

VALIDITY ANALYSIS OF TYPES OF INTUITION (TINTS) SCALE

Abirami Swaminathan and Dr. Maya Rathnasabapathy*

Cognitive Psychology Laboratory, School of Social Sciences and Languages (SSL),
Vellore Institute of Technology (VIT), Chennai – 600127, India

Abstract

The prevalence of the cognitive construct intuition was measured among university students in India (n=755) using types of intuition scale (TintS) developed by Pretz et.al to explore the types of intuition prevalent among students. The scale showed good reliability score 0.66 (Cronbach's alpha). Confirmatory factor analysis of the four factor model proposed by the scale developer on the sample of the present study showed good model fit parameters and the values are better than the values reported by the scale developers. SEM based validity analysis for construct reliability, convergent and discriminant validity of scale and factor wise reliability (Cronbach's alpha) are consistent with the values reported in literature for inferential intuition only.

Key words: Types of intuition, Confirmatory factor analysis, SEM based validity analysis, Feeling Theorists, Big picture modellers

Introduction

Intuition, also known as the gut feeling, refers to non-conscious processing of emotional information. It plays a significant role in everyday life in problem solving, decision making and creativity. Owing to the diversified nature of perception, process and outcome formulating a unified definition of the construct intuition remains a challenge to researchers. A generally accepted definition of intuition is “*an understanding of the concept based on our feelings, knowledge and experience*” (McCutcheon & Pincombe, 2001). Initially intuition was recognised as cognitive process operating at subconscious level (Jung, 1971). The cognitive process of intuition can be defined as “*The mental faculty that allows us to learn from (i.e., to build tacit knowledge from) and quickly and successfully adapt to or deal with changes in the world (i.e., to use that tacit knowledge) in a non-conscious, non-recursive, holistic way (i.e., in an associative way)*” (Allard C.R. van Riel & Csilla Horvath, 2014). With the advancement in the understanding of cognitive mechanisms of intuition, several different types of intuitions were proposed with their role in the outcome such as:

- (i) **Inferential intuition:** which results in “*decisions based on automated inferences, decision-making processes that were once analytical but have become intuitive with practice, and which draw on well-developed mental schemas*” (Hill, 1987; Pretz et al., 2014);
- (ii) **Holistic-intuition:** which results in decisions based on “*non-analytical process that are bottom-up, data driven, and which integrate multiple, diverse cues into immediate situational judgements*” (Hammond, 1996; Pretz et al., 2014);
- (iii) **Affective-intuition:** which results in decisions based on “*emotional reactions (gut feeling) to decision situations, and can be understood as associative in nature, drawing on prior conditioning and emotional arousal*” (Bastick., 1982; Epstein., 1994; Pretz et al., 2014).

Irrespective of the cognitive mechanism and the type of intuition applied, no explicit rational support could be offered for an intuitive outcome.

The theoretical frameworks that analyse the cognitive mechanisms of intuition mainly include: “1. *Dual process cognitive theory where intuition is placed in non-conscious cognitive process*, 2. *Process – outcome framework which analyses each type of intuition into either intuitive judgement or intuitive insight*, 3. *Phenomenon based for analysing non – stereotypical intuitions*”. There is an increasing awareness about the need to have an integrated approach to facilitate smooth navigation between analytical and intuitive process (Princea. M & Priporas. C (2018)). Marta Sinclair has arrived at an integrated framework of intuition (Sinclair.M, 2011”).

Several researchers have investigated the role of intuition in problem solving and decision making outside of academic set up. The studies have offered an insight into the factors contributing to intuition that results in better problem solving and decision making. The contemporary scenario of explosion of information and the need to arrive at a fast, innovative decision, it is imperative that the professionals make a balance between the rational analytical approach and intuitive approach to arrive at superior decisions. This necessitated the development of suitable tool to measure objectively different types of intuition and to study its impact on other cognitive tasks like problem solving, decision making etc. The tools available to measure intuition include:

“(1) *Myers–Briggs Type Indicator (MBTI; Myers et al (1998)*; (2) *Rational Experiential Inventory ((REI; Pacini & Epstein (1999)*; (3) *Perceived Modes of Processing Inventory (Burns & D’Zurilla (1999)*; (4) *Intuitive Behaviour Questionnaire (Raidl & Lubart, (2000–2001)*; (5) *Preference for Intuition and Deliberation Scale (Betsch, 2004, 2008)*; (6) *Types of intuition scale ((TintS) (Pretz et.al., 2014)*”. Of these, the types of intuition scale (TintS), developed by Pretz et. al. is said to measure comprehensively all three types of intuition viz; inferential intuition, holistic intuition and affective intuition. Development of the scale involved adaptation of MBTI and REI and adding a few more items. Applying the scale validation methodology to the preliminary scale the authors arrived at a 29 items scale with four factors in initial screening. Further validation of the 29 items scale by applying exploratory and confirmatory factor analyses a 24 items / 23 items scales were arrived at. All scales extracted four factors that are labelled as (i) inferential intuition, (ii) affective intuition (iii) holistic abstract and (iv) holistic big picture. The scale has been used by a few researchers to measure intuition.

