



## Suderburger Working Paper No 17



EUROPÄISCHE UNION  
Europäischer Fonds für  
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# **Towards the development of a new Measurement Instrument for Intuition (RHIA) - First Pilot Study for Scale Development measuring Intuition**

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November 2022

A Working paper by Ostfalia Hochschule für angewandte Wissenschaften Braunschweig /  
Wolfenbüttel, Standort Suderburg, Fakultät H, Studiengang Handel und Logistik

Herbert-Meyer-Straße 7, 29556 Suderburg, [www.ostfalia.de/cms/de/h/](http://www.ostfalia.de/cms/de/h/)

DOI: 10.13140/RG.2.2.29962.03528, ISSN 2198-9184

<https://www.ostfalia.de/cms/en/pws/launer/working-papers/>

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### **Bibliographische Informationen**

Die Deutsche Bibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über <http://dnb.ddb.de> abrufbar.

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# **Towards the development of a new Measurement Instrument for Intuition (RHIA)**

## **First Pilot Study for Scale Development measuring Intuition**

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Published in the Conference Proceeding of the 6th international Conference on Contemporary Studies in Management (CoSiM), November 22, 2022

### Introduction

Today, intuition becomes a widely accepted approach to describe decision-making. Some researchers treat intuition in a unitary way (Behling, Eckel, 1991; Ambady, 2010). In psychology, the distinction between rational decision-making (deliberation) and intuition has entered psychological theory long time ago (Pachur, Spaar, 2015). Dual-process models assume a clear distinction between intuitive and deliberate processes. However, intuition is not a homogeneous concept, but a label used for different cognitive mechanisms (Glöckner, Witteman, 2010).

Hill (1981) provided evidence that multiple types of intuition exist. He suggests two types of intuition, e.g. classical intuition and inferential intuition. He defines classical holistic intuition to be an spontaneous, uncritical perception of the whole rather than the parts. The second aspect of intuition, inferential intuition, as “a heuristic that represented a logical (inferential) process in which several intermediary steps have been omitted or obscured” (p. 138). Pretz et al. (2014) developed the Types of Intuition Scale (TIntS, Pretz, Brookings, 2007; Pretz, Totz, 2007) an own development and validation of a new measure of intuition (Pretz et al, 2014) with the dimensions holistic, inferential, and affective intuition.

The Rational Experiential Inventory (REI) was developed, containing heuristic, holistic, and affective components (Epstein, Pacini, 1999). Scott and Bruce (1995) developed the General Decision Making Style inventory (GDMS). Their construct definitions was developed from prior theory, and items were defined as assess rational, avoidant, intuitive, and dependent decision-making styles. Burns and D’Zurilla (1999) developed the Perceived Modes of Processing Inventory (PMPI). Their instrument is measuring three different perceived processing styles: rational processing, emotional processing, and automatic processing. Later, the Cognitive Style Indicator (CoSI) was developed by Cools and Van den Broeck (2007). The authors concentrated on the analytic-intuitive cognitive style dimension by splitting the analytic pole in a knowing and a planning style (and creative) and developed a valid and reliable

cognitive style instrument for use in organizations. Pachur and Spaar summarized all these studies in a new model based on Rationality (planning and Knowing) and intuition (affective and spontaneous). But there are more dimensions of intuition not added to existing intuition measurements and scales. Heuristics as a cognitive thinking-style has been researched in depth as a very fast type of intuition based on experience and job training (Gigerenzer et al, 2000), Simple heuristics that make us smart. Oxford University Press.. Unconscious thoughts are researched as the opposite of conscious cognitive thinking (Dijksterhuis, 2004). The anticipation of future events has been developed to an own dimension. However, the unnormal or paranormal decision-making has not been accepted into intuition theory yet (Honorton, Ferrari, 1989). Researchers from neurology science have been researching intuitive decision-processes as well, in particular the emotional decision-making process (Craig, 2003). The so-called gut feeling is a very narrow term excluding feelings and emotions (Damasio, 1999).

