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## THE DEVELOPMENT AND VALIDATION OF THE INTUITION STYLE INSTRUMENT (ISI)

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KEYWORDS	ABSTRACT
Intuition Style Instrument, Cognitive Styles, Validation. Structural Equation Modeling, Services Sector, Delphi Technique	Decision making is most important factor in organizations. It was essential to introduce the new instrument which could help the employees to make spontaneous decisions. The mix methods research was used. Data was collected from 511 respondents using survey. Reliability and validity factor analysis (EFA & CFA) identified four dimensions of intuition i.e. experience, judgment, thinking and emotion/gut feeling styles. The main contribution of this study is refinement of analytic-intuitive style dimension by splitting intuition into four more dimensions. Initial instrument was developed having 95 items for five dimensions Emotional Style (26-Items), Experience style (27-Items), thinking style (15-Items), Feeling style (10-Items) and the Judgmental style (12-Items). Thus, total 800 questionnaires were distributed randomly of which 685 were retrieved. The measurement model was developed and tested in the SPSS and AMOS-SEM. The newly developed instrument was found valid and reliable having 12 final items, 3 items for each construct likewise (experience, judgment, thinking and emotion/gut feeling style.
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### INTRODUCTION

Cognitive styles are extensively studied in management, education, psychology, organizational behavior and business domains. An individual preference of noticing and processing information is called cognitive style (Cools & Broeck, 2007; Allinson & Hayes, 1996). Past studies identified those individual differences in cognition which effects problem solving, decision making learning, thinking, knowing, planning and creating in many ways (Cools & Broeck, 2007). Numbers of cognitive styles are identified till date (Kirton, 2003). The researchers also developed their own instruments to measure cognitive styles. It is also reported that cognitive styles are also useful for the organizations (Hodgkinson & Sadler-Smith, 2003; Oladotun, 2020). In this connection, due to increasing number of the studies, cognitive style field is getting difficult (Grigorenko & Sternberg, 1995). In this regard, the main objective behind the main theme of this study is to

develop reliable and valid instrument for i.e. intuition style instrument. The reason why author initiated to develop such instrument is that organizations and their professionals face complex issue which needs spontaneous actions; this instrument could help managers to make quick decisions.

In this study researcher identified the model of intuition style and methodology for validation of the model is also explained. Researcher has explained the process of items generation, scale development, its validation conclusion and scientific implications. Cognitive style got attention four to five decades ago with studies of Witkin. Style refers to specific way of individual of doing something. Cognitive style is defined as preferred way of individual thinking, learning, solving problem, making decision is called cognitive style (Witkin, Moore, Goodenough & Cox, 1977). Another definition by Hunt, Krzystofiak, Meindl and Yousry (1989) process of collecting the information and arriving at conclusion and judgment on basis of observation is called cognitive style. Cognitive styles have been investigated and related with respect to many concepts such as the ability (Riding & Agrell, 1997), personality (Goldsmith, 1984), affect (Tullet & Devies, 1997). Study on relationship between cognitive styles and ability is main debate among researchers. Different researchers found the relationship between cognition, cognitive style and ability (Allinson & Hayes, 1996; Cools & Broeck, 2007; Oladotun, 2020). On contrast, Kirton (1994) claimed that the cognitive styles are different in concept from affect. According to Micheli et al., (2018), several demographic as well as the cognitive factors are directed towards the behavioral manifestation.

In addition, Vranic, Rebernjak & Martincevic (2019) argued that personality is “habitual way of feeling, thinking and perceiving and reaction to the World”. These personality and its traits are linked with work performance, commitment, decision making and attitudes. There are many instruments, scales and questionnaire developed and validated on the cognitive styles, decision making styles but there was a gap which prevails in the literature as no such instrument is available which only focus on the intuition. Therefore this study tried to fill this gap. The scales, instruments, questionnaires and index developed in western perspective but there was intense need to develop an instrument which could be helpful in eastern perspective especially in South Asia and Pakistan’s perspective. Therefore, researcher got motivation to carry out such study. Investigating cognitive styles in organizational setting is attaining attention. Cognitive styles are related with the organizational behavior (OB), management, composition of team, learning, the decision making, organizational development (OD), career development (CD), training and development (TD). Several cognitive styles have been identified by number of researchers but most relevant styles related with current study are identified such as Kirton and Ciantis (1986) adaptors-innovators, Riding and Cheema (1991) wholist-analytical/verbalizer-imager, cognitive style index (CSI) and analytical and intuition (Allinson and Hayes, 1996), Cools and Broeck (2007).

Human resources can play important role in management and administration using cognition. A different individual perceives things differently. Allinson and Hayes introduced the analytical and intuition styles. In this connection, an analytical style is called left brain while intuition is called right brain. Analytical is based on logical reasoning, and intuition is based on immediate judgments and feelings. Cools and Broeck (2007) divided analytical into ‘knowing (people with knowing style want to know facts and like complex problems), planning (want to control and organize the work environment they need the well-structured work environment, and in this

connection, they plan to attain their objectives), and creating (people with creating style want experimentation)', but [Busari et al., \(2017\)](#) suggested to split the intuition into further more dimensions.

## LITERATURE REVIEW

Human decisions have lot of deficiencies and in order to reduce these deficiencies and make quality decisions at workplace. The cognitