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An Assessment of Chronic Regulatory Focus Measures

by

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An Assessment of Chronic Regulatory Focus Measures

Prior consumer research has demonstrated the ability of promotion and prevention regulatory orientations to moderate a variety of consumer and marketing phenomena, but has used several different methods to measure chronic regulatory focus. This paper assesses five different chronic regulatory focus measures using criteria of theoretical coverage, internal consistency, homogeneity, stability, and predictive ability. The results reveal a lack of convergence among the measures and variation in their performance along these criteria. Specific guidance for choosing a particular measure in regulatory focus research is provided and a composite measure is suggested.

Regulatory focus theory (Higgins 1997, 1998) elaborates on the means employed by individuals for self-regulation during goal pursuit, distinguishing between two regulatory orientations: a promotion focus and a prevention focus. A promotion focus emphasizes the "ideal" self, as reflected in the individual's hopes and aspirations, and favors strategic means that are eagerness-oriented. In contrast, a prevention focus emphasizes the "ought" self, as reflected in the person's duties and obligations, and supports strategic means that are vigilance-oriented. Thus, a promotion focus emphasizes the presence of positive outcomes and minimizing "errors of omission" (e.g., missing opportunities for making progress), whereas a prevention focus favors the absence of negative outcomes and minimizing "errors of commission" (e.g., by doing something which turns out to be a mistake; Higgins 1997; Higgins and Spiegel 2004). Regulatory focus theory is increasingly used in consumer research to explain a wide range of consumer phenomena (see Pham and Higgins 2005 for a review).

As the body of regulatory focus research continues to grow, one issue which has the potential to muddle our understanding of this research area concerns the diverse operationalizations of an individual's chronic regulatory focus. Specifically, researchers have used several different approaches to measure chronic regulatory focus. We identify and study five distinct measures in the current research. Typically, when conducting a study where chronic regulatory focus is examined, researchers must choose one of these measures. However, they have little guidance on which to base their choice because prior studies have not considered how these measures overlap or vary in theoretical content, compared their psychometric properties, or explained which measure may be more suitable in one or another context of study.

We seek to shed light on this particular issue in the current research. Through a series of studies, we investigate the convergence, psychometric properties, and predictive power of measures used to assess the chronic regulatory focus of individuals. We also examine the theoretical domain covered by the measures vis-à-vis the primary postulates of regulatory focus theory. Through this analysis, our goal is to offer researchers with useful information and guidance regarding which measures they should use when conducting research involving a chronic conceptualization of regulatory focus. Much of the detailed analyses that support our conclusions are available through the Web Appendix.

REGULATORY ORIENTATIONS OF CONSUMERS

Regulatory focus theory has gained influence in psychology, marketing, and beyond, because of its ability to explain and predict a variety of psychological processes and behaviors. A key assumption underlying regulatory focus theory is that, while some individuals are chronically more promotion oriented and others are more prevention oriented, these orientations can also be activated by situational demands, such as via experimental promotion versus prevention framing (e.g., Avnet and Higgins 2006; Wang and Lee 2006; Zhou and Pham 2004). In experimental studies, tasks such as essay writing, reflecting on past experiences, reading persuasive information framed in gain/ non-gain vs. loss/ non-loss terms, and describing one’s aspirations or duties have been successfully used to activate situational regulatory orientations of participants. Previous research provides ample evidence that one or the other orientations can be chronically (trait-wise) or temporarily (situationally) more accessible to the individual (e.g., Avnet and Higgins 2006; Higgins 1997, 1998, 2000). While recognizing the importance of the consumer’s situationally accessible regulatory focus, we limit ourselves to assessing chronic regulatory focus measures in the current research.

The chronic form of regulatory focus largely derives from a person's developmental history (Higgins and Silberman 1998). Higgins (2002) explains that regulatory orientations reflect distinct and enduring concerns regarding how to get along in the world, stemming from how the person was socialized in his or her childhood. The social regulatory style of parents, for example, can emphasize either nurturance or security towards their offspring. Nurturing social regulation engenders a promotion focus in the child, marked by an enduring concern with advancement and accomplishments; security-based social regulation, in contrast, fosters a prevention focus centered on protection and responsibilities (Higgins 2002). Furthermore, Higgins (2002) posits that promotion and prevention concerns are not the end-points of a uni-dimensional, bipolar construct; rather, even though either the promotion or prevention system may be chronically more accessible than the other system for an individual, both systems coexist independently.

Regulatory Focus in Marketing Research

Regulatory focus theory has generated significant consumer and marketing research. For example, Lee and Aaker (2004) found that promotion focused consumers are more persuaded by appeals framed in terms of gains, while prevention focused participants are persuaded to a greater degree by appeals framed in terms of losses. Jain et al. (2007) found that promotion and prevention focused participants react differently to negative versus positive frames in comparative brand advertising, and Zhao and Pechmann (2007) found that antismoking advertisements are the most persuasive when the viewers' regulatory focus and the message's valence (positive or negative) are congruent. Studies have found the consumer's regulatory focus to play important roles in processes involving persuasion, self-regulation, categorization, judgment, and choice.

In other recent consumer research, applications of regulatory focus theory have emphasized the importance of regulatory fit (e.g., Avnet and Higgins 2006; Hong and Lee 2008; Wang and Lee 2006; Zhou and Pham 2004). Regulatory fit occurs when individuals derive value from using strategic means during goal pursuit that align with their underlying regulatory orientations. Specifically, when consumers engage in activities that are consistent with their regulatory orientation, they experience heightened motivation and "it just feels right" (Aaker and Lee 2006). Studies examining regulatory fit and its consequences have employed chronic as well as situational operationalizations of the consumer's regulatory focus.

The Operationalization of Chronic Regulatory Focus

A number of recent consumer research studies have employed a chronic operationalization of regulatory focus (e.g., Aaker and Lee 2001; Avnet and Higgins 2006; Herzenstein, Posavac and Brakus 2007; Pham and Avnet 2004). These studies have used at least five different measurement approaches for chronic regulatory focus assessment. Table 1 provides a summary of the measures, along with examples of prior consumer research using each scale. While there is some overlap in method of administration and content across the measures, there are also significant differences. In this section, we introduce and briefly describe each measure and then proceed to conduct an initial test of the relationship among them in Study 1.

[Insert Table 1 about here]

RFQ. Perhaps the most frequently employed scale to measure chronic regulatory focus is the 11-item Regulatory Focus Questionnaire (RFQ) developed by Higgins et al. (2001). The RFQ has six reflective items assessing chronic promotion focus and five reflective items assessing chronic prevention focus. In designing the RFQ, Higgins (2002) conceptualizes promotion and prevention success via promotion pride and prevention pride respectively, which are anticipatory reactions to new task goals derived from the individual's subjective history of past success in promotion and prevention goal attainment. The two RFQ sub-scales generally have a low correlation with one another, indicating independence.

BIS/BAS scale. A second means of assessing chronic regulatory focus is the BIS/BAS scale developed by Carver and White (1994) to assess Gray's (1990) regulatory systems. These systems include the behavioral inhibition system (BIS) sensitive to negative outcomes, and the behavioral activation system (BAS) responsive to positive outcomes. The seven BIS items (operationalizing prevention focus) reflect concerns regarding the possibility of a negative occurrence or sensitivity to such events when they do occur. The five BAS items[1] reflect the individual's responsiveness to rewards, measured via excitement tendencies or arousal associated with positive experiences.

Selves questionnaire. The third chronic regulatory focus measure employs the Higgins et al. (1986) Selves Questionnaire. It assesses the degrees of congruency between people's actual selves, their ideal selves, and their ought selves. These three selves represent the attributes people believe they possess, the attributes they aspire to possess, and the attributes they perceive as their duty to possess, respectively (Pham and Avnet 2004). Promotion focus is represented by the degree of congruence between individuals' actual and ideal selves, while prevention focus is represented by convergence between actual and ought selves (Brockner et al. 2002).

In the most commonly used approach of administering the Selves Questionnaire, study participants provide six different attributes that they either would like to possess (ideal attributes) or think that they should possess (ought attributes) in a random order. After each ideal attribute, participants are asked the extent to which they would like to possess the attribute (ideal rating)

[1] Note that in the original BIS/BAS scale (Carver and White 1994), BAS had three dimensions: BAS Reward Responsiveness, BAS Drive, and BAS Fun Seeking. However, consistent with previous regulatory focus theory research (e.g., Dholakia et al. 2006), we use the BAS Reward Responsiveness measure throughout our research.

while after each ought attribute, they are asked the extent to which they should possess the attribute (ought rating). Then, for all six attributes, participants indicate the degree to which they currently possess that attribute (actual rating). Differences between actual ratings and either ideal or ought ratings are calculated for each attribute. Difference scores of ideal and actual ratings are summed to obtain the measure of promotion focus and difference scores of ought and actual ratings are summed to obtain the prevention focus measure (see also Brockner et al. 2002; Higgins, Shah, and Friedman 1997; Pham and Avnet 2004). We employed this assessment approach in our studies.

Using a somewhat different approach, Avnet and Higgins (2006) computed two scores based upon the match between actual and ideal attributes, and actual and ought attributes, as scored by independent raters. Study participants were considered to have a promotion orientation if their actual-ideal congruency score was higher than the actual-ought congruency score, and a prevention orientation otherwise. This approach collapsed promotion and prevention focus into a single bipolar dimension.

Self-guide strength measure. The fourth approach measures the chronic accessibility of the individual's ideals and oughts, employing latencies of responses given by study participants in the Selves Questionnaire as measures of strength of the respective regulatory focus (Shah, Higgins, and Friedman 1998). The tasks of eliciting ideal and ought attributes, followed by ideal or ought ratings and actual ratings in the Selves Questionnaire are completed by participants on a computer equipped with the ability to record response times. The time taken by each participant to produce each attribute and rate them is recorded by the computer. Attribute elicitation latencies and ratings latencies are summed across the three ideal attributes and across the three ought attributes separately, resulting in one total ideal strength assessment and one total ought strength assessment. In this way, it is possible to assess both the Selves Questionnaire and the Self-guide Strength measures within a single computer-based session. We employed such an approach in all our studies.

Lockwood et al. measure. The fifth measure of regulatory focus is described by Lockwood, Jordan, and Kunda (2002), and was developed to study motivation instigated by role models. The eighteen items described by Lockwood et al. (2002) incorporate key terms of regulatory focus theory and consider success and failure in goal pursuit, with nine reflective items each for promotion and prevention focus. Like the RFQ measure, Lockwood et al. (2002) report only a modest correlation of +.17 between the promotion and prevention focus sub-scales.

STUDY 1

Prior research has not examined the degree to which the measures of chronic regulatory focus converge in their assessment. Accordingly, the primary objective of study 1 was to conduct correlation tests to investigate convergence of the promotion and prevention focus scales. We also briefly discuss a replication of study 1 using a second sample.

Method

Data were gathered from 174 students who received course credit for participation. Participants completed the RFQ, BIS/BAS, Selves (including response latencies to assess the Self-guide Strength measure), and Lockwood measures. Administration of the scales was counterbalanced across participants, and short filler tasks such as rating artwork and solving simple anagrams were given between each scale to provide cognitive separation.

For the RFQ, the BIS/BAS, and the Lockwood measures, averages of the respective items were calculated. For the Selves promotion focus measure, the sum of difference scores of the three ideal ratings and the three corresponding actual ratings was calculated. Lower scores reflect more congruence between actual and ideal, and hence stronger promotion focus (Brockner et al. 2002). A similar procedure was employed to compute the Selves prevention focus measure. Consequently, greater convergence between these measures and corresponding measures of RFQ, BIS/BAS, and Lockwood scales is indicated by more negative correlations. The response latency measures were calculated as described earlier; additionally, because the latency distributions were positively skewed, we performed natural log transformations on the latencies before summing them. This is consistent with the approach followed by other researchers using this measure (e.g., Shah et al. 1998).

Results

Factor analyses. Separate exploratory factor analyses conducted for the 11-item RFQ, the 12-item BIS/BAS scale, and the 18-item Lockwood scale revealed clean two-factor loading patterns in each case, with each item demonstrating simple structure on the appropriate subscale. Detailed results for the exploratory factor analyses are provided in the Web Appendix. Additionally, the descriptive statistics (means and standard deviations) along with the Cronbach α values for all the measures are summarized in the top panel of table 2. As can be seen, the promotion focus sub-scale of the Selves Questionnaire had lower than acceptable (< .60) reliability, whereas the other sub-scales had adequate reliability. In addition, we also performed confirmatory factor analysis on this data, in an effort to further assess the factor structure. This analysis is provided in the Web Appendix, and the results are consistent with an orthogonal, two-dimensional conceptualization of the regulatory focus orientations (Higgins 2002).

