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Reference for published paper:

Pretz, J.E., & Tetz, K.S. (2007). Measuring individual differences in affective, heuristic, and holistic intuition. *Personality and Individual Differences*, 43(5), 1247-1257.

Measuring Individual Differences in Affective, Heuristic, and Holistic Intuition

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Abstract

What is the nature of intuition? How should individual differences in intuition be measured? We examined the nature of intuition as measured by two commonly-used questionnaires of the construct. Two hundred twelve undergraduates completed the Rational-Experiential Inventory and the Intuitive/Sensate and Thinking/Feeling subscales of the Myers Briggs Type Indicator to examine correspondences between the constructs measured by each. Factor analyses revealed that the scales tap three distinct aspects of intuition: affective, heuristic, and holistic intuition. The REI was unique in its measurement of intuitive ability, and the MBTI was unique in its measurement of holistic intuition. An unexpected relationship between REI rational favorability and MBTI Intuitive/Sensate was found. Theoretical issues are discussed, and implications for future work are suggested.

Keywords: Intuition, individual differences, personality, decision making, dual process theory

Measuring Individual Differences in Affective, Heuristic, and Holistic Intuition

Consider a task that requires the use of intuition, for example, the hiring of a new colleague. This task relies on subjective information, incomplete objective information, and requires you to predict events in an uncertain future. Even if an analytical approach is preferred, the inherent uncertainty of the task necessitates an intuitive solution. Much research on judgments made under conditions of uncertainty has documented the failings of the use of intuitive heuristics (Tversky & Kahneman, 1974). Yet other researchers have found that quick, gut-level judgments are remarkably accurate (Ambady & Rosenthal, 1992).

Intuition is becoming a hot topic among popular writers (Gladwell, 2005) and scholars (Hogarth, 2001; Myers, 2002). If we want to understand when intuition is accurate and reliable, we must determine what intuition is and how we should measure it. This paper considers existing definitions of intuition and evaluates the relationship between two theory-based measures of the construct, the Myers Briggs Type Indicator (MBTI; Myers, McCaulley, Quenk, & Hammer, 1998), and the Rational-Experiential Inventory (REI; Pacini & Epstein, 1999).

Defining Intuition

One of the first psychologists to theorize about intuition, Jung (1926) characterized intuition as a primary mode of perception which operates subconsciously. Intuitive types prefer to acquire information by imagining possibilities and sensing patterns, which is in contrast to sensing types who prefer to notice concrete factual details. In this view, intuition is a basic cognitive mode which varies among individuals. Jungian theory has been studied primarily by individual-differences researchers, and unfortunately, has not often been tied into the cognitive literature on intuition, with two notable exceptions. Woolhouse and Bayne (2000) found a positive relationship between intuitive preference and implicit learning performance. Langan-

Fox and Shirley (2003), in contrast, found that those who preferred intuition were not more successful on a verbal problem-solving task requiring intuitive responses.

Although intuition has been a marginal area of inquiry among cognitive psychologists, recent work places the construct firmly within the context of dual-process models. In the dual-process framework, intuition is part of the system that is automatic, holistic, affective, fast, and associative, as contrasted with rational thought which is deliberate, analytical, non-affective, slow, and rule-based. This framework has been embraced by decision-making researchers such as Hogarth (2001) and Epstein (1994). According to Hogarth, “the essence of intuition or intuitive responses is that they are reached with little apparent effort, and typically without conscious awareness. They involve little or no conscious deliberation” (p. 14). Epstein’s Cognitive Experiential Self Theory (CEST) includes intuition as part of the tacit, experiential system that is contrasted with the deliberate, rational system. We view intuition as a product of the tacit system and highlight three distinct aspects of the nature of intuition: affective, heuristic, and holistic. These aspects of intuition have been consistently mentioned in past theoretical work on the construct.

The Affective Nature of Intuition

Intuition has often been linked to emotion. When an emotion is experienced in response to a problem situation, the information that feeling provides is not always easily verbalized. Thus, emotions are often expressed as intuitions, beliefs that cannot always be rationally justified. Bastick (1982) characterized intuition as a judgment achieved with a strong feeling of certainty in its truth, emphasizing the emotional quality of intuitive judgments. According to CEST, the experiential (intuitive) mode is also characterized by its reliance on emotion and affect. In contrast, Hogarth (2001) has argued that affect is merely a correlate, not an essential

component of intuition. In his view, some intuitive judgments may be accompanied by a feeling of certainty but others may develop more slowly over the course of time.