#### Purpose of the Study

The purpose of this research is to develop and test new dimensions of intuitive decision-making styles. This is important to better describe intuition for different occupations. Current intuition measures inadequately assess job related intuition types. Intuitive decision making hardly made into business administration science. A new description on intuition is needed to relate it to decision making at the workplace.

In economics, the approach of behavioral economics still lacks intuitive decision-making processes (Beck, 2014). Critics of behavioral economics typically stress the rationality of economic agents (Myagkov, Plott, 1997), it is even stated that no behavioral research can establish an economic theory (Maialeh, 2019). (However, behavioral economics is the effort to increase the explanatory and predictive power of economic theory by providing it with more psychologically plausible foundations (Angner, Loewenstein, 2012). It was Tversky and Kahneman (1973) that described the irrationalities in human decision making which started a new era in behavioral economics (Einhorn, Hogarth, 1981). Heuristic decisions based on knowledge and experience entered the literature on behavioral economics (Gigerenzer, Selten, 2002).

The common concepts presented so far cannot handle all phenomena of intuitive decision-making we know from everyday practice (Swami, 2013; Dane, Pratt, 2007). Affective intuition may need deeper explanation differentiating feelings and emotions (Denburg, Hedgcock, 2015) based on neuroscience (Damasio, 1994). The anticipation of future developments, very important in banking (Kandasamy et al, 2016), strategic management (Liebowitz et al, 2019) especially for CEOs (Woiceshyn, 2009) is seen as a type of affective intuition or a hunch. An expansion towards more para-psychological intuition promises additional insight. Most approaches towards intuition describe spontaneous decision-

making. However, in business, managers may take their time to think through decisions with times of distractions from the problem. We argue that the theory of unconscious thinking may describe this decision-process best. Therefore, it is important to test and validate new structural patterns of intuition for the use in business administration: emotional intuition, quick heuristic, slow unconscious thoughts, and anticipation.

#### Scale Development for 4 Intuitive Decisions Types

This article describes a pilot study for subsequent Pre-Tests and Main studies in 2021 and 2022. Instead of developing completely new scales, we used existing proven scales but adapted shortened a small amount of questions for a pilot study.

#### Rationality and Deliberation

The rational choice theory (RCT) constitutes a major approach of sociological theory and research (Kroneberg, Kalter, 2012). The theory goes back to Meckling (1976), Lindenberg (1985 a and b) and Esser (1990, 1991). Their views on rational choice was constituting the RREEMM-Modell (Ressourceful, Restricted, Evaluating, Expecting, Maximizing Man). It was an entry question to the intuition questions and was removed later. Based on this theory, we asked the employees

- I tend to be a rational thinker (New question)

Betsch (2004, 2008) developed an inventory with different scales to measure differences between deliberation and intuition (PID scale). This goes along with the research by Burns and D’Zurilla (1999), Scott and Bruce (1995) as well as Evans (2008) and Hodgkinson and Sadler-Smith (2003). We also used parts of the Cognitive Style Indicator (CoSI) by Cools and van der Broeck (2007) and the Rational-Experiential Inventory (REI) by Pacini and Epstein (1999). This is in line with the scale development of Pachur and Spaar (2015). They called the items preference for deliberation (sub item planning) and preference for intuition. Based on these scales we asked employees

- Before I make a decision, I usually think about it for quite some time (PID)
- I think more about my plans and goals than other people (PID and CoSI)
- I think first before I act (PID)
- I prefer to make elaborate plans rather than leave anything to chance (PID)

## Emotional Intuition

Affective intuition was described in literature by many authors in different scale developments such as Pretz et al (2014), GDMS (1995), REI (1999), PID (2004) and Pachur and Spaar (2015). In our research, we reduced the amount of questions to two items separating emotions and feelings with high factor loading in their original studies.