[Insert table 2 about here]

Correlations among regulatory focus measures. Table 2 also provides the bivariate correlations between the sub-scales. Notably, the table reveals that the correlations between the corresponding sub-scales have minimal convergence (Campbell and Fiske 1959). Most of the correlations are less than .30 in magnitude. The only correlations greater than this magnitude are +.45 between the Selves promotion sub-scale and the Selves prevention sub-scale, +.80 between the Self-guide Strength promotion and prevention measures, +.38 between the BAS scale and the Lockwood promotion sub-scale, and +.36 between the BIS scale and the Lockwood prevention sub-scale. Based on these results, we conclude that minimal correlations are found among scales intended to assess a promotion focus and among scales designed to assess a prevention focus. Also worth noting, the low to non-existent correlations between the Self-guide Strength measures and the other scales are unsurprising because of the fundamentally different methods used in the two cases, i.e., response latencies for the former scale vs. self-reported ratings for the remaining scales; the low correlations are indicative of different underlying processes for implicit versus explicit measurement approaches (Cunningham, Preacher, and Banaji 2001).

To confirm the surprising lack of convergence between the different sub-scales, we replicated this study with a second student sample, $N = 232$. The bottom panel of table 2 provides the results summary. Here, reliabilities of both Selves sub-scales are below the conventional .60 adequacy threshold. The same four correlations as those in the first sample are greater than +.30. The correlation between the Selves promotion and prevention sub-scales is +.44, the one between Self-guide Strength promotion and prevention sub-scales is +.46. The Lockwood promotion sub-scale and the BAS scale have a correlation of +.51, and the Lockwood prevention sub-scale and the BIS scale have a correlation of +.39. Additionally, unlike the first sample, the correlation between RFQ promotion and Lockwood prevention is -.48.

Discussion

The main result from these correlation tests is that except for moderate convergence of the BIS/BAS and the Lockwood sub-scales, the remaining scales demonstrated minimal convergence. This result was found in both samples despite the fact that the scales were administered consecutively during the same experimental session and are intended to measure the same underlying constructs. The conservative nature of this test, that is, consecutive counterbalanced administration of the measures which should have accentuated any existing relations, makes the results even more intriguing, raising the pressing questions of: (1) what are the differences between the scales, and (2) which scale(s) should consumer researchers use when conducting research involving a chronic conceptualization of regulatory focus. Next, by carefully assessing the measures, we seek to answer these questions.

ASSESSMENT OF CHRONIC REGULATORY FOCUS MEASURES

To understand the reasons contributing to lack of convergence and to answer the question of which chronic regulatory focus measure to use, we evaluated the measures using four criteria considered as comprehensive for scale assessment in the personality literature: (1) representativeness, (2) internal consistency and homogeneity, (3) stability, and (4) predictive validity (Simms and Watson 2007).

Representativeness refers to the scale's theoretical content. A scale is representative to the extent that its items cover all the important theoretical facets of the target construct. A representative scale should have items that reflect different manifestations and levels of the underlying trait for which reliable measurement is desired (Simms and Watson 2007). This particular criterion can only be evaluated by thoroughly understanding the theoretical underpinnings of the measures and an examination of their specific content.

Given the findings of study 1 and subsequent studies, it appears that each regulatory focus scale has unique strengths and weaknesses, and the measures appear to be emphasizing different aspects of regulatory focus theory. Therefore, the measures appear to be differentially representative of the underlying tenets of regulatory focus theory. We provide a detailed examination of representativeness of the scales in the Web Appendix, and a summary of this analysis is provided in Table 3. Table 3, therefore, provides a summary of our analyses regarding how well the measures incorporate the key tenets of regulatory focus theory, item-specific issues with the measures, and suggested uses based on our analyses. We demarcate our theoretical analysis into the scale's primary theoretical focus, how well it captures strategic aspects of goal pursuit and approach/ avoidance motivations, and affective and cognitive elements of regulatory focus theory.

--Insert table 3 about here--

Second, the scale should have high *internal consistency* or *coherence* which includes its reliability as measured by indices such as the Cronbach's α, and *homogeneity*, which is the extent to which all the items in the scale tap into a single dimension. Study 1 revealed the sub-scales of the Selves Questionnaire (promotion twice, prevention in one sample) had lower reliabilities than the conventional .60 threshold, whereas the other scales had higher reliabilities. Through both exploratory and confirmatory factor analysis, study 1 also provided preliminary evidence that the RFQ, BIS/BAS, and the Lockwood scales are homogeneous. Scale homogeneity is further tested by conducting additional confirmatory factor analyses in study 2.

Third, the scale should have *stability,* that is, the measure should remain stable for the same individual across measurements at different times. Test-retest reliability is examined in study 2.[2]

Fourth, the scale should have *predictive validity* in that it should be able to match and/or predict relevant behavioral manifestations that are postulated by the theory. For this criterion to be met, those scoring high in chronic promotion focus should behave in ways that are consistent with a promotion focused individual, and those scoring high in chronic prevention focus should show behaviors that theory suggests are consistent with such a focus. The same should be true for medium and low levels of promotion and prevention focus. The predictive validity of the scales is tested in studies 3A and 3B. In addition to these four criteria, we also assess the scales for logistical and administrative issues in the Web Appendix.

STUDY 2

Study 2 was computer-based, and designed to evaluate the homogeneity and stability of the five promotion and prevention focus measures using a standard test-retest reliability experimental design (Peter 1979). Homogeneity is the extent to which the items in a sub-scale tap into a single dimension, whereas stability is the scale's ability to obtain consistent responses across multiple administrations.

Method

A total of 197 undergraduate students participated in a two-part study involving regulatory focus measurement as part of a class assignment. Participants were provided with a

[2] Another way to gauge the scale's stability is to examine the extent to which it changes after a situational manipulation of the factor. Details of a study testing this can be found in the Web Appendix as Study 2b.

link to an online survey at time 1 and again at time 2, with five weeks in between the two measurements. Although participants were given four days each time to complete the study, the average time between administrations was five weeks.

Each version of the study included all the regulatory focus scales (along with response latencies gathered in conjunction with the Selves Questionnaire), collected in a random order for each participant, and separated by brief unrelated filler tasks to provide cognitive separation between the measures.

The homogeneity of the RFQ, the BIS/BAS, and the Lockwood scales was assessed with confirmatory factor analyses (CFAs) using the LISREL 8.80 program (Jöreskog and Sörböm 1999). Note that the three scales are *summated scales*, whereas the Selves Questionnaire and the Self-guide Strength measures are *cumulative scales* (Pedhazur and Schmelkin 1991); consequently, CFA is not applicable to these two scales. We assessed each model's goodness-of-fit with the Root Mean Square Error of Approximation (RMSEA), the Standardized Root Mean Square Residual (SRMR), the Non-Normed Fit Index (NNFI), and the Comparative Fit Index (CFI). Details regarding these indices can be found in Bentler (1990) and Marsh, Balla, and Hau (1996). Satisfactory model fits are indicated by RMSEA and SRMR values $\leq .08$, and NNFI and CFI values $\geq .90$.

To evaluate stability, each scale was summarized using the same procedures as study 1. We then calculated the correlations or stability coefficients between the scales from the first and second measurements. Greater scale stability (in terms of test-retest reliability) is indicated by higher stability coefficients.

Results

Replication of convergence results. We calculated the bivariate correlations between the sub-scales at each measurement, obtaining similar results to Study 1, i.e., low to moderate correlations amongst the different measures. The correlation matrices and a discussion of these results are provided in the Web Appendix.

Homogeneity of regulatory focus measures. Table 4 provides the goodness-of-fit measures for the CFAs for the RFQ, the BIS/BAS, and the Lockwood scales (the Selves and Self-guide Strength measures are not appropriate for this analysis) completed in the two sessions. As can be seen, the measurement models fit the scale measures reasonably well in all six cases, indicating that the three scales have adequate homogeneity. The phi-coefficients (measures of correlation, attenuated for measurement error) between the promotion and prevention factors are provided in table 4. These results indicate that the promotion and prevention factors of the RFQ and the BIS-BAS scales have moderately positive correlations, whereas the Lockwood scale factors are uncorrelated to each other. These results are consistent with an orthogonal, two-dimensional conceptualization of the regulatory orientations (Higgins 2002).

[Insert table 4 about here]

Stability of regulatory focus measures. The last two rows of table 4 provide the stability coefficients. As can be seen, stability coefficients (and therefore test-retest reliability) are the highest for the RFQ measures (.69 and .75 for the promotion and the prevention sub-scales, respectively), followed by the Lockwood (.67 and .62) and the BIS-BAS scales (.55 and .69). The Selves measures have moderate coefficients (.47 and .40), whilst the Self-guide Strength measures have the lowest stability coefficients (.14 and .25) across the time intervals. Study 2 provides evidence of adequate homogeneity and stability for the RFQ sub-scales, the BIS/BAS scales, and the Lockwood sub-scales. Results also indicate the Selves Questionnaire sub-scales and the Self-guide Strength sub-scales to be relatively unstable over a longer period of time.

STUDY 3A

In Study 3A, we examine predictive validity of the scales, that is, their ability to predict salient outcomes as hypothesized by regulatory focus theory. Study participants responded to a number of dependent measures eliciting their adoption of innovative products, preference for a secure vs. high-paying job, preference for investing an inheritance in a risky business venture vs. a safer mutual fund, and the persuasive impact of public service advertisements along with assessments of affective responses and substantive content in the ads. These dependent measures have been shown (or hypothesized) by prior research to be influenced by the individual's regulatory orientations (Pham and Higgins 2005).

Method

Participants were 367 undergraduate students participating in a behavioral laboratory research session in exchange for course credit. The study contained two main parts (scale assessment and dependent measure collection) along with a fifteen minute unrelated task in between to provide temporal separation. Half of the participants completed the measurement portion first, the remainder completed the dependent measure portion first. The order in which responses were given did not emerge as significant in the analysis, and so this factor is not considered further.

In the scale assessment part, participants responded to each of the regulatory focus scales counterbalanced across subjects and separated by brief filler tasks as in the previous studies. For the dependent measure part, the participants were instructed to answer a series of questions. The first set of questions asked participants to indicate whether they had adopted the following innovative products: Nintendo Wii game console, Apple iPhone, internet telephone (VOIP), Playstation 3 game console, a GPS navigation device, an Apple MacBook computer, satellite radio, a plasma television, high-definition television service, a Blue-Ray DVD player, the Netflix movie rental service, and teeth whitening strips. The first dependent measure was the sum of innovative products adopted by the participant[3]. Our reasoning was that promotion focus should be a positive predictor and prevention focus should be a negative predictor of new product adoption (Herzenstein et al. 2007).

The second dependent measure concerned the respondent's selection of a job. Participants were told to evaluate two jobs: Job A had a high salary with low job security, and Job B had an average salary with high job security. Participants were asked to provide their relative preference for the jobs on a scale from -5 (anchored with "I strongly prefer Job A") to +5 (anchored with "I strongly prefer Job B"). Based on prior research, promotion focus was expected to be negatively related and prevention focus positively related to a greater preference for Job B (Pham and Higgins 2005; Zhou and Pham 2004).

The third dependent variable involved making an investment decision. Participants were told to "Imagine that you received $25,000 as an inheritance recently that is available for investment". They were given two investment opportunities to invest this money: "(1) A business venture that has a 70% chance of earning an 18% return and a 30% chance of losing 11% in a year, and (2) A mutual fund that has a 90% chance of earning a 10% return and a 10% chance of losing 5% in a year." Participants were asked how much of the $25,000 they would

[3] A pretest conducted with 166 participants from the same subject pool indicated that current adoption rates for these products ranging from 23.6% for the Netflix movie rental service to 71.5% for the Wii game console. In most cases, adoption rates ranged from 40% to 60%. The adoption rates for the study sample are provided in the Web Appendix.

invest in the risky business venture, which was the third dependent variable in the analysis.

The last two dependent variables were based on the recent findings of Pham and Avnet (2004). They found that for persuasive communications, a promotion focus increases consumers' reliance on their subjective affective responses to the ad relative to the message's substance but the opposite occurs for a prevention focus. We employed an approach similar to Pham and Avnet's (2004) Study 4, asking participants to read and evaluate three print public service announcement ads (PSA), one at a time, rating their affective responses, substantive assessments, and the ad's persuasive impact[4]. Regressions of persuasive impact on affective response, substantive assessment, promotion and prevention focus, along with interaction terms were conducted to test the differential impacts of promotion and prevention focus.