Review of literature

The scale developers themselves applied it on two samples to examine the predictive validity of the TintS ((TInsT), Pretz J.E. et.al 2014). In one of the studies the scale was applied on 23 5th year (final year) students of occupational therapy program to assess the type of intuition used in clinical decision making. In another study, TintS, (Pretz. J.E. et.al., 2014) the scale was applied to 71 undergraduate students of a liberal arts college comprising of musicians and non-musicians to study the use of type of intuition used by participants in musical performance. In both the studies the factors of the scale showed good values for Cronbach’s alpha.

Organ. D and Flaherty. B.O (2016) studied the influence of intuitive decision style diversity on both team level states and team performance by measuring intuition using TIntS among 188 samples of 48 ICT firms spread over 22 countries. By regression analysis the relationship between intuition type and team level performance was explored.

Káplár.M et.al (2017). measured intuition among 59 college students and analysed the relationship between types of intuition and the performance in an intuitive task of deciding the direction to turn to trace a rose on an animated labyrinth. Accuracy and reaction time were measured. Holistic- affective intuition was found to influence the accuracy in decision.

Leibowitz et al (2019), as part of Fulbright project measured intuition using TIntS among 172 samples (65% C-level executives and 12 % Directors and other low level professionals) from USA, Canada, Poland and Italy. The main findings of the research include: *“The use of and preference for intuition types change as employees gain more experience. However, there may be intuition styles that are more static and trait-like, which are linked to roles, differentiating managers from leaders. Using “inferential intuition” and “seeing the big picture” go hand in hand. Listening to your body signals can promote improved intuition. Cross-cultural differences may impact executive decision-making. Executives often prefer to use their intuition over analysis/analytics”*.

Kreitler. S and Benbenisty. C (2020) explored the motivational components of intuition. Measurement of cognitive orientation and intuition types using cognitive orientation questionnaire, TintS and Decision style scale among 90 undergraduate students. Analysis of data revealed that *“motivational components of intuition were found to be focusing on emotions, opening-up to situations, preference for fast and easy solutions and self-reliance. The theoretical conclusions are that intuition is a personality tendency grounded in a specific motivational network, amenable for assessment and training”*.

Shi. M.C et al (2021), measured the prevalence of intuition using TIntS among engineering (361) and engineering technology (43) students. The study found that students use inferential intuition to solve problems.

Shi. M. C and Lucietto. A. M (2022), studied the use of intuition over other methods of problem solving among undergraduate students (n=1109) using TIntS and analysed four regression models to explore the relationship between the types of intuition and the demographic variables such as gender, major, college year of classification, and ethnicity. *“The results showed that inferential intuition was influenced by gender and ethnicity, while all four studied factors major, gender, ethnicity, and college year of classification have an impact on affective intuition. The holistic big-picture intuition model indicated that only gender and college influenced the use of this intuition type. In addition, gender, major, and ethnicity were the main drivers for holistic abstract intuition usage. The study suggests that intuition usage is driven by all four factors with gender as the main factor that have an impact on all four of the types of intuition”*.

Taleyarkhan, M. R et al (2023), measured intuition among 223 engineering technology students and analysed the relationship between intuition type and approach to problem solving. The study found the students used inferential intuition to solve problems.

The survey of literature on use of TintS to measure intuition revealed that only the scale developers and Jay Liebowitz and co-workers have subjected the scale to SEM based validation methods. Other researchers either accepted the validation scores of scale developers, or computed Cronbach's alpha (Organ. D & Flaherty. B.O., 2016).

It is suggested that even a well-established scale may not perform well in a new sample. It is recommended that reporting SEM based validity analysis of multiple-indicator scales is important before examining relationships among constructs or testing hypotheses (Heggstad et al., 2019). Gordon W. Cheung et. al has reviewed and recommended the best practices for reporting validity of the scale in empirical studies. (Gordon W, 2023))

Despite the significant role of intuition in problem solving, decision making and creativity, measuring, nurturing and application of intuition in task performance is still outside of academic curriculum. It is in this context the present study reports the assessment of intuition among university students in India and validation of Types of intuition scale by applying confirmatory factor analysis.

