09	.25	.08	.05	.54	
Stopping my work when I get tired	**.45**	.09	.03	.16	.05	.04	.46	
Food								.86
Snacking on junk food	.13	**.76**	.09	.14	.01	.21	.76	
Eating snacks	.14	**.70**	.08	.13	-.07	.04	.68	
Eating candy	.07	**.65**	.05	.10	-.05	.05	.61	
Eating when I am not hungry	.17	**.64**	.14	.16	-.09	.10	.61	
Consuming more food than I should	.20	**.63**	.14	.16	-.02	.18	.62	
Eating chips and other salty snacks	.09	**.59**	.09	.10	.07	.19	.58	
Eating chocolate	.02	**.55**	.02	.01	-.12	.00	.48	
Having dessert	.02	**.54**	.05	.07	-.15	-.03	.49	
Eating fried food	.07	.39	.12	.14	.16	.26	.42	
Finance								.91
Buying a lot of things	.16	.15	**.78**	.22	.05	.03	.79	
Purchasing things when I don't really need	.20	.15	**.76**	.22	.01	.08	.78	
Buying things on impulse	.16	.10	**.76**	.20	.03	.06	.77	

Spending a lot of money	.14	.09	**.75**	.14	.11	.00	.74	
Buying things I hadn't planned to buy	.19	.13	**.75**	.19	.02	.08	.77	
Spending rather than saving my money	.19	.08	**.65**	.05	.10	.07	.65	
Relationship								.80
Losing my temper	-.01	.01	.07	**.67**	-.04	.15	.50	
Getting angry	.02	.02	.04	**.67**	-.02	.13	.49	
Complaining about my problems	.23	.12	.07	**.51**	.00	.09	.52	
Holding a grudge	.17	.10	.03	**.48**	.02	.05	.44	
Telling another person's secret	.14	.12	.12	**.47**	.10	-.02	.49	
Gossiping	.14	.21	.15	**.46**	.08	-.04	.49	
Speaking before thinking	.14	.05	.14	**.41**	.01	-.02	.42	
Taking more than my fair share[a]	.24	.23	.16	.37	.05	.02	.44	
Lying	.18	.09	.16	.35	.13	-.08	.39	
Interrupting people when they are talking	.17	.11	.11	.35	.01	.04	.40	
Breaking promises	.35	.06	.19	.31	.07	.04	.40	
Drug								.78

Getting drunk	.06	.02	.08	.06	**.82**	-.06	.74	
Binge drinking	.04	.01	.11	.08	**.73**	-.02	.65	
Drinking hard liquor	.08	.04	.03	-.01	**.66**	-.06	.58	
Drinking beer	.03	.01	-.02	.01	**.62**	-.05	.56	
Getting high on drugs	.07	-.08	.04	.08	**.51**	.08	.43	
Smoking marijuana	.06	-.08	-.03	.06	**.50**	.06	.40	
Drinking wine	-.01	.00	.02	-.07	**.47**	-.11	.39	
Smoking cigarettes	.03	-.11	.08	-.02	.37	.18	.31	
Smoking cigars	.01	-.06	.01	.06	.28	.03	.26	
Exercise								.90
Avoiding physical exercise	.26	.21	.07	.10	-.01	**.81**	.84	
Remaining physically inactive	.28	.22	.07	.08	-.01	**.77**	.82	
Avoiding working out[b]	.23	.21	.09	.06	.02	**.75**	.76	
Being sedentary	.36	.18	.04	.11	-.01	**.59**	.66	

Note. Factor loadings .40 and greater are shown in bold.

[a]The full item was "Taking more than my fair share (i.e., being greedy)." [b]The full item was "Avoiding working out (e.g., jogging, going to the gym, etc.)."