Results

Each scale was summarized in the same way as the previous studies. In this study, we additionally reverse scored the Selves Questionnaires scores and the Response Latencies to make the results of the analyses easier to compare across the five regulatory focus scales. The inter-scale correlations, which replicated earlier studies' findings, are provided in the Web Appendix.

To examine the scales' predictive validity, we analyzed the dependent variables in two different ways. First, we ran separate regressions for each dependent variable on each chronic promotion and prevention focus sub-scale. The results are provided in the top panel of table 5.

[Insert table 5 about here]

[4] For each ad, participants: (1) reported their subjective affective responses using three 7-point measures anchored with "catchy/ not catchy", "appeals/ doesn't appeal to me" and "excites/ doesn't excite me" ($\alpha = .88$); (2) provided their substantive assessments of the ads with 7-point measures anchored with "gives me/ doesn't give me additional information about [issue]," "explains/ doesn't explain the link between [issue and its consequences], and "stimulates/ doesn't stimulate my thoughts about [issue]" ($\alpha = .81$); and (3) rated the ad's persuasive impact using three measures anchored with "influences/ doesn't influence my opinion about [issue], "changed/ didn't change my attitude toward [issue]" and "the ad will influence my/ other people's [issue] habits" ($\alpha = .85$).

As can be seen from table 5, there is considerable variability in the predictive power of the different scales. At least one component (i.e., either promotion or prevention) of the RFQ predicted four of the five dependent variables significantly. For the assessment of the persuasive impact of the PSAs, we ran separate regressions for promotion focus and prevention focus. The regression equation for promotion focus was:

$$\text{Persuasive impact} = \beta_0 + \beta_{\text{Affect}}X1 + \beta_{\text{Substance}}X2 + \beta_{\text{Affect*Substance}}X3 + \beta_{\text{Prom}}X4 + \beta_{\text{Prom*Affect}}X5 + \beta_{\text{Prom*Substance}}X6.$$

A similar regression was run for prevention focus. The key coefficients that explain the differential impact of the consumer's regulatory orientations are those of the interactions between each regulatory focus and affective response and substantive assessment. As can be seen in table 5, both coefficients were significant for the promotion and prevention regressions for the RFQ (marginally so, at the $p < .10$ level for the prevention focus – substantive content interaction). Only the inheritance amount allocated to risky venture investment was not predicted successfully by either RFQ sub-scale.

The predictive performance of the other four scales was markedly inferior to that of the RFQ. The BIS/BAS and the Self-guide Strength scales predicted two of the five variables significantly. The prevention sub-scale of the BIS/BAS predicted allocation of inheritance and relative preference for jobs, whereas the Self-guide Strength scales were effective in explaining the differential effects of promotion and prevention on the persuasive impact of the PSA ads. The Selves measures only predicted one of the five outcomes (relative preference for jobs) as did the Lockwood scale (allocation of inheritance) in our study. Except for the interaction regressions, both promotion and prevention coefficients were not simultaneously significant in the regressions for any of the five scales.[5]

STUDY 3B

Collecting multiple measurements of the same construct at the same time provides the best opportunity to demonstrate correlations between the measures. The results reported in the studies thus far (and the Web Appendix) therefore provide a conservative view of the relationships between the various scales. However, to reduce any concerns about the drawbacks of administering the regulatory focus scales within the same experimental session, we conducted Study 3B in which each measurement was spaced over the course of four different sessions over a three-month time period. Once again, we examined scale convergence.

Study 3B also had a second objective: to further evaluate the predictive validity of the scales using two additional dependent measures. In a fifth and final session, we: (1) evaluated participants' creativity by having them generate creative and unusual uses for a brick (Friedman and Förster 2001), and (2) obtained the size of their consideration set, that is, the options they seriously considered, by soliciting the number of movies they considered before selecting movie rentals (Pham and Change 2008). These measures have also been shown by prior research to be influenced by the individual's regulatory orientations.

Method

[5] We also ran the analysis for Studies 3a and 3b using the methodological approach employed by many regulatory focus researchers involving the classification of participants as either promotion or prevention focused. While the results largely mirror those presented above, minor differences emerge. More details are available in the Web Appendix.

Study participants were undergraduate students enrolled in a multiple-phase study involving several visits to a behavioral laboratory throughout the duration of a semester in exchange for course credit. Although 205 participants began this five-phased study, due to the inherent difficulties with getting multiple repeat appearances from the same pariticipants, only 180 participants (or 87.8%) fully completed all five phases. The analyses reported here are based on this sample. The primary purpose of the study was unrelated to the current research; however, from an administration perspective, the study structure provided an excellent opportunity to assess regulatory focus measures over time.

Accordingly, the first task in each of the first four sessions was to complete one of the measures. Because of the difficulty of tracking, the order in which the scales were collected was the same for all participants, but given the 2-4 week separation between each scale, this would seem to present a minimal concern. Scales were administered in the following order: the BIS/BAS, the RFQ, the Lockwood, and the Selves Questionnaire. Response latencies for the Self-guide Strength measures were again recorded in conjunction with the Selves Questionnaire.

In the fifth and final study phase, participants completed the two dependent measures. For the creativity task, participants were asked to generate as many unusual uses for a brick as possible, excluding ordinary or impossible uses. They were given examples of unusual uses for paper clips to help them understand the task. The responses were analyzed by a coder who evaluated the answers for suitability and counted the number of creative brick uses provided by each participant. In the second task, participants were told that the researchers were interested in their movie preferences. They were asked to visit the Netflix website (www.netflix.com), and spend time looking at the selections available on it with the goal of choosing two movies to rent from the site. After they had finished the browsing task, they were asked to list all the movies that they seriously considered renting, and then provided their choices. To enhance involvement in the task, two participants were randomly selected to receive their chosen DVD. The participant's consideration set, that is, the number of movies they seriously considered, is the second dependent measure in the analysis. Our reasoning, following Pham and Chang (2008), was that promotion focus should be a positive predictor and prevention focus should be a negative predictor of consideration set size (see also Pham and Higgins 2005).

Results

The scales were summarized in the same way as Study 3A. By and large, the results replicate findings of the previous studies by revealing low correlations between the sub-scales when the scales were administered weeks apart from one another, strengthening support for lack of convergence.

From the bottom of table 5, the regressions reveal that number of creative uses for a brick is predicted significantly by two of the five scales: (1) the BIS/ BAS scale, where the coefficient is negative for the BIS, and (2) the Lockwood scale, where the promotion focus scale has a positive coefficient and the prevention focus scale has a negative coefficient. The RFQ, the Selves Questionnaire and the Self-guide Strength measure do not predict respondents' creativity. However, these three scales are all successful in predicting size of the movie consideration set provided by respondents, whereas the BIS/ BAS scale and the Lockwood scale are not.

Discussion

Studies 3A and 3B confirmed the results from our previous studies regarding the low convergence among the measures. Further, study 3B provides a strict test of convergence by spacing the measures over time, thereby addressing potential concerns regarding measure collection during the same experimental session. Most importantly, the two studies assess the predictive validity of the five measures using a slate of dependent measures suggested by previous research. Such a direct comparison of the measures is revealing, finding considerable variation in the measures' performance. Across the studies, results of the assessment indicate that the RFQ performs the best in predicting the outcomes. That is, five of the seven outcomes examined in table 6 were significantly predicted by at least one dimension of the RFQ. The Self-guide Strength measure was able to predict four of the seven outcomes, the BIS/BAS scale and the Lockwood scale were able to each predict three outcomes, and the Selves Questionnaire only two outcomes.

It is also noteworthy that both sub-scales were rarely significant predictors at the same time. Coupled with the low to moderate correlations between the sub-scales of these measures, this finding provides a further glimpse into the complexity of operation of the individual's regulatory orientations. The pattern of findings suggests that more careful theory development is necessary to account for the orthogonal nature of the two regulatory orientations. In many cases, it may not be sufficient to hypothesize that if promotion focus operates one way, prevention focus will operate in the opposite manner in influencing a given outcome. Again, we refer to our discussion of representativeness included in the Web Appendix for additional analysis of the theoretical underpinnings of regulatory focus and the related measures.

GENERAL DISCUSSION

Regulatory focus theory has become extremely influential in psychology, marketing and beyond, and will likely continue to have a strong presence in the future. Observing a variety of approaches to measure chronic regulatory focus of individuals, in the current research, we sought to very carefully conceptually and empirically evaluate five commonly used measurement approaches. Through these efforts, we hoped to bring greater clarity not only to understanding key aspects of regulatory focus theory itself, but to a deeper knowledge of the extent to which these measures overlap, how well they perform on various psychometric criteria, and their theoretical strengths and weaknesses. Our goal in doing so was to provide guidance to researchers regarding the appropriate use of these scales and their integration into a variety of research questions involving regulatory focus theory. In this section, we focus on succinctly summarizing our current findings and presenting recommendations for future research.

Key Findings

Across our series of studies, a primary conclusion that can be drawn is that the various measurement approaches to chronic regulatory focus orientation are very different empirically, with little theoretical or empirical overlap. Table 6 provides a summary of the five measures' performance on the Simms and Watson (2007) criteria.

[Insert table 6 about here]

As can be seen from the table, the results of our studies and analysis of scale representativeness show that the RFQ emerges as the most suitable measure for general-purpose theory testing. Of the five measures, it alone is adequate in internal consistency, homogeneity, and stability, and performs the best in predictive validity and representativeness. Notably, it is the only scale to explicitly distinguish between approach and avoidance in each regulatory focus, and encapsulate the key tenets of regulatory focus theory.

Despite the fact that they have more weaknesses when compared to the RFQ, the other measures may have niche uses. The BIS/BAS scale could be used to examine research questions involving emotion and where the subtleties of regulatory focus theory beyond the approach-avoidance motivation distinction are not paramount. The Selves Questionnaire would serve well in studying questions regarding consumers' self-discrepancies, and the Self-guide Strength measures are apt for non-conscious and automatic processing issues, or where social desirability would make an association-based assessment more accurate than an explicit attitude-based assessment. The Lockwood scale seems designed to study questions of academic performance and achievement and would work well in answering such research questions.

A Composite Scale of Chronic Regulatory Focus

Despite the RFQ's superior comparative performance, as noted in our analysis of its representativeness (see Web Appendix), it does have two limitations: (1) an absence of emotional content in its items, and (2) items that are entirely past-oriented. As such, based on the large amount of data collected in our research endeavor, we offer insights regarding a composite scale using measures from the RFQ, the BIS/BAS scale, and the Lockwood scale to address these limitations of the RFQ, and we provide this composite scale as a useful alternative to future researchers interested in the impact of differences in chronic regulatory focus. Our suggested composite scale is comprised of ten items (5 each for promotion focus and prevention focus) and includes four items from the RFQ (2 for promotion and 2 for prevention), two items from the BIS/ BAS scale (1 for promotion and 1 for prevention), and four items from the Lockwood scale (2 for promotion and 2 for prevention). Table 7 provides this composite chronic regulatory focus scale, and also describes results for testing its psychometric properties.

[Insert table 7 about here]

The items in the composite scale meet the following representativeness criteria: (1) they cover the key tenets of regulatory focus theory including distinguishing between approach and avoidance within each regulatory focus (with the RFQ items), describing key concepts such as ideal and ought selves in the measures (with the Lockwood items), and measuring self-regulation for promotion and prevention focus, (2) they include both cognitive and emotional measures (with the BIS/ BAS items) to provide a broad-based assessment, and (3) they use items which are past-, present-, and future-oriented. Consequently, from a perspective of scale representativeness, the composite scale is able to overcome the limitations that the RFQ, as well as the other scales individually, suffers from.

We also examined the psychometric properties of the composite scale using the Study 3A sample to assess reliability, homogeneity via confirmatory factor analysis and predictive validity. The Study 2 sample was used to assess test-retest reliability. In both these samples, the five measures were assessed at the same time in counterbalanced order so that all measures included in the composite scale were assessed within the same experimental session. As can be seen from table 7, the composite scale performs well in all the tests. Its reliability for the promotion focus sub-scale is .79 and for the prevention focus sub-scale is .74. A confirmatory factor analysis reveals good fit to the two-factor model and a phi-coefficient of .29 indicating moderate positive correlation between the promotion and the prevention factors. The test-retest reliability analysis on the Study 2 sample reveals a coefficient of stability of .67 for the promotion focus sub-scale and .64 for the prevention focus sub-scale. Finally, the predictive validity results are also strong with significant results along at least one dimension for four of the five dependent measures tested.