- Emotions play a significant role in my decision-making patterns (GDMS)
- I carefully watch my innermost feelings (PID)
- I prefer emotional persons (PID)

## Experience-based, Spontaneous, Heuristical Intuition

For decision based on heuristics, we did not find existing scales. We based our questions on the theory of Gigerenzer and Todd (2012). However, they did not develop new specific scales. Therefore, we used the scales called Spontaneous by Pachur and Spaar (2015) based on the General Decision Making Style Inventory (GDMS) by Scott & Bruce (1995) and Perceived Modes of Processing Inventory (PMPI) by Burns and D’Zurilla (1999). These items are based on experience as described by Gigerenzer and Todd.

- I frequently make quick and spontaneous decisions based on my insights into humanity (PID, PMPI)
- I frequently make quick and spontaneous decisions based on my life experience (PID, PMPI)
- I make quick decisions by rules of thumb (GDMS)

## Slow Unconscious Thoughts

For the Unconscious Thought theory we could not find existing scales. Therefore, we developed new scales based on the theory of Dijksterhuis, Nordgren (2006) and discussions with managers.

- If I have to make a decision, I always sleep on it.
- I never make decisions right away, and I always wait for a while
- Before I make a decision, I first focus on doing something else

## Anticipation and Pre-Cognition

The questions on Anticipation are more problematic. The existing scales are not for direct use for managers in organizations. Therefore, we adapted the scales. First, we used the question style from the Perceived Modes of Processing Inventory (PMPI) by Burns and D’Zurilla (1999) and the Rational-

Experiential Inventory (REI) scales by Pacini and Epstein (1999). Then we adapted the questions to the scales by Radin (2004), Bem et al. (2015) and the AEI scales by Thalbourne (1993).

- I frequently have a premonition as to what will happen (REI)
- I can often predict emotional events (PMPI)
- Before the phone rings, I frequently know in advance who the caller is (new question)
- I can frequently predict the outcome of a transaction (PMPI)

The instrument consisted of 21 items measuring six different decision main styles with a four-point response type (1 strongly disagree to 4 strongly agree).

## Method

The data in this study were part of two EU-funded research projects named “Digital Trust @ the Workplace” (Launer, *n.d.*) and Intuition (RHIA). An electronic questionnaire was used to collect data with a snowball sampling method through the international personal network of first author. Following the European data protection rules, the voluntariness and confidentiality were used to invite individuals to participate. The final online questionnaire was developed was translated into 15 different languages German, Español, Português, Français, Russian, Polski, Română, Slovenský, Traditional Chinese, Simplified Chinese, Japanese, South Korean, Vietnamese, and Thai.

Participants of the research were 5.574 employees working in 43 different industries from over 30 countries from the research project. Gender distribution was 41.2% female, 8.4% LGBT-Q, and 50.3% male. Of the professional experiences of participants, 9.3% were less than one year, 19.7% were 1 to 3 years, 40.3% were 4 to 10 years, 18% were 11-20 years, 6.6% were 21 to 30 years, 1.3 % were 31 to 40 years, and 0.3% were more than 40 years. The employment status was mostly permanent (85.8%). The methodology of this study is based on a self-report instrument. Self-report studies always have validity problems. Respondents may answer questions in the way they would like to see themselves. In terms of intuition, it is critical to measure the real intuitive decision-making. In particular, it is difficult to asks about unconscious decisions.

## Results

The Construct Validation Rational and Intuition Styles based on PID (Table 1)