Table 4

DSIS Subscale and Self-Control Scale Means, Standard Deviations, and Intercorrelations in Study 2

Measure	*M*	*SD*	Correlations						
			1	2	3	4	5	6	7
1. Work ethic	2.97	0.71	-						
2. Relationship	2.43	0.49	.47***	-					
3. Drug	1.65	0.56	.12***	.08**	-				
4. Food	2.98	0.71	.31***	.35***	-.06*	-			
5. Exercise	3.07	1.00	.47***	.29***	.02	.41***	-		
6. Finance	2.64	0.79	.40***	.42***	.12***	.31***	.24***	-	
7. Self-Control Scale	3.27	0.65	**-.69*** **	**-.51*** **	**-.26*** **	**-.38*** **	**-.46*** **	**-.44*** **	**-**
8. BMI[a]	25.83	6.13	.11***	.09**	-.10***	**.38*** **	**.38*** **	.15***	-.23***

Note. DSIS = Domain-Specific Impulsivity Scale. Correlations shown in bold were predicted to be significant.

[a]BMI = Body Mass Index. These analyses are based on the 1436 cases that reported height and weight information.

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

Table 5

Summary of Factor Loadings, Subscale Corrected Item-Total Correlations, and Subscale Alphas for Six-Factor Solutions with Orthogonal Varimax Rotation for the Domain-Specific Impulsivity Behavior, Temptation, and Perceived Harm Scales in Study 3

Subscale / Item	Factor loading	Item-total *r*	Subscale α
Work ethic			.92 / .93 / .92
Putting off work that needs to get done	**.81 / .74 / .69**	.76 / .76 / .73	
Procrastinating	**.78 / .73 / .68**	.76 / .71 / .73	
Doing my work at the last minute	**.78 / .66 / .70**	.71 / .64 / .78	
Doing nothing when I have work to do	**.74 / .67 / .70**	.73 / .71 / .75	
Delaying the start of big projects	**.73 / .74 / .67**	.74 / .75 / .75	
Letting responsibilities pile up	**.71 / .65 / .63**	.70 / .70 / .66	
Wasting time	**.67 / .68 / .66**	.72 / .77 / .71	
Getting distracted from my work	**.62 / .68 / .68**	.69 / .71 / .74	
Quitting when I get bored	**.54 / .49 / .52**	.59 / .64 / .62	
Stopping my work when I get tired	**.46 / .53 / .42**	.52 / .67 / .50	
Quitting when I am frustrated	**.44 / .58 / .52**	.58 / .73 / .60	
Giving up when I encounter problems	.34 / **.50 / .52**	.45 / .64 / .58	
Relationship			.81 / .87 / .86
Losing my temper	**.68 / .74 / .61**	.54 / .62 / .62	
Getting angry	**.63 / .70 / .46**	.50 / .57 / .49	
Holding a grudge	**.59 / .65 / .59**	.52 / .59 / .61	

Telling another person's secret	**.54 / .61 / .69**	.54 / .64 / .59	
Lying	**.52 / .60 / .57**	.53 / .63 / .54	
Taking more than my fair share[a]	**.48 / .51 / .57**	.49 / .58 / .59	
Breaking promises	**.46 / .57 / .62**	.43 / .62 / .59	
Complaining about my problems	**.46 / .42 / .41**	.46 / .47 / .49	
Interrupting people when they are talking	.39 / **.64 / .52**	.42 / .61 / .55	
Gossiping	.39 / **.42 / .58**	.41 / .53 / .61	
Speaking before thinking	.24 / **.43** / .30	.30 / .46 / .47	
Drug			.87 / .90 / .89
Getting drunk	**.88 / .78 / .75**	.83 / .78 / .71	
Drinking hard liquor	**.82 / .74 / .75**	.78 / .76 / .72	
Binge drinking	**.78 / .74 / .60**	.74 / .71 / .60	
Drinking beer	**.70 / .71 / .72**	.64 / .66 / .71	
Smoking marijuana	**.69 / .77 / .76**	.61 / .70 / .68	
Getting high on drugs	**.68 / .76 / .72**	.61 / .70 / .66	
Drinking wine	**.59 / .60 / .59**	.57 / .63 / .62	
Smoking cigarettes	.36 / **.51 / .49**	.33 / .51 / .49	
Smoking cigars	.34 / **.49 / .64**	.34 / .49 / .64	
Food			.83 / .90 / .92
Snacking on junk food	**.74 / .75 / .76**	.70 / .79 / .83	
Eating candy	**.67 / .68 / .72**	.62 / .65 / .75	
Eating snacks	**.62 / .75 / .69**	.60 / .79 / .72	
Eating chips and other salty snacks	**.62 / .65 / .77**	.56 / .72 / .79	