It is worth noting here that in both studies (2 and 3A) the measures of the composite scale were dispersed within the experimental session as they were collected along with their respective parent scale items. Therefore, these psychometric test results of the composite scale can be viewed as conservative; if all the measures are assessed consecutively, we expect even stronger reliability, stability, and test-retest reliability results. Based on these findings, we concluded that the composite scale offers a viable alternative to the RFQ to assess the consumer's chronic regulatory focus, and we recommend its use in future research examining the impact of differences in regulatory focus.

Our findings also provide some useful guidelines to researchers regarding how to operationalize their chosen chronic regulatory focus measure. When used as independent variables, chronic regulatory focus measures are often discretized by researchers. In many studies, difference scores are used to classify participants as promotion *or* prevention focused. Those scoring relatively high on the (promotion - prevention) difference are classified as promotion focus, and vice versa using a median split of the sample (e.g., Avnet and Higgins 2006; Louro, Pieters and Zeelenberg 2005). Although this approach collapses promotion and prevention focus into a single dimension and is convenient for exposition purposes, the current research highlights its limitations. The low to non-significant present correlations between promotion and prevention focus (even within the same measurement approach) suggest that such divisions may in fact be tenuous. Because there is little or no relationship between one's chronic promotion and chronic prevention orientation, we therefore recommend that promotion and prevention orientations be considered separately in future research. Another limitation of collapsing two scales using difference scores is that it goes against the grain of regulatory focus theory, which postulates that the two orientations are orthogonal. Third, there are several methodological concerns with discretizing the chronic regulatory focus measures into high and low categories, such as a significant loss of statistical power, and an increased likelihood of confounding (Fitzsimons 2008).

Future Research and Conclusions

The present research has provided detailed theoretical and empirical analyses of measurement approaches of regulatory focus. We believe that our results and actionable recommendations will guide researchers in future endeavors. We view two general areas of future research particularly worthwhile: 1) the examination of the potential for interactions between chronic promotion and prevention orientations, and 2) further investigations into the role of regulatory fit in decision making.

First, we believe that studying the chronic orientations of regulatory focus that are examined in the present research in conjunction with the often used situational manipulations is an important area of future research. Empirical insights not reported in the present work highlight the potential for interactions between these chronic and situational instances of regulatory focus. We believe that researchers should strongly consider including our composite regulatory focus measure (or one of the other measures best suited to the research purpose), when using regulatory focus manipulations, in order to at least be able to control for these differences. In addition, similar to the measurement approaches, a careful evaluation of manipulation approaches would be very useful to researchers trying to choose among the many alternatives available. Some examples of the alternative that could be examined include essay writing, self-report reflections of past experiences, brand name anagram solution scoring, descriptions of aspirations or important duties, varying types and attributes of products used in evaluations (e.g., retirement investment accounts induce a prevention focus while stock trading investment accounts induce a promotion focus; Zhou and Pham 2004), and decision frames emphasizing gains (to evoke promotion goals) versus the avoidance of losses (to evoke prevention goals).

Secondly, regulatory fit, which occurs when consumers use strategies and engage in activities that are consistent with their goal orientation and as a result they experience heightened motivation and "it just feels right" (Aaker and Lee 2006). This fit can be achieved through matches with task framing and chronic regulatory focus or situationally manipulated focus. Seemingly, in order to fully understand such "fit" effects that lead to enhanced value perceptions and other positive outcomes (e.g., Avnet and Higgins 2006; Wang and Lee 2006; Zhou and Pham 2004), differences in chronic regulatory focus should be accounted for, using the recommendations from the present research. We believe that regulatory fit will continue to be an important theoretical perspective in future research, and that the inclusion of a chronic perspective of regulatory focus is essential.

In conclusion, we recommend that researchers carefully consider the purposes of their research when selecting an appropriate method of assessing chronic differences in regulatory focus. While we believe that both theoretically and empirically the RFQ (Higgins et al. 2001) is the most widely appropriate of the existing measures, we also offer a composite measure as an alternative that has broad applicability across research contexts and captures the fundamental theoretical components of regulatory focus theory. The use of any measures should avoid collapsing promotion and prevention orientations into a single dimension. We also recommend assessing chronic regulatory focus when using situational manipulations of promotion and prevention orientations in future research.

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TABLE 1

MEASURES OF CHRONIC REGULATORY FOCUS IN CONSUMER RESEARCH

Measure	Items/Description	Used by
Regulatory Focus Questionnaire (RFQ) (Higgins et al. 2001)	1. Compared to most people, are you typically unable to get what you want out of life? (R)* 2. Growing up, would you ever "cross the line" by doing things that your parents would not tolerate? (R) 3. How often have you accomplished things that got you "psyched"' to work even harder?* 4. Did you get on your parents' nerves often when you were growing up? (R) 5. How often did you obey rules and regulations that were established by your parents? 6. Growing up, did you ever act in ways that your parents thought were objectionable? (R) 7. Do you often do well at different things that you try?* 8. Not being careful enough has gotten me into trouble at times. (R) 9. When it comes to achieving things that are important to me, I find that I don't perform as well as I ideally would like to do. (R)* 10. I feel like I have made progress toward being successful in my life.* 11. I have found very few hobbies or activities in my life that capture my interest or motivate me to put effort into them. (R)* * Promotion item	Louro et al. (2005) (Study 2); Hong and Lee (2008)
Behavioral Inhibition System/ Behavioral Approach System (BIS/BAS) Scales (Carver and White 1994)	1. If something unpleasant is going to happen I usually get pretty "worked up." 2. I worry about making mistakes. 3. Criticism or scolding hurts me quite a bit. 4. I feel pretty worried or upset when I think or know somebody is angry at me. 5. Even if something bad is about to happen to me, I rarely experience fear or nervousness. (R) 6. I feel worried when I think I have done poorly at something. 7. I have very few fears compared to my friends. (R) 8. When I get something I want, I feel excited and energized.* 9. When I'm doing well at something, I love to keep at it.* 10. When good things happen to me, it affects me strongly.* 11. It would excite me to win a contest.* 12. When I see an opportunity for something I like, I get excited right away.* * BAS or promotion item	Dholakia et al. (2005); Dholakia et al. (2006)

TABLE 1 (Cont.)

MEASURES OF CHRONIC REGULATORY FOCUS IN CONSUMER RESEARCH

Selves Questionnaire (Higgins et al. 1986; Shah et al. 1998; Brockner et al. 2002)	In the following pages, you will be asked to list the attributes of the type of person that YOU believe you actually are, you would ideally like to be, and you ought to be: Your Actual Self: Your beliefs concerning the attributes or characteristics you think you actually possess now. Your Ideal Self: Your beliefs concerning the attributes or characteristics you would like ideally to possess; the type of person you wish, desire, or hope to be. Your Ought Self: Your beliefs concerning the attributes or characteristics you believe you should or ought to possess; the type of person you believe it is your duty, obligation, or responsibility to be.	Pham and Avnet (2004); Avnet and Higgins (2006); Jain et al. (2007)
Lockwood Scale (Lockwood, Jordan, and Kunda 2002)	1. In general, I am focused on preventing negative events in my life. 2. I am anxious that I will fall short of my responsibilities and obligations. 3. I frequently imagine how I will achieve my hopes and aspirations.* 4. I often think about the person I am afraid I might become in the future. 5. I often think about the person I would ideally like to be in the future.* 6. I typically focus on the success I hope to achieve in the future.* 7. I often worry that I will fail to accomplish my academic goals.(**) 8. I often think about how I will achieve academic success.*(**) 9. I often imagine myself experiencing bad things that I fear might happen to me. 10. I frequently think about how I can prevent failures in my life. 11. I am more oriented toward preventing losses than I am toward achieving gains. 12. My major goal in school right now is to achieve my academic ambitions.*(**) 13. My major goal in school right now is to avoid becoming an academic failure.(**) 14. I see myself as someone who is primarily striving to reach my "ideal self" – to fulfill my hopes, wishes, and aspirations.* 15. I see myself as someone who is primarily striving to become the self I "ought" to be – fulfill my duties, responsibilities, and obligations. 16. In general, I am focused on achieving positive outcomes in my life.* 17. I often imagine myself experiencing good things that I hope will happen to me.* 18. Overall, I am more oriented toward achieving success than preventing failure.* * promotion item ** indicates item that was not used with adult samples	Yeo and Park (2006); Zhao and Pechmann (2007);

TABLE 2
STUDY 1: VARIABLE MEANS, STANDARD DEVIATIONS, RELIABILITIES AND INTERCORRELATIONS

	Study 1 (N = 174)	Mean	SD	Alpha	1	2	3	4	5	6	7	8	9	10
1	RFQ Promotion	5.30	.79	.64	-									
2	RFQ Prevention	4.74	1.11	.80	.19*	-								
3	BAS (Promotion)	6.14	.84	.88	.21**	-.00	-							
4	BIS (Prevention)	4.89	.97	.80	-.12	.20*	.25**	-						
5	Selves Promotion	5.25	2.08	.58	-13	-.07	.06	.19*	-					
6	Selves Prevention	4.02	2.05	.64	-.08	-.13	.08	.20**	.45**	-				
7	S.G Strgth. Promotion	3.17	3.27	.76	-.00	.08	.01	-.01	.14	.07	-			
8	S.G Strgth. Prevention	3.11	3.27	.73	.02	.09	.05	-.00	.11	.06	.80**	-		
9	Lockwood Promotion	5.70	.85	.85	.25**	.07*	.38**	.26**	-.07	-.08	.02	.03	-	
10	Lockwood Prevention	4.12	1.00	.77	-.28**	-.14	.05	.36**	.03	.05	-.09	-.15*	.27**	-
	Replication Sample (N = 232)	Mean	SD	Alpha	1	2	3	4	5	6	7	8	9	10
1	RFQ Promotion	3.94	.53	.64	-									
2	RFQ Prevention	3.52	.77	.80	.13	-								
3	BAS (Promotion)	3.62	.39	.77	.21**	.12	-							
4	BIS (Prevention)	3.94	.51	.78	-.19**	.12	.24**	-						
5	Selves Promotion	5.33	1.99	.58	-19**	.01	.02	.18**	-					
6	Selves Prevention	4.32	2.24	.54	-.20**	.00	-.09	.04	.44**	-				
7	S.G Strgth. Promotion	4.56	.30	.65	.01	.03	-.02	.02	.06	.02	-			
8	S.G Strgth. Prevention	4.53	.34	.62	.05	.10	-.01	-.04	-.04	.01	.46**	-		
9	Lockwood Promotion	7.42	1.00	.78	.27**	.07	.51**	.09	.01	-.12	.06	-.06	-	
10	Lockwood Prevention	5.30	1.37	.85	-.48**	-.18**	.04	.39**	.16*	.08	.02	-.19**	.12	-

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

TABLE 3
THEORETICAL CONTENT AND SUGGESTED USES OF CHRONIC REGULATORY FOCUS MEASURES

	Relation to Tenets of Regulatory Focus Theory			Item-Specific Issues			Suggested Uses
Regulatory Focus Measure	**Primary Theoretical Emphasis**	**Strategy During Goal Pursuit & Approach/ Avoidance Motivations**	**Affective/ Cognitive RF Theory Elements**	**Composition of items***	**Promotion-specific issues**	**Prevention-specific issues**	
Regulatory Focus Questionnaire	Anticipatory goal reactions based on past success using promotion/ prevention orientations and the resulting pride from those successes.	Distinguishes between approach and avoidance within each of the two regulatory orientations. Approach positive outcomes, avoid “crossing the line” or breaking the rules.	Does not focus on affective aspects of regulatory focus. More emphasis on outcomes and cognitions about outcomes.	Unique among scales in focusing on past events. Wide variety including more general and more specific instances.	Achieving success; accomplishing what you want to.	Adherence to rules and specifically parental rules; may engender a sense of rebelliousness casting positive light on prevention focus	Most generally applicable and suitable scale for testing theory. Unsuitable for operationalizing emotional components of regulatory focus.
BIS/BAS Scale	Based on regulating aversive/ appetitive motivations and approach/ avoidance regulatory systems in which one wishes to approach success or pleasant outcomes and inhibit failure or unpleasant outcomes. Emphasizes emotional reactions of respondents.	BAS items capture approach behaviors mostly through emotions, BIS addresses the unpleasant emotions from negative outcomes. Does not distinguish between approach and avoidance within each regulatory orientation.	Strongly emphasizes affective aspects: Emphasis on worry, nervousness, hurt, fear (in the BIS) and excitement (in the BAS). Addresses motivational aspects of goal achievement. Cognitive elements of RF are not measured by these scales.	Scales tap into affective responses to events and outcomes. Reactions of respondents to fear of failure (prevention) or the joy from success (promotion).	Excitement or positive energy generated from good outcomes.	Dread or negative energy in response to potential failure or negative outcomes.	Most suitable for studying questions involving emotion-based self-regulation of consumers. Weakest of all the measures examined along the representativeness criterion. May not be suitable for studying questions involving cognitive processing, judgment and decision making.