First, we tested the items from the original PID theory by Betsch. It employed an Exploratory Factor Analysis (EFA) for testing its bi-dimensional constructs. We have selected Primary Component Analysis (PCA) for exploring the components, “eigenvalues greater than one” criteria for the most interpretable



solution, and “varimax rotation” technic to maximize the variance of squared loadings on a factor. The result of EFA indicated that 11 items loaded on two factors with explaining 66.2% of the construct (factor loadings ranged from .69 to .82 for intuition and from .80 to .85 for deliberation or rational). When the PID instrument has been confirmed in the explorative analysis, we have used Confirmatory Factor Analysis (CFA) for testing the two-factorial construct of PID in our sample. The results of CFA in Table 1 indicated unacceptable fit indices with the values as .83 for Comparative Fit Index (CFI), .79 for Tucker Lewis Index (TLI), .130 for Root Mean Square Error of Approximation (RMSEA), and .144 for Root Mean Residual (RMR). Based on the suggestions of the program we have modified the two-factorial PID structure, since not only the fit indices are at lower levels, but also some item loadings are at lower levels for explaining the factors. Accordingly, two items were excluded from the structure after trying all possible modification suggestions to increase fit. Thereby, the modified two-factorial PID instrument confirmed the fit of two construct ( $\chi^2/df= 10.6$ ,  $TLI=.99$ ,  $CFI= .99$ ,  $RMSEA= .041$ ,  $RMR=.028$ ). But concerning the cut of a maximum value of 5 for the acceptance, the calculated ratio of chi-square on the degree of freedom ( $\chi^2/df$ ) was higher level.

Since one of the reasons for this result related to the larger sample sizes, we conducted more analysis through decreasing sample size by random selections. We tested the confirmed structure on three random subsamples selected from the total sample to get an acceptable ratio and increase the generalizability. For determining the random samples, we used the case selection option in the SPSS program with a random selection about 33% of the total sample. The confirmed factorial structure was tested on each sample ( $n= 1862$  for the random sample 1,  $n= 1825$  for the random sample 2, and  $n= 1812$  for the random sample 3) and found acceptable fit indices (values were ranged  $\chi^2/df=3.9$  to  $4.5$ ,  $CFI=.99$ ,  $TLI=.99$ ,  $RMSEA=.040$  to  $.044$ ). All these findings supported the two-factorial PID and also provided evidence of the convergent and discriminant structure of the instrument in a diversified sample.

After confirming the factorial structure, we calculated Cronbach’s Alpha coefficients of factors for determining the internal consistencies. The coefficient of modified two-factorial PID ranged from .86 to .90, and the Cronbach’s Alpha coefficient between factors ranged from -.41 to -.43 ( $p<.01$ ) for the total and random samples. These results presented reliability of the instrument.

#### The Construct Validation of rational and the types of intuition Styles (Table 2)

After confirming the two-factorial PID, we have tested the structural patterns of unconscious thoughts, emotional intuition, quick heuristic, and anticipative decision-making styles with rational decision-making style. We have used CFA for testing the multifactorial structure of instrument in the sample. In the first analysis the CFA results produced acceptable fit indices with the values as .98 for Comparative Fit Index (CFI), .98 for Tucker Lewis Index (TLI), .035 for Root Mean Square Error of Approximation

(RMSEA), and .028 for Root Mean Residual (RMR). But the calculated ratio of chi-square on the degree of freedom ( $\chi^2/df= 5.10$ ) was higher level than highest acceptance value of 5 and also strict value of 3 (...). Therefore, we followed the modification suggestions of the program and excluded five inconsistent items loaded on other factors causing an inflating chi-square value. Thus, the modified version of the construct confirmed the fit of five construct of four types of intuition and rational decision-making ( $\chi^2/df= 2.5$ ,  $TLI=.99$ ,  $CFI= .99$ ,  $RMSEA= .029$ ,  $RMR=.021$ ). We also tested the modified and confirmed factorial structure on the same three random subsamples selected from the total sample to increase the generalizability. The confirmed structure was tested on each sample (n= 1862 for the random sample 1, n= 1825 for the random sample 2, and n= 1812 for the random sample 3) and found acceptable fit indices (values were ranged  $\chi^2/df=3.9$  to  $4.5$ ,  $CFI=.99$ ,  $TLI=.99$ ,  $RMSEA=.040$  to  $.044$ ).

