The Fit of Thinking Style and Situation:

New Measures of Situation-Specific Experiential and Rational Cognition

THOMAS P. NOVAK

DONNA L. HOFFMAN*

August 27, 2007

Under Review, Journal of Consumer Research

*Thomas P. Novak (tom.novak@ucr.edu) is Albert O. Steffey Professor of Marketing and Donna L. Hoffman (donna.hoffman@ucr.edu) is Chancellor's Chair and Professor of Marketing at the A. Gary Anderson Graduate School of Management, University of California, Riverside, 900 University Avenue, Riverside, CA 92501. The authors thank Seymour Epstein for his many thoughtful comments on an earlier version of this manuscript, and thank Sean Rhea and James Robbins for their programming and data collection efforts. This research received support from the UCR Sloan Center for Internet Retailing.

ABSTRACT

Decades of theoretical and empirical research in social and cognitive psychology provide strong evidence that consumers process information in two distinct and qualitatively different ways: rational and experiential. However, there has been surprisingly little research attention devoted to explicitly measuring how situational influences directly impact thinking style. Further, attempts to simultaneously measure the two dimensions of thinking style as either situation-specific or as an enduring state are even fewer and lack validation in a broad context. In five studies, we develop and validate a new instrument for measuring experiential and rational situation-specific thinking style in the context of a range of performance tasks designed to induce primarily rational or experiential cognition, as well as in the context of differing motivations toward the same task. We establish congruence effects related to the fit of situation-specific thinking style and the nature of the task on performance outcomes; also, we show that the prediction of task performance and related outcomes from dispositional thinking style is completely mediated by situation-specific thinking style.

Over the past 35 years, beginning with Cognitive Experiential Self Theory (CEST) (Epstein 1973), a series of dual process models have been introduced that describe two qualitatively different systems of thinking. In addition to the experiential and rational systems of CEST (Epstein 1973; 1983; 1985; 1994, 2003; 2005), these theories include "rule-based vs. associative" (Sloman 1996; Smith and DeCoster 2000); "System 1 vs. System 2" (Stanovich and West 1998, 2000; Kahneman and Frederick 2002, Kahneman 2003); "reflective vs impulsive" (Strack and Deutsch 2004); and "deliberative/ analytic vs. tacit/intuittive" (Hogarth 2005)[1]. A key commonality among modern dual process theories is the existence of two qualitatively different and interoperating systems, each best suited to its own purpose.

While any number of modern dual-process theories could be used to motivate studying situational and individual differences in thinking styles, we ground our work in CEST for several reasons. First, we note that CEST predates other modern dual-process theories, with its foundations presented in Epstein (1973), and with several recently introduced dual-process theories bearing very close resemblance to CEST (e.g. Sloman 1996; Smith and DeCoster 2000). Second, as summarized in Table 1, CEST provides the richest conceptual descriptions and understanding of two qualitatively different thinking styles, thus providing greater guidance for item development. By assimilating all of the attributes of equivalents of the experiential system found in other dual-process theories, CEST provides a meaningful substitute for what is generically referred to as "System 1" and "System 2" (e.g. Kahneman, 2003; Stanovich and West 2000). Third, as a global theory of personality as well as a dual processing theory, CEST has a

[1] We note some earlier dual-process theories, rather than positing two qualitatively different systems, identify two systems more narrowly based upon ease of processing, limitations on cognitive resources, or degree of motivation: "heuristic vs. systematic" (Chaiken 1980); "central vs. peripheral" Petty and Cacioppo (1986); or "associative access vs. construct attitudes" (Fazio 1986). However, it has been noted (Kruglansky, Thompson, and Spiegel 1999) that defining experiential and rational processing systems solely upon low vs. high effort is necessary but not sufficient, since this distinction could just as well underlie two levels of rational processing as two qualitatively different systems of processing.

unique focus on individual differences, with well established scales that measure general dispositional tendencies to adopt rational and experiential thinking styles (Epstein et al. 1996; Pacini and Epstein 1999; Norris and Epstein 2003a, 2003b). Incorporating dispositional tendencies allows us to understand how trait and state thinking style processes jointly influence task performance and related outcomes of situational influences.

--- insert table 1 about here ---

CEST posits that humans simultaneously employ dual, and qualitatively different, experiential and rational processing systems, or "thinking styles." Key assumptions of CEST are that neither the experiential or rational system is generally superior, and the two systems operate both simultaneously and sequentially. The key operating characteristics of CEST, summarized in Table 1, are derived from Epstein, Denes-Raj and Heier (1996) and Epstein (2003). As noted, this well articulated set of operating characteristics is a key distinction between CEST and other dual-process theories; other dual process theories do not describe the characteristics of component dual process systems in as much depth as does CEST (for detailed discussion of CEST and other dual-process theories, see Chaiken and Trope 1999).

A second point of distinction between CEST and other dual process theories is that CEST identifies the experiential system in a meaningful way as an adaptive automatic learning system with roots in evolution. The operating characteristics of the experiential system in CEST are consistent with and can be derived from the operation of an automatic, non-verbal learning system. The rational, inferential reasoning system, on the other hand, is uniquely human (Epstein 1994). Associative connections in the nonverbal, rapid, imagistic, affect-laden and holistic experiential system are automatically learned by experience through classical conditioning, instrumental conditioning, and imitation learning; the verbal, effortful, abstract, affect-free and analytic rational system learns through logical inference (e.g., Epstein 1994, 2003, 2005). A third major difference is that the experiential and rational systems are embedded in a global theory of personality. Thus, the two systems can and have been validated by measuring personality variables that are not applicable to more narrowly conceived dual-process theories (e.g. Epstein et al. 1996; Pacini and Epstein 1999; Norris and Epstein 2003a, 2003b).

Thinking style is often primed or experimentally manipulated, but is rarely directly measured in the context of a given situation. We define situation broadly to incorporate different tasks or activities that consumers may undertake, as well as different motivations or orientations that consumers may bring to a specific task or activity. In this context, we measure *situation-specific thinking style (SSTS),* which is the particular thinking style or momentary thinking orientation adopted by a consumer in a specific situation, as contrasted with a general dispositional tendency to favor a particular thinking style. Theoretically, SSTS may be influenced by the task itself, or by the consumer's underlying motive for performing a given task, independent of the task.

We develop new two-dimensional scales to reliably measure situation-specific thinking style, and demonstrate the validity of these scales by showing that the rational or experiential nature of a task, as well at the motivation for performing a task, influence situation-specific thinking style. Our scales thus have an immediate application for consumer behavior researchers as manipulation checks for priming tasks or experimental manipulations intended to induce a particular thinking style.

Additionally, we address the question of which system (experiential or rational) is superior under what conditions. Hammond (1996) produces an illuminating discussion of this issue. He proposes a general rule that to optimally solve a problem the kind of processing used should match the kind of problem. Higgins (2000) similarly raises the question, “what makes a decision good?” and notes that the fit of the means by which an outcome was obtained with the situation contributes to superior performance and perception of value from fit. In our research, we use SSTS to systematically test the outcomes of fit between the demands of a task and the thinking style adopted when performing the task. Our findings contribute to the literature on fit and congruence effects involving thinking styles, and argue for situation-specific thinking style being routinely measured as a process variable when considering performance on a wide range of consumer activities.

While we focus on clearly defined experimental tasks, our conceptualization of situational differences in thinking style is broad enough to include everyday activities that consumers engage in. For example, the fit of thinking style with activity would be expected to impact outcomes for work vs. play (Babin, Darden and Griffin 1994; Hammond, McWilliam and Diaz 1998; Wolfinbarger and Gilly 2001), directed vs. nondirected search (Bloch Sherrell and Ridgway 1986), choice among specific alternatives vs. navigational choice (Hoffman and Novak 1996; Deci and Ryan 1985), and planned purchases vs. impulse buys (Rook 1987).

We further propose that *dispositional thinking style*, an enduring predisposition toward predominantly rational or experiential thinking, plays a key role in determining the thinking style employed in a given situation. Dispositional tendencies create heterogeneity in how different individuals approach the same task, contributing to congruence or incongruence of SSTS with the task. Thus, SSTS provides an important mediating link between a broad, dispositional cross-situational thinking style, and performance on tasks that are congruent or incongruent with a thinking style

The five studies presented here contribute to theory linking a) situations as elicitors of thinking style, b) dispositional tendencies to adopt a thinking style, and c) thinking styles employed by consumers in practice. Our research also has practical implications for empirical consumer behavior researchers employing dispositional and situation-specific thinking style as manipulation checks, process measures, explanatory variables, or covariates.

