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THE INTUITION ATTITUDE SCALE: DEVELOPMENT AND PSYCHOMETRIC EVALUATION

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Abstract

The objective of this study was to develop a culturally appropriate and psychometrically robust measure of Attitude of young Pakistanis towards intuition and intuitive decision making based on the Seymour Epstein Dual-Process model of perception (1994). Scale structure was investigated by EFA and CFA in two large samples of participants with ages 18 to 25 (N=200, 110 males & 90 females, M_{age} = 20.46, SD= 1.73) and (N=200, 113 males & 87 females, M_{age} = 20.39, SD = 1.71). Test of dimensionality revealed an 11-item scale with two factors: Intuitive Beliefs and Intuitive Decision Making. Overall, the indices of internal consistency indicate acceptable internal reliability (a=.783) and good convergent validity with the two dimensions of the intuition attitude scale (r=.886, .922). The findings are suggestive of significant psychometric properties. This investigation contributes to determining the link between intuition and the behavior of young adults. It can also help them to improve their intuitive powers and decision-making skills to achieve success in their lives.

Keywords: *Exploratory Factor Analysis, Confirmatory Factor Analysis, Intuition attitude, Scale Development, Pakistani youth*

Introduction

Intuitions are characterized as rapid thoughts, feelings, and behaviors without conscious awareness (Dane & Pratt, 2007). Although this concept is difficult to define, it can be thought of as feelings, including physical sensations, emotions, and mood. Intuitions are always instinctive, without conscious reasoning and evidence that such feelings occur in everyday situations; they occur through an unconscious process ending in abstract knowledge

QUALITATIVE RESEARCH JOURNAL FOR SOCIAL STUDIES
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Volume No: 02 Issue No: 03 (2025)

(Fredrickson, 2001). Intuitive concepts can be understood effortlessly as they require minimal or no cognitive processing at the conscious level (Reiff, 2008).

Primarily, intuitions relating to the psychoanalytic theory of Carl Jung and were classified under the concept of personality. Currently, tests based on his work are being used to measure intuitive thinking, including the Myers–Briggs Type Indicator (Briggs & Myers, 1976). Intuitions are involved in several cognitive processes that facilitate understanding. According to Dane and Pratt's (2009) classification, there are three types of intuition, i.e., problem-solving (pattern recognition), moral (cultural standards), and creative intuitions (feelings aroused when knowledge is combined in novel ways). Attention is nowadays being paid to whether intuitions are correct or accurate. One implication of investigating intuition within various cultures is that it demands explanations and the consideration of many phenomena. Intuition requires studying cognitive processes and unconscious thought processes, learning, the effect, and integration of the different information-processing systems referred to above (Hogarth, 2010).

Analytical and intuitive decisions are different in kind and nature; therefore, intuition is part of a dual processing system (Epstein, 1994). The objective behind Epstein's Cognitive Experiential Self-Theory (CEST-1994) is to identify the functions of the human brain and information processing. Epstein's theory considers two separate systems of information processing: one is based on logical thinking, rationalization, and deliberate way of thinking, the analytical-rational system; the second is emotional and automatic processing, referred to as the intuitive-experiential system. Further, Epstein found that the intuitive-experiential process is faster than the analytical-rational system. He claims that both systems work together to form behavior, and through these processes, conscious thoughts interact in with and in parallel to unconscious thoughts (Antoine, 2014).

Some Measures of Intuition

The already available self-report measures of intuition specific to western culture are rational Experiential Inventory. The scale is based on Epstein's dual-process theory and measures the ability and preference of participants to engage in intuitive or analytical processing (Pacini & Epstein, 1999). Other measures of intuition include the Intuitive Perceived Modes of Processing Inventory (Burns & D'Zurilla, 1999), Behavior Questionnaire (Raidl & Lubart, 2001), and the Preference for Intuition and Deliberation Scale (Betsch, 2008). The scales measure multiple aspects of intuition and are psychometrically sound as well.

The literature available from Pakistan suggests that empirical research is being carried out on intuition from different fields of study. In all the studies, either descriptive methods (interviews) or interventional analysis methods have been used. However, this phenomenon has been understudied when it comes to exploring the intuitive decision-making, beliefs, or the intuitive attitude of students in terms of their academic success or otherwise. One of the reasons for this paucity of investigation of intuition is the lack of indigenously developed scales for measuring intuition.