The objective of the present study was to investigate the scale developed by Pretz et al (2014) for measuring types of intuition, for its suitability to measure the same among the students of higher education institutions in India.

A survey type research design was adopted. The tool developed by Pretz (2014) to measure intuition consisted of 29 items and 4 factors. Reliability score Cronbach's alpha 0.701 was obtained in a pilot study using this scale. The tool format was a self-report questionnaire on a 5-point Likert scale to elicit the perceptions of respondents (Pretz (2014)). 1 –Definitely false, 2- Mostly false, 3 - Undecided (neither true nor false), 4- Mostly true and 5 - Definitely true. Items 5, 7 14, 18, 20, 23 and 28 are to be reversed. Items 8, 25, 17, 21 and 25 were not included in 24 items scale based on EFA analysis. In addition to these items, Holistic–Big Picture item 5 was not included in 23 items scale (Pretz (2014) after CFA analysis which showed low factor (0.11) loading in CFA. The 23 items scale contained 8 items for factor labelled inferential, 8 items for affective, 4 items for holistic big picture and 3 for holistic abstract intuition types.

Methodology

The scale developed by Pretz for measuring intuition that contained 29 items was used for the study. A questionnaire along with items to collect demographic details was used both in printed format and google form format for data collection. Students of universities and colleges in India form the population. Google form format was shared with a faculty of several colleges and universities in Tamil Nadu, Karnataka, Pondicherry, Andrapradesh and Assam with the request to share among the students of their institutions. Responses were received in the researchers' google account. The researcher visited several institutions in Tamil Nadu and Pondicherry, met the students with the consent of the head of the institution, circulated the printed form gave instructions and collected the forms. A total of 227 forms were received in google form and a total of 596 forms were collected in printed form. The data collected in printed format was entered in excel and combined with the google form responses. The data was first analysed for missing values in the variables and omitted for further analysis. A total of 755 data was used for further analysis.

Statistical analysis was performed for the 23 items scale in SPSS version 25 and AMOS version 24.

Results and Discussion

Demographic profile of the sample is presented in Table 1

Table 1

Demographic profile

| Variable | Category | Frequency (N) | Percentage (%) |
|-----------------------------|-----------------------------|---------------|----------------|
| Age | 18 - 22 | 545 | 72.2 |
| | 22 - 25 | 99 | 13.1 |
| | 26 - 30 | 91 | 12.1 |
| | >30 | 20 | 2.6 |
| Gender | Male | 310 | 41.1 |
| | Female | 445 | 58.9 |
| Region | Urban | 474 | 62.8 |
| | Rural | 281 | 37.2 |
| Program of study | Engineering | 258 | 34.2 |
| | Management | 156 | 20.7 |
| | Science | 138 | 18.3 |
| | Humanities | 60 | 7.9 |
| | Social sciences | 7 | 0.9 |
| | Behavioural science | 14 | 1.9 |
| | Law | 8 | 1.1 |
| | Art Design and Architecture | 5 | 0.7 |
| | Health sciences | 45 | 6.0 |
| | Others | 64 | 8.5 |
| Year of study | First year | 284 | 37.6 |
| | Second year | 303 | 40.1 |
| | Third year | 93 | 12.3 |
| | Fourth year | 54 | 7.2 |
| | Fifth year | 21 | 2.8 |
| Grade in HS | First class | 538 | 71.3 |
| | Second class | 180 | 23.8 |
| | Third class | 37 | 4.9 |
| CGPA in the current program | 4 - 5 | 40 | 5.3 |
| | 5 - 7 | 208 | 27.5 |

| | | |
|-------|-----|------|
| 7 - 9 | 324 | 42.9 |
| 9+ | 183 | 24.2 |

The relationship between types of intuition scale and its factors with gender, region, age group, program studied, year of study, grade in higher secondary and CGPA in the current program was analysed (Tables 2 – 8). Statistically significant difference was observed between inferential intuition and (i) rural and urban samples, (ii) age group, (iii) year of study. Statistically significant difference was observed between CGPA in the current program and inferential intuition and affective intuition. Statistically significant difference was observed between the types of intuition scale and year of study, grade in higher secondary and CGPA in the current program. These observations are consistent with the nature of the inferential intuition which develops with experience and expertise. It can be suggested that it is a learned behaviour. Several empirical studies among undergraduate regarding the use of intuition in problem solving / task performance have revealed that students use inferential intuition to solve problem / in task performance.