HYPOTHESES

Measurement. Considerable research has established that different thinking styles are better suited for different tasks or activities (e.g. Epstein 1994 and 2003; Hammond et al 1987; Hammond 1996; Hogarth 2005; Kahneman and Frederick 2002; Kahneman 2003). Hogarth (2005), in discussing Hammond (1996), notes that "tasks can also be arranged on a continuum that reflects the extent to which they are likely to induce intuitive thought, at one extreme, to analytic thought, at the other." Additionally, the nature of the task has been found to influence the degree to which a rational or experiential thinking style is adopted (e.g. Epstein, Donovan and Denes-Raj 1999; Isen, Daubman and Nowicki 1987; Schwartz and Bless 1991). For example, Hammond et al. (1987) specify a set of 11 task properties that "induce a corresponding package of cognitive properties" of either intuition (experiential) or analysis (rational). These 11 task properties include features such as number of cues (many induces experiential, few induces rational), availability of an organizing principle (unavailable induces experiential, available induces rational), and display of cues (simultaneous induces experiential, sequential induces rational).

If some situations are better suited to a particular thinking style, then it naturally makes sense to measure thinking style in the context of specific situations. However, Hogarth (2005) notes this is rarely done, since "few investigators provide any kinds of controls over whether people respond to problems in tacit [experiential] or deliberative [rational] manners." We further observe that few consumer behavior investigators routinely measure thinking style as a control variable or covariate, as they do with constructs like mood or involvement. In fairness, this is most likely the case because easily administered, reliable and valid situation-specific thinking style measures do not exist. One notable exception is Shiv and Fedorikhin's (1999) five-item "decision basis" summed scale of bipolar items generating a post-situation self-report of what can be interpreted as rational versus experiential thinking style. However, the bipolar nature of Shiv and Fedorikhin's items, with experiential versus rational anchors for each semantic differential item, forces experiential and rational responses into a unidimensional structure and precludes identifying separate rational and experiential dimensions.

While tasks or activities can be characterized as primarily rational or experiential, CEST assumes that consumer responses will be based upon both information processing systems. Rational and experiential thinking are separate constructs. Empirical evidence has found the two underlying constructs of rationality and experientially are independent, when measured as dispositional variables (e.g. Epstein et al. 1996; Pacini and Epstein 1999; Norris and Epstein 2003a, 2003b). Thus, we propose that:

> **H1:** Rational and experiential SSTS will be better fit by a two-dimensional factor structure than by a one-dimensional factor structure.

Fit of Task and Thinking Style. In the context of regulatory focus theory, the value of a good fit between task demands and processing style has been clearly established (Higgins 2000; Higgins et al. 2003), and it has been noted that "there is also evidence from other research programs that the fit effect is not restricted to regulatory focus variables" (Higgins et. al 2003, p. 1150). Some fit effects have been reported regarding thinking style and tasks, although none of these studies have employed self-report measures of thinking style. Hogarth (2005) notes that "people's judgments will tend to be more valid when there is a match between properties of the task and the mode of thought employed," citing empirical evidence provided by Hammond et al. (1987). While fit between task and mode of thought appear to improve performance, lack of fit has been found to degrade performance (Hammond et al. 1987; Hogarth 2005; McMacklin and Slovic 2000; Schooler, Ohlsson and Brooks 1993; Schooler and Engstler-Schooler 1990). For example, verbalization induces rational thinking and has a negative impact on the ability to solve problems that require insightful solutions (Schooler et al. 1993), even when the respondent is an expert (Fallshore and Schooler 1995; Wilson and Schooler 1991; Wilson et al. 1993).

Similarly, Cacioppo, Priester and Berntson (1993) examined the outcome of the fit of an anagram task framed as either promotion or prevention regulatory focus with the orientation toward the task manipulated as either an approach or avoidance orientation. Fit of task framing with orientation taken toward the task improved performance. Subjective measures of performance have also been found to be impacted by the fit of the task and the approach taken when performing the task (Higgens 2000; Higgens et al. 2003). Thus:

> **H2:** SSTS that is congruent (incongruent) with the experiential or rational nature of a task will correlate positively (negatively) with objective measures of task performance.
>
> **H3:** SSTS that is congruent (incongruent) with the experiential or rational nature of a task will be positively (negatively) associated with subjective measures of i) decreased perceived workload, ii) increased perceived performance and iii) decreased perceived task difficulty.

Mediation of Disposition in Performance Prediction. The Rational-Experiential Inventory (REI) is a measure of dispositional thinking style that has been in continuous development since

1996 (Epstein et al. 1996; Pacini and Epstein 1999; Norris and Epstein 2003a, 2003b). The REI originally consisted of two scales, Need for Cognition (19 items adapted from Cacioppo and Petty 1982) and Faith in Intuition (12 items). Subsequent methodological improvements by Epstein and his colleagues have yielded long and short forms of the REI, with scales for Experientiality and Rationality.

In any given situation, task performance can be influenced be a person's dispositional thinking style (e.g. REI), and the situation-specific thinking style adopted in that situation. Dispositional thinking style will also influence SSTS. Will the prediction of task performance from dispositional thinking style be fully or only partially mediated by SSTS? If partially mediated, there would be two paths for the influence of dispositional thinking style, a mediated path through SSTS and a direct path. The direct path will indicate the degree to which participants were unable to report the entire influence of their SSTS, some of which may be unconscious. On the other hand, if completely mediated, this suggests that people can accurately report their SSTS, and there is no residual influence of dispositional thinking style on performance. Note that hypothesis four is worded in a manner that keeps open as an empirical matter the degree of mediation, and whether the degree of mediation may be different for experiential and rational processing.

H4: The prediction of rational (experiential) task performance from rational (experiential) dispositional thinking style will be mediated by rational (experiential) SSTS.

Our first three studies investigate the above hypotheses. Studies 1 and 2 develop and cross-validate two original scales measuring the new constructs of experiential and rational situation-specific thinking style (SSTS), and test hypotheses 1 and 2. Study 3 also includes measures of dispositional thinking style, and is used to test hypotheses 2, 3 and 4.

The preceding hypotheses are framed in terms of different types of tasks. As we view SSTS in a broader situational context, we introduce two additional hypotheses involving different motives for performing the same task. The first three studies provide an internal validation of the SSTS, since if the degree of experiential (rational) processing improves performance on an experiential (rational) task, then this is also a confirmation that the task itself was experiential (rational) in nature. Hypotheses 5 and 6, in turn, focus on the external, nomological validity of the SSTS – do the scales correlate with constructs to which, theoretically, they should be related?

Consummatory vs. Instrumental Motives. Over 50 years ago, Alderson (1957) contrasted consummatory and instrumental motives: "Consummatory motives underlie consumption behaviors that are intrinsically rewarding … whereas instrumental motives underlie consumption behaviors that are seldom rewarding in themselves and are undertaken to achieve some other goals" (Pham 1998). This is similar to the distinction made in the communications literature between ritualistic and instrumental orientations to media (Rubin; Rubin and Perse 1987), and to the classification of expected benefits in the marketing literature into hedonic/experiential and utilitarian benefits (e.g. Havlena and Holbrook 1986; Srinivasan 1987), as well as the distinction between hedonic and instrumental components of attitudes (e.g. Batra and Ahtola 1990).

In particular, it has been shown that consumers are more likely to rely on experiential decision strategies (such as the recruitment of anticipatory feelings through imagery) when they have consummatory motives (Pham 1998). On the other hand, consumers are more likely to rely on reason-based strategies (e.g., the comparison of pros and cons) when they have instrumental motives. To the extent that the above-mentioned strategies map onto the processes captured by the SSTS scales (which may or may not be true), an important determinant of a consumer's situational thinking approach would be the consumer's underlying motive for performing the task, independent of the task itself.[2] Thus:

H5: Consumers with consummatory (instrumental) motives will have higher rational (experiential) SSTS scores than consumers with instrumental (consummatory) motives.

Promotion vs. Prevention Focus. In the regulatory focus literature, a promotion focus is characterized by an emphasis on ideals, reflecting an individual's hopes, wishes and aspirations, while a prevention focus is characterized by an emphasis on oughts, reflecting an individual's duties, obligations and responsibilities (e.g. Higgins, 2000). Based upon the face value of these characterizations, a promotion focus appears to be well suited to experiential thinking, while a prevention focus appears to be suited to rational thinking. In persuasion settings, it has been shown that consumers with a promotion focus (e.g. Higgins 1998) are more likely to rely on affective cues than consumers with a prevention focus. Consumers with a prevention focus are more likely to rely on substantive and factual information than consumers with a promotion focus (Pham and Avnet, 2004). To the extent that the reliance on affect versus substance maps onto the processes captured by the SSTS scales, consumers' situational thinking approaches also depend on their self-regulatory orientation, independent of the task itself. Thus:

H6: Consumers with a prevention (promotion) focus will have higher rational (experiential) SSTS scores than consumers with an experiential (rational) focus.

STUDY 1: SCALE DEVELOPMENT

Method

Sample and Measures. A total of 602 respondents in study 1 comprised the calibration

[2] The authors thank Reviewer B for suggesting Hypotheses 5 and 6.

sample for developing the SSTS. Study 1 was programmed and administered via an academic Web-based online research facility, with 2400 respondents randomly selected from an online panel. Up to three email notifications over a one week period were used to solicit cooperation for a Web-based experiment, and a $500 prize drawing served as an incentive. Of the 2400 invitations, 655 respondents (27%) completed study 1. We eliminated 37 respondents who spent less than 5 minutes or more than one hour on the full study, as well as additional 16 outliers with extremely low or high times spent on one of the five individual tasks, producing an analysis sample size of 602 respondents [3].