In recent years, there has been a growing trend of research into psychological test development in Pakistan. The limited availability of culturally relevant measures on the

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Volume No: 02 Issue No: 03 (2025)

phenomenon in question has compelled Pakistani researchers to develop one. To overcome this lack of measuring instruments requires developing some specifically in our National Language (Urdu) to measure the desired constructs. This investigation was carried out to make available an intuition scale in Urdu to measure the attitude to the intuition of young Pakistanis, which is different from a general measure of intuition due to the cultural and linguistic context-specific to Pakistan. To the best of our knowledge, the present investigation is the first research on developing an intuition scale for young adults in a Pakistani setting. Therefore, there seems to be a need for a reliable and valid measure to be developed. The primary purpose of this study was to develop the measure along with its psychometric properties by specifying its accuracy and consistency of measurement.

Method and Results

Research Design

A sequential mixed methods research design was used in this study for the development of the intuition attitude. The study was carried out in three stages: (a) a qualitative stage where a focus group was conducted, (b) an instrument development stage where items stage were written, and finally (c) a quantitative stage where the scale was tested.

Qualitative Stage

Item Generation Method

At the exploratory stage, an item pool for the Intuition Attitude scale was carried out to explore the culturally valid and reliable views of Pakistani Students about their attitude towards intuition and intuition-based decision making. Twelve undergraduates from a public university were given a semi-structured questionnaire designed to be used in a focus group along with a detailed discussion of the phenomena under question. Based on our theoretical framework, 38 statements were aligned to be answered on a 4-point Likert scale with each statement rated on four dimensions (0 "strongly Disagree," 1 "Disagree," 2 "Agree" to 3, "strongly Agree").

Content Validation of the Instrument

While developing a preliminary draft of the 38 items instrument, its content validity was established by discussing it with five professional psychologists. The experts critically examined and rated the content of each statement in terms of their clarity, comprehensiveness, suitability, and relevance with the phenomenon in question. An Average for each item was calculated, and only those items were retained for the second draft that had 75% to 90% agreement among experts concerning their suitability. According to the expert's opinion, the remaining 24 items were suitable and related to the measure of young Pakistanis attitude to intuition regarding their beliefs related to it and use in decision making.

Pilot Test of the Instrument

For piloting the instrument, Fifty Undergraduates (27 males & 23 females) ranging in age from 18 to 24 (M_{age}=19.96, SD =1.70) years were recruited through convenient sampling from a public university of Lahore, Pakistan. Permission was obtained from the departments concerned, and a copy of the research synopsis was provided for their approval. The 24-item questionnaire had a 4-point Likert scale for each statement, ranging from 0 "strongly Disagree," 1 "Disagree," 2 "Agree" to 3, "strongly Agree." Before administering

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Volume No: 02 Issue No: 03 (2025)

the questionnaire, a written consent form with a brief introduction to the phenomenon under investigation was signed by the participants. A demographic information form with their names, date of birth, religion, family status, birth order, gender, age, area of residence, family's monthly income, and mother tongue was completed along with the 24-item self-developed questionnaire. The participants were asked to rate each item concerning its applicability to them in their daily lives. Reliability analysis of the scale was carried out through IBM SPSS Statistics, version 24 to determine its internal consistency, i.e., Cronbach's alpha, and to delete items with weak correlations. The analysis revealed that the scale had α .85, indicating Internal high consistency. Items with correlation values of below .2 were deleted as not being sufficiently consistent with the group as a whole. With the help of the overall statistics, three items were deleted. The deletion of items leads to the third draft of statements with 21 items further assesses for their factorability.

Instrument Development Stage

Respondents of Exploratory and Confirmatory Factor Analysis

From the total sample of 400 undergraduates, 200 (110 males & 90 females, M_{age} = 20.46, SD= 1.73) contributed to the exploratory factor analysis, and a further cohort of 200 (113 males & 87 females, M_{age} = 20.39, SD = 1.71) answered the questionnaire finalized after factor analysis for the confirmatory factor analysis. They were convenience sampled from 6 public universities of Lahore, Pakistan. To maintain the homogeneity of the sample and control for extraneous variables, the participants were: (a) not earning, (b) unmarried, and (c) currently enrolled in an undergraduate university program. They were excluded from the investigation if: (a) they had been diagnosed with any physical or mental illness, and (b) were enrolled in an overseas student program.

