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Pilot Study on Scale Development for measuring Intuition in Uelzen (RIEHUA)

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Pilot Study on Scale Development for measuring Intuition in Uelzen (RIEHUA)

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Introduction

The aim of this study is to develop an intuition test prototype for the EFRE research project Intuition (RHIA) funded by the European Union and the state of Lower Saxony. The aim is to measure intuition in the Uelzen area and explore opportunities to improve decision-making in the workplace. The data sheet is used for discussion with the cooperation partners in Uelzen and our specialists for intuition: Prof. Dr. Wendelin Kupers, Dr. Anne-Kathrin Auer and Dirk Schneider. With the publication of the data sheet, all employees of the cooperation companies should have access to our Uelzen study.

Literature Review

The literature supports a broad range of theories (Dane & Prat, 2009; Akinci, Sadler-Smith, 2011) and methodologies (Sinclair, 2011, 2014, 2020) for intuition. The basic approach hereby is the dual process theory distinguishing between Rational decision-making (Deliberation) and Intuition. In principal, there are two major studies:

Intuition according to Rational-Experiental Inventory (REI) by Epstein, Pacini & Norris (1998) and the new version by Pacini & Epstein (1999, REI) based on the Cognitigve-Experiental Self-Theory (CEST) by Epstein, Pacini, Denes-Raj & Heier (1996); German version by Keller, Bohner & Erb, 2000. Theoretical basis therefore is based on Epstein, 1994; Chasiken& Trope, 1999; Denes-Raj & Epstein, 1994; Kirkpatrick & Epstein, 1992; Pacini & Epstein, 1999a, 1999b; Pacini, Muir & Epstein, 1998.

- Rationality Scale (Need for Cognition or Analytical-Rational Thinking) incl. thinking, intellectual, logical, analytical, reasoning (Cacioppo & Petty, 1982; Jung, 1964/1968), natural (Tversky & Kahneman, 1983), automatic (Bargh, 1989; Higgins, 1989), heuristic (Chaiken, 1980; Fiske & Taylor, 1991; Tversky & Kahneman, 1983), schematic (Leventhal, 1984), prototypical (Rosch, 1983), narrative (Bruner, 1986), implicit (Weinberger & McClelland, 1991), imagistic-nonverbal (Bucci, 1985; Paivio, 1986), experiential (Epstein, 1983), mythos (Labouvie-Vief, 1990), and first-signal system (Pavlov, cited in Luria, 1961)
- Experiental Scale (Faith for Intuition or Intuitive-Experiental) incl. intuition in general, gut feeling, hunches, instincts, feelings, snap judgement, heart (Buck, 1985; Leventhal, 1984; Jung,

1964/1968), analytical-rational (Epstein, 1983), deliberative-effortful-intentional-systematic (Bargh, 1989; Chaiken, 1980; Higgins, 1989), explicit (Weinberger & McClelland, 1991), extensional (Tversky & Kahneman, 1983), verbal (Bucci, 1985; Paivio, 1986), logos (Labouvie-Vief, 1990), and second-signal system (Pavlov, cited in Luria, 1961)

Preference for Intuition or Deliberation according to Betsch (2014, PID) based on Epstein et al (1996). The theotretical basis is: Wilson & Schooler (1991); Wilson, Lisle, Schooler, Hodges, Klaaren, & LaFleur (1993), Betsch (2008), Betsch, & Haberstroh (2004), Betsch, Plessner, Schwieren, & Gütig (2001), Haberstroh & Betsch (2002), Epstein (1983), Hogarth (2001), Sloman (1996), Bowers, Regher, Balthazard, & Parker (1990), Langan-Fox & Shirley (2003), Myers & McCaulley (1986).

- Deliberation (Analytical and Planning) incl. thinking, perfectionism, fact-based, self-reflection, planning and goal-orientation (Cacioppo & Petty, 1982)
- Affective Intuition (Feelings, Body Impulses, Experience-based) incl. intuition in general, feelings, gut feeling, life-experience, emotions, inner feelings (Jung, 1962; Slovic, Finucane, Peters, & MacGregor, 2001, Loewenstein, Weber, Hsee, & Welch, 2001; Myers & McCaulley, 1986; Keller et al. 2000)

In this study we do not follow the dual approach. Therefore, a multi-dimensional approach will be developed.