Selves Questionnaire	Based on self-discrepancy theory, this scale measures the level of match between one's actual and ideal/ought selves. Emphasis is on failing in either promotion or prevention self-regulation, and therefore working to achieve more in either dimension.	Assumes discrepancies represent selves we are striving for in order to achieve ideals or achieve oughts. Presumably less emphasis on avoidance of negative outcomes.	Depends upon affect elicited by the chosen attribute. Less discrepancy between actual and ideal or actual and ought is viewed as producing positive affect, and vice versa.	Related to characteristics the person believes that they have, should have, and would like to have. Could lead to widely different definitions for different respondents. Ideal attribute for one person could be ought attribute for another one.	Difference scores obfuscate actual level of ideal attributes desired, i.e., strength of approach motivation.	Same issue as promotion, strength of avoidance motivation is not captured because of difference scoring methodology.	Suitable as a dependent measure of regulatory focus and/or as a means of manipulating regulatory focus. Less useful as a dispositional measure of chronic RF except where self-discrepancy theory is specifically being tested.
Self-Guide Strength Measures	Based on the idea of attitude accessibility through response latencies.	Quick responses for attributes that are more important to individual and ones Does not make distinction between approach and avoidance self-regulation.	Relies on an associative process characterization of regulatory orientations. Affect is captured through implicit processing model.	Response latencies for the attributes listed for Selves Measure. Same issues of diverse definitions and attribute dissimilarity across participants as the Selves Questionnaire.	N/A	N/A	Most suitable for theory-testing for research questions involving non-conscious and automatic processing. May also be effective when social desirability bias is a possibility.
Lockwood et al. Scale	Intended to be a measure of the primary tenets of regulatory focus theory. Incorporates key RF concepts in wording of measures.	Present and future focus on thinking about achieving success/ ideals, or thinking about how to prevent failures. Less emphasis on avoiding non-gains or approaching non-losses.	Includes measure on hope for ideals, otherwise more negative emotion focus on anxiety, worry, and fear. Cognitive responses to potential future outcomes are included.	Mix of cognitive, affective, and behavioral responses. Items are mostly abstract. Some items seem narrowly suited to students (7, 8, 12, & 13). Focus is on responding to current and future events rather than past goal pursuit. Includes items (11 & 18) that capture difference between promotion and prevention within a single item.	Key terms used include: ideal, achieve, success, hopes, wishes, and aspirations.	Key terms used include: ought, avoid, prevent, duties, responsibility, and obligations.	Can be used as an alternative to the RFQ for theory-testing. Could be used as a first choice when the researchers are specifically interested in studying research questions involving academic performance and achievement.

*Theoretical dimensions and mix of antecedents, indicators, and consequences

TABLE 4
STUDY 2: GOODNESS-OF-FIT MEASURES FOR CONFIRMATORY FACTOR ANALYSES OF THE RFQ, BIS/BAS AND LOCKWOOD SCALES AND STABILITY COEFFICIENTS

Study 2	At Time 1			At Time 2		
Goodness-of-fit Measures	RFQ Scale	BIS/BAS Scale	Lockwood Scale	RFQ Scale	BIS/BAS Scale	Lockwood Scale
χ^2	$\chi^2(43)= 75$ $p = .003$	$\chi^2(53)= 133$ $p = .007$	$\chi^2(134)= 414$ $p \approx .00$	$\chi^2(43)= 99$ $p \approx .00$	$\chi^2(53)= 170$ $p \approx .00$	$\chi^2(134)= 316$ $p \approx .00$
RMSEA	.06	.08	.09	.08	.05	.05
SRMR	.06	.06	.08	.07	.09	.05
NNFI	.93	.88	.91	.91	.87	.97
CFI	.92	.91	.87	.90	.89	.98
Φ-value[1]	.48	.29	.02	.30	.42	.04

Stability Coefficients					
	RFQ	BIS/BAS	Lockwood	Selves	Strength
Promotion subscale	.69***	.55***	.67***	.47***	.14*
Prevention subscale	.75***	.69***	.62***	.40***	.25

[1]Φ-value provides the correlation between the promotion factor and the prevention factor in the Confirmatory Factor Analysis model that has been attenuated for measurement error.
$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

TABLE 5

STUDIES 3A AND 3B: REGRESSIONS OF OUTCOMES ON REGULATORY FOCUS MEASURES

Chronic Regulatory Focus Measure		RFQ[1]	BIS/BAS	Selves	Strength	Lockwood
Study 3A (N = 367)						
DV: Number of products adopted	Prom.	.03	.05	-.06	.04	.06
	Prev.	-.13**	-.02	-.04	-.01	.07
DV: Relative preference for jobs	Prom.	.02	-.04	-.12*	.05	-.01
	Prev.	.19***	.13**	.02	-.09	.04
DV: Amount of $25K inheritance invested in business venture	Prom.	-.01	.09	.02	.07	.11*
	Prev.	-.02	-.14*	-.04	-.01	-.07
DV: Persuasive impact of advertisement: Interaction w/ affect	Prom.	.30*	.15	.05	.87**	.26[3]
	Prev.	-.23*	-.08	-.08	-.48*	-.10
DV: Persuasive impact of advertisement: Interaction w/ substance	Prom.	-.22*	-.06	-.04	-.51*	.00
	Prev.	.17[3]	.11	.05	.54*	-.01
Study 3B (N = 180)						
DV: Number of unusual uses for a brick	Prom.	.03	.16*	.05	.12	.14*
	Prev.	-.07	-.08	-.02	-.12	-.16*
DV: Number of movies considered	Prom.	.16*	.03	.01	.12	.01
	Prev.	-.08	-.08	-.15*	-.26**	-.02

[1]Standardized regression coefficients are provided

[2]Based on Pham and Avnet (2004). The regression equation is: Persuasive impact = $\beta_0 + \beta_{Affect}X1 + \beta_{Substance}X2 + \beta_{Affect*Substance}X3 + \beta_{Prom}X4 + \beta_{Prom*Affect}X5 + \beta_{Prom*Substance}X6$

**p* < .05, ***p* < .01, ****p* < .001, [3]*p* < .10

TABLE 6

SUMMARY OF MEASURE PERFORMANCE USING THE SIMMS AND WATSON (2007) CRITERIA

Regulatory Focus Measure	Representativeness	Internal Consistency	Homogeneity	Stability	Predictive Validity
Regulatory Focus Questionnaire	Best-performing. Lacks items measuring emotional reactions, and present- or future-oriented items.	Adequate.	Adequate. The two sub-scales have moderate positive correlation.	Adequate. Best-performing of the five measures.	Best-performing of the five measures. 5/7 significant predictions.
BIS/BAS Scale	Inadequate. Only approach-avoidance issues covered in the items.	Adequate.	Adequate. The two sub-scales have moderate positive correlations.	Adequate.	3/7 significant predictions.
Selves Questionnaire	Adequate in covering self-discrepancy. Concerns with using difference scores to represent regulatory focus theory adequately.	Promotion sub-scale is inadequate.	Not applicable.	Inadequate.	Poorest performance of the five measures. 2/7 significant predictions.
Self-guide Strength Measures	Adequate for non-conscious and automatic processing research questions.	Adequate.	Not applicable.	Inadequate.	4/7 significant predictions.
Lockwood Scale	Adequate. Could be used as an alternative to the RFQ, especially in studying academic performance and achievement.	Adequate.	Adequate. The two scales are uncorrelated.	Adequate.	3/7 significant predictions.
Composite Regulatory Focus Scale	Proposed as a means of addressing limitations of the RFQ. Includes emotional content and has a blend of past, present, and future-oriented items.	Adequate.	Adequate.	Adequate.	Comparable to the RFQ in performance. 4/5 significant predictions (using Study 3A data only).

TABLE 7

COMPOSITE REGULATORY FOCUS SCALE

Promotion Focus (5 measures)

1. When it comes to achieving things that are important to me, I find that I don't perform as well as I would ideally like to do. (R) [A]
2. I feel like I have made progress toward being successful in my life. [A]
3. When I see an opportunity for something I like, I get excited right away. [B]
4. I frequently imagine how I will achieve my hopes and aspirations. [C]
5. I see myself as someone who is primarily striving to reach my "ideal self" - to fulfill my hopes, wishes, and aspirations. [C]

Prevention Focus (5 measures)

1. I usually obeyed rules and regulations that were established by my parents. [A,*]
2. Not being careful enough has gotten me into trouble at times. (R) [A]
3. I worry about making mistakes. [B]
4. I frequently think about how I can prevent failures in my life. [C]
5. I see myself as someone who is primarily striving to become the self I "ought" to be – fulfill my duties, responsibilities and obligations. [C]

Psychometric Properties of the Composite Scale
(using Study 3A sample, N = 367)

Scale Reliability

Promotion focus Cronbach $\alpha = .79$
(ranges from .69 to .84 in other study samples)
Prevention focus Cronbach $\alpha = .74$
(ranges from .67 to .77 in other study samples)

Confirmatory Factor Analysis

$\chi^2(34) = 124.99$, $p < .001$, RMSEA = .07, NNFI = .92, CFI = .91, Φ-value = .29

Test-Retest Reliability (using Study 2 sample, N = 197)

Promotion focus coefficient of stability = .67***
Prevention focus coefficient of stability = .64***

Predictive Validity (using Study 3A sample, N = 367)

DV: Number of Innovative products adopted	DV: Relative preference for jobs	DV: % of $25K inheritance invested in risky venture	DV: Persuasive impact of advertisement: Promotion regressions	DV: Persuasive impact of advertisement: Prevention regressions
$\beta_{Prom} = .07$	$\beta_{Prom} = -.09$*	$\beta_{Prom} = .00$	$\beta_{Prom*Affect} = .33$*	$\beta_{Prev*Affect} = -.16$
$\beta_{Prev} = -.11$*	$\beta_{Prev} = .11$*	$\beta_{Prev} = -.03$	$\beta_{Prom*Substance} = -.21$*	$\beta_{Prev*Substance} = .23$**

[A]Regulatory Focus Questionnaire Measure; [B]BIS/BAS Scale Measure; [C]Lockwood Scale Measure
*This item is reworded from the original question "How often did you obey rules and regulations that were established by your parents?" in order that the 10 items can all be used with the same Strongly Disagree to Strongly Agree response scale.

An Assessment of Chronic Regulatory Focus Measures

Kelly L. Haws, Utpal M. Dholakia, and William O. Bearden

Web Appendix

This web appendix provides more detailed explanations to readers regarding the analysis used in the experiments reported in the paper. Note that only additional details are provided; when the paper contains discussion regarding a particular issue, we do not repeat it here.

REPRESENTATIVENESS OF CHRONIC REGULATORY FOCUS MEASURES

Each measure studied in this research incorporates relevant aspects of regulatory focus theory and, as table 1 (in the paper) shows, has been used successfully in prior consumer research. However, as the findings thus far indicate, each scale does have unique strengths and weaknesses, and the measures appear to be emphasizing different aspects of regulatory focus theory. We provided a summary of our analyses of the representativeness of the measures in table 3 of the paper. However, here we provide full details of this analysis for each of the measures.

The Regulatory Focus Questionnaire (RFQ)

The RFQ was introduced as being grounded in achievement motivation, which includes a focus on both past successes and failures in pursuing goals. It emphasizes achievement motivation success by disentangling two distinct approaches (promotion and prevention) that can be used to achieve the success (Harlow, Friedman, and Higgins 1997; Higgins et al. 2001). Promotion and prevention success are operationalized via promotion pride and prevention pride respectively, which are anticipatory reactions to new task goals, derived from the individual's subjective history of past success in promotion and prevention goal attainment (Higgins 2002). The scale uses items about past events (e.g., "How often did you obey rules and regulations that were established by your parents?") to gauge respondents' chronic orientations towards new tasks, using the reasoning that similar self-regulation strategies will be evoked (Cesario, Grant, and Higgins 2004). It is unique among the scales in its use of past events to assess chronic regulatory focus.