Eating chocolate	**.60 / .67 / .70**	.53 / .63 / .64	
Having dessert	**.57 / .68 / .73**	.54 / .64 / .71	
Consuming more food than I should	**.44 / .54 / .59**	.46 / .63 / .69	
Eating when I am not hungry	**.43 / .51 / .58**	.44 / .59 / .66	
Eating fried food	.36 / **.47 / .69**	.35 / .53 / .73	
Exercise			.87 / .90 / .86
Avoiding physical exercise	**.82 / .82** / .35	.84 / .85 / .81	
Avoiding working out[b]	**.77 / .77** / .34	.75 / .78 / .69	
Remaining physically inactive	**.77 / .75** / .38	.80 / .80 / .74	
Being sedentary	**.51 / .55** / .25	.51 / .65 / .59	
Finance			.90 / .94 / .87
Buying a lot of things	**.79 / .78 / .57**	.78 / .85 / .69	
Purchasing things when I don't really need	**.78 / .73 / .53**	.78 / .85 / .69	
Buying things I hadn't planned to buy	**.76 / .72 / .52**	.74 / .81 / .69	
Spending a lot of money	**.74 / .74 / .58**	.71 / .81 / .66	
Buying things on impulse	**.68 / .73 / .59**	.69 / .82 / .62	
Spending rather than saving my money	**.67 / .72 / .53**	.66 / .81 / .62	

Note. Factor loadings .40 and greater are shown in bold. The full factor loading tables for each scale are available from the first author.

[a]The full item was "Taking more than my fair share (i.e., being greedy)." [b]The full item was "Avoiding working out (e.g., jogging, going to the gym, etc.)."

Table 6

Mean, Standard Deviations, and Intercorrelations for the DSIS-B and Self-Control Scale, DSIS-T, and DSIS-H in Study 3

Measure			Correlations					
DSIS-B Subscale	*M*	*SD*	1	2	3	4	5	6
1. Work ethic	3.04	0.66	-					
2. Relationship	2.50	0.46	.44***	-				
3. Drug	1.92	0.67	.09	.17**	-			
4. Food	3.06	0.61	.41***	.37***	-.04	-		
5. Exercise	2.77	0.90	.48***	.30***	-.03	.32***	-	
6. Finance	2.63	0.73	.32***	.32***	.24***	.28***	.13*	-
Self-Control Scale	3.21	0.59	-.69***	-.52***	-.34***	-.32***	-.40***	-.37***
DSIS-T Subscale			1	2	3	4	5	6
1. Work ethic	3.05	0.93	-					
2. Relationship	2.25	0.75	.56***	-				
3. Drug	2.16	0.97	.31***	.35***	-			
4. Food	3.28	0.92	.50***	.42***	.30***	-		

5. Exercise	2.59	1.14	.60***	.42***	.14*	.44***	-	
6. Finance	3.19	1.14	.54***	.43***	.43***	.50***	.28***	-
DSIS-H Subscale			1	2	3	4	5	6
1. Work ethic	3.33	0.72	-					
2. Relationship	3.39	0.64	.60***	-				
3. Drug	3.25	0.91	.41***	.32***	-			
4. Food	2.53	0.85	.43***	.45***	.33***	-		
5. Exercise	3.41	0.85	.60***	.49***	.28***	.54***	-	
6. Finance	3.04	0.75	.60***	.53***	.37***	.55***	.48***	-

Note. DSIS = Domain-Specific Impulsivity Scale. -B = Behavior. -T = Temptation. -H = Perceived harm

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

Table 7

Summary of Two-Level Hierarchical Linear Models in Study 3

Parameter	Model 1		Model 2		Model 3		Model 4		Model 5	
	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Fixed effects										
Intercept	2.65	0.02	2.65	0.02	2.65	0.02	2.65	0.02	2.65	0.02
Temptation[a]			0.58	0.02			0.53	0.02	0.53	0.02
Perceived harm[a]					-.35	0.03	-0.10	0.02	-0.11	0.02
Self-control[b]									-0.49	0.03
Self-control x Temptation[b]									-0.08	0.03
Self-control x Perceived harm[b]									-0.19	0.03
Random effects										
Between-individual variance										
Intercept	0.08		0.13		0.10		0.13		0.05	
Temptation slope			0.04				0.05		0.05	