Table 2

Relationship between gender and types of intuition

| Category | Gender | | | | | | | | | |
|----------|--------------|------|--------------|------|----------------------|------|-------------------|------|--------------|------|
| | Inferential | | Affective | | Holistic Big picture | | Holistic abstract | | Scale | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Male | 3.30 | 0.77 | 3.03 | 0.53 | 2.99 | 0.79 | 2.89 | 0.66 | 3.10 | 0.42 |
| Female | 3.31 | 0.79 | 3.07 | 0.53 | 2.97 | 0.64 | 2.91 | 0.65 | 3.12 | 0.42 |
| T | -0.21 | | -1.08 | | 0.51 | | -0.34 | | -0.59 | |
| P | 0.61 | | 0.28 | | 0.61 | | 0.73 | | 0.55 | |

Table 3

Relationship between region and types of intuition

| Category | Region | | | | | | | | | |
|----------------|-------------|------|-------------|------|----------------------|------|-------------------|------|-------------|------|
| | Inferential | | Affective | | Holistic Big picture | | Holistic abstract | | Scale | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Urban | 3.36 | 0.79 | 3.08 | 0.54 | 2.98 | 0.64 | 2.88 | 0.66 | 3.14 | 0.42 |
| Rural | 3.22 | 0.77 | 3.01 | 0.51 | 2.98 | 0.69 | 2.95 | 0.65 | 3.07 | 0.41 |
| t value | 2.45 | | 1.69 | | -0.007 | | -1.39 | | 1.91 | |

| | | | | | |
|----------------|-------------|-------------|--------------|-------------|--------------|
| P value | 0.01 | 0.09 | 0.995 | 0.17 | 0.057 |
|----------------|-------------|-------------|--------------|-------------|--------------|

Table 4

Relationship between age group and types of intuition

| Category | Age group | | | | | | | | | |
|----------------|--------------|------|-------------|------|-------------------------|------|----------------------|------|-------------|------|
| | Inferential | | Affective | | Holistic Big picture | | Holistic abstract | | Scale | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| 18-22 | 3.24 | 0.77 | 3.07 | 0.52 | 3.00 | 0.66 | 2.92 | 0.66 | 3.10 | 0.42 |
| 23-25 | 3.36 | 0.76 | 3.06 | 0.49 | 2.83 | 0.65 | 2.98 | 0.61 | 3.10 | 0.39 |
| 26-30 | 3.70 | 0.79 | 3.03 | 0.63 | 3.05 | 0.68 | 2.74 | 0.68 | 3.21 | 0.42 |
| >30 | 2.97 | 0.96 | 2.96 | 0.59 | 2.86 | 0.50 | 2.88 | 0.60 | 2.9 | 0.46 |
| F value | 10.37 | | 0.39 | | 2.45 | | 2.58 | | 2.82 | |
| P value | 0.000 | | 0.75 | | 0.63 | | 0.53 | | 0.04 | |

Table 5

Relationship between year of study and types of intuition

| Year of study | Year of study | | | | | | | | | |
|----------------|---------------|------|-------------|------|-------------------------|------|----------------------|------|-------------|------|
| | Inferential | | Affective | | Holistic Big picture | | Holistic abstract | | Scale | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| First year | 3.20 | 0.88 | 3.04 | 0.51 | 2.94 | 0.68 | 2.94 | 0.64 | 3.08 | 0.47 |
| Second year | 3.27 | 0.74 | 3.08 | 0.52 | 2.98 | 0.68 | 2.88 | 0.66 | 3.10 | 0.39 |
| Third year | 3.47 | 0.72 | 3.08 | 0.65 | 3.08 | 0.64 | 2.97 | 0.66 | 3.21 | 0.43 |
| Fourth year | 3.61 | 0.52 | 3.01 | 0.49 | 3.07 | 0.47 | 2.94 | 0.66 | 3.21 | 0.33 |
| Fifth year | 3.70 | 0.63 | 2.96 | 0.50 | 3.92 | 0.61 | 2.49 | 0.55 | 3.12 | 0.28 |
| F value | 5.81 | | 0.56 | | 1.13 | | 2.72 | | 2.74 | |
| P value | 0.00 | | 0.69 | | 0.34 | | 0.3 | | 0.03 | |