The Automatic Nature of Intuition: Heuristic and Holistic

Much past research has characterized intuition as automatic and heuristic. Intuitive judgments have been described as “knowing without being able to explain how we know” (Vaughan, 1979, p. 46). Similarly, intuition is often thought of as a “hunch” or “gut feeling” made without reflection as opposed to a rational conclusion based on explicitly available evidence. Intuitions are immediate insights rather than reasoned responses.

In the judgment and decision-making literature, intuitions are often classified as mental shortcuts, heuristics that are highly susceptible to irrational biases (Tversky & Kahneman, 1974). Social cognition researchers have also described social biases such as stereotypes as automatic, implicit judgments that capitalize on inappropriate generalizations (Greenwald & Banaji, 1995). Westcott (1968), one of the first researchers to study intuition empirically, also adopted a heuristic notion of intuition. Westcott operationally defined intuition as the ability to make a judgment based on limited information. Participants in his studies were given clues to a puzzle one at a time, and those who required fewer clues to make an intuitive leap to a solution were considered more intuitive. In this sense, intuitive responses were achieved by taking a shortcut to the solution, an analytical process which has been made automatic.

The heuristic view of intuition, though dominant among cognition researchers, has been contrasted with a holistic view of intuition. Hill (1987) made a distinction between two types of intuition: inferential and classical. Both types can be characterized as fast or automatic, but are the result of different mechanisms. According to Hill, inferential intuitions are heuristic judgments based on analytical processes that have become automatic through practice. In

contrast, classical intuition is a holistic judgment that integrates diverse sources of information. This is a Gestalt understanding of intuition, one that is qualitatively non-analytical. The holistic nature of intuition is not typically highlighted in dual-process notions of the construct, with the exception of CEST.

Several other researchers have described intuition as holistic. Jung's (1926) intuition is the unconscious, holistic perception of internal and external stimuli that extends beyond the concrete sensations of the experienced world. Hammond (1996) stated that intuitive judgments are achieved via the holistic integration of multiple cues without awareness. Intuition differs from analysis in that it is not transparent and cannot be justified by articulating logical steps behind the judgment process.

Several empirical studies provide evidence to support the hypothesis that intuition relies on a holistic mechanism (e.g., Bowers, Regehr, Balthazard, and Parker, 1990; Dijksterhuis, 2004; Wilson & Schooler, 1991). Bowers and colleagues' cognitive study of intuition found that spreading activation led to accurate intuitions in a verbal task. Participants were presented with two sets of three words (Remote Associates Test items) and asked to find the fourth word that one set of three had in common. Even when participants could not find a solution, they were able to guess the correct triad at a rate above chance. Bowers and colleagues attributed this result to spreading activation among verbal associates in memory. In this study, intuition was not the result of a heuristic process but rather a holistic integration of stimuli.

Measurement of Intuition

Intuition has typically been measured as a self-reported personality construct, beginning with the Intuitive/Sensate scale of the MBTI (Myers et al., 1998) which is based on Jungian theory. This scale taps an individual's preference for imagination, possibility, and abstract

relationships over reality and concrete facts. Another relevant measurement of the MBTI is the Thinking/Feeling subscale. This subscale measures an individual's preference for logic in making decisions (thinking) as opposed to a reliance on emotions (feeling). Theoretically, the Intuitive/Sensate scale may tap the holistic nature of intuition, whereas the Thinking/Feeling scale may reflect the affective nature of intuition.

More recently, Epstein has introduced a measure of preference for rational versus intuitive thinking based on CEST (Pacini & Epstein, 1999). The Rational-Experiential Inventory (REI) consists of the rational and experiential subscales which are each divided into ability and favorability subscales. Ability subscales estimate a person's belief in their own ability to use rational or experiential thinking, and favorability subscales reflect preference to engage in that type of processing. Items on the rational subscale measure preference for logical and complex thinking about difficult problems. This subscale is adapted from the Need for Cognition scale (Cacioppo & Petty, 1982). In Epstein's theory, experiential processing is affective, heuristic, and holistic, and the REI experiential subscale should reflect intuition in all of these aspects. Previous research on this measure has not revealed a clear distinction between these components of the construct, however (Pacini & Epstein).