Perceived-harm slope			0.10	0.03	0.02
Within-individual variance	0.54	0.23	0.44	0.22	0.22
Pseudo-R^2_ε		.57	.19	.59	.59

Note. All of the fixed effects and between-individual variance components were significant at $p < .001$, except for the Self-control x Temptation fixed effect in Model 5 ($p < .05$) and the variance component of the perceived-harm slope in Models 4 ($p < .05$) and 5 (*ns*).

[a]Variable was individual-mean centered. [b]Self-control was between-individual grand-mean centered.

Table 8

Group Means on the DSIS-T Subscales in Study 4

Group	Subscale (Domain)				*n*
	Work ethic	Food	Finance	Drug	
	DSIS-T				
Work ethic	3.60[a]	3.42	3.28	2.23	152
Food	3.06	3.64[a]	3.41	2.17	61
Finance	2.96	3.45	3.66[a]	2.25	102
Drug	2.92	3.19	3.33	2.88[a]	78
All	3.21	3.42	3.41	2.35	393

Note. DSIS-T = Domain-Specific Impulsivity Scale - Temptation.

[a]Mean is significantly higher ($p < .05$) than the mean of the rest of the sample in this domain.

Table 9

Group Differences in DSIS-T Subscales in Study 4

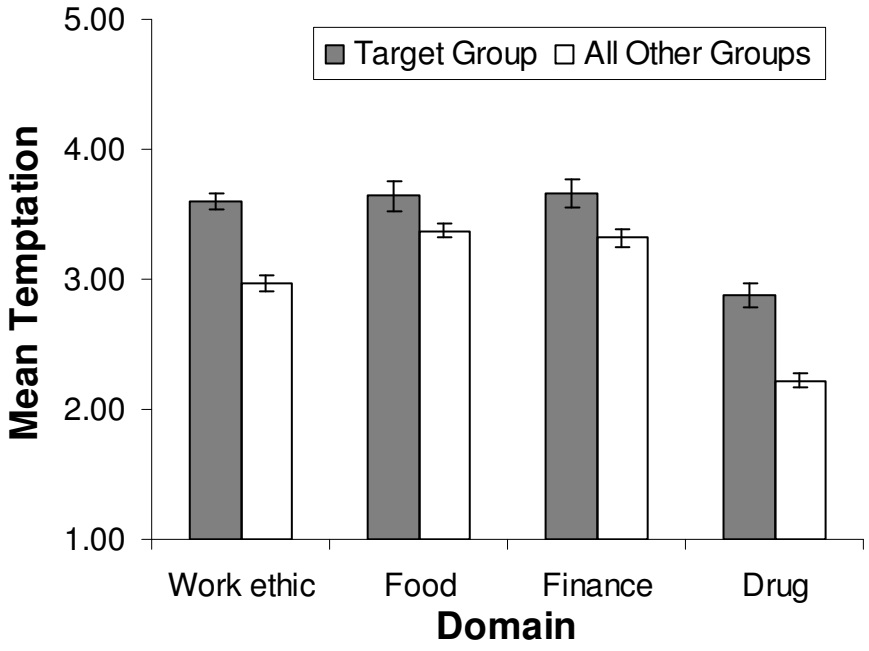
Measure	Target Group		All Other Groups		
	M	*SD*	*M*	*SD*	*d*
DSIS-T Subscale					
Work ethic	3.60	0.79	2.97	0.86	.76***
Food	3.64	0.89	3.38	0.91	.29*
Finance	3.66	1.06	3.32	1.15	.30**
Drug	2.88	0.79	2.22	0.95	.72***

Note. DSIS-T = Domain-Specific Impulsivity Scale - Temptation.

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

Figure Caption

Figure 1. Mean Temptation by domain and subgroups. Error bars represent standard errors.


5.00
4.00
3.00
2.00
1.00
Mean Temptation
Target Group
All Other Groups
Work ethic
Food
Finance
Drug
Domain