Respondents were randomly assigned to one of five experimental tasks in a between-subjects design. Prior to completing one of the five experimental tasks, respondents completed a brief set of four warm up questions dealing with general Internet use. Following the experimental task, respondents completed 53 SSTS items (five point rating scales), followed by the six-item NASA TLX rating scale of subjective workload assessment (seven point rating scales) (NASA Human Performance Research Group 1987). As a summed scale comprised of items measuring mental demand, physical demand, temporal demand, performance, effort, and frustration, TLX provides a broadly-based measure of workload that has been extensively used in evaluating human-computer interaction.

Experimental Tasks. The five experimental tasks used in study 1 were chosen based upon the extent that experiential or rational processing would be most appropriate for successfully completing the task. As a nonverbal test of abstract reasoning, Raven's Standard Progressive Matrices (Raven 1976) was expected to favor rational processing, and respondents in Raven's condition completed 11 problems from one of the more difficult sections of the Raven's test.

[3] Of the 602 respondents in study 1, 66% were female; 21% had a high school education or less, 31% had some college education, and 42% had college degrees or higher; 33.7% were between ages 18 and 30, 43.5% were between ages 31 and 45, and 22.8% were over age 45. The demographic composition was similar in studies 2 and 3.

Each problem consisted of a three-by-three grid of geometric patterns, with one item in the grid missing. Respondents were asked to select the correct missing piece from a set of eight alternatives. The geometric patterns increased in difficulty as the respondent moved through the task. In a second rational task, respondents were given five specific factual questions about films that could be answered by searching the Internet Movie Database (IMDB).

The “Product Improvement Task” from the Torrance Tests of Creative Thinking (Torrance 1990) was expected to favor experiential processing; respondents were shown a picture of a stuffed toy elephant, and asked to “list the most clever, interesting, and unusual ways you can think of for changing this toy elephant so that children will have more fun playing with it.” Respondents were allowed to list up to 20 different modifications, but were asked to try and come up with at least five. In a similar experiential task, respondents were asked to browse the IMDB and provide up to 20 “clever, interesting, and unusual ways you can think of for modifying the IMDB Web site so that people like you will have more fun browsing through it.” Finally, in a third experiential task, respondents were simply asked to “browse at your own pace” and “just have fun as you look around” the IMDB site.

SSTS Item Construction. Drawing from the 13 characteristics differentiating experiential and rational processing shown in table 1, we constructed 28 experiential and 25 rational items that spanned these 13 characteristics, worded as self-report, post-task measures of situation-specific thinking style (SSTS). Of the 53 items, 15 items were modified from the 40-item Rational-Experiential Inventory (REI), a measure of dispositional thinking style (Pacini and Epstein 1999), and reworded to be suitable as situation-specific ratings. Many of the REI items tap very similar constructs, with redundancy in wording. The 20 item REI experiential scale, for example, includes seven items including either the word “intuition” or “intuitive,” and seven items including either “gut feelings” or “feelings”. Thus our remaining 38 items employed an expanded vocabulary to maximize coverage of the 13 characteristics in table 1.

Results

Using the full set of 53 SSTS items, coefficient alpha was .864 for the 28 experiential items, and .884 for the 25 rational items. However, a principal components analysis of the combined set of 53 rational and experiential items revealed 10 factors with eigenvalues greater than one, indicating a highly multidimensional structure, complicated by a few rational and experiential items crossloading on the same factors. We sequentially eliminated 21 experiential and rational items with a corrected item-total correlation less than .4, reducing the experiential item set from 28 to 14 items, and the rational from 25 to 18 items, and then sequentially dropped items that minimized the decrease in coefficient alpha for the rational and experiential item sets, producing final item sets of 10 rational and 10 experiential items. We note that identical 10 item subsets were obtained by the alternate procedure of selecting 10 items with the largest factor loadings on the first two unrotated factors from a five factor solution (after eliminating the 21 items with low item-total correlations). These final 10 item scales are indicated in the first two columns of table 2, along with factor pattern loadings from an oblique promax rotation (only two factors had eigenvalues greater than one, and the two factors explained 52.6% of variance). Coefficient alphas for the 10-item summed scales were .887 for the 10 experiential items and .900 for the 10 rational items. The 10 item summed scales for experiential and rational SSTS correlated -.102 in the calibration sample.

---- Insert table 2 about here ----

For each of the five study 1 tasks, table 3 reports means on the SSTS scales, NASA TLX summed scale, and time spent on each task. Significant differences were found on all of these measures, with the pattern of rational and experiential SSTS means consistent with our a priori characterization of the five tasks as either primarily rational or experiential. Table 3 also reports means and standard deviations for task performance. For the Ravens task and the IMBD directed search tasks, performance was measured as the number of items correctly answered. Performance on the elephant product improvement task was the sum of codes for fluency, originality, and flexibility (Torrance 1990). Fluency is the total number of relevant ideas expressed, originality the number of total responses excluding those characterized as having "zero-originality," and flexibility the number of non-redundant broader general approaches. As scoring procedures for originality and flexibility were not available for the IMDB improvement task, only fluency was scored for the IMDB tasks. Note that there is no objective measure of task performance for the task of non-directed browsing of the IMDB.

---- Insert table 3 about here ----

Within-task correlations of rational and experiential SSTS with task performance are shown in table 4. Correlations in table 4 are consistent with hypothesis 2; for the two rational tasks, rational SSTS significantly correlates with task performance, while experiential SSTS is either significantly negatively correlated or uncorrelated. For the two experiential tasks where it is possible to measure performance, experiential SSTS significantly correlates with task performance, while rational SSTS is uncorrelated with performance.

---- Insert table 4 about here ----

STUDY 2: VALIDATION

Method

Sample and Measures. Of 1100 randomly selected respondents, 335 (30%) completed study 2. The same set and sequence of measures used in study 1 was also used in study 2, as was the same procedure of emailing invitations to respondents from an online panel for a Web-based study. Eliminating 16 outlier respondents who had extremely low or extremely high times on the full study and/or the experimental task produced an analysis sample size of 319 respondents, which served as the validation sample for the 10-item experiential and rational SSTS scales developed in study 1. This uneven split with more respondents in the calibration sample is recommended (Wickens 1989).

Experimental Tasks. Six experimental tasks in a between-subjects design were used in study 2, as summarized in table 5. The two tasks with the largest differences between mean SSTS score were retained from study 1 and four new tasks were added to increase the generalizability of the validation. Four tasks were expected to elicit rational processing. Two rational tasks employed Raven's Matrices; one task used the same higher difficulty problems as in study 1, and a second Raven's task included only six lower difficulty problems. Verbal analogies were used in the other two rational conditions. For each of ten pairs of words, respondents were asked to identify an answer pair from a list of five pairs that "best expresses a relationship similar to that expressed in the original pair." The ten pairs were either at a low or high degree of difficulty, using pre-established items and difficulty ratings (College Board 2003). The toy elephant "Product Improvement Task" from study 1 was used as one experiential condition. The "Alternate Uses Task" was used as the second experiential condition to measure ideational fluency (Torrance 1990). In the Alternate Uses Task, respondents were asked "to list as many different uses for a common brick as you can think of."

Results

Coefficient alpha in the study 2 validation sample for the ten-item experiential SSTS scale was .904. For the 10-item rational SSTS scale, coefficient alpha was .916 in the validation sample. The 10 item scales for experiential and rational SSTS correlated -.292 in the validation sample. The third and fourth columns in table 2 reports factor pattern loadings from an oblique promax rotation (only two factors had eigenvalues greater than one)[4]. A two-factor confirmatory factor analysis model was fit to the 319 respondents in the validation sample, with 10 items loading on each of the experiential and rational factors. Fit of this structural model was acceptable with CFI=.93 and RMSEA=.07. These results provide good evidence of reliability and validity of the two-dimensional structure for experiential and rational situation-specific thinking style, and support hypotheses 1.

Table 5 reports means on the SSTS scales, NASA TLX summed scale and the time spent on each task, as well as means and standard deviations for task performance. As in study 1, the rational (experiential) tasks had higher rational (experiential) SSTS scores than the experiential (rational) tasks, again providing evidence of internal validity of the scales. Task performance for the Raven's Progressive Matrices tasks and verbal analogies was measured as the number of items correctly answered. The elephant product improvement task was again coded for fluency, originality, and flexibility (Torrance 1990). As scoring procedures for originality and flexibility were not available for the alternative uses task, only fluency was scored.