Table 1 CFA results of PID Instrument

	n	NOIs	FLs	X2	df	X2/df	TLI	CFI	RMSEA	RMR
Two-factorial PID	5574	11	from .18 to .83	6096.16	64	95.2	.79	.83	.130	.144
Two-factorial PID modified	5574	9	from .74 to .83	275.35	26	10.6	.99	.99	.041	.028
Two-factorial PID modified	Random sample 1 (n=1862)	9	from .72 to .86	113.55	26	4.3	.99	.99	.043	.030
Two-factorial PID modified	Random sample 1 (n=1825)	9	from .74 to .84	101.67	26	3.9	.99	.99	.040	.031
Two-factorial PID modified	Random sample 3 (n=1812)	9	from .73 to .83	117.79	26	4.5	.99	.99	.044	.033

NOIs= Number of items, FLs= Factor loadings

Table 2 CFA results of five-factor Instrument

	n	NOI	FL	X2	df	X2/ df	TLI	CFI	RMSEA	RMR
Five factor structure	5574	19	from .71 to .83	1128.41	142	7.9	.98	.98	.035	.026
Five factor structure modified	5574	14	from .74 to .83	341.21	67	5.0	.99	.99	.027	.020
Five factor structure modified	Random sample 1 (n=1862)	14	from .73 to .84	172.13	67	2.5	.99	.99	.029	.021
Five factor structure modified	Random sample 1 (n=1825)	14	from .74 to .83	125.31	67	1.8	.99	.99	.021	.022
Five factor structure modified	Random sample 3 (n=1812)	14	from .73 to .83	127.03	67	1.9	.99	.99	.021	.022

NOI= Number of items, FL= Factor loadings

We then calculated Cronbach's Alpha coefficients of confirmed factors for determining the internal consistencies. The coefficients of the sub-dimensions of the modified five-factor structure ranged from .76 to .85 for the total sample and all random samples. These results presented reliability of the multifactorial structure.

Table 3 The statistics of the confirmed construct

Factors	N	Min.	Max.	Mean	SD	Skewness	Kurtosis
Rational	5579	1.00	4.00	2.80	.95	-.595	-.682
Emotional	5579	1.00	4.00	2.71	.91	-.319	-.752
Slow Unconscious	5579	1.00	4.00	2.68	.88	-.336	-.660
Quick Heuristics	5579	1.00	4.00	2.56	.87	-.054	-.768
Anticipation	5579	1.00	4.00	2.40	.90	-.043	-.911

The factors in the instrument and the statistics were presented in Table 3. The factor means ranged from 2.34 to 2.80 (SD ranged from .87 to .95), and the skewness (ranged from -.595 to -.043) and kurtosis (ranged from -.911 to -.660) statistics were at acceptable levels for the univariate normality. We also calculated Pearson correlations among factors in the Table 4. According to the results there were significant positive relationship between rational and unconscious thinking ( $r = .591, p < .01$ ), negative relationship between rational and emotional ( $r = -.336, p < .01$ ), quick ( $r = -.039, p < .05$ ), and anticipation thinking style ( $r = -.030, p < .05$ ). Emotional thinking was also positively related with quick ( $r = .190, p < .01$ ), and anticipation ( $r = .479, p < .01$ ) but negatively related with unconscious thinking ( $r = -.171, p < .01$ ). Unconscious style was negatively correlated with quick thinking ( $r = -.134, p < .01$ ). Lastly quick style related positively with anticipation style ( $r = .077, p < .05$ ). There was no significant relation between quick and anticipation style.