Studies on Rational Decision-Making

There are three major studies on rational decision-making:

- General Decision Making Style (GDMS) by Scott and Bruce (1995)
- Cognitive Style Indicator by Cools and van den Broek (2007)
- Perceived Modes of Processing (PMPI) by Burns and D'Zurilla (1999)

Analytical Style

The studies GDMS and PMPI describe the analytical decision-making style based on the theories by D'Zurilla & Goldfrid, (1971), D'Zurilla & Nezu (1990), Mayde u-Olivare s & D'Zurilla (1996).

- Search & Evaluation by Scott & Bruce (GDMS, 1995) incl. logic and systematic analysis and evaluation in terms of specific goals (Keen, 1974; Mitrof, 1983).
- Rational Processing by Burns & D`Zurilla, (PMPI, 1999) incl. thinking, structural, fact-based, goal-oriented, evaluating alternatives (Aldwin, 1994; Lazarus & Folkman, 1984).

Knowing & Planning Style

The studies by Cools, & van den Broek (CoSI, 2007) and Pachur & Spaar (USID, 2015) show two additional rational decision making styles. The basic theories are Witkin, Moore, Goodenough & Cox (1977), Shipman & Shipman (1985), Messick (1984), Miller (1987), Hunt, Krzystofiak, Meindl, & Yousry (1989), Riding, Cheema (1991), Hayes & Allinson (1994), Kirton, (1994), Grigorenko & Sternberg (1995,; Allinson, Hayes (1996), Rayner & Riding (1997), Riding and Rayner (1998); Sadler-Smith & Badger (1998), Hodgkinson (2003), Hodgkinson & Sadler-Smith (2003), Kirton (2003), Myers, McCaulley, Quenk, Hammer (2003). They describe the rational decision making styles:

- Knowing Style
    - Knowing Style by Cools & van den Broek (CoSI, 2007) incl. facts, details, logical, reflective, objective, impersonal, rational, precise, methodical decisions.
    - Knowing Style by Pachur & Spaar (USID, 2015) incl. systematic, analysis, logical, thinking, intellectual, complexity, and abstract terms.
- Planning Style
    - Planning Style by Cools & van den Broek (CoSI, 2007) incl. sequential, structured, conventional, conformity, planned, organized, systematic, routine-based.
    - Planning Style by Pachur & Spaar (USID, 2015) incl. preparation, time-sensitive, process-oriented, reason-based and planning.
- Creating according to Cools, & van den Broek (CoSI, 2007) was not used

Multidimensional Intuitive Decision-Making

There are four major multidimensional studies with more detailed, structured dimensions:

- General Decision Making Style (GDMS) by Scott and Bruce (1995)
- Types of Intuition Scale (TIntS) by Pretz et al (2007) and Carlson (2008)
- Perceived Modes of Processing (PMPI) by Burns and D'Zurilla (1999)
- Unified Scale to Assess Individual Differences in Intuition and Deliberation (USID) by Pachur and Spaar (2015)

Intuition according to Scott & Bruce (1995, GDMS) based on the theories of by Keen (1973), Driver (1970), Harren (1979), Behling, Gifford & Tolliver (1980), Philips, Pazienza & Ferrin (1984), Hunt et al (1989), and Driver et al (1990). They define the intuition styles:

- Spontaneous incl. quick, impulsive. snap decisions in the spur of the moment feeling natural
- Intuition (= Feelings) incl. intuition in general, instincts, and feelings
- Dependent incl. assistance, consulting, advise, support by other people
- Avoidant was not used in this study

Intuitive Holistic Decision Making according to Pretz et al (2007, 2014, TIntS). They describe the intuition style:

- Holistic (Andersen, 2000; Singer, 1994, Behling and Eckel, 1991; Brockman and Anthony, 1998; Mintzberg, Ahlstrand and Lampel, 1998; Isenberg's (1984); Simon, 1987; Baylor, 2001)
    - Holistic Big Picture Intuition incl. big picture decisions
    - Holistic Abstract Intuition incl. abstract, theoretical decisions
- Inferential Intuition (= Experience-baced and Spontaneous) incl. quick, experience based, familiar decisions with reasoning, logic (Simon, 1987; critics by Hammond et al., 1987, Klein, 1998; Monsay, 1997; Crossan et al., 1999; Epstein, 1998; Hayashi, 2001; Monsay, 1997)
- Affective Intuition (= Feelings, Body Impulsess, Anticipation) incl. heart-based, feelings in general, emotions, hunches, gut feeling decisions (Bastick, 1982, Epstein, 1998; Petitmengin-Peugeot, 1999; Forgas, 1994; Frijda, 1993; Lazarus, 1999; Forgas, 2001; Agor, 1989)