---- Insert table 5 about here ----

Within-task correlations of rational and experiential SSTS with task performance are displayed in table 6. Correlations in table 6 provide support hypothesis 2 for the rational tasks; for all four rational tasks, rational SSTS significantly correlates with task performance. As hypothesized, for three of these four rational tasks, experiential SSTS *negatively* correlates with task performance, and for the other task is not significantly correlated. Support for hypothesis 2

[4] We note that the tasks used in studies 1 and 2 were somewhat different, suggesting that the factor structure is not dependent upon the nature of the task. Nevertheless, we fit two factor models to the 20 SSTS items within each of the five tasks in study 1, and each of the six tasks in study 2. In all 11 cases, the rational items loaded more strongly on one factor, and the 10 experiential SSTS items loaded more strongly on the other factor.

is, however, not provided for the two experiential tasks. While in study 1, experiential SSTS correlated with performance on the two experiential tasks, in study 2, correlations of experiential and rational SSTS with performance were not significant for either experiential task.

---- Insert table 6 about here ----

STUDY 3: FIT AND MEDIATION

Method

Sample and Experimental Tasks. Study 3 was administered via an academic Web-based facility as in studies 1 and 2, with a cooperation rate of 31% (399 completes from 1300 randomly selected respondents). Respondents were asked to complete either the Raven's Progressive Matrices (11 items) task or the elephant Product Improvement task. These two tasks were selected because they exhibited the largest separation in mean rational and experiential SSTS scores in studies 1 and 2. Eliminating 26 respondents who spent less than 5 minutes or more than 60 minutes on the study produced an analysis sample size of 373, with 193 respondents completing the rational Raven's task, and 180 the experiential Product Improvement task.

Measures. Measures were collected in the following sequence. First, prior to completing the experimental task, dispositional thinking style was assessed using Norris and Epstein's (2003b) REI-24 scale. Respondents' mood prior to the experimental task was next measured using Allen and Janiszewski's (1989) four item scale. The Raven's or Product Improvement task was then presented, after which mood was again assessed, followed by the 10-item rational and experiential SSTS scales validated in studies 1 and 2. This was followed by Shiv and Fedorikhin's (1999) unidimensional five-item "Heart vs. Mind" scale (scaled so a higher summed score corresponded to rational thinking, and a lower score to experiential thinking). The following measures were then obtained, in this sequence: perceived task performance (using new items we developed[5]); task difficulty (four-item scale from Keller Anand and McGill 1994); subjective workload assessment using the six-item NASA TLX (NASA Human Performance Research Group 1987); and task involvement (four-item scale from Pham 1996). As before, objective task performance was measured as the number of the 11 Raven's Progressive Matrices items the respondent correctly identified, and the sum of coded values of the Product Improvement task on flexibility, originality, and fluency (Torrance 1990).

Results

Measurement. Reliabilities for all summed scales were greater than .7 (see table 7), with the exception of the NASA TLX scale (alpha=.681) and the REI Rational Ability subscale (alpha=.669) which had marginal alphas. The mean rational SSTS for the rational task (M=40.4) was significantly higher (p<.001) than mean rational SSTS for the experiential task (M=30.4), and mean experiential SSTS for the rational task (M=31.8) was significantly lower (p<.001) than mean experiential SSTS for the experiential task (M=38.7), providing additional support for internal validity of the SSTS.

---- Insert table 7 about here ----

Correlations (table 8) of the rational and experiential SSTS with objective performance are consistent with hypothesis 2. Correlations (table 8) of the two SSTS scores with subjective workload, task difficulty, and perceived performance provide partial support for hypothesis 3. Seven of 12 correlations of SSTS scores with the three subjective measures are consistent with hypothesis 3, four are non-significant, and one correlation is opposite that predicted by hypothesis 3, in that rational SSTS significantly correlates with perceived performance on the

[5] Three items were used to measure perceived performance: 1) How would you rate your performance on the … task? (7 item scale from "extremely poor" to "extremely good"); 2) "Compared to other people, how well do you think you did on the … task? (7 item scale from "well below average" to "well above average"); and 3) "If you were to grade your performance on the … task, what grade would you give yourself? (10 item scale ranging from "D or less," "C-," "C" … "A", "A+").

experiential task[6].

---- Insert table 8 about here ----

Regression Models. Table 9 presents results of a set of regression models predicting task performance from the REI and SSTS scales, for both the rational and experiential task. First consider models 2 and 3 which show that: 1) rational SSTS is positively related, and experiential SSTS is negatively related, to rational task performance; and 2) experiential SSTS is positively related, and rational SSTS is negatively related, to experiential task performance. These results support hypothesis 2. Further, model 1 shows that rational REI significantly predicts rational task performance when SSTS is not included in the model, but model 2 shows that this effect is completely mediated by rational SSTS, supporting hypothesis 4. Considering the experiential task, experiential REI does not significantly predict experiential task performance in model 1, so the question of mediation is not relevant for the experiential task[7].

---- Insert table 9 about here ----

Structural Models. We systematically tested for congruence and incongruence effects in a broader context by considering the impact of dispositional and situation-specific thinking style on task performance, taking into account mood measured before and after task completion,

---

[6] A supplemental analysis compared the two SSTS scales with Shiv and Fedorikhin's (1999) Heart vs. Mind scale, in predicting actual and perceived task performance for the rational and experiential tasks. For the rational task, the two SSTS scales significantly (p<.05) predicted actual performance (R^2 = .194) and perceived performance (R^2 = .368). The Heart vs. Mind scale also significantly predicted actual performance (R^2 = .142) and perceived performance (R^2 = .172). However, for the experiential task, while the two SSTS scales significantly predicted actual performance (R^2 = .085) and perceived performance (R^2 = .225), the Heart vs. Mind scale predicted neither actual performance (R^2 = .000, p=.604) nor perceived performance (R^2 = .001, p=.337).

[7] Note that when predicting experiential task performance, including rational and experiential REI in model 2 increases both the absolute value and statistical significance of the standardized regression coefficients for rational and experiential SSTS, as compared to Model 3. Further, the signs of coefficients for rational and experiential REI in model 2 are opposite those of coefficients for rational and experiential SSTS. These results suggest that in model 2, rational and experiential REI serve as suppressor variables when predicting actual task performance on the experiential task (Maasen and Bakker 2001).

perceived task difficulty, task involvement, and task time. Mood prior to task completion and dispositional thinking style were treated as exogenous. Dispositional thinking was measured by the two REI-24 subscales for rational/experiential ability (extent to which the respondent believes they successfully employ a thinking style) and the two REI-24 subscales for favorability (extent to which the respondent believes a thinking style should be used). Task time, perceived task difficulty, task involvement, and mood following task initiation are included as mediators of SSTS in predicting task performance. Based upon the results of table 9, SSTS is expected to fully mediate the role of REI in predicting task performance.

Figures 1a and 1b respectively show structural model results for rational and experiential tasks. In both cases, we began with a more complex structural model that included all of the paths shown in both figures 1a and 1b, and sequentially removed nonsignificant paths. Both models exhibit excellent fit (Rational Task Model CFI=.958, RMSEA=.059; Experiential Task Model CFI=.965, RMSEA=.057).[8] Dispositional thinking significantly predicts SSTS, but consistent with table 7 and hypothesis 4, the role of dispositional thinking in predicting task performance is completely mediated by SSTS. The more positive the pre-task mood, the more a rational SSTS was adopted for the rational task and the more an experiential SSTS was adopted for the experiential task (see General Discussion section). As shown in figures 1a and 1b, pre-task mood also positively impacts post-task mood, which in turn increases task involvement and decreases task difficulty. Task involvement and task difficulty both increase task time. These results appear for both the rational and experiential tasks.

---

[8] Since post-task mood might be considered a consequence (rather than antecedent) of perceived difficulty and involvement, or a consequence of task performance, four additional structural models were fit. All four alternatives produced substantially inferior fits: 1) experiential task, mood as consequence of difficulty and involvement, CFI=.756, RMSEA=.153; 2) experiential task, mood as consequence of performance, CFI=.708, RMSEA=.164; 3) rational task, mood as consequence of difficulty and involvement, CFI=.735, RMSEA=.149; 4) rational task, mood as consequence of performance, CFI=.674, RMSEA=.162).

---- Insert figure 1a and 1b about here ----

For the rational task (figure 1a), there is a strong congruence effect across multiple constructs. Rational SSTS improves post-task mood, increases task involvement, decreases perceived task difficulty, and increases task performance. Rational SSTS during the rational task impacts task performance both directly and in a mediated manner through mood, involvement, and task difficulty. Experiential SSTS, which is incongruent with the demands of the task, has a negative direct relationship with task performance for the rational task, detracting from performance on the rational task.