Table 4 Relations among decision styles

	(1)	(2)	(3)	(4)
1.Rational	1			
2.Emotional	-.336**	1		
3.SlowUnconscious	.591**	-.171**	1	
4.Quick Heuristics	-.039**	.190**	-.134**	1
5.Anticipation	-.030*	.479**	.006	.077**

We also tested gender differences in decision-making styles with using ANOVA. Since group sizes were about the equal, the male (n= 2807) and female (n= 2300) participants were selected for the comparison. The result of Levene statistics presented that all variances were homogeneous (Levene statistics ranged from 49.12 to 114.23 with  $p < .01$ ). The findings showed that there are significant differences between male and female in the emotional ( $F = 86.22$ ,  $p < .01$ ), quick ( $F = 20.18$ ,  $p < .01$ ), and anticipation ( $F = 113.20$ ,  $p < .01$ ) thinking styles. Results indicated that females are more emotional (female Mean= 2.84, SD= .81; male Mean= 2.60, SD= .79) and anticipative (female Mean= 2.52, SD= .84; male Mean= 2.25, SD= .92), but less quick (female Mean= 2.48, SD= .79; male Mean= 2.59, SD= .94) than males. There were no significant differences in the rational and unconscious decision-making styles.

## Discussion

We have argued that intuition is not a unitary construct and specified four distinct types of intuition: emotional, fast heuristics, slow unconscious, and anticipation. This tool can be measured using a new self-report tool, the RHIA. These types are largely uncorrelated with one another, and we provide evidence for both concurrent and predictive validity of the scales. We have shown that the RHIA provides a multifaceted, more comprehensive measure of intuition than existing measures such as PID, MBTI, REI, GDMS, CoSi, and Pachur and Spaar. It may be used as a supplement to other studies. It also builds the basis for a new study on Intuition to further develop new scales (German Pre-Test in 2021 and Main Study in 2022).

We suggested a broader multi-dimensional domain-specific approach to intuition. The existing scales were allocated newly based on research paradigms. The quick intuition was based on the theory of heuristics. Emotional intuition was based on the latest findings in neurology. The anticipation (e.g. hunches) got an enlarged theoretical basis based on pre-cognition-premonition and paranormal scales. A completely new scale was added for the unconscious thought theory. Therefore, new scales had to be derived from the theory and discussed and tested with managers.

The proposed model has the dimension rational decisions (deliberation), unconscious intuition, emotional (affective) intuition, quick heuristics, unconscious thoughts, and anticipation (Pre-cognition). We found that individuals' decision styles vary considerably across the proposed decision-making domains. However, this approach does not state, that employee's decision style belong to one or another dimension. They have a mix of different decision-styles. We argue that there is a distinction between the different decision-making styles. Therefore, using a generalizable sample from different cultures and industries, the purpose is to confirm the rational and intuitive decision-making styles, and test and validate the structural patterns of rational, emotional, quick heuristic, unconscious, and anticipation decision-making styles with using a new instrument.

Although the differences between rational and intuitive decision making is very well known in the existing literature, the sources or forms of intuition decision making is unknown. The main intention in the paper has been to give a primary evidence about different forms of intuition. The first findings have shown that rational and intuitive decision-making styles are structurally separate but also negatively related constructs. The second findings have confirmed that rational, emotional, quick heuristic, unconscious, and anticipation intuitive styles are not only structurally separate from each other but also related constructs. Concerning the relations, rational decision-making was positively related to the unconscious but negatively related to emotional, quick heuristic, and anticipation style of intuition. Moreover, there were significant gender differences in the emotional, quick heuristic, and anticipative decision-making styles. The intercorrelations between the domains also suggest that a person's decision style in one domain can be relatively dissociated from her decision style in another domain.

### Conclusion

This study developed and tested new dimensions of intuition in a pilot study. The four intuitive decision styles fast heuristic, slow unconscious thoughts, emotional intuition, and anticipation were proven to be valid, reliable and independent variables. This will be the basis for future studies on intuition in a broader sample.

### Acknowledgment

This abstract is part of the local EFRE research project "Intuition (RHIA)" financed by the European Union and the State of Lower Saxony. It was expanded to a multi-dimensional RIEHUAD approach.

Keywords: Intuition, Rationality, Emotional Intuition, Gut feeling, Unconscious Thoughts, Anticipation, Decision Making

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