Intuitive decision making according to Burns & D`Zurilla (1999, PMPI) based on the theories of Brewin (1989); Epstein (1990, 1994), Ingram (1986), Epstein & Meier (1989), Epstein, Lipson, Holsten, & Huh (1992). They describe the intuition style:

- Automated Processing (= Experience-based and Spontaneous) incl. quick, swiftly, awareness, repetitive and experience-based decisions
- Emotional Processing (= Feelings, Body Impulses, Anticipation) incl. instincts, feelings, gut feeling, hunches, emotions

Intuition according to Pachur and Spaar (2015, USID) based on the theories of Betsch (2004, 2008); Betsch & Iannello (2010) and all previous scale development studies such as REI, GDMS, CoSI, PMPI. They describe the intuition styles:

- Spontaneous (Spontaneous and Experience-based) incl. immediate, swiftly, quick, snap decisions, awareness, experience, repetitive decisions
- Affective (Feelings, Body Impulsess, Anticipation) incl. feeling, inner reactions, knowledge of human nature, life experience, gut feeling, hunches, heart

In a second step we take a broader and deeper perspective on intuition. Within the existing scales, certain dimensions should be deepened and broadened according to the latest literature and new approaches in intuition. Therefore the following dimensions will be established as an independent dimension.

Anticipation (Pre-Cognition)

The described scales on intuition describe an affective type of decisions based on hunches (Scott, Bruce, 1995; Pacini, Epstein, 1999; Pretz et al 2014; Pachur, Spaar, 2015). In this study we enlarge this characteristics to an own dimension called Anticipation (Launer, XXX). The received information in this regard comes from outside the body (Sinclair, 2011, 2014). Many researchers try to explain atypical or paranormal decision making (Honorton, Ferrari, 1989), anticipation of solutions, e.g. presentiments of future emotions (Radin, 2004), precognition (conscious cognitive awareness), premonition (affective apprehension) according to Bem et al. (2015), extrasensory perception (ESP) by Thalbourne and Haraldsson (1980) paranormal belief and experiences (Lange, Thalbourne, 2002), or automatic evaluation (Ferguson, Zayas, 2009). In sports, the concept of anticipating future moves by people, balls or ….. are called heuristics (Grush, 2004; Williams, Ward, 2007; Schultz, 2013).

Unconscious Thoughts (Time-delayed Intuition)

In a study by Carlson (2008) based on the TIntS by Pretz and Totz (2007), he included the dimension incubation based on the theory by Dijksterhuis (2004). Decisions can not only be made fast but also after a period of time and (unconscious) reflection and activation (Bowers et al., 1990; Waroquier et al, 2010), incubation (Wallas, 1920; Shirley & Langan-Fox, 1996), unconscious thinking (Dijksterhuis and Nordgren (2006), distraction (Kohler, 1969), removal of blockages (Duncker, 1945), completion of schemes (Mayer, 1996), or in intuitive step-ups (Nicholson, 2000). Despite the many critics on the quality of the decision (González-Vallejo et al., 2008; Srinivasan et al, 2013; Newell & Shanks, 2014; Čavojová, Mikušková, 2014; Abbott, 2015; Nieuwenstein et al., 2015) slow decision-making is the usual process in management.