For the experiential task (figure 1b), the pattern is reversed, the only anomaly being a positive relationship between rational SSTS during the experiential task and task involvement. Otherwise, experiential SSTS (congruent with the task) improves post-task mood, increases task involvement, decreases perceived task difficulty and increases task performance, while rational SSTS (incongruent with the task) decreases task performance. The results show that rational and experiential thinkers are in their elements when performing rational and experiential tasks, respectively, and offer comprehensive support for hypothesis 4. [9]

STUDY 4: CONSUMMATORY AND INSTRUMENTAL MOTIVES

Method

Study 4 was administered via an academic Web-based facility, with a cooperation rate of 20% (409 completes from 2050 randomly selected respondents). Eliminating 25 respondents

[9] Structural models were also fit to REI total rational and REI total experiential scales (in place of the ability and engagement subscales), with similar results. In addition, as we noted the presence of suppressor effects of the REI scales, structural models were also fit for the experiential task including paths for suppressor effects from REI Rational → Task Performance (.110), and from REI Experiential → Task Performance (-.190) increases CFI to .989 and decreases RMSEA to .038. As expected, the path coefficient from SSTS Rational → Task Performance increases to -.22, and the path coefficient from SSTS Experiential → Task Performance increases to .26.

who spent less than 5 minutes or more than 45 minutes on the study produced an analysis sample size of 384. After completing the experimental task described below, respondents completed the 20 SSTS items.

There were two experimental conditions in a between subject design. In the consummatory condition (n=187), subjects were told, “we are interested in your ideas of how the online shopping experience can be made more fun for people and better help them enjoy themselves while shopping.” Subjects were asked to “provide any specific ideas you may have about how online shopping can be made more fun and engaging,” were encouraged to expand on their ideas in any way they wanted, and to take as much time as needed. In the instrumental condition (n=197), subjects were told, “we are interested in your ideas of how the online shopping process can be made more useful for people and better help them achieve their shopping goals.” Subjects were asked to “provide any specific ideas you may have about how online shopping can be made more useful and functional,” and were encouraged to expand on their ideas and take as much time as needed.

Results

The mean experiential SSTS for the consummatory condition was significantly higher than the mean experiential SSTS for the instrumental condition (3.83 vs. 3.55), ($F(1,382) = 15.51$, $p<.001$). Additionally, the mean rational SSTS for the instrumental condition was significantly higher than the mean rational SSTS for the consummatory condition (3.70 vs. 3.41), ($F(1,382) = 17.82$, $p<.001$). These results support hypothesis 5, and provide evidence of external validity of the SSTS scales. We note that the effect size of the mean differences is small-to-moderate (Cohen, 1988): eta-squared for differences in experiential SSTS was .039, while eta-square for differences in rational SSTS was .045.

STUDY 5: REGULATORY FOCUS

Method

Study 5 was administered via an academic Web-based facility, with a cooperation rate of 31% (231 completes from 750 randomly selected respondents). Eliminating 28 respondents who spent less than 30 seconds or more than 400 seconds on the experimental task produced an analysis sample size of 203. After completing the experimental task described below, respondents completed the 20 SSTS items.

There were two experimental conditions in a between-subject design. The conditions were taken from Phan and Avnet's (2004) experimental conditions for promotion vs. prevention focus. In the promotion focus (ideals) condition (n=101), subjects were told, "this study is about how people's hopes and goals evolve over time." Subjects were asked to think about their "hopes and goals", and to write down at least two hopes and goals they had in the past, as well as two they have today. In the prevention focus (oughts) condition (n=102), subjects were told, "this study is about how people's sense of duty and obligations evolve over time." Subjects were asked to think about their "duties and obligations," and two write down at least two duties and obligations they had in the past, as well as two they have today.

Results

The mean experiential SSTS for the promotion focus (ideals) condition was significantly higher than the mean experiential SSTS for the prevention focus (oughts) condition (3.80 vs. 3.60), ($F(1,201) = 5.61$, $p=.019$). Additionally, the mean rational SSTS for the prevention focus (oughts) condition was significantly higher than the mean rational SSTS for the promotion focus (ideals) condition (3.76 vs. 3.49), ($F(1,201) = 7.50$, $p=.006$). These results support hypothesis 6, and provide evidence of external validity of the SSTS scales. We note that the effect size of the mean differences is small-to-moderate (Cohen 1988): eta-squared for differences in experiential SSTS was .027, while eta-square for differences in rational SSTS was .036.

DISCUSSION

We developed and cross-validated new scales measuring experiential and rational situation-specific thinking style (SSTS) using a series of experimental tasks designed to induce primarily rational or experiential thinking. Our highly reliable SSTS measure was, as predicted, best fit by a two-dimensional factor structure. Evidence of internal validity was provided in that rational SSTS was higher for rational tasks and experiential SSTS was higher for experiential tasks. Further, the fit (congruence) of SSTS with task improved task performance, while lack of fit worsened task performance; thus SSTS is an important process variable in understanding task performance. Fit effects were also found for subjective measures of perceived performance, task difficulty and subjective workload. As evidence of external validity, SSTS was found to be influenced by motivation (consummatory vs. instrumental) as well as regulatory focus (promotion vs. prevention).

Both the task itself, as well as dispositional tendencies to adopt a particular thinking style, predict SSTS. Since dispositional tendencies predict SSTS, disposition influences the degree to which a priming task is likely to be effective, and thus disposition should be measured as a covariate when attempting to prime thinking style. However, we did find that the role of dispositional tendencies in predicting objective performance as well as subjective outcomes was completely mediated by SSTS.

Besides disposition, task demands, and motivation, there are likely many other factors that influence SSTS. For example, ability, in the form of task-relevant background knowledge or expertise, may influence whether rational or experiential thinking is employed in the service of a specific task. Novices tend to use rational thinking to construct a solution, whereas experts are more likely to rely on experiential thinking, drawing upon their extensive body of experience to recognize patterns and similarities in an intuitive manner (Alba and Hutchinson 1987; Ericsson and Lehmann 1996; Hogarth 2005).

Individuals in a happy mood have been found to have superior performance on creative tasks (Isen 1987; Isen et al. 1985; Schwarz and Clor 1996). Figure 1b shows that this result for mood may be explained by the mediating role of experiential SSTS for the experiential task. Prior research has also shown that consumers in an unhappy mood are more likely to engage in systematic (rational) processing, while those in a happy mood are more likely to engage in heuristic (experiential) processing (Bless and Schwarz 1999; Bless et. al 1990; Forgas 2001; Schwarz and Bless 1991). Our results expand these findings: we observed that positive pre-task mood leads respondents to adopt a thinking style congruent to the task. It may be that adopting an inappropriate (inconsistent with task) thinking style puts individuals in a worse mood. Our congruence finding also extends the affect-confirmation process result in which mood can influence evaluations, for example, by causing subjects to give more weight to information congruent with their manipulated mood (Adaval 2001). In our case, a positive affective state motivates respondents to adopt a thinking style congruent with the task.

In addressing the discrepancy between our congruence results for mood and thinking style and previous research that finds happy mood induces experiential processing while unhappy mood induces rational processing, we note from table 7 that our respondents' reported mood was, on average, relatively high both pre- and post-task. Thus, the distinction in our case is actually between individuals in a "good vs. better" mood, rather than a "bad vs. good" mood. An interesting question for future research concerns the boundary conditions of our congruence findings under mood manipulations: will congruence and incongruence effects hold under truly negative affective states?

While our experimental tasks indicated largely *oppositional* effects of the two styles, it is likely that other tasks might demonstrate *synergistic* effects, with both experiential and rational SSTS correlating positively with task performance. For example, Donovan and Epstein (1997) demonstrated that priming intuitive knowledge can facilitate intellectual performance, and Norris and Epstein (2003a) demonstrated numerous situations in which both thinking styles predict in the same direction.

In terms of future empirical work, we note that in Tables 4 and 6, hypothesized correlations of rational and experiential SSTS with task performance are stronger for the rational tasks than for the experiential tasks. Additionally, the correlations supporting H3 in Table 8 are somewhat stronger for the rational than experiential tasks. It is not clear if this is a function of the experimental tasks chosen, or the nature of the experiential SSTS items.

Recently, cognitive neuropsychologists have utilized brain imaging tools such as fMRI to support the presence in the brain of dual thinking styles (Goel 2003; Goel and Dolan 2003). McClure et al, for example, found "the discrepancy between short-run and long-run preferences reflects the differential activation of distinguishable neural systems" (2004, p. 504). Further, biochemical theories of emotion speculate that "gut reactions," for example, may literally reside in one's stomach (Pert 1997).   Our empirical results demonstrating the importance of situation-specific thinking style over and above dispositional thinking style for task performance may provide further impetus to scientists seeking neurological and chemical pathways that correspond to human cognition and task performance.

REFERENCES

Adaval, Rashmi (2001), "Sometimes It Just Feels Right: The Differential Weighting of Affect-Consistent and Affect-Inconsistent Product Information," Journal of Consumer Research, 28 (June), 1-17.

Alba, Joseph W. and J. Wesley Hutchinson (1987), "Dimensions of Consumer Expertise," *Journal of Consumer Research,* 13 (March), 411-454.

Allen, Chris T. and Chris Janiszewski (1989), "Assessing the Role of Contingency Awareness in Attitudinal Conditioning with Implications for Advertising Research," *Journal of Marketing Research*, 26 (February), 30-43.

Babin, Barry J., William R. Darden, and Mitch Griffin (1994), "Work and/or Fun: Measuring Hedonic and Utilitarian Shopping Value, *Journal of Consumer Research*, 20 (March), 644-656.