Statistical Analysis

IBM SPSS Statistics 24 was used to reduce many variables from the questionnaire responses and determine the key factors using Exploratory factor analysis; Amos 24 was used to determine whether the factor and factor loading of the measured variables were as expected from a theoretical perspective using confirmatory factor analysis.

Exploratory Factor Analysis

In the refinement phase, the fourth step was the Exploratory Factor Analysis (EFA) using the Varimax rotation method on a 21 item 4-point Likert scale questionnaire. The criteria for determining the relationship between factors were (a) a structure of measure with distinctive factors and different items loaded on a single factor; (b) an Eigenvalue that is equal to or greater than 1; (c) a factor loading a minimum of .30 and (d) the meaningfulness of the factor to the underlying construct. Numerous iterative cycles of factor analysis were conducted on the data set. The total variance and numbers of factors extracted were examined after each iteration. Factors with low communalities which did not correlate were deleted to refine the factor structure to get a matrix with clearer loadings. To check the assumption of a normal distribution of responses, Bartlett's Test of Sphericity was employed. It was found to be significant (p<0.001), suggesting that the responses of 200 undergraduates were distributed adequately for the analysis of a potential factor structure. The measure of sample adequacy, i.e., Kaiser-Meyer-Olkin (KMO), was found to be .84, which is above the

QUALITATIVE RESEARCH JOURNAL FOR SOCIAL STUDIES
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Volume No: 02 Issue No: 03 (2025)

recommended value of .5, suggesting that the sample was adequate for factor analysis (see Table-1). The communalities for the 17 items measured after extraction of factors were greater than .3.

Table 1

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's test of sphericity (N = 200)

	KMO	Bartlett's Test		
		Chi-Square	Df	Sig.
Intuition Attitude Scale	.84	909.12	210	.000

Factor Structure: The first factor comprised 10 items on (intuitive beliefs) described 21.37% of the variance, the second factor comprised 5 items on (Intuitive Decision Making) with 11.69%, of variance and the third factor comprised 2 items on (Intuitive Ability) with 6.98% of the variance, all after extraction. Finally, 17 items loaded significantly on three factors ranging from .51 to .76 (see Table-2)

Table 2

The Factor Loadings of the Intuition Scale in the Factor Solution Obtained through Varimax Rotation (N=200).

Item No.	Component 1	2	3
1		.58	
2		.54	
3			.52
4	.57		
5	.59		
6		.57	
7		.76	
8	.51		
9	.68		
10	.59		
11		.57	
12	.68		
13	.67		
14	.59		
15	.52		
16			.52
17	.52		

QUALITATIVE RESEARCH JOURNAL FOR SOCIAL STUDIES
ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 02 Issue No: 03 (2025)

Confirmatory Factor Analysis

Confirmatory factor analysis was used in this investigation to compare the fit of factor structure to the female objectified body consciousness scale using AMOS 24. To Determine the fit indices for structural equational modeling, the following were estimated (Moss, 2016). The chi-square value (CMIN), acceptable fit value between 1.00 and 5.00; model fit Comparative Fit Index (CFI) and Tucker Lewis index (TLI), acceptable fit value>0.90; root mean square error of approximation (RMSEA), acceptable value<0.08; NFI (normed fit index)' acceptable fit value > 0.90 and GFI (Goodness of fit index), acceptable fit value > 0.90). The data indicated a good fit, and the items loaded significantly ranged from .23 to .69 (see table 3). CFA had good indicators of fit with two factors, i.e., "Intuitive Beliefs" with 6 items, and "Intuitive Decision Making" with 5 items, producing an eleven-item measure