The RFQ covers a range of behaviors within its items, has clearly worded, unambiguous questions that address hopes and aspirations, as well as duties and responsibilities. Relatively abstract (e.g., "Compared to most people, are you typically unable to get what you want out of life?") and concrete (e.g., "Did you get on your parents' nerves often when you were growing up?") questions are included. The measures capture the subtlety of regulatory focus theory by referencing both the presence and absence of positive and negative outcomes (Grant and Higgins 2003). The focus on both approaching gains and avoiding non-gains (promotion), and on approaching non-losses and avoiding losses (prevention) is captured by the reverse coding required for several items, and strategically captures the distinction between approach and avoidance within each regulatory focus. Thus, content-wise, the RFQ maps well on to key concepts within regulatory focus theory.

However, one limitation is that some items may be less appropriate for middle-aged or elderly respondents who may find it difficult to reflect back on their childhood in answering questions regarding parents' opinions and evaluations. Another limitation is that despite the theoretical relation of regulatory focus to affect and affective responses, the RFQ measures do not explicitly tap into emotional content. The scale emphasizes outcomes and cognitions about outcomes. So it is of questionable suitability for operationalizing emotional components of regulatory focus, although it has been used successfully in prior research to predict emotional outcomes (e.g., Camacho, Higgins and Luger 2003).

The BIS/BAS Scale

The BIS/BAS scale was originally developed to assess individuals' sensitivity to neurological systems regulating aversive and appetitive motivations (Carver and White 1994) rather than specifically to measure promotion and prevention focus. Although the scale items measure the individual's sensitivity to gains and losses, they do not measure hopes, aspirations, duties or obligations, which are central to regulatory focus theory. Nor do they make the distinction, or explicitly measure the presence and absence of positive and negative outcomes. Instead, the BIS/BAS scales measure predominantly motivational aspects of individuals' goal orientations. For example, the BIS items reference potentially punishing events and ask how individuals respond to them (e.g., "Criticism or scolding hurts me quite a bit."). The items capture "eagerness" and "vigilance" aspects of motivation and regulatory focus theory.

The BIS/BAS scale relies on a classic approach-avoidance distinction and rather than acting consistently with achievement motivation, the BIS items assess how to avoid movement towards a goal for fear of making mistakes (i.e., "I worry about making mistakes", etc.). As such, the BIS/BAS scale operationalizes the respondents' approach towards positive outcomes and avoidance of negative outcomes rather than addressing the full range of regulatory focus theory (i.e., avoidance of non-gains and approach of non-losses). The BIS/BAS scales are thus better suited for situations in which the researcher employs a classic approach-avoidance paradigm.

Interestingly, of all the measures studied, the BIS/BAS is the most affective, explicitly assessing emotional responses such as worry, fear, hurt, nervousness, and excitement. Consequently, this scale could be used to study research questions concerning the roles and effects of regulatory focus in emotion-based self-regulation (e.g., Dholakia et al. 2006), but will be less useful when studying other types of research questions involving chronic regulatory focus, for example, cognitive processing, judgment, and decision making by consumers. In summary, of all the measures assessed, these scales are the weakest in including the key tenets of regulatory focus theory.

The Selves Questionnaire

The Selves Questionnaire operationalizes self-discrepancies in regulatory orientations. It measures psychological distances from whom one would ideally like to be and whom they think that they should be and the emotional responses that result. Thus, the sub-scales distinguish between the ideal self, operationalizing hopes and aspirations, and the ought self, capturing duties and obligations. When the individual's represented actual self is congruent with the self-guide, s/he feels good, and to the extent there is a discrepancy, s/he feels bad (Higgins 2002; Higgins et al. 1997).

Like the RFQ, the Selves Questionnaire utilizes two conceptually orthogonal dimensions for promotion and prevention focus such that congruencies to ideals represent presence of positive outcomes, whereas discrepancies from ideals represent absence of positive outcomes, and congruencies to oughts represent absence of negative outcomes and discrepancies from oughts represent presence of negative outcomes. Unlike other measures, it does not use attributes specified by the researchers; instead, respondents specify attributes themselves. Thus, the individual is likely to consider a broader and a more personally relevant set of attributes. This flexibility ensures that over time, the measure is likely to accurately reflect any changes that the person has undergone in his or her goal orientation because the assessment is based on one's own chosen attributes. On the down side, as we found in Study 2, the test-retest reliability of this scale is low because respondents may provide different ideal and ought attributes during different administrations.

Representativeness-wise, the Selves Questionnaire has several limitations. First, it does not directly tap into positive and negative outcomes, assuming instead that discrepancies between desired and currently possessed attributes reflect the amount of effort one has put into achieving the desired attributes (reflecting the importance of the attributes to the individual). Second, having participants list attributes that they would ideally like to have or ought to have increases the possibility of eliciting attributes that are aspirational rather than ones that are currently possessed by the individual, resulting in discovery of greater discrepancies in evaluating promotion and prevention focus for the respondent.

Another psychometric limitation of the Selves Questionnaire is that the use of difference scores obfuscates actual levels of ideal attributes and ought attributes desired by the individual (Edwards 2001). For example, someone with high ideal and actual ratings on a particular attribute could have a low ideal-self discrepancy, and will score as high in promotion focus, just as another person who provides low levels of ideal and actual ratings, even though theoretically, the former may have higher motivation for promotion self-regulation than the latter person.

As we discovered in Studies 3A and 3B, these limitations of the Selves Questionnaire reduce the predictive power of the scales in theory-testing, making it less useful as a general-purpose dispositional measure of chronic regulatory focus than either the RFQ or the Lockwood scale.

Self-Guide Strength Measures

The Self-guide Strength measure is most closely related to the Selves measure through its emphasis on how fast the ideal and ought attributes are provided, plus how quickly they are rated by the respondent. However, the Self-guide Strength measures have several key differences when compared to the other measures. First, unlike the explicit measures used in the other four approaches, response latency strengths are implicit measures of self regulatory focus (Amodio et al. 2004). Consequently, they operationalize a theoretical view that endorses regulatory focus as operating nonconsciously and regulatory functioning as *constructed* rather than stored (Fazio and Olson 2003). The mechanism underlying these measures is derived from an association paradigm. That is, automatic activation of attributes and extent determinations produce a processing advantage for evaluatively congruent attributes (Fazio and Olson 2003). As Higgins, Shah, and Friedman (1997) suggest, chronic goal accessibility is analogous to chronic attitude accessibility, and, more accessible attitudes take less time to retrieve. Further, the self-guide strengths are viewed as independent of the magnitude of self-discrepancy as captured by the Selves measure. Our convergence results support this conclusion as their correlations are non-significant. In calculating the overall latency measure, attribute and rating latencies are summed together although they represent somewhat different concepts. Higgins et al. (1997) argue that strong self-guides, as expressed by fast responses to the extent ratings for each attribute, should act as important self-evaluative information (Newman et al. 1992). As such, the strength measure is designed to tap into as assessment of the strength of self-guides rather than the discrepancies between actual and desired (whether ideal or ought) states and is therefore both conceptually and empirically distinct from the Selves measure.

Interestingly, previous researchers (Higgins, Shah, and Friedman 1997) have found a strong correlation (r = .73) between the ideal self-guide strength and ought self-guide strength, suggesting that there is a high correspondence between the accessibility of ideal and ought attributes. Similarly, our present results highlight this strong relationship (with some variation across samples, with correlations of .80, .46, .73, .68, and .48 in the different samples). The strength measures are likely to be particularly useful for examining research questions involving non-conscious and automatic processing (Brazy, Shah, and Devine 2008). Also, because the response latency strength measure is based on indirect measures, it is less likely to be influenced by social desirability biases when compared to other scales (Nosek 2005). However, for the same reason, they may not function as well as other measures in tests of regulatory focus theory involving questions of cognitive processing, judgment, decision making, or emotions and where dependent variables are explicit ratings or choices.

Lockwood Scale

The Lockwood scale's authors offer it as being "designed to tap into the theoretical underpinnings of promotion and prevention concerns directly, providing a concise means of assessing them" (Lockwood et al. 2002, 859), although it is not clear why the authors did not use the RFQ which also maps onto regulatory focus theory tenets strongly. Phrases and words that are central concepts in regulatory focus theory are employed directly in the Lockwood measures. For example, the promotion items include "I frequently imagine how I will achieve my hopes and aspirations," while the prevention items include "I am anxious that I will fall short of my responsibilities and obligations."

However, the measures do less to focus on avoiding non-gains (promotion) or approaching non-losses (prevention), thereby overlooking some of the subtleties of regulatory focus theory that the RFQ captures (Grant and Higgins 2003). The Lockwood scale appears to have promotion items that focus on achievement and prevention items focusing on failure. This would appear to be somewhat inconsistent with the original intent of regulatory focus theory to encompass both approach and avoidance using both promotion and prevention means (Higgins et al 1997). Not surprisingly, we found positive correlations between the BIS/BAS sub-scales and the corresponding Lockwood sub-scales throughout our convergence tests.

Another limitation of the Lockwood scale is that the items are mostly abstract, and many of them are narrowly suited to a student population. Also noteworthy is the fact that some items measure only promotion (e.g., "I frequently imagine how I will achieve my hopes and aspirations") or prevention (e.g., "In general, I am focused on preventing negative events in my life") allowing them to be treated as different dimensions. Other items treat promotion and prevention focus as end-points of a single dimension (e.g., "I am more oriented toward preventing losses than toward achieving gains"), thus creating theoretical confusion regarding whether the two orientations should be treated as orthogonal or as the end-points of a single dimension.

Logistic and Administrative Considerations

In addition to understanding how each measure represents regulatory focus theory, there are also some administrative issues to consider. The RFQ, the BIS/BAS scales, and the Lockwood measures are all straightforward and simple measures that can be administered through surveys. The RFQ and the Lockwood scale both have some statements that are relevant to younger participants: the RFQ discusses parental influences and the Lockwood scale includes statements about academic focus. For the Lockwood scale, four of the 18 items (two promotion and two prevention items) are specific to students, for example, “My major goal in school right now is to achieve my academic ambitions”; however, the remaining 14 items are applicable across contexts and ages. To administer the scale to adult samples, some researchers have adapted the four items to fit a non-student population (Lockwood, Chasteen, and Wong 2005), Another alternative would be to simply use the 18-item scale for student samples and the shorter 14-item scale for adult samples. Such an approach eliminates the need to reword the items. The BIS/BAS and the Lockwood scales both use a single set of response categories, further simplifying their use as compared to the RFQ, which utilizes different responses labels for each item.

Considering the Selves Questionnaire, although the measure can be used with the same variety of formats as the scaled measures, the measures are more difficult to complete for respondents, requiring detailed instructions to explain concepts such as “ideal self” and “ought self” to study participants, and more thought by them in coming up with attributes and ratings. Consequently, the variation in effort put into answering may be more pronounced and impact results when using this scale. It also requires more time to complete, which is often problematic in experimental and survey research as time and space come at a premium. The use of three attributes per dimension is somewhat arbitrary. Also, depending on the particular approach used, analysis using these measures relies either on somewhat subjective (and more onerous) comparisons of attributes by independent raters or on difference scores which raise concerns from a methodological standpoint (Edwards 2001; Peter, Churchill, and Brown 1993).

The Self-guide Strength measure utilizes a more indirect or implicit approach, which requires precise timing measures that must be collected using computers and specific software, reducing the flexibility of this approach. These implicit measures may suffer from problems identified with implicit approaches in general, such as lower test-retest reliabilities stemming from greater measurement error than the direct approach used by other scales.

STUDY 1

Exploratory Factor Analysis Results

As described in the paper, separate exploratory factor analyses were conducted for the 11-item RFQ, the 12-item BIS/BAS measure, and the 18-item Lockwood measures. In each case, we used principal components extraction and Varimax rotation to interpret the factor loadings. Table WA1 provides the results of the exploratory factor analysis for the three scales.