Batra, R. and O.T. Ahtola (1990), "Measuring the Hedonic and Utilitarian Sources of Consumer Attitudes," *Marketing Letters,* 2, 159-170.

Bless, Herbert, Gerald Bohner, Norbet Schwarz, and Fritz Strack (1990), "Mood and Persuasion: A Cognitive Response Analysis," *Personality and Social Psychology Bulletin,* 16 (June), 331-45.

Bless, Herbert and Norbert Schwartz (1999), "Sufficient and Necessary Conditions in Dual-Process Models." In Shelly Chaiken and Yaacov Trope (Eds.), *Dual-Process Theories in Social Psychology.* New York: The Guilford Press, pp. 423-440.

Bloch, Peter H., Daniel L. Sherrell, and Nancy M. Ridgway (1986), "Consumer Search: An Extended Framework," *Journal of Consumer Research,* 13 (June), 119-126.

Cacioppo, J.T. and R.E. Petty (1982), "The Need for Cognition," *Journal of Personality and Social Psychology*, 42, 116-131.

Cacioppo, J.T., J.R. Priester, and G.G. Berntson (1993), "Rudimentary Determinants of Attitudes. II: Arm Flexion and Extension Have Different Effects on Attitudes," *Journal of Personality and Social Psychology,* 65(1), 5-17.

Chaiken, S. (1980), "Heuristic Versus Systematic Information Processing and the Use of Source Versus Message Cues in Persuasion," *Journal of Personality and Social Psychology,* 39, 752-766.

Chaiken, Shelly and Yaacov Trope (1999), *Dual-Process Theories in Social Psychology.* New York: The Guilford Press.

Cohen, Jacob (1988), *Statistical Power Analysis for the Behavioral Sciences (2nd ed.)*. Hillsdale, J.J.: Lawrence Earlbaum Associates.

Deci, Edward L. and Richard M. Ryan (1985), *Intrinsic Motivation and Self-Determination in Human Behavior*. New York: Plenum Press.

Donovan, S. and S. Epstein (1997), "The Difficulty of the Linda Conjunction Problem Can Be Attributed to its Simultaneous Concrete and Unnatural Representation, and Not to Conversational Implicature," *Journal of Experimental Social Psychology*, Vol 33, 1-20.

Epstein, S. (1973), "The self-concept revisited, or a theory of a theory," *American Psychologist, 28*, 404-416.

Epstein, S. (1983), "The unconscious, the preconscious, and the self-concept," In J. Suls and A. Greenwald (Eds.), *Psychological Perspectives on the Self, Vol 2.* Hillsdale, NJ: Erlbaum.

Epstein, S. (1985), "The implications of cognitive-experiential self-theory for research in social psychology and personality," *Journal for the Theory of Social Behavior, 15*, 283-310.

Epstein, S. (1994), "Integration of the cognitive and the psychodynamic unconscious," *American Psychologist*, 49, 709- 724.

Epstein, S. (2003), "Cognitive-experiential self-theory." In T. Millon & M. J. Lerner (Eds.), *Comprehensive handbook of psychology*, Vol. 5: Personality and Social Psychology.

Epstein, S. (2005), "Intuition from the Perspective of Cognitive-Experiential Self-Theory," *working paper*.

Epstein, S., Donovan, S., & Denes-Raj, V. (1999), "The missing link in the paradox of the Linda conjunction problem: Beyond knowing and thinking of the conjunction rule, the intrinsic appeal of heuristic processing," *Personality and Social Psychology Bulletin*, 25, 204-214.

Epstein, Seymour and Rosemary Pacini (1999), "Some Basic Issues Regarding Dual-Process Theories from the Perspective of Cognitive-Experiential Self-Theory," In Shelly Chaiken and Yaacov Trope (Eds.), *Dual-Process Theories in Social Psychology*. New York: The Guilford Press.

Epstein, S., Pacini, R., Denes-Raj, V., & Heier, H. (1996), "Individual differences in intuitive-experiential and analytical-rational thinking styles," *Journal of Personality and Social Psychology*, 71(2), 390-405.

Ericsson, K.A. and A. C. Lehmann (1996), "Expert and Exceptional Performance: Evidence of Maximal Adaptation to Task Constraints," *Annual Review of Psychology*, 47, 273-305.

Fallshore, Marte and Jonathan W. Schooler (1993), "Verbal Vulnerability of Perceptual Expertise," *Journal of Experimental Psychology: Learning, Memory and Cognition*, 21 (6), 1608-1623.

Fazio, R.H. (1986), “How Do Attitudes Guide Behavior?” In R.M. Sorrentino and E.T. Higgins (Eds.), *Handbook of Motivation and Cognition* (pp. 204-243), New York: Guilford.

Forgas. Joseph P. (2001), *Handbook of Affect and Social Cognition,* Mahwah, NJ: Erlbaum.

Goel, V. (2003), “Evidence for dual neural pathways for syllogistic reasoning,” *Psychologica*, *32*, 301-309

Goel, V., & Dolan, R. J. (2003), “Explaining modulation of reasoning by belief,” *Cognition*, *87*, 11-22.

Hammond, Kenneth. R. (1996), *Human Judgment and Social Policy: Irreducible Uncertainty, Inevitable Error, Unavoidable Injustice.* New York: Oxford University Press.

Hammond, Kathy, Gil McWilliam and Andrea N. Diaz (1998), "Fun and Work on the Web: Differences in attitudes between novices and experienced users," *Advances in Consumer Research,* 25, 372-378.

Hammond, Kenneth R., Robert M. Hamm, Janet Grassia, and Tamra Pearson (1987), “Direct Comparison of the Efficacy of Intuitive and Analytical Cognition in Expert Judgment,” *IEEE Transactions on Systems, Man and Cybernetics*, 17 (5), 753-770.

Havlena, William J. and Morris B. Holbrook (1986), “The Varieties of Consumption Experience: Comparing Two Typologies of Emotion in Consumer Behavior,” *Journal of Consumer Research*, 13 (December), 394-404.

Higgins, E.T. (2000), “Making a Good Decision: Value from Fit,” *American Psychologist*, 55, 1217-1230.

Higgins, E.T., L.C. Idson, A.L. Freitas, S. Spiegel and D.C. Molden (2003), “Transfer of Value from Fit,” *Journal of Personality and Social Psychology,* 84, 1140-1153.

Hoffman, Donna L. and Thomas P. Novak (1996), "Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations," *Journal of Marketing, 60* (July), 50-68.

Hogarth, Robin (2005), “Deciding analytically or trusting your intuition? The advantages and disadvantages of analytic and intuitive thought.” In *The Routines of Decision Making*, Haberstroh, Susanne and Betsch, Tilman (eds.), Mahwah, NJ: Lawrence Erlbaum Associates, pp392+.

Isen, Alice M. (1987), “Positive Affect, Cognitive Processes, and Social Behavior,” *Advances in Experimental Social Psychology,* 20, 203-253.

Isen, Alice M., Mitzi M. Johnson, Elizabeth Mertz, and Gregory F. Robinson (1985), “The Influence of Positive Affect on the Unusualness of Word Associations,” *Journal of Personality and Social Psychology* ,48 (June) 1413-26.

Isen, Alice M., Kimberly Daubman, and Gary P. Nowicki (1987), "Positive Affect Facilitates Creative Problem Solving," *Journal of Personality and Social Psychology*, 52 (June), 1122-31.

Kahneman, D. (2003), "A Perspective on Judgment and Choice: Mapping Bounded Rationality," *American Psychologist,* 58 (9), 697-720.

Kahneman, D. and Frederick. S. (2002), "Representativeness Revisited: Attribute Substitution in Intuitive Judgment." In. T. Gilovich, D. Griffin, and D. Kahneman (Eds.), *Heuristics and Biases: The Psychology of Intuitive Judgment.* New York: Cambridge University Press.

Keller Anand, Punam and Ann McGill (1994), "Differences in the Relative Influence of Product Attributes Under Alternative Processing Conditions: Attribute Importance Versus Attribute Ease of Imageability," *Journal of Consumer Psychology*, 3(1), 29-49.

Kruglansky, A. W., Thompson, D. P., & Spiegel, S. (1999), "Separate or equal? Bimodal notions of persuasion and a single-process 'uni-modal.'" In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology*, pp.293-313. NY: Guilford Press.

Maassen, Gerard H. and Arnold B. Bakker (2001), "Suppressor Variables in Path Models," *Sociological Methods and Research,* 30(2), pp 241-270.

McMacklin, J., and P. Slovic (2000), "When Does Explicit Justification Impair Decision Making?" *Journal of Applied Cognitive Psychology*. 14, 527-541.

NASA Human Performance Research Group (1987), *Task Load Index (NASA-TLX) v1.0 computerized version.* NASA Ames Research Centre.

McClure, Samuel, David I. Laibson, George Loewenstein, and Jonathan D. Cohen (2004), "Separate Neural Systems Value Immediate and Delayed Monetary Rewards," *SCIENCE*, 306, 503-507.