Rationale and Hypotheses

Though measures of individual differences in intuition are used in the literature, what is the nature of the constructs measured by each? Is Jung's intuitive perception the same as Epstein's experiential processing? Are these measures tapping the affective, heuristic, or holistic aspects of intuition? As interest in the use of intuition in the decision making and social cognition literatures increases, so does the value of an individual-differences measure of intuition. In the past, researchers have used the MBTI and the REI with the intention of

measuring the same construct, but no research has addressed the question of whether this is a fair assumption. The theoretical basis for each measure suggests that they may not be assessing the same processes or preferences at all.

The current study seeks to understand the relationship between these two commonly-used measures of intuition and the characteristics of intuition measured by each by testing three hypotheses. Hypothesis 1 states that the experiential subscale of the REI is not unidimensional, but rather has distinct affective, heuristic, and holistic components. Hypothesis 2 states that these components are differentially related to MBTI Intuitive/Sensate and Thinking/Feeling. Hypothesis 3 states that REI rational corresponds to MBTI Thinking/Feeling.

Method

Participants

Two hundred and twelve undergraduates at Illinois Wesleyan University were recruited from psychology classes and participated for credit. The sample included 126 women, 81 men, and five people who did not report gender. The sample consisted of 115 first-year students, 59 sophomores, 23 juniors, and 10 seniors. Age ranged from 18 to 22 ($M = 19.09$, $SD = 1.00$).

Materials and Procedure

Participants completed both the Intuitive/Sensate and Thinking/Feeling subscales of the MBTI Form M (Myers et al., 1998) and the long version of the REI (Pacini & Epstein, 1999). Each MBTI subscale consists of 24-26 items with forced choice responses that indicate preference for either of the poles of the subscale. The total number of Intuitive and Thinking responses is tallied to create a score on each of the two subscales. High scores reflect preference for Intuitive over Sensate and for Thinking over Feeling. The REI long version consists of 40 Likert-scale items, ten for each subscale (rational favorability, rational ability, experiential

favorability, experiential ability). Favorability reflects preference for that mode of thinking, and ability reflects belief in one's own ability to successfully use that mode. Participants were tested in small groups in classrooms. These self-report questionnaires were administered in a battery of measures during a 60-90 minute experimental session.

Results

Correlations and reliability coefficients for each subscale are displayed in Table 1.

Correlations among subscales were as expected, with two exceptions. REI rational favorability and MBTI Intuitive/Sensate were moderately positively correlated, and the expected correlation between REI rational favorability and MBTI Thinking/Feeling was weak. These findings are further discussed in relation to Hypothesis 3.

H1: Does REI Experiential Have Distinct Dimensions?

Factor analysis was used to determine the existence of multiple factors within the REI experiential scale. The 20 REI experiential ability and favorability items were entered into a principal components factor analysis (PCFA) with Varimax rotation. Based on an examination of the Scree plot and the interpretability of factors, three factors were extracted. The three-factor solution explained 47.94% of the total variance, 18.02%, 15.15%, and 14.77% for factors 1, 2, and 3, respectively. A preliminary analysis with oblique rotation showed that factors 1 and 3 were correlated ($r = .37$), with the other correlations around $r = -.17$. For ease of interpretation, the orthogonally-rotated solution was chosen.

Each of the three extracted factors was characterized by items relating to different aspects of intuition (see Table 2). The first factor consisted of items comprising the REI experiential ability subscale, for example, "I trust my initial feelings about people." In short, this factor reflected intuition ability. The second factor was comprised of experiential favorability items

referring to affective judgments, such as, “I tend to use my heart as a guide for my actions.” Thus, this second factor described faith in feeling. Finally, the third factor represented a more general faith in intuition; it was characterized by experiential favorability items that did not refer to affect, for example, “Intuition can be a very useful way to solve problems.” This three-factor solution supported Hypothesis 1 by demonstrating that the REI experiential scale is not unidimensional, but rather distinguishes between affective and automatic intuition. This scale does not distinguish between holistic and heuristic intuition, however.