Table 6

Relationship between program of study and types of intuition

| Program of study | | | | | | | | | | |
|------------------|--|--|--|--|--|--|--|--|--|--|
|------------------|--|--|--|--|--|--|--|--|--|--|

| Program of study | Inferential | | Affective | | Holistic Big picture | | Holistic abstract | | Scale | |
|-----------------------------|-------------|------|-------------|------|----------------------|------|-------------------|------|-------------|------|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Engineering | 3.32 | 0.75 | 3.14 | 0.52 | 2.98 | 0.65 | 2.94 | 0.66 | 3.16 | 0.41 |
| Management | 3.21 | 0.75 | 2.99 | 0.47 | 3.05 | 0.74 | 2.93 | 0.64 | 3.07 | 0.39 |
| Science | 3.35 | 0.83 | 2.97 | 0.56 | 2.96 | 0.62 | 2.82 | 0.66 | 3.07 | 0.42 |
| Humanities | 3.47 | 0.77 | 3.15 | 0.53 | 2.95 | 0.61 | 2.85 | 0.62 | 3.19 | 0.44 |
| Social Sciences | 3.32 | 0.52 | 2.92 | 0.94 | 2.64 | 0.66 | 2.85 | 0.60 | 3.04 | 0.38 |
| Behavioural Science | 3.67 | 0.71 | 3.01 | 0.82 | 2.77 | 0.49 | 2.73 | 0.53 | 3.14 | 0.38 |
| Law | 3.38 | 0.57 | 3.12 | 0.92 | 2.96 | 0.76 | 2.79 | 0.59 | 3.08 | 0.48 |
| Art Design and Architecture | 3.21 | 1.01 | 2.97 | 0.58 | 2.75 | 1.00 | 2.93 | 1.14 | 2.96 | 0.38 |
| Health Sciences | 3.04 | 0.91 | 3.01 | 0.48 | 2.96 | 0.64 | 2.89 | 0.47 | 3.00 | 0.47 |
| Others | 3.35 | 0.91 | 3.06 | 0.48 | 3.01 | 0.67 | 3.03 | 0.76 | 3.15 | 0.44 |
| F value | 1.57 | | 1.61 | | 0.69 | | 0.82 | | 1.30 | |
| P value | 0.12 | | 0.11 | | 0.72 | | 0.60 | | 0.23 | |

Table 7

Relationship between grade in higher secondary and types of intuition

| Grade in HS | Grade in HS | | | | | | | | | |
|--------------|-------------|------|-----------|------|----------------------|------|-------------------|------|-------|------|
| | Inferential | | Affective | | Holistic Big picture | | Holistic abstract | | Scale | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| First class | 3.37 | 0.80 | 3.06 | 0.55 | 2.99 | 0.66 | 2.89 | 0.64 | 3.13 | 0.43 |
| Second class | 3.13 | 0.76 | 3.04 | 0.48 | 2.96 | 0.67 | 2.90 | 0.70 | 3.04 | 0.40 |
| Third class | 3.31 | 0.68 | 3.06 | 0.52 | 2.93 | 0.64 | 3.07 | 0.57 | 3.13 | 0.38 |

| | | | | | |
|----------------|-------------|--------------|-------------|-------------|-------------|
| F value | 6.18 | 0.11 | 0.37 | 1.22 | 3.33 |
| P value | 0.69 | 0.002 | 0.69 | 0.29 | 0.04 |

Table 8

Relationship between CGPA and types of intuition

| CGPA | CGPA | | | | | | | | | |
|----------------|--------------|------|-------------|------|----------------------|------|-------------------|------|--------------|------|
| | Inferential | | Affective | | Holistic Big picture | | Holistic abstract | | Scale | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| 4-5 | 2.78 | 1.05 | 2.82 | 0.50 | 2.83 | 0.81 | 2.81 | 0.55 | 2.83 | 0.51 |
| 5-7 | 3.24 | 0.72 | 3.04 | 0.48 | 2.92 | 0.65 | 2.93 | 0.68 | 3.09 | 0.38 |
| 7-9 | 3.33 | 0.77 | 3.10 | 0.52 | 2.99 | 0.65 | 2.93 | 0.67 | 3.13 | 0.41 |
| 9+ | 3.44 | 0.78 | 3.05 | 0.59 | 3.08 | 0.66 | 2.87 | 0.61 | 3.16 | 0.43 |
| F value | 8.43 | | 3.42 | | 2.47 | | 0.70 | | 7.54 | |
| P value | 0.000 | | 0.02 | | 0.06 | | 0.55 | | 0.000 | |

Correlation analysis between the factors of intuition (Table 9) shows a strong, significant positive correlation between holistic big picture and inferential intuition ($r = 0.435, p < 0.005$). Moderate positive correlation is observed between inferential and affective intuition ($r = 0.301, p < 0.005$). There is no significant correlation between holistic big picture and affective intuition ($p > 0.05$). Other correlations are weak and significant. The correlations in the present study are consistent with the correlations of Jay et.al except between holistic big picture and holistic abstract which is weak and significant in the present study but not significant in Jay et.al.