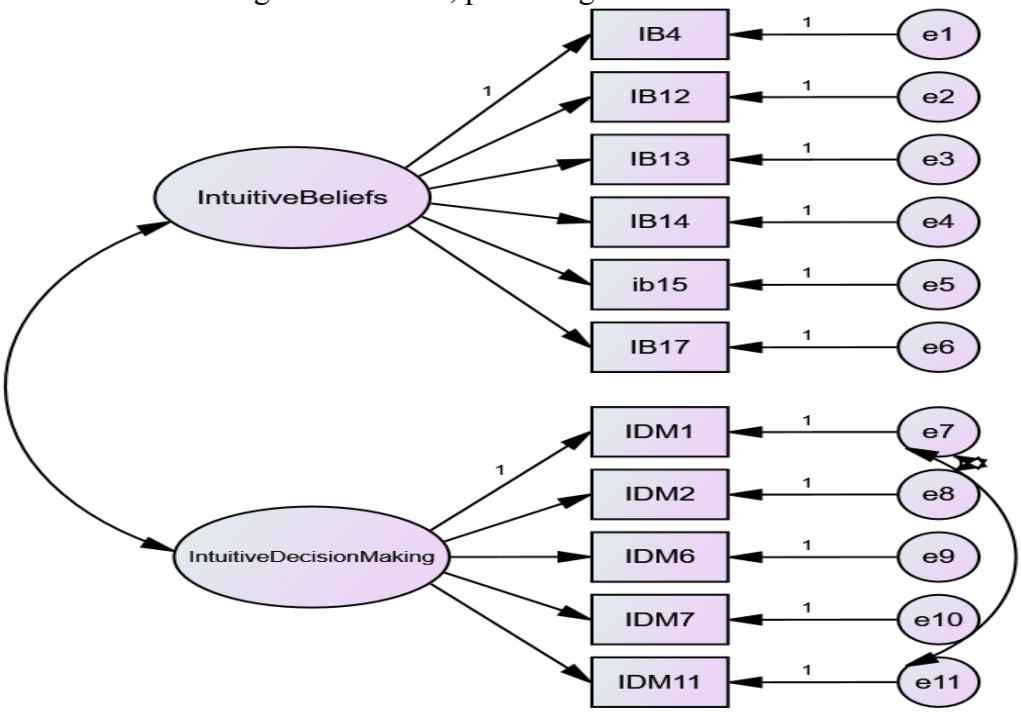

Figure 1. Model from Confirmatory Factor Analysis (After 3rd-factor deletion)

Table 3

Factor loadings and reliability measures of the Intuition Scale after Exploratory and Confirmatory Factor Analysis

Factors	**Exploratory Factor Analysis**		**Confirmatory Factor Analysis**	
	Indicator	Factor loadings	Standardized factor loading	Significance factor loading
Intuitive Beliefs	IB 1	.57	.23	***
	IB 2	.68	.65	***
	IB 3	.67	.48	***
	IB 4	.59	.60	***

QUALITATIVE RESEARCH JOURNAL FOR SOCIAL STUDIES
ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 02 Issue No: 03 (2025)

	IB 5	.52	.60	***	
	IB 6	.52	.41	***	
Intuitive Decision Making	IDM 1	.58	.30		***
	IDM 2	.54	.50	***	
	IDM 3	.57	.63	***	
	IDM 4	.56	.20	***	
	IDM 5	.57	.64	***	
Overall Model Fit	Kaiser-Myer-Olkin Measure of Sampling Adequacy = .84 Bartlett's Test of Sphericity, Approx. Chi-Square = 909.12***		RMSEA = .05, *X*2/df. = 1.64, NFI = .84, TLI = .90, CFI = .93, SRMR = .04		

Scale Testing Stage

Reliability Analysis of The Scale

The Cronbach's alpha was used to determine the internal consistency among items of the scale. According to DeVellis (2012), the thumb rule for interpreting Cronbach's alpha is that the acceptable value should be between $0.7 \leq \alpha < 0.8$. Hence, the Cronbach's alpha of the Intuition Attitude Scale (α= .830) indicates acceptable internal reliability.

Table 4.

Internal consistency among items of the scale

Cronbach's Alpha	Number of Items
.783	11

Convergent Validity of The Scale

Pearson product-moment coefficient of correlation was used to determine correlations between the Intuition Attitude Scale (Intuitive Beliefs and Intuitive Decision Making) with a total score of Intuition Attitude Scale. The interrelationship of these dimensions and the total score correlated are found to be .886 to .922, suggesting good convergent validity of the Intuition Attitude Scale.

Table 5.

Correlations between Intuitive Beliefs, Intuitive Decision Making, and total score of Intuition Attitude Scale.