Factor analyses on the items of the MBTI Intuitive/Sensate and MBTI Thinking/Feeling subscales showed that each subscale loaded on its “target” factor. Therefore, all further analyses were conducted with the scores on the original subscales.

H2: How Does REI Experiential Relate to the MBTI Subscales?

Factor analysis was used to examine relationships among the three measures of intuition: REI experiential, MBTI Intuitive/Sensate, and MBTI Thinking/Feeling. Zero-order correlations among the three REI experiential factors and the two MBTI scales can be found in Table 3. These scores were also entered into a PCFA with Varimax rotation. Based on an examination of the Scree plot, three factors were extracted. Together, the factors accounted for 76.92% of the variance. Factors 1, 2, and 3 accounted for 32.72%, 24.03%, and 20.17% of the variance, respectively. An analysis using oblique rotation showed that these factors were uncorrelated (r 's $< .16$).

Table 4 displays the results of the factor analysis. The first factor consisted of the REI faith in feeling factor, MBTI Feeling, and, to a lesser extent, MBTI Intuitive. We characterized this factor as affective intuition. The second factor consisted of the REI faith in intuition factor and MBTI Intuitive. We described this factor as non-affective intuition. Finally, the third factor

was characterized solely by the REI intuition ability factor. These results suggest that the REI experiential and MBTI Intuitive components are related, but not identical. The REI experiential is unique in its measurement of self-reported intuitive ability; no component of MBTI Intuitive loaded on this factor.

H3: How Does REI Rational Relate to MBTI Intuitive and MBTI Thinking?

Due to the unusual pattern of correlations between the REI rational scales and both MBTI subscales, we further investigated these relationships in a factor analysis. The REI rational ability and favorability subscales and MBTI Thinking/Feeling and Intuitive/Sensate were entered into a PCFA with Varimax rotation. Two factors were extracted (see Table 5). Factor 1 corresponded to REI rational ability, MBTI Thinking, and, to a lesser extent, REI rational favorability. This factor was characterized as rational, logical thinking and accounted for 42.88% of the variance. Factor 2 consisted of equally strong loadings of MBTI Intuitive/Sensate and REI rational favorability, accounting for 34.76% of the variance. Together, the two-factor solution accounted for 77.64% of the total variance. These results demonstrate that REI rational ability and MBTI Thinking tap related but distinguishable constructs. There is an aspect of REI rational favorability that corresponds to the Jungian understanding of intuition.

Further analyses were conducted to investigate the relationship between REI rational favorability and MBTI Intuitive items. A PCFA was conducted on items from both subscales; two factors were extracted based on an examination of the Scree plot and the interpretability of factors. The two-factor solution accounted for 36.62% of the total variance. Factor 1 accounted for 25.29% of the variance, and factor 2 captured 11.33% of the variance. These two factors were correlated weakly ($r = .25$) in an oblique solution, so the orthogonal solution was interpreted.

Examining the factor loadings for individual items, we were able to understand what these two subscales have in common. The first factor was primarily MBTI Intuitive/Sensate items plus a strong loading by one REI item. These items shared an emphasis on abstract thinking. For example, the REI item loading on factor 1 is “I enjoy thinking in abstract terms.” MBTI items loading on factor 1 include preference for “ideas” over “facts” and preference for “abstract” over “concrete.” Thus, both REI rational favorability and MBTI Intuitive/Sensate measure preference for abstract thought. Factor 2 was primarily REI rational favorability items such as “I enjoy intellectual challenges.” This is consistent with the Need for Cognition scale, on which REI rational is based.

Discussion

These findings suggest that the REI and MBTI measure affective, heuristic, and holistic characteristics of intuition. REI experiential favorability reflected both affective and automatic intuition, but lacked the theoretical distinction between heuristic and holistic intuition. The affective factor of REI experiential corresponded to MBTI Feeling scores, and the automatic factor of REI experiential loaded with MBTI Intuitive/Sensate. In addition, the results showed that each questionnaire measured an aspect of intuition that was not captured by the other. Specifically, REI experiential uniquely measured self-reported ability to use intuition, and MBTI Intuitive/Sensate uniquely measured the holistic nature of intuition as preference for abstract, conceptual thought. Dual-process models imply that the tacit system is both heuristic and holistic in nature, and these results support this distinction. The unexpected relationship between MBTI Intuitive/Sensate and REI rational favorability, though counterintuitive, was invaluable in understanding the holistic aspect of intuition measured by the MBTI subscale.