Table 9

Correlation between types of intuition

| Dimensions | 1 | 2 | 3 | 4 |
|------------------------|--------|--------|---|---|
| 1 Holistic Big picture | 1 | | | |
| 2 Inferential | .435** | 1 | | |
| 3 Affective | .060 | .301** | 1 | |

| | | | | |
|-------------|--------|-------|--------|------|
| | .102 | .000 | | |
| 4. Holistic | .152** | .093* | .111** | 1 |
| Abstract | .000 | .010 | .002 | |
| Mean | 2.98 | 0.33 | 0.31 | 0.29 |
| SD | 0.66 | 0.79 | 0.53 | 0.65 |

Confirmatory factor analysis for the four factor model proposed by the scale developers was carried out in AMOS version 24. The model is presented in Fig.1. The model shows acceptable values for the model fit and are better than the values reported literature for the model (Table 10)

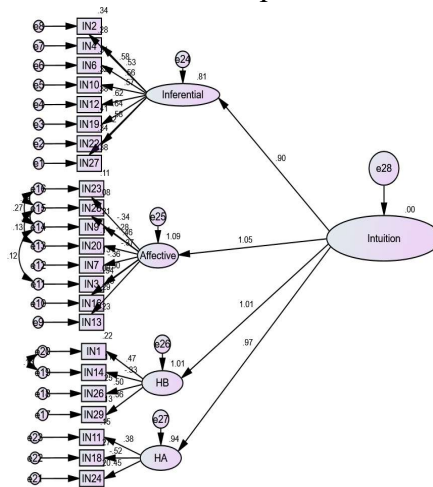


Fig.1 Confirmatory factor model of Types of intuition scale

Table 10

Model fit parameters of types of intuition

| Parameter | Present study | Pretz et.al | | Jay. L et.al |
|-----------|---------------|---------------|------------|--------------|
| | | Uncorrelated/ | Correlated | |
| P | 0.000 | | | |
| CMIN/DF | 2.745 | 4.542 / 4.375 | | - |
| RMR | 0.069 | | | |
| GFI | 0.930 | | | |
| AGFI | 0.912 | | | |
| CFI | 0.890 | 0.706 / 0.727 | | 0.872 |
| TLI | 0.873 | 0.678 / 0.694 | | |
| NFI | 0.838 | | | |
| RMSEA | 0.048 | 0.076 / 0.76 | | 0.63 |

All relationships between the construct intuition and the types of intuition (factors) and the items loading on to each factor are significant (Table 11). All factor loadings are good except that

of two items 3 and 28. The factor loading of items of inferential intuition are comparable with the values reported by Pretz et.al. But the factor loadings of items of other factors show mixed trend. From the results of master validity analysis of the scale and the factor-wise Cronbach’s alpha values of the present study and a comparison with the Cronbach’s alpha values reported by Pretz et.al, it is observed that the construct reliability, Cronbach’s alpha are consistent with the value reported by the scale developers for inferential intuition (Table 12). The values of other factors are poor. From these results it may be suggested that as proposed by Jay et.al “*rather than four distinct types of intuition, there may, in fact, be two predominant styles of intuition that employees adopt. The first style, what we call “Feeling Theorists,” are employees who tend to trust their emotional intelligence and rely on more theoretical understandings in their decision-making. In other words, this style reflects employees who tend to rely on emotional hunches and gut feelings (reflective of affective intuition) and also prefer to adopt abstract theories (reflective of holistic abstract intuition) rather than concrete facts and experience to make decisions. The second style, referred to as “Big Picture Modellers,” are employees who prefer to look at the bigger picture and leverage their experience when making decisions. Thus, this style reflects employees who prefer adopting a full-system view or model (reflective of a holistic big picture), as well as relying on their prior knowledge and experience, to envision that model (reflective of inferential intuition) when making decisions”.*