Measures	Intuitive Ability	Intuitive Decision Making	Total Score of Intuition Attitude Scale
Intuitive Ability	1	.638**	.922**
Intuitive Decision Making		1	.886**

**. Correlation is significant at 0.01 level

QUALITATIVE RESEARCH JOURNAL FOR SOCIAL STUDIES
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Volume No: 02 Issue No: 03 (2025)

Table 6.
Intuition Attitude Scale Items

اس تحقیق کا مقصد چھٹی حِس کے بارے میں لوگوں کی رائے اور اُس کے اِن کی زندگی پر اثرات جاننا ہے۔ مندرجہ ذیل جملوں کو بغور پڑھیئے اور (1) مکمل اختلاف (2) اختلاف (3) اتفاق (4) مکمل اتفاق میں سے کسی ایک پر ( ) کا نشان لگا کر اپنی رائے کا اظہار کیجئے !

نمبر شمار	بیانات
1	IDM انسان کی چھٹی حِس اس کو انہونی سے آگاہ کر سکتا ہے؟
2	IDM چھٹی حِس ہماری ذاتی اور معاشی زندگی کے فیصلے کرنے میں اہم کردار ادا کرتی ہے۔
3	IA[a] انسان کوئی بھی کام سر انجام دینے سے پہلے اپنے دل سے رہنمائی حاصل کرتا ہے۔
4	IB اپنی چھٹی حِص پر انحصار کرنے والے لوگ زیادہ کامیاب زندگی گزارتے ہیں
5	IB[a] اپنی چھٹی حِص پر بھروسہ کرنے والے لوگوں کی فیصلے زیادہ تر درست ثابت ہوتے ہیں۔
6	IDM اکثر لوگوں کے دماغ میں درست فیصلے اور خیالات خودبخود آجاتے ہیں۔
7	IDM کیا آپ کو کبھی کسی فرد کی موجودگی میں مثبت/منفی احساسات ہوتے ہیں۔
8	IB[a] اپنے مسائل کو حل کرنے میں میری چھٹی حِس میرے بہت کام آتی ہے۔
9	IB[a] مجھے اپنی چھٹی حِس پر پورا بھروسہ ہے۔
10	IB[a] میری چھٹی حِس زیادہ تر درست ثابت ہوتی ہے۔
11	IDM مجھے اپنے مستقبل میں ہونے والے اچھے /برے واقعات کا اِدراَک اپنی چھٹی حِس سے ہو جاتا ہے۔
12	IB میں منطق کے بجائے اپنی چھٹی حِس پر زیادہ بھروسہ کرتا/کرتی ہوں۔
13	IB لوگوں پر بھروسہ کرنے کیلئے میں زیادہ تر اپنی چھٹی حِس پر انحصار کرتا/کرتی ہوں
14	IB میری چھٹی حِس کا تعلق میری روح سےہے۔
15	IB میرے چھٹی حس کا تعلق میری روح سے ہے۔
16	IA[a] میری چھٹی حِس مجھے زندگی کے فیصلے کرنے میں مدد دیتی ہے۔
17	IB میری کامیاب زندگی کا اانحصار میری چھٹی حِس پر ہے۔

Note: IB, Intuitive Beliefs; IDM, Intuitive Decision Making; IA, Intuitive Ability.
[a] Item was not included in the final 11 - item scale. The scale is copyrighted, for permission email at muneebashakeel@cuilahore.edu.pk

Discussion

To develop The Intuition Attitude Scale, both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used in this research. EFA was used to determine the number of factors to measure the underlying relationship between factors and the items loaded on each factor. CFA was used to test the theory concerning the structure of Seymour Epstein Dual Process Model of perception (1994) on Pakistani students. This investigation was started explicitly with EFA to test the difference in theory regarding language and culture. Then, CFA, the second procedure, was used on a different set of data from the data tested for EFA, since after EFA, the variables were reduced to three factors by extracting the

QUALITATIVE RESEARCH JOURNAL FOR SOCIAL STUDIES
ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 02 Issue No: 03 (2025)

maximum common variance and putting them into a standard score for further analysis. Principle Component Analysis was used to confirm the factors extracted. Some impressive results were produced. Factor analysis gave a reasonable estimate of what the overall measure of the intuition scale was. In general, intuition is psychologically present in every person, and the concept and model for the Seymour Epstein Dual Processing Model of perception (1994) are worldwide accepted.