TABLE WA1

STUDY 1: RESULTS OF EXPLORATORY FACTOR ANALYSIS FOR RFQ, BIS/BAS AND LOCKWOOD SCALES

Measure	Rotated Factor Loading – 1st Factor	Rotated Factor Loading – 2nd Factor	Measure	Rotated Factor Loading – 1st Factor	Rotated Factor Loading – 2nd Factor	Measure	Rotated Factor Loading – 1st Factor	Rotated Factor Loading – 2nd Factor
Fac1 Eigenvalue	3.083			4.206			5.017	
Fac2 Eigenvalue		1.957			2.586			3.191
RFQ Prom 1	.599	.040	BAS 1	.829	.001	Lock Prom 1	.731	.143
RFQ Prom 2	.652	-.096	BAS 2	.843	-.026	Lock Prom 2	.519	.269
RFQ Prom 3	.542	-.068	BAS 3	.837	.171	Lock Prom 3	.741	.031

RFQ Prom 4	.614	.150	BAS 4	.774	.166	Lock Prom 4	.664	.264
RFQ Prom 5	.660	.119	BAS 5	.765	.080	Lock Prom 5	.591	.059
RFQ Prom 6	.590	.077	BIS 1	.137	.718	Lock Prom 6	.729	-.081
RFQ Prev 1	.022	.850	BIS 2	.083	.725	Lock Prom 7	.676	-.065
RFQ Prev 2	.089	.661	BIS 3	.137	.706	Lock Prom 8	.761	-.012
RFQ Prev 3	.089	.672	BIS 4	.275	.584	Lock Prom 9	.550	-.441
RFQ Prev 4	.064	.832	BIS 5	-.056	.674	Lock Prev 1	.095	.473
RFQ Prev 5	.007	.677	BIS 6	.307	.541	Lock Prev 2	.068	.546
			BIS 7	-.184	.702	Lock Prev 3	-.022	.675
						Lock Prev 4	.201	.700
						Lock Prev 5	-.061	.722
						Lock Prev 6	.261	.586
						Lock Prev 7	-.234	.727
						Lock Prev 8	.235	.633
						Lock Prev 9	.363	.522

As can be seen from table WA1, the analyses revealed that for each scale, two factors with eigenvalues greater than one emerged, and there were clean two-factor loading patterns with each individual measure demonstrating loading on the appropriate subscale.

Confirmatory Factor Analysis Results

As mentioned in the paper, we also perform confirmatory factor analysis on Study 1 data, which serves as additional validation of the factor structure of the RF measures and allows an examination of the homogeneity of the measures. Table WA2 provides the goodness-of-fit measures for the CFAs for the RFQ, the BIS/BAS, and the Lockwood scales (the Selves and Self-guide Strength measures are not appropriate for this analysis). As can be seen, the measurement models fit the scale measures well in each case, indicating that the three scales have adequate homogeneity. The ϕ-coefficients (measures of correlation, attenuated for measurement error) between the promotion and prevention factors are provided in the last row of table WA2. The results indicate that the promotion and prevention factors of the RFQ and the BIS-BAS scales have moderately positive correlations, whereas the Lockwood scale factors are uncorrelated to each other. These results are consistent with an orthogonal, two-dimensional conceptualization of the regulatory orientations (Higgins 2002).

TABLE WA2

STUDY 1A: GOODNESS-OF-FIT MEASURES FOR CONFIRMATORY FACTOR ANALYSES OF THE RFQ, BIS/BAS AND LOCKWOOD SCALES

Goodness-of-fit Measures	RFQ Scale	BIS/BAS Scale	Lockwood Scale
χ^2	$\chi^2(43)= 78$ $p = .003$	$\chi^2(53)= 156$ $p = .00$	$\chi^2(134)= 403$ $p \approx .00$
RMSEA	.07	.07	.08
SRMR	.07	.08	.08
NNFI	.91	.91	.91
CFI	.91	.93	.89
Φ-value[1]	.38	.30	.11

[1]Φ-value provides the correlation between the promotion factor and the prevention factor in the Confirmatory Factor Analysis model that has been attenuated for measurement error.

STUDY 2

Replication of Convergence Results

To verify the convergence results of Study 1, we again calculated the bivariate correlations between the various sub-scales separately at the two time points. The results are provided in the top panel of table WA3 for the first session, and the bottom panel for the second session.

In the two datasets, the same four correlations have the highest values: (1) the correlation between the Selves promotion and prevention sub-scales (+.55 and +.54), (2) the one between Self-guide Strength promotion and prevention sub-scales (+.73 and +.68), (3) the one between the Lockwood promotion sub-scale and the BAS scale (+.51 and +.53), and (4) the one between the Lockwood prevention sub-scale and the BIS scale (+.43 and +.44). Additionally, just like the replication study sample, the correlation between RFQ promotion and Lockwood prevention sub-scales is negative (-.39 and -.40) both times.

TABLE WA3

STUDY 2: VARIABLE MEANS, STANDARD DEVIATIONS, AND INTERCORRELATIONS AT TIMES 1 AND 2 (N = 197)

	Time 1 Session	Mean	SD	Alpha	1	2	3	4	5	6	7	8	9	10
1	RFQ Promotion	5.11	.75	.64	-									
2	RFQ Prevention	4.40	1.07	.78	.36**	-								
3	BAS (Promotion)	6.06	.73	.84	.34**	.20**	-							
4	BIS (Prevention)	4.97	1.01	.83	-.13	.14*	.25**	-						
5	Selves Promotion	4.72	2.32	.63	-15*	.07	.20**	.28**	-					
6	Selves Prevention	3.85	2.26	.64	-.20**	.00	.17*	.26**	.55**	-				
7	S.G Strgth. Promotion	3.19	3.63	.69	.06	.11	.14	.11	.15*	.20**	-			
8	S.G Strgth. Prevention	3.14	3.79	.68	-.02	.03	.08	.16*	.22**	.21**	.73**	-		
9	Lockwood Promotion	5.72	.79	.86	.29**	.16*	.51**	.24**	.18*	.12	.13	.11	-	
10	Lockwood Prevention	4.45	.89	.74	-.39**	-.16*	-.04	.43**	.24**	.18*	.02	.06	.12	-

	Time 2 Session	Mean	SD	Alpha	1	2	3	4	5	6	7	8	9	10
1	RFQ Promotion	5.03	.81	.71	-									
2	RFQ Prevention	4.42	1.04	.80	.27**	-								
3	BAS (Promotion)	5.84	.89	.88	.34**	.21**	-							
4	BIS (Prevention)	4.84	.95	.79	-.08	.21*	.35**	-						
5	Selves Promotion	4.55	2.33	.61	.06	.07	.12	.28**	-					
6	Selves Prevention	3.76	2.20	.63	.02	.10	.18*	.23**	.54**	-				
7	S.G Strgth. Promotion	3.10	3.77	.57	.05	.10	.00	.11	.33**	.25**	-			
8	S.G Strgth. Prevention	3.03	3.84	.56	.04	.10	.13	.18*	.32**	.30**	.68**	-		
9	Lockwood Promotion	5.52	.75	.83	.30**	.20*	.53**	.32**	.18*	.21**	.06	.13	-	
10	Lockwood Prevention	4.30	.99	.81	-.40**	-.11	.02	.44**	.13	.18*	.05	.12	.23**	-

* $p < .05$; $^{**}p < .01$

STUDY 2B

Study 2B (which was referred to but not reported in the paper) was computer-based, and designed to evaluate the stability of the regulatory focus measures using a different approach. Instead of assessing measures in a second session after a period of time, in this case, participants completed the scales a second time after a situational regulatory focus manipulation within the same experimental session.

Method

Data were gathered from 226 students who received course credit for participation. In the introduction to the study tasks, participants were specifically instructed that they would be asked several questions during the course of the study, some of which would be repetitive, but that it was very important that they read and carefully respond to each question based on how they felt at that moment. Participants were then randomly assigned to complete one of the following four scales: the RFQ, the BIS/BAS, the Lockwood, or the Selves Questionnaire. As in the prior studies, the Selves Questionnaire was also used to obtain the Self-guide Strength measures.

After this initial task, participants completed an unrelated filler task which took approximately ten minutes. Next, the participants' situational regulatory focus was manipulated by having them write an essay either regarding their current hopes and aspirations (promotion focus) or about their current duties and responsibilities (prevention focus) (Pham and Avnet 2004). After this manipulation, participants again responded to the same chronic regulatory focus scale that they had completed at the beginning of the session.

The homogeneity of the RFQ, BIS/BAS and Lockwood scales was assessed by conducting CFAs using the same procedure as Study 2. To evaluate scale stability after the regulatory focus situational manipulation, each scale was summarized as in the prior studies. We then calculated the correlations between the scales for the first and second measurements for each manipulation condition. Greater scale stability is indicated by higher positive correlations after both situational regulatory focus manipulations.

Results

Homogeneity of regulatory focus measures. Table WA4 provides the goodness-of-fit measures for the CFAs for the RFQ, BIS/BAS, and Lockwood scales assessed initially (the Selves and Strength measures are not appropriate for this analysis as discussed earlier). As can be seen from table 4, the measurement models fit the scale measures well in all three cases, providing further evidence that the three scales have adequate homogeneity.

TABLE WA4

STUDY 2B: GOODNESS-OF-FIT MEASURES FOR CONFIRMATORY FACTOR ANALYSES OF THE RFQ, BIS/BAS AND LOCKWOOD SCALES AND STABILITY COEFFICIENTS

Goodness-of-fit Measures	RFQ Scale	BIS/BAS Scale	Lockwood Scale	Selves Measure	Strength Measure
χ^2	$\chi^2(43)$= 61 $p \approx .03$	$\chi^2(53)$= 82 $p \approx .007$	$\chi^2(134)$= 305 $p \approx .00$		
RMSEA	.04	.05	.06		
SRMR	.06	.06	.05		
NNFI	.97	.97	.96		
CFI	.98	.97	.97		
Φ-value[1]	.11	-.30	.04		
Stability Coefficients					
Promotion subscale (after a promotion manipulation)	.58***	.64***	.89***	.36*	.30
Promotion subscale (after a prevention manipulation)	.91***	.78***	.89***	.16	.60**

Prevention subscale (after a promotion manipulation)	.87***	.92***	.93***	.34	.23
Prevention subscale (after a prevention manipulation)	.91***	.94***	.86***	.77***	.52*

[1]Φ-value provides the correlation between the promotion factor and the prevention factor in the Confirmatory Factor Analysis model, that has been attenuated for measurement error.
$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

Stability of regulatory focus measures. Table WA4 provides the bivariate correlations between the measures examined before and after the situational manipulations. As can be seen from the table, both sub-scales of the RFQ, the BIS/BAS scale, and the Lockwood scale demonstrate stability in both situational manipulations, as evidenced by strongly positive, significant correlations for corresponding pre- and post-manipulation measures.

The results for the Selves Questionnaire sub-scales are mixed. Consistent with the manipulations, the ideal-actual promotion sub-scale has a positive correlation after a situational promotion focus manipulation, whereas the ideal-ought prevention sub-scale has a positive correlation after a situational prevention focus manipulation. However, the correlations between the pre- and post-manipulation chronic measures, when the manipulation was for the non-corresponding regulatory focus, are not significant for either promotion or prevention focus.

Both response latency sub-scales are found to be stable after a prevention focus manipulation but neither is stable after a promotion focus manipulation. On the basis of these findings, we concluded that the RFQ, the BIS/BAS scales, and the Lockwood scale, all appear to be stable following situational manipulations of regulatory focus, but the remaining two scales are not. Study 2B provides evidence of adequate homogeneity and stability for the RFQ sub-scales, the BIS/BAS scales, and the Lockwood sub-scales. Results also indicate the Selves Questionnaire sub-scales and the Self-guide Strength sub-scales to be relatively unstable after a situational manipulation of regulatory focus.

STUDY 3A

Replication of Convergence Results

To verify the convergence results, we again calculated the bivariate correlations between the various sub-scales. The results are provided in the top panel of table WA5.