Theoretical Issues in the Study of Intuition

The distinction between heuristic and holistic aspects of intuition has received little attention in discussions of intuition or dual process theory. However, the literature reviewed and evidence presented in this study affirm this distinction. Researchers should investigate this theoretical distinction by studying the mechanisms behind the two types of intuition. If different mechanisms are identified, they can then be related to the individual difference measures discussed in the present work. This line of research may help clarify circumstances when intuition may be an inappropriate strategy for decision making (e.g., intuition as heuristics and biases) and when intuition may be a highly successful cognitive strategy (e.g., intuition as holistic integration of complex information).

This research shows that commonly-used measures of individual differences in intuitive processing do tap distinct aspects of intuition, yet the dimensions that were discovered were limited by the items included in the original inventories. Are there additional aspects of intuition that should be measured? Raidl and Lubart (2000-2001) describe three types of intuition: socioaffective, applied, and free. These first two types of intuition may correspond to the faith in feeling and faith in intuition factors, respectively, as discovered in the REI experiential scale. Free intuition, precognition about the future, is not measured by either the REI or MBTI.

In addition, intuition is often linked with tacit knowledge and expertise. Research has shown that individuals with more experience often have more accurate intuitions than novices (e.g., Klein, 1998). Klein's work has shown that experts can recognize familiar patterns in complex high-stakes situations, resulting in very accurate intuitions. Sternberg and colleagues (2001) have conducted research on the acquisition of tacit knowledge in experts. Because it is acquired without awareness and often difficult to articulate, tacit knowledge can be considered

intuitive in nature. However, the current findings raise an interesting question about the nature of intuitive expertise. Are intuitive responses based on a wealth of experience heuristic or holistic?

To pursue that research question, we must address another theoretical issue in the study of intuition: domain-specificity. Intuition must be measured using a task that relates specifically to the domain in which it is used. The MBTI and REI were designed to measure global preferences rather than contextualized behavior. Yet researchers have found that decision modes often depend on domain characteristics (e.g., Blais & Weber, 2001). Individuals who score low on global affective intuition may actually be highly trusting of affect when it is appropriate (e.g., in a social situation). Similarly, an individual may report preference to rely on heuristic intuitions when the context is perceived to be familiar and straightforward, whereas he/she may score higher on holistic intuition when the context is extremely novel and complex. Betsch (2004) has argued that use of intuition may vary by domain, especially for individuals who have no clear global preference for either intuitive or analytical processing.

Implications for the Measurement of Intuition

What measure should be used to assess individual differences in intuition? It depends on what type of intuition is to be measured. The REI assesses affective and automatic aspects of intuition, including intuitive ability. Relying on the MBTI alone will not tap preference for heuristic intuition, or trust in quick, gut feelings. Neither measure is specific to a particular domain, and neither measures trust in intuitions about the future.

A next step is to establish a measure of these three aspects of intuition. REI and MBTI items are logical candidates for a revised measure, but additional items are needed to distinguish between the holistic and heuristic aspects of automatic intuition. Items intended to measure holistic intuition would refer to preference for abstract, holistic processing and reliance on

incubation in decision making. Items assessing heuristic intuition would refer to trust in snap judgments and first impressions. The ideal measure would specify the domain(s) in question for the entire measure and/or for individual items.

We also need validation studies of these intuition measures with respect to behavioral measures of intuition. For example, Pacini and Epstein (1999) found that REI experiential scores correlated with heuristic responding in a laboratory gambling task. Is this behavioral measure distinctly correlated with faith in intuition as opposed to faith in feeling? When Woolhouse and Bayne (2000) found a relationship between MBTI Intuitive/Sensate and performance on an implicit learning task, was that due to trust in holistic intuition or could it have reflected a more general preference for intuitive processing?