Norris, Paul and Seymour Epstein (2003a), "Objective Correlates of Experiential Processing," Working Paper.

Norris, Paul and Seymour Epstein (2003b), "The Investigation of Some Fundamental Issues Concerning Rational-Analytic and Intuitive-Experiential Thinking Styles with a Short Form of the Rational-Experiential Inventory," Working Paper.

Pert, Candace B. (1997), *Molecules of Emotion: The Science Behind Mind-Body Medicine*. NY: Simon & Schuster.

Petty, R.E. and J.T. Cacioppo (1986), *Communication and persuasion: Central and peripheral routes to attitude change.* New York: Springer-Verlag.

Pham, Michel Tuan (1996), “Cue Representation and Selection Effects of Arousal on Persuasion,” *Journal of Consumer Research*, 22 (Mar), 373-387

Pham , Michel Tuan (1998), “Representativeness, Relevance, and the Use of Feelings in Decision Making,” *Journal of Consumer Research*, 25 (September), 144-159.

Pham, Michel Tuan and Tamar Avnet (2004), “Ideals and Oughts and the Reliance on Affect versus Substance in Persuasion,” *Journal of Consumer Research, 30* (March), 503-518.

Raven, J.C. (1976), *Standard Progressive Matrices Sets A, B, C, D & E.* Oxford, UK: Oxford Psychologist Press Ltd.

Rook, Dennis W. (1987), "The buying impulse," *Journal of Consumer Research*, 14(2), 189-199.

Schooler, Jonathan W., Stellan Ohlsson, and Kevin Brooks (1993), “Thoughts Beyond Words: When Language Overshadows Insight,” *Journal of Experimental Psychology: General*, 122 (2), 166-183.

Schooler, J.W. and T.Y. Engstler-Schooler (1990), “Verbal Overshadowing of Visual Memories: Some Things are Better Left Unsaid,” *Cognitive Psychology*, 17, 36-71.

Schwarz, Norbert and Herbert Bless (1991), “Happy and Mindless, but Sad and Smart? The Impact of Affective States on Analytical Reasoning,” In *Emotion and Social Judgments*, Leonard L. Martin and Gerald L. Clore, Eds., Mahway, NJ: Erlbaum, 159-176.

Shiv, Baba and Fedorikhin, A. (1999), "Heart and Mind in Conflict: Interplay of Affect and Cognition in Consumer Decision Making," *Journal of Consumer Research*, Vol. 26 (December), 278-282.

Sloman, Steven A. (1996), “The Empirical Case for Two Systems of Reasoning,” *Psychological Bulletin*, 119(1), 3-22.

Smith, Elliot R. and Jamie DeCoster (2000), Dual-Process Models in Social and Cognitive Psychology: Conceptual Integration and Links to Underlying Memory Systems. Personality and Social Psychology Review, Vol 4(2), 108-131.

Stanovich, K.E., & West, R.F. (2000), “Individual differences in reasoning: Implications for the rationality debate?” *Behavioral & Brain Science*, *23,* 645-726.

Stanovich, Keith E. and Richard F. West (1998), “Individual Differences in Rational Thought,” *Journal of Experimental Psychology: General*, 127 (2), 161-168.

Strack, F. and R. Deutch (2004), “Reflective and Impulsive Determinants of Social Behavior,” *Personality and Social Psychology Review*, 8, 220-247.

Torrance, P.E (1990), *Manual for Scoring and Interpreting Results. Torrance Tests of Creative Thinking. Verbal, Forms A and B.* Bensenville, IL: Scholastic Testing Services.

Wickens, T.D. (1989), *Multiway Contingency Tables Analysis for the Social Sciences.* Hillsdale, NJ: LEA, Associates.

Wilson, T. D. & Schooler, J. W. (1991), “Thinking too much: Introspection can reduce the quality of preferences and decisions,” *Journal of Personality and Social Psychology, 60*, 181-192.

Wilson, T. D., Lisle, D. J., Schooler, J. W., Hodges, S. D., Klaaren, K. J., & LaFleur, S. J. (1993), “Introspecting about reasons can reduce post-choice satisfaction,” *Personality and Social Psychology Bulletin, 1*9, 331-339.

Wolfinbarger, Mary and Mary Gilly (2001), “Shopping Online for Freedom, Control, and Fun,” *California Management Review*, Winter, 43 (2), 34-55.

TABLE 1

CHARACTERISTICS OF SITUATION-SPECIFIC EXPERIENTIAL AND RATIONAL THINKING STYLES

	EXPERIENTIAL CHARACTERISTICS	**RATIONAL CHARACTERISTICS**
1	Holistic	Analytic
2	Automatic, effortless	Intentional, effortful
3	Emotional/Affective: Pleasure-pain oriented (what feels good)	Logical: Reason oriented (what is rational or sensible)
4	Associative connections	Logical, cause-and-effect, connections
5	Behavior mediated by "vibes" from past events	Behavior mediated by conscious appraisal of events
6	Encodes reality in concrete images, metaphors, and narratives	Encodes reality in abstract symbols, words, and numbers
7	More rapid processing; oriented toward immediate action	Slower processing; oriented toward delayed action
8	Slower and more resistant to change: change with repetitive or intense experience	Changes more rapidly and easily; changes with strength of argument and new evidence
9	More crudely differentiated; broad generalization gradient; context-specific processing; categorical and stereotypical thinking	More highly differentiated; dimensional thinking
10	More crudely integrated; dissociative, organized in part by emotional complexes; context-specific processing	More highly integrated; context-general principles
11	Experienced passively and preconsciously; we are seized by our emotions	Experienced actively and consciously; we are in control of our thoughts
12	Self-evidently valid; "experiencing is believing"	Requires justification via logic and evidence
13	More outcome oriented	More process oriented

TABLE 2
FINAL EXPERIENTIAL AND RATIONAL SSTS ITEMS

Factor pattern coefficient from oblique promax solution. Each of the following items is measured on the five-point rating scale: 1=definitely false, 2=mostly false, 3=undecided or equally true and false, 4=mostly true, 5=definitely true

Study 1[a]		Study 2[b]		
Rat	**Exp**	**Rat**	**Exp**	
Rational SSTS Items:				
.776	-.083	**.767**	-.081	I reasoned things out carefully.
.768	-.078	**.802**	-.070	I tackled this task systematically.
.761	-.037	**.767**	-.062	I figured things out logically.
.742	-.068	**.707**	-.099	I approached this task analytically.
.722	.095	**.744**	.206	I was very focused on the steps involved in doing this task.
.719	-.071	**.783**	-.067	I applied precise rules to deduce the answers.
.716	.082	**.751**	.121	I was very focused on what I was doing to arrive at the answers.
.692	.124	**.749**	.143	I was very aware of my thinking process.
.675	.026	**.780**	-.025	I arrived at my answers by carefully assessing the information in front of me.
.670	.058	**.721**	.028	I used clear rules.
Experiential SSTS items:				
.034	**.823**	-.075	**.826**	I used my gut feelings.
-.026	**.797**	-.003	**.812**	I went by what felt good to me.
.066	**.796**	.065	**.829**	I trusted my hunches.
-.081	**.756**	-.031	**.794**	I relied on my sense of intuition.
-.083	**.754**	-.065	**.748**	I relied on my first impressions.
.027	**.746**	.019	**.774**	I used my instincts.
-.134	**.694**	-.058	**.769**	I used my heart as a guide for my actions.
.231	**.567**	.277	**.635**	I had flashes of insight.
-.050	**.567**	-.158	**.635**	Ideas just popped into my head.
.242	**.531**	.135	**.502**	I used free-association, where one idea leads to the next.

[a] Study 1, first two factors explain 52.6% of variance; oblique promax correlation = -.102
[b] Study 2, first two factors explain 57.0% of variance; oblique promax correlation = -.308

TABLE 3

MEANS OF SUMMED SCALES AND PERFORMANCE MEASURES FOR EXPERIMENTAL TASKS USED IN STUDY 1 (N=602)

		Summed Scales:			Task Performance: [a]				
Experimental Task:	**Sample Size**	**SSTS Rational**	**SSTS Experiential**	**NASA TLX**	**Time spent on study (seconds)**	**Time spent on task (seconds)**	**Task performance (mean)**	**Task perrmance (standard dev.)**	**Task Performance (scale range)**
Rational (11 Ravens Progressive Matrices Items)	93	4.04	2.97	2.88	1370	481.0	8.77	2.26	(0,11)
Rational (search IMDB for specific information to answer 5 questions)	142	3.93	3.42	3.03	1854	1077	3.67	1.32	(0,5)
Experiential (product improvement task - toy elephant)	95	3.27	3.96	2.74	1067	291.4	11.71	4.90	(0,29)
Experiential (browse IMDB and suggest fun product improvement)	138	3.48	3.76	3.20	1336	614.1	5.02	2.02	(0, 20)
Experiential (non-directed browsing of IMDB)	134	3.39	3.65	2.33	1261	440.1	n/a	n/a	n/a
Eta-squared:		.188	.186	.094					
P_value:		.000	.000	.000					
Coefficient alpha for:		.887	.900	.751					

[a]Performance measures: Raven's and IMDB directed search tasks use number correct; elephant product improvement tasks use sum of coded counts for fluency, originality, and flexibility; IMBD product improvement task uses fluency (number of suggestions).