TABLE WA5
STUDY 3A: VARIABLE MEANS, STANDARD DEVIATIONS, RELIABILITIES AND INTERCORRELATIONS (N = 367)

		Mean	SD	Alpha	1	2	3	4	5	6	7	8	9	10
1	RFQ Promotion	5.12	.79	.59	-									
2	RFQ Prevention	4.54	1.19	.82	.06	-								
3	BAS (Promotion)	6.27	.71	.85	.10	.00	-							
4	BIS (Prevention)	5.01	1.09	.83	-.16**	.11*	.36**	-						
5	Selves Promotion	5.33	2.24	.64	-19**	-.12*	.09	.17**	-					
6	Selves Prevention	3.96	2.42	.68	-.04	-.21**	.06	.07	.49**	-				
7	S.G Strgth. Promotion	4.66	.32	.58	-.01	-.02	.06	-.00	.00	.04	-			
8	S.G Strgth. Prevention	4.55	.32	.59	-.02	.02	.11*	.02	-.01	.01	.48**	-		
9	Lockwood Promotion	5.84	.78	.86	.27**	.04	.44**	.25**	-.01	-.07	.06	.03	-	
10	Lockwood Prevention	4.30	1.05	.80	-.36**	-.15**	.14**	.39**	.19**	.08	.09	.06	.19**	-

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

Perhaps not surprisingly, the same four correlations as in the previous studies emerge as having the four highest values. The correlation between the Selves promotion sub-scale and the Selves prevention sub-scale is +.49, the one between the Self-guide Strength promotion sub-scale and the Self-guide Strength prevention sub-scale is +.48, the one between Lockwood promotion sub-scale and the BAS scale is +.44 and the one between the Lockwood prevention sub-scale and the BIS scale is +.39.

Adoption Rates of the Innovative Products

Table WA6 provides the percentage of respondents who had adopted each one of the innovative products. As can be seen, adoption rates in the sample vary from a low of 26.4% for the Netflix movie rental service to 77.4% for the Plasma television. The study participants had adopted an average of 6.28 (SD = 3.17) of the twelve innovative products in the study.

TABLE WA6
STUDY 3A: ADOPTION RATES OF INNOVATIVE PRODUCTS

Innovative Product	Adoption Rate	Innovative Product	Adoption Rate
Nintendo Wii game console	66.8%	Plasma television	77.0%
Apple iPhone	49.3%	High-definition television service	64.6%
Internet Telephone (VoIP)	39.2%	Blue Ray DVD player	33.0%
Playstation 3 game console	33.8%	Netflix movie rental service	26.4%
GPS navigation device	65.9%	Teeth whitening strips	66.1%
Apple MacBook computer	42.5%	Satellite Radio	53.7%
Average number of innovative products adopted		6.28/12 (SD = 3.17)	

Analysis Classifying Participants as either Promotion or Prevention Focused

Despite its limitations (Fitzsimons 2008), we re-ran the continuous regression analyses reported in the paper using the methodological approach employed by many regulatory focus researchers of classifying participants as either promotion or prevention focused (e.g., Herzenstein et al. 2007; Higgins et al. 2001; Hong and Lee 2008; Zhao and Pechmann 2007). In this method, the two sub-scales are collapsed into a single dimension by calculating the difference between the sub-scale scores. A median split is then performed on this difference score to classify participants as either promotion focused or prevention focused. After implementing this procedure, we conducted ANOVAs with promotion or prevention focus as the independent factor. The results of this analysis are provided in the left panel of table WA7.

TABLE WA7

STUDIES 3A AND 3B: ONE-WAY ANOVAS OF OUTCOMES ON MEDIAN SPLIT ON DIFFERENCE BETWEEN PROMOTION AND PREVENTION FOCUS SUBSCALE SCORES

	STUDY 3A (*N* = 367)			STUDY 3B (*N* = 180)	
Chronic Regulatory Focus Measure	DV: Number of Innovative products adopted	DV: Relative preference for jobs	DV: Amt. of $25K inheritance invested in bus. venture	DV: Number of unusual uses for a brick	DV: Number of movies considered
RFQ	$M_{Prom} = 6.71$ vs. $M_{Prev} = 5.83$, $p < .01$	$M_{Prom} = 5.48$ vs. $M_{Prev} = 6.32$, $p < .001$	$M_{Prom} = \$9369$ vs. $M_{Prev} = \$9207$, $p > .78$	$M_{Prom} = 5.29$ vs. $M_{Prev} = 5.24$, $p > .91$	$M_{Prom} = 4.83$ vs. $M_{Prev} = 3.88$, $p < .01$
BIS/BAS	$M_{Prom} = 6.29$ vs. $M_{Prev} = 6.25$, $p > .89$	$M_{Prom} = 5.38$ vs. $M_{Prev} = 6.11$, $p < .05$	$M_{Prom} = \$9881$ vs. $M_{Prev} = \$8820$, $p < .05$	$M_{Prom} = 5.93$ vs. $M_{Prev} = 4.55$, $p < .01$	$M_{Prom} = 4.41$ vs. $M_{Prev} = 4.24$, $p > .72$
Selves Measure	$M_{Prom} = 6.53$ vs. $M_{Prev} = 6.18$, $p > .30$	$M_{Prom} = 5.70$ vs. $M_{Prev} = 5.94$, $p > .37$	$M_{Prom} = \$9233$ vs. $M_{Prev} = \$9446$, $p > .73$	$M_{Prom} = 5.57$ vs. $M_{Prev} = 5.20$, $p > .50$	$M_{Prom} = 4.67$ vs. $M_{Prev} = 3.92$, $p < .05$
Self-Guide Strength Measure	$M_{Prom} = 6.06$ vs. $M_{Prev} = 6.54$, $p > .15$	$M_{Prom} = 6.06$ vs. $M_{Prev} = 5.71$, $p > .17$	$M_{Prom} = \$9594$ vs. $M_{Prev} = \$8995$, $p > .32$	$M_{Prom} = 4.99$ vs. $M_{Prev} = 5.67$, $p > .21$	$M_{Prom} = 4.55$ vs. $M_{Prev} = 4.13$, $p > .37$
Lockwood Scale	$M_{Prom} = 6.14$ vs. $M_{Prev} = 6.43$, $p > .39$	$M_{Prom} = 5.82$ vs. $M_{Prev} = 5.98$, $p > .53$	$M_{Prom} = \$9959$ vs. $M_{Prev} = \$8672$, $p < .01$	$M_{Prom} = 5.69$ vs. $M_{Prev} = 4.75$, $p < .05$	$M_{Prom} = 4.41$ vs. $M_{Prev} = 4.33$, $p > .84$

As can be seen from table WA7, these results mirror the regression results in most cases. The only exception is that the Selves Questionnaire results are no longer significant in predicting the individual's relative preference for secure vs. high-paying jobs. This is consistent with Fitzsimon's (2008) recent critique that dichotomizing continuous variables reduces statistical power for hypothesis testing. Nevertheless, one advantage of using this approach is that because a single independent factor is used in the analysis, the results are easier to interpret and discuss. For example, from WA7, we can say that promotion-focused consumers (as identified by the RFQ) own more innovative products ($M = 6.71$) when compared to those who are prevention-focused ($M = 5.83$; $p < .01$), thus replicating Herzenstein et al.'s (2007) finding.

However, on the flip side, the interaction between promotion focus and prevention focus cannot be tested nor can the unique effects of either regulatory focus alone be examined. Consequently, using this method, we were not able to test Pham and Avnet's (2004) hypotheses concerning interaction effects of promotion and prevention with affective responses and substantive assessments in predicting the persuasive impacts of public service ads. Finally, this method ignores the low to moderate correlations of the two sub-scales that are indicative of factor independence.

Regressions of Dependent Measures on Uni-Dimensional Promotion-Prevention Focus Measure

In addition to the results reported in the paper and above, we ran a series of regressions using the uni-dimensional promotion-prevention measure for each scale to predict the outcome variables. The results are provided in the left panel of table WA8.

TABLE WA8

STUDIES 3A AND 3B: REGRESSIONS OF OUTCOMES ON DIFFERENCE SCORES BETWEEN PROMOTION AND PREVENTION FOCUS SUBSCALES

Chronic Regulatory Focus Measure	DV: Number of Innovative products adopted[1]	DV: Relative preference for jobs	DV: Amt. of $25K invested in bus. venture	DV: Persuasive impact of advertisement[2]	DV: Number of unusual brick uses	DV: Number of movies considered
RFQ	$\beta = .12$, $p < .05$	$\beta = -.15$, $p < .001$	$\beta = .01$, $p > .85$	$\beta_{RFQ*Affect} = .18$, $p < .05$ $\beta_{RFQ*Sub.} = -.08$, $p > .50$	$\beta = .01$, $p > .88$	$\beta = .15$, $p < .05$
BIS/BAS	$\beta = .03$, $p > .60$	$\beta = -.11$, $p < .05$	$\beta = .06$, $p > .41$	$\beta_{BIS/BAS*Affect} = .11$, $p > .15$ $\beta_{BIS/BAS*Sub.} = -.08$, $p > .15$	$\beta = .16$, $p < .05$	$\beta = .06$, $p > .39$
Selves Measure	$\beta = .04$, $p > .30$	$\beta = -.04$, $p > .43$	$\beta = .03$, $p > .53$	$\beta_{Selves*Affect} = .03$, $p > .65$ $\beta_{Selves*Sub.} = -.02$, $p > .79$	$\beta = .02$, $p > .82$	$\beta = .08$, $p > .27$
Response Latency Measure	$\beta = .03$, $p > .64$	$\beta = .07$, $p > .19$	$\beta = .09$, $p < .05$	$\beta_{RLat*Affect} = .07$, $p > .29$ $\beta_{RLat*Sub.} = .00$, $p > .99$	$\beta = -.09$, $p > .23$	$\beta = .15$, $p < .05$
Lockwood Scale	$\beta = .02$, $p > .65$	$\beta = -.03$, $p > .53$	$\beta = .01$, $p > .93$	$\beta_{Lockwood*Affect} = .06$, $p > .42$ $\beta_{Lockwood*Sub.} = .03$, $p > .15$	$\beta = .19$, $p < .01$	$\beta = -.01$, $p > .92$

[1]Standardized regression coefficients are provided; [2]Based on Pham and Avnet (2004). The regression equation is: Persuasive impact = $\beta_0 + \beta_{Affect}X1 + \beta_{Substance}X2 + \beta_{Affect*Substance}X3 + \beta_{Prom/Prev}X4 + \beta_{Prom/Prev*Affect}X5 + \beta_{Prom/Prev*Substance}X6$; *$p < .05$, **$p < .01$, ***$p < .001$

By and large, the results mirrored the two-dimensional regressions and the ANOVA results but were weaker, i.e., fewer coefficients were significant. The RFQ predicted the number of innovative products adopted, relative preference for jobs, and the persuasive impact of advertisements. The BIS/BAS measure predicted relative preference for jobs, and the Self-guide Strength response latency measure predicted the amount invested in the riskier business venture. Neither the Selves measure nor the Lockwood measure emerged as significant in any of the regressions.

STUDY 3B

Replication of Convergence Results

To verify the convergence results, we again calculated the bivariate correlations between the various sub-scales. The results are provided in the top panel of table WA9.

Regressions of Dependent Measures on Uni-Dimensional Promotion-Prevention Focus Measure

In addition to the results reported in the paper, we repeated the regression analysis as in the previous study by using the uni-dimensional promotion-prevention measure for each scale. The results are provided in the right panel of table WA8. As can be seen, again, the results are similar to those of the two-dimensional regressions and the ANOVAs reported in table WA7. The number of unusual brick uses is predicted significantly by the BIS/BAS and the Lockwood measures, and the number of movies in the respondent's consideration set is predicted by the RFQ and the Self-guide Strength measures. The Selves measure again does not predict either dependent variable.

TABLE WA9
STUDY 3B: VARIABLE MEANS, STANDARD DEVIATIONS, RELIABILITIES AND INTERCORRELATIONS (N = 180)

		Mean	SD	Alpha	1	2	3	4	5	6	7	8	9	10
1	RFQ Promotion	5.24	.73	.63	-									
2	RFQ Prevention	4.65	1.04	.77	.19*	-								
3	BAS (Promotion)	6.06	.94	.90	.21**	.19*	-							
4	BIS (Prevention)	4.05	.41	.79	.04	.07	.13	-						
5	Selves Promotion	5.77	2.01	.62	-.35**	-.08	-.04	-.01	-					
6	Selves Prevention	4.41	2.22	.69	-.09	-.08	.00	-.05	.33**	-				
7	S.G. Strength Promotion	3.17	1.12	.67	.00	.04	-.09	.03	.15	.07	-			
8	S.G. Strength Prevention	3.11	1.14	.69	.04	.11	-.06	.02	.18*	.13	.68**	-		
9	Lockwood Promotion	5.73	.77	.84	.40**	.13	.38**	.10	-.22**	-.06	.06	.05	-	
10	Lockwood Prevention	4.40	1.00	.80	-.24**	.03	.16**	-.05	.20**	.03	.13	.12	.13	-

$^{*}p < .05$; $^{**}p < .01$

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