In factor 1, items 4, 5, 8, 9, 10, 12, 13, 14, 15 and 17 were loaded. The content analysis revealed that all the items were related to the beliefs one has about intuition in general or their own beliefs. Therefore, the first subscale refers to ***"Intuitive Beliefs."*** In factor 2, items 1, 2, 6, and 7 are loaded; content analysis revealed that all these items measure the ability to use intuition while making decisions in their daily lives. Intuition plays an important part in making decisions for the future. People with common sense use intuitive listening to their inner voice while deciding what to do rather than relying merely on logical reasoning. Intuition in the context of decision-making is defined as a way of processing non-sequential information. It is distinct from perception and can be contrasted with the deliberative style of decision making. Intuition can influence judgment through emotion or cognition, and it has been suggested that it may be a means of uniting these two processes. Some individuals use intuition and more deliberate decision-making styles interchangeably, but there is some evidence that people tend to gravitate towards one or the other style more naturally. Factor two was called ***"Intuitive Decision-Making."***

In factor 3, items 3 and 16 were loaded, with the loading of .52 each. Content analysis revealed that these items identified young people's general attitude towards intuitions, whether they are optimistic or pessimistic about the power of intuition and their ability to use it. Therefore, this factor was called "Intuitive Ability." The literature suggests that researchers should retain a factor with just two items only if they can interpret it in a meaningful manner (Worthington & Whittaker, 2006). Any factor with 2 items is considered reliable only if the items are highly correlated to each other (*r* above .7) and uncorrelated with other variables (Yong & Pearce, 2013). According to Kline (2005), models that have a factor with only two items are prone to estimation problems, so where the recommendation is to retain at least three items in a factor. In terms of reliability, scale briefness is also of concern, and scale length must be balanced against parsimony in measurement (Netemeyer et al.,2003).

After determining the factors and items through EFA, to determine the factor loading of measured items to confirm what was expected based on the primary or pre-established theory, CFA was carried out. The results suggest that six items for intuitive beliefs and 5 items for intuitive decision-making should be retained. However, the third factor, with 2 items for intuitive ability, was not significantly loaded in CFA. The literature suggests that two items in a factor are a question of identification for confirmatory factor analysis. In this investigation, the CFA model was identified by setting the variance of each factor at 1. The third factor model with two items had only two loadings and two error variances estimated with three parameters; however, there were only two non-trivial entries in the variance-covariance matrix. Therefore, there was not enough information to estimate the three parameters required. The CFA model can be identified only if there are more than three items

QUALITATIVE RESEARCH JOURNAL FOR SOCIAL STUDIES
ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 02 Issue No: 03 (2025)

in each factor. Otherwise, the factor in question falls out of the system and has not been identified (Bollen, 1989). The results of this research suggest that only intuitive ability and intuitive decision- making have been identified as fitting the pre-established Seymour Epstein Dual Process Model of perception (1994). Therefore, overall, 11 items on the Intuition Scale are assumed to be a good fit for the factors; the Chi-square and some other goodness-of-fit indexes also indicated how well the model fits. Finally, the correlations of the measure in terms of inter-item correlation and correlations related to its related dimensions suggest that the scale has satisfactory psychometric properties to measure the attitude of young Pakistanis towards intuition.

Conclusion and Implication of the Study

A scale is designed to make reliable and valid measurements built into the questions of a questionnaire. Based on the outcomes of this research, it is concluded that the factors of examination selected have given a valid approximation of a complete measure for an Intuition Attitude Scale. The findings from Pope's 2003, study indicate that intuition is not a mystical power but a synergetic product that occurs due to several factors such as feelings, previous knowledge, past experiences, and beliefs. Intuition helps people to make fast and accurate judgments. Most people who use their intuitive ability in decision-making are more confident about their everyday life decisions (Nierenberg, 2016). Intuitive processing relates to many different fields, both in life and in the profession. This research has a complementary role in helping to determine the closest contact of aspects of intuition to the behavior of young Pakistani adults. It can also be a measure to help them be aware of their intuitive potential and how to improve it and achieve success in their lives.

Limitations and Future Suggestions

The researcher aimed to proceed in the best possible way; however, after the initial stages, different barriers were encountered, which caused deviation from the ideal path. The research constraints included time limitations. Consequently, detailed reliability and validity studies have not been conducted. As a future endeavor, it is suggested that the studies, as mentioned earlier, be carried out on a larger sample. Further refinement of the measure is still required and is highly recommended.

Ethical Considerations

The research was carried out according to the ethical principles and guidelines of the American Psychological Association. Informed consent was obtained from the participants, and their right to withdraw at any time was explained to them. The Ethical Review Board of the Department of Humanities, COMSATS University Islamabad, Lahore Campus approved the research study before we began.

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