Note: SSTS items were measured using five-point scales; NASA TLX items were measured using seven-point rating scales, with higher TLX scores indicating greater subjective workload.

Note: Tukey post-hoc tests are summarized with underscores. Means with a solid underline are significantly different from means with a dotted underline. Within solid and dotted underline groups, means are not significantly different.

TABLE 4

CORRELATIONS OF RATIONAL AND EXPERIENTIAL SSTS WITH TASK PERFORMANCE AND SUBJECTIVE WORKLOAD IN STUDY 1 (N=602)

	Correlation of Task Performance and:	
Task:	**Rational SSTS**	**Experiential SSTS**
Rational (11 Ravens Progressive Matrices Items)	**.399***	**-.227***
Rational (search IMDB for specific information to answer 5 questions)	**.279***	.052
Experiential (product improvement task - toy elephant)	.118	**.368***
Experiential (browse IMDB and suggest fun product improvement)	.115	**.349***
Experiential (non-directed browsing of IMDB)	n/a	n/a

[a]NASA TLX Scale of Subjective Workload.

TABLE 5

MEANS OF SUMMED SCALES AND PERFORMANCE MEASURES FOR EXPERIMENTAL TASKS USED IN STUDY 2 (N=319)

		Summed Scales:			**Task Performance:** [a]				
Experimental Task:	**Sample Size**	**SSTS Rational**	**SSTS Experiential**	**NASA TLX**	**Time spent on study (seconds)**	**Time spent on task (seconds)**	**Task performance (mean)**	**Task perrmance (standard dev.)**	
Rational (10 verbal analogies items, low level of difficulty)	56	3.85	3.08	2.97	866	210.7	8.32	2.31	(0,10)
Rational (10 verbal analogies items, high level of difficulty)	53	3.74	3.23	3.43	978	299.6	5.85	2.45	(0,10)
Rational (6 Ravens Progressive Matrices Items)	51	4.21	2.93	2.38	889	192.7	5.61	1.22	(0,6)
Rational (11 Ravens Progressive Matrices items)	54	4.08	2.91	2.92	1183	469.7	9.15	2.08	(0,11)
Experiential (alternate uses task – uses of a brick)	52	3.36	3.76	2.93	1083	407.2	9.51	4.90	(0,30)
Experiential (product improvement task - toy elephant)	53	3.29	4.02	3.01	910	289.9	12.92	10.85	(0,60)
Eta-squared:		.211	.262	.092					
P_value:		.000	.000	.000					
Coefficient alpha for:		.904	.916	.749					

[a]Performance measures: Verbal analogies and Raven's use number correct; elephant product improvement tasks use sum of coded counts for fluency, originality, and flexibility; alternate uses of a brick task uses fluency (number of uses suggested).

Note: SSTS items were measured using five-point scales; NASA TLX items were measured using seven-point rating scales, with higher TLX scores indicating greater subjective workload.

Note: Tukey post-hoc tests are summarized with underscores. Means with a solid underline are significantly different from means with a dotted underline. Within solid and dotted underline groups, means are not significantly different.

TABLE 6

CORRELATIONS OF RATIONAL AND EXPERIENTIAL SSTS WITH TASK PERFORMANCE AND SUBJECTIVE WORKLOAD IN STUDY 2 (N=319)

CORRELATIONS OF RATIONAL AND EXPERIENTIAL SSTS WITH TASK PERFORMANCE AND SUBJECTIVE WORKLOAD IN STUDY 1 (N=602)

	Correlation of Task Performance and:	
Task:	**Rational SSTS**	**Experiential SSTS**
Rational (10 verbal analogies items, low level of difficulty)	**.323***	**-.309***
Rational (10 verbal analogies items, high level of difficulty)	**.262***	**-.369***
Rational (6 Ravens Progressive Matrices Items)	**.593***	.050
Rational (11 Ravens Progressive Matrices items)	**.303***	**-.269***
Experiential (alternate uses task – uses of a brick)	.050	.215
Experiential (product improvement task - toy elephant)	-.218	-.045

[a]NASA TLX Scale of Subjective Workload.

TABLE 7

MEASURES USED IN STUDY 3

(n=373 and 7-point rating scales used unless otherwise noted) Scale:	Number of Items:	Reliability (alpha):	Mean:	Valid Range:
SSTS – Rational	10	.930	36.25	(10, 50)
SSTS – Experiential	10	.921	34.41	(10, 50)
Heart vs. Mind	5	.791	17.22	(5, 35)
REI - Rational Ability*	6	.669	23.09	(6, 30)
REI - Rational Favorability*	6	.781	22.01	(6, 30)
REI - Rational Total*	12	.824	45.11	(12,60)
REI - Experiential Ability*	6	.776	22.27	(6, 30)
REI - Experiential Favorability*	6	.783	20.86	(6, 30)
REI - Experiential Total*	12	.870	43.13	(12, 60)
Mood (pre-task)	4	.859	22.25	(7,28)
Mood (post-task)	4	.922	22.72	(7, 28)
Perceived Performance	3	.889	16.77	(3, 24)
Perceived Task Difficulty	4	.747	13.44	(4, 28)
NASA TLX	6	.681	17.95	(6, 36)
Task Involvement	4	.736	20.86	(4, 28)
Product Improvement Task Score (n=180)	3	.867	12.31	(0, 43)
Number of Raven's Items Correctly Answered (n=193)	1	---	8.94	(0, 11)

*5 point rating scale used

TABLE 8

CORRELATIONS OF SSTS WITH PERFORMANCE VARIABLES FOR THE RATIONAL AND EXPERIENTIAL TASKS

	Rational Task (n=193)				Experiential Task (n=180)			
	Perceived Performance	Perceived Task Difficulty	Subjective Workload	Task Performance	Perceived Performance	Perceived Task Difficulty	Subjective Workload	Task Performance
SSTS Rational	**.606****	**-.317****	**-.381****	**.408****	**.269****	-.013	-.131	**-.218****
SSTS Experiential	-.096	.042	**.226****	**-.207****	**.404****	**-.330****	**-.165***	**.182***

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

TABLE 9

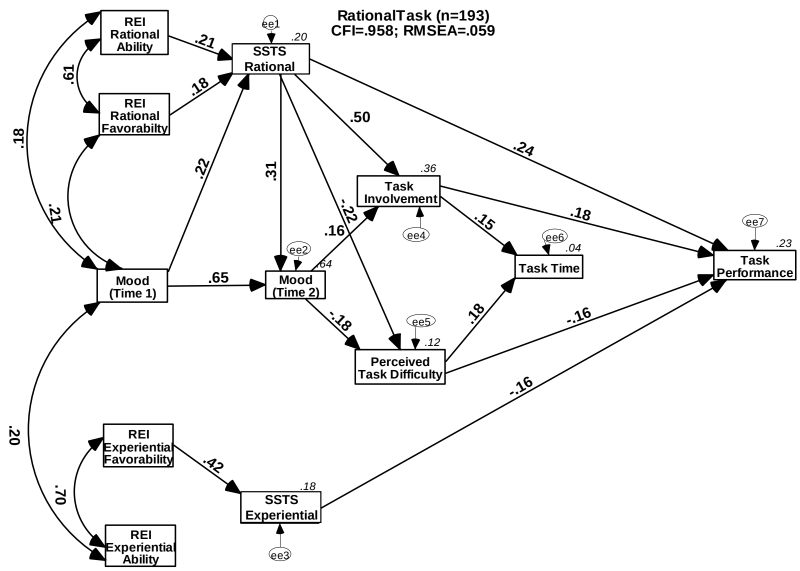
REGRESSION MODELS TO TEST MEDIATING ROLE OF SITUATION SPECIFIC THINKING STYLE

	Dependent Variable: Rational Task Performance			Dependent Variable: Experiential Task Performance		
	Beta	**p-value**	**Model R^2**	**Beta**	**p-value**	**Model R^2**
Model 1:						
REI (rational)	.192	.008	.039	.139	.064	.019
REI (experiential)	-.076	.288		.011	.887	
Model 2:						
REI (rational)	.004	.954	.195	.179	.016	.140
REI (experiential)	.031	.667		-.191	.041	
SSTS (rational)	.389	.000		-.286	.000	
SSTS (experiential)	-.181	.014		.300	.002	
Model 3:						
SSTS (rational)	.391	.000	.194	-.229	.002	.085
SSTS (experiential)	-.168	.011		.194	.008	

FIGURE 1

ESTIMATED STRUCTURAL MODELS OF THINKING STYLE AND TASK PERFORMANCE

1A. RATIONAL TASK



1B. EXPERIENTIAL TASK