Method

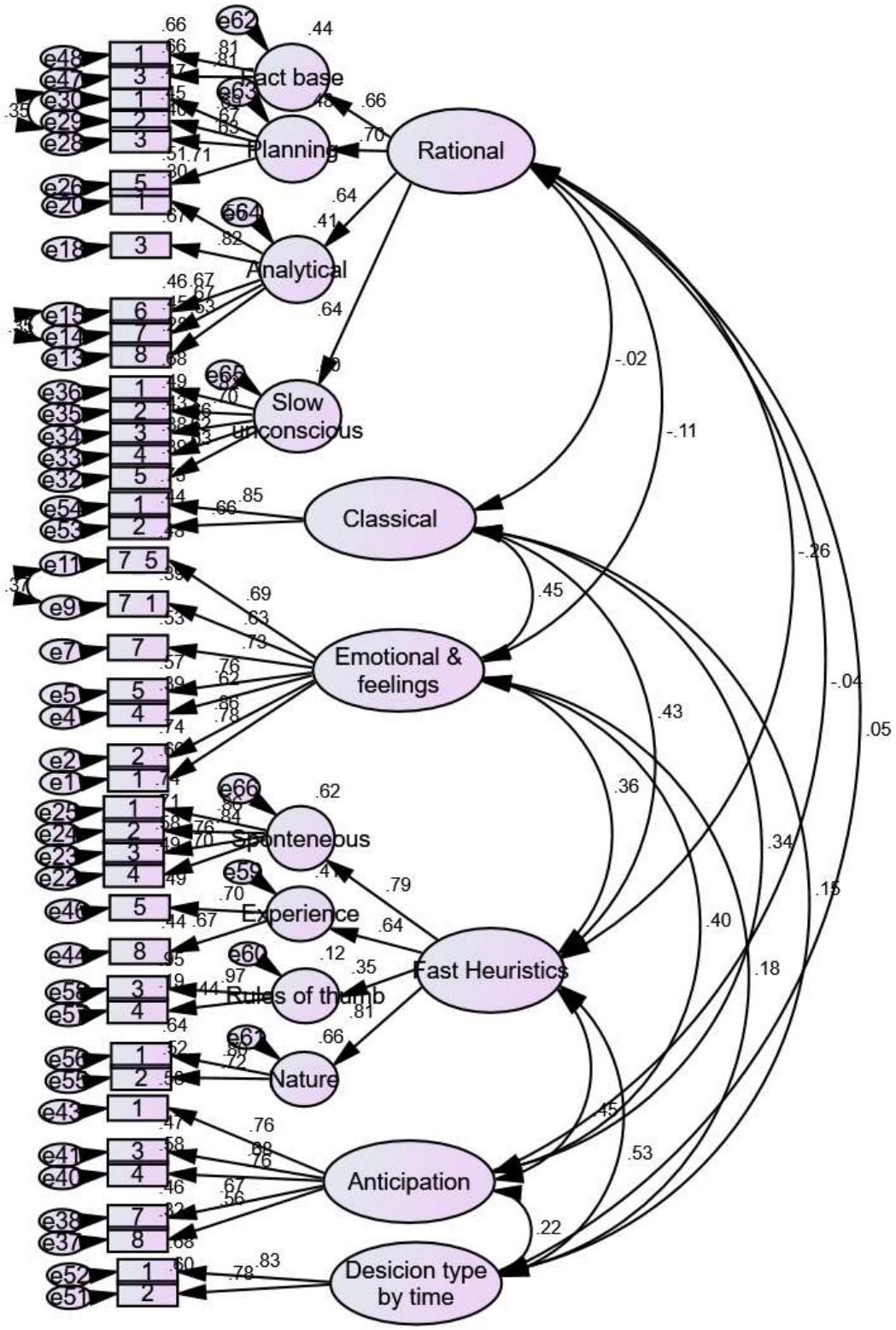
A study was conducted based on the EFRE research project “Intuition: Rationality, Heuristics, Intuition and Anticipation (RHIA)” funded by the European Union and the State of Lower Saxony. The questionnaire was distributed in the Uelzen area using a snowball system. 300 participants registered, but only 180 responses could be used in the study.

Our goal was to test the questions expected to measure rational and differential types of intuitive decision-making. Explanatory and confirmatory analyzes and internal consistencies were carried out to check the validity and reliability of the instruments. In the first step, explanatory factor analysis (EFA) was used for a priori information to identify the latent factorial structures and to construct validity. We followed the procedures of primary component analysis, eigenvalue criteria, and varimax rotation to examine latent structures and achieve the greatest possible variance, which is explained by assuming uncorrelated factors.

In the second step, we used confirmatory factor analysis (CFA) to support the factorial design and provide evidence of a convergent and discriminatory structure of the instrument. Accordingly, the maximum likelihood model estimation method was used to estimate parameters that best explain the observed data.