Table 11
Estimates of CFA model of types of intuition

| | Variables and factors | | Estimate | S.E. | C.R. | Factor loading | P | Factor Loading (Pretz et.al) |
|-------------|-----------------------------|-------------|----------|------|--------|-------------------|-----|------------------------------------|
| Inferential | <--- | Intuition | 1.000 | | | .900 | | |
| Affective | <--- | Intuition | .939 | .087 | 10.821 | 1.045 | *** | |
| HB | <--- | Intuition | .705 | .083 | 8.540 | 1.007 | *** | |
| HA | <--- | Intuition | .786 | .079 | 9.988 | .970 | *** | |
| IN27 | <--- | Inferential | 1.000 | | | .618 | | 0.62 |
| IN22 | <--- | Inferential | .928 | .070 | 13.208 | .580 | *** | 0.58 |
| IN19 | <--- | Inferential | 1.084 | .076 | 14.303 | .642 | *** | 0.56 |
| IN12 | <--- | Inferential | 1.046 | .075 | 13.909 | .619 | *** | 0.28 |
| IN10 | <--- | Inferential | .922 | .071 | 12.994 | .568 | *** | 0.43 |
| IN6 | <--- | Inferential | .919 | .072 | 12.790 | .557 | *** | 0.56 |
| IN4 | <--- | Inferential | .841 | .068 | 12.286 | .530 | *** | 0.41 |
| IN2 | <--- | Inferential | .987 | .075 | 13.244 | .582 | *** | 0.48 |
| IN13 | <--- | Affective | 1.000 | | | .477 | | 0.48 |
| IN16 | <--- | Affective | 1.062 | .100 | 10.644 | .541 | *** | 0.48 |
| IN3 | <--- | Affective | .593 | .085 | 6.945 | .298 | *** | 0.52 |
| IN7 | <--- | Affective | -.758 | .093 | -8.110 | -.361 | *** | 0.44 |

| | | | | | | | | |
|------|------|-----------|--------|------|--------|-------|-----|------|
| IN20 | <--- | Affective | -.843 | .101 | -8.321 | -.374 | *** | 0.61 |
| IN9 | <--- | Affective | 1.002 | .104 | 9.592 | .459 | *** | 0.75 |
| IN28 | <--- | Affective | -.594 | .089 | -6.666 | -.284 | *** | 0.61 |
| IN23 | <--- | Affective | -.684 | .090 | -7.635 | -.335 | *** | 0.74 |
| IN29 | <--- | HB | 1.000 | | | .361 | | 0.73 |
| IN26 | <--- | HB | 1.307 | .160 | 8.166 | .503 | *** | 0.59 |
| IN14 | <--- | HB | -.811 | .124 | -6.534 | -.327 | *** | 0.54 |
| IN1 | <--- | HB | 1.352 | .170 | 7.950 | .473 | *** | 0.54 |
| IN24 | <--- | HA | 1.000 | | | .449 | | 0.35 |
| IN18 | <--- | HA | -1.130 | .119 | -9.476 | -.520 | *** | 0.80 |
| IN11 | <--- | HA | .870 | .111 | 7.876 | .384 | *** | 0.51 |

Table 12

Validity analysis of types of intuition

| | CR | AV E | Inferenti al | Affectiv e | HB | HA | Cronbach' s Alpha Present study | Cronbach's Alpha Pretz et.al | | |
|-------------------------|-----------|---------|-----------------|---------------|--------------|-------------------|---|------------------------------------|-----------|-----------|
| Inferenti al | 0.80 8 | 0.346 | 0.588 | | | | 0.808 | 0.74 a | 0.75 b | 0.72 c |
| Affective | 0.02 6 | 0.160 | 0.943*** | 0.400 | | | 0.213 | 0.79 a | 0.85 b | 0.76 c |
| HB | 0.23 7 | 0.179 | 0.908*** | 1.045*** | 0.423 | | 0.151 | 0.77 a | 0.86 b | 0.73 c |
| HA | 0.04 1 | 0.206 | 0.862*** | 1.016*** | 0.996** * | 0.45 4 | 0.171 | 0.76 a | 0.63 b | 0.74 c |

^a Pretz et.al Study 1; ^b Pretz et.al Study 2; ^c Pretz et.al Study 3

Conclusion

The observation in the present study that (i) a statistically significant difference between inferential intuition and region, age group and year of study; a strong positive correlation between inferential intuition and holistic big picture; and constancy in CR, Cronbach's alpha and factor loading in CFA for inferential intuition may be considered to be reflective of the “ *two predominant*

styles of intuition” proposed by Jay.*et.al.* It may be suggested that the results reflect that the students might prefer to be “**Big Picture Modellers**,” *who prefer to look at the bigger picture and leverage their experience when making decisions*”.

Scope of the study:

The can be extended to investigate the type of intuition used in task performance or some other cognitive traits relevant to problem solving and decision making. Since certain types of intuitions are suggested to be dynamic, and can be learned, suitable strategies can be developed and integrated in academic training to equip prospective professionals with competency to effectively exploit intuition to reap the benefits of striking a balance between rational analytical approach and intuitive approach in decision making in professional performance.