Many tasks used in the study of judgment, decision making, and problem solving can be viewed as behavioral measures of intuitive processing. For example, medical decision-making, judgments made in the context of uncertainty, insight problems, creativity tasks, implicit association tasks, and judgments of thin slices of behavior are all intuitive in that they rely on incomplete information and cannot be reduced to an analytical formula. Which aspects of intuition are most closely related to these behavioral measures of intuition? Future work should examine the reliability and validity of measures of all three aspects of intuition in various tasks and in various domains.

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Table 1
Correlations among REI and MBTI subscales

	1	2	3	4	5	6
1. REI rational favorability	(.81)					
2. REI rational ability	.468***	(.81)				
3. REI exper. favorability	.097	-.166*	(.82)			
4. REI experiential ability	.074	.099	.633***	(.82)		
5. MBTI intuitive	.368***	-.108	.371***	.176**	(.92)	
6. MBTI thinking	.180**	.405***	-.431***	-.149*	-.292***	(.89)

Note: N = 205. * $p < .05$, ** $p < .01$, *** $p < .001$. Cronbach's α for each scale is listed on diagonal in parentheses.

Table 2
Factor analysis of REI experiential items

Item	Intuitive ability	Faith in feeling	Faith in intuition
6. When it comes to trusting people, I can usually rely on my gut feelings.	.703		
25. I trust my initial feelings about people.	.660		
10. I believe in trusting my hunches.	.618	.406	
8. I like to rely on my intuitive impressions.	.587	.426	
19. I can usually feel when a person is right or wrong, even if I can't explain how I know.	.552		
37. I hardly ever go wrong when I listen to my deepest gut feelings to find an answer.	.541		
21. My snap judgments are probably not as good as most people's. (-)	.501		
2. If I were to rely on my gut feelings, I would often make mistakes. (-)	.498		.400
33. Using my gut feelings usually works well for me in figuring out problems in my life.	.465	.463	
13. I suspect my hunches are inaccurate as often as they are accurate. (-)	.462		
35. I tend to use my heart as a guide for my actions.		.754	
4. I generally don't depend on my feelings to help me make decisions. (-)		.680	
20. I often go by my instincts when deciding on a course of action.		.678	
12. I think it is foolish to make important decisions based on feelings. (-)		.613	.404

16. I would not want to depend on anyone who described himself or herself as intuitive. (-)		.656
39. Intuition can be a very useful way to solve problems.		.654
27. I don't think it is a good idea to rely on one's intuition for important decisions. (-)	.452	.616
23. I don't like situations in which I have to rely on intuition. (-)		.601
29. I don't have a very good sense of intuition. (-)		.547
31. I think there are times when one should rely on one's intuition.		.484

Note: Factor loadings under .4 have been omitted. Reverse-coded items are marked (-). $\lambda_1=6.209$, $\lambda_2=1.800$, $\lambda_3=1.578$

Table 3
Correlations among REI experiential factors and MBTI subscales

	1	2	3	4
1. Intuition ability factor	-			
2. Faith in feeling factor	.000	-		
3. Faith in intuition factor	.000	.000	-	
4. MBTI Intuitive/Sensate	.059	.245***	.230***	-
5. MBTI Thinking/Feeling	.011	-.525***	-.059	-.292***

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Table 4

Factor analysis of REI experiential factors and MBTI subscales

	Emotional intuition	Non-affective intuition	Intuition ability
Intuition ability factor			.992
Faith in feeling factor	.859		
MBTI Thinking/Feeling	-.844		
Faith in intuition factor		.892	
MBTI Intuitive/Sensate	.416	.628	

Note: Factor loadings under .3 have been omitted. $\lambda_1=1.747$, $\lambda_2=1.099$, $\lambda_3=1.000$

Table 5
Factor analysis of REI rational and MBTI scales

	Rational, logical thinking	Abstract, conceptual thinking
REI rational ability	.851	
MBTI Thinking/Feeling	.771	-.311
MBTI Intuitive/Sensate		.880
REI rational favorability	.567	.719

Note: Factor loadings under .3 have been omitted. $\lambda_1=1.715$, $\lambda_2=1.391$

Author Note

These data were presented at the 2006 annual meeting of the Association for Psychological Science. The authors thank Matthew Hendrickson for his help with data collection and Dr. Jeff Brookings for his comments on earlier drafts of the manuscript.