We tested the structural patterns of unconscious thought, emotional intuition, quick heuristic and anticipatory decision-making styles with rational decision-making styles. We used CFA to test the multifactorial structure of the instrument in the sample. Currently, only the raw data based on a factor analysis is available.

Results of the Factor Analysis


Fact base
Planning
Rational
Analytical
Slow unconscious
Classical
Emotional & feelings
Spontenebus
Experience
Rules of thumb
Nature
Fast Heuristics
Anticipation
Desicion type by time

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	110	1155.588	793	.000	1.457
Saturated model	903	.000	0		
Independence model	42	3893.623	861	.000	4.522

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.149	.771	.739	.677
Saturated model	.000	1.000		
Independence model	.355	.345	.313	.329

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.703	.678	.883	.870	.880
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.921	.648	.811
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	362.588	275.919	457.246
Saturated model	.000	.000	.000
Independence model	3032.623	2842.676	3229.998

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	6.529	2.049	1.559	2.583
Saturated model	.000	.000	.000	.000
Independence model	21.998	17.133	16.060	18.249

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.051	.044	.057	.410
Independence model	.141	.137	.146	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	1375.588	1446.185	1725.584	1835.584
Saturated model	1806.000	2385.537	4679.151	5582.151
Independence model	3977.623	4004.579	4111.258	4153.258

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	7.772	7.282	8.306	8.171
Saturated model	10.203	10.203	10.203	13.478
Independence model	22.472	21.399	23.588	22.625

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	132	137
Independence model	43	44

Discussion

We have argued that intuition is a multidimensional construct and specified five different types of intuition: holistic, emotional, fast heuristic, slow unconscious, and anticipation.

The rational decision-making style consisted of the three sub-dimensions of analytics, knowledge and planning. The result of the factor analysis shows, that the Unconscious Thought Theory is related to the rational thinking styles.

The multidimensional model of intuition had five sub-dimensions. Classical holistic Intuition, Emotional Intuition, Fast Heuristics, Anticipation, and Decision made over Time (based on the Unconscious Thought Theory). The Fast Heuristic style showed four (4) subdimensions: spontanous decisions, experience-based decisions, rule of thumb, and natural decisions.

This instrument was measured using a new self-report instrument, the RHIA approach. These different types of intuition are largely uncorrelated. We also provide evidence for both concurrent and predictive validity of the scales. We have shown that the original RHIA approach provides a multi-faceted, more comprehensive level of intuition than existing measures such as PID, MBTI, REI, GDMS, CoSi, and Pachur and Spaar. It can be used as a

complement to other studies. It also forms the basis for a new study on intuition to further develop new scales in a RIEHUA approach.

Therefore, we propose a broader multidimensional domain-specific approach to intuition. The existing scales were reassigned based on the RHIA research paradigm. New questions (items) were developed in the previous RHIA scale development study (Launer, Svenson, 2020). The quick intuition was based on the theory of heuristics. The emotional intuition was based on the latest findings in neurology. Anticipation (e.g. premonitions) was given an expanded theoretical basis based on precognition/anticipation and paranormal scales. A new scale has been added for the Unconscious Thought Theory. Therefore, new scales had to be derived from theory and discussed and tested with managers.

The proposed model has the dimensions rational decisions (analytics, knowledge and planning), Unconscious Holistic Intuition, Emotional and Affective Intuition, Spontaneous and fast Heuristics, Unconscious Thinking (Time delayed Intuition), and Anticipation (pre-cognition). We have found that individuals' decision-making styles differ significantly in the proposed decision-making areas. However, this approach does not imply that the decision-making style of employees belongs to one dimension or the other. They have a mix of different decision-making styles. We argue that there is a difference between the different decision-making styles.

Conclusion

This study has developed and tested new dimensions of intuition based on the RHIA model in a second pilot study (RIEHUA). The five intuitive decision-making styles Classic Holistic Intuition, Spontaneous and fast Heuristic, slow Unconscious Thought (Time-delayed Intuition), Emotional and Affective Intuition and Anticipation (pre-cognition) proved to be valid, reliable and independent variables. Rationality was divided into three dimensions: analytical, planning, and knowing. The RIEHUA Approach will be the basis for our future studies of intuition in a broader sample.

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