References:

1. Bastick. T (1982); *Intuition: How we think and act*; Wiley publication; New York.
2. Burns. L. R and Zurilla. T.J (1999); Individual differences in perceived information – processing styles in stress and coping situations: Development and validation of the perceived modes of processing inventory; *Journal of cognitive therapy and research*; 23, 345 – 371.
3. Cheung. G. W., Thomas. H. D. C., Lau. R.S and Wang. L.C (2023); Reporting reliability, convergent and discriminant validity with structural equation modelling; A review and best – practice recommendations; *Journal of management*; <https://doi.org/10.1007/SI0490 - 023 - 09871>.
4. Epstein. S (1994); Integration of the cognitive and psychodynamic unconscious; *Journal of American psychologist*; 49, 709 – 724.9.1.
5. Hill. O. W (1987); Intuition: Inferential heuristic or epistemic mode? *Journal of imagination, cognition and personality*, 7, 137 – 154.
6. Hammond. K.R (1996); Human judgement and social policy; *Journal of irreducible uncertainty*, inevitable error, unavoidable injustice; New York, NY; Oxford University Press.
7. Jung. C.G (1971); Psychological types; *Priceton publisher*; NJ; University of Princeton press.
8. Kaplar. M., Dezma. L., Teleki. S., Csokasi. K., Kiss. E.C (2017); Intuition and abstract thinking in learning and understanding; *Journal of WEI International academic conference proceedings*.
9. Kreitler. S and Benbisty. C (2020); The cognitive orientation of intuitive thinking; *Journal of psychological applications and trends*; DOI; 10. 36315/2020/impact042.
10. Liebowitz. J., Chan. Y., Jenkin. T., Spicker. D., Paliszkievicz. J and Babiloni. F (2019); If numbers could “feel” : How well do executives trust their intuition? *VINE Journal of information and knowledge management systems*, ahead of print; <https://doi.org/10.1108/VJKMS-12-2018- 0129>.
11. Marta Sinclair ; An integrated framework of intuition, Chapter 1 Handbook of Intuition Research, p 3- 16 2011, Published by Edward Elgar Publishing, Inc.
12. William Pratt House, 9 Dewey Court, Northampton, Massachusetts 01060, USA

13. McCutshon. H.H.L and Pincombe.L (2001); Intuition: An important tool in the practice of nursing; *Journal of advancing nursing*; 35 (3), 342 – 348; <https://doi.org/10.1046/j.1365-2648.2001.01882>
14. Myers. I., McCaulley. M. H., Quenk.N.L and Hammer. A.L (1998); *Manual: A guide to the development and use of the Myers – Briggs Type Indicator*; Palo Alto. C.A Consulting psychologists publishers; 2nd edition.
15. Organ. D and Flaherty. B.O (2016); Intuitive decision – making and deep level diversity in entrepreneurial ICT teams, *Journal of decisions systems*, 25 (1); 421 – 435; DOI: 10.1080.12460125.2016.1187406
16. Pacini. R and Epstein. R.S (1999); The relation of rational and experiential information processing styles to personality, basic beliefs and the ratio – bias phenomenon; *Journal of personality and social psychology*, 76, 972 – 987.
17. Pretz. J.E., Brookings. J.B., Carlson. L.A., Humbert. K., Roy. M., Jones. M and Memmert. D (2014); Development and validation of a new measure of intuition: The Types of Intuition Scale; *Journal of behavioral decision making*; 27; 454 – 467; Wiley Online Library; DOI: 10.1002/bdm.1820.
18. Shi. M.C., Azevado. T.M and Lucietto. A.M (2021); Assessing intuition used among undergraduate engineering technology and engineering students; *Journal of American society for engineering education*.
19. Shi. M.C and Lucietto. A.M (2022); The preference of the use of intuition over other methods of problem solving by undergraduate students; *Journal of European educational researcher*; DOI: 10.31757/euer.532.
20. Taleyarkhan. M.R., Lucietto. A.M., Hobson. N.L and Azenado. T.M (2023); Approach to problem solving and use of intuition by engineering technology students; *Journal of global education and research*; 7 (1), 81 – 98; <https://www.doi.org/10.5038/2577-509X7.1.1174>.
21. Princea. M and Priporas. C (2018); Using intuitive awakening for business students to enhance strategic thinking skills; *Journal of Australian marketing*; Vol 26(2); <https://doi.org/10.1016/j.ausmj.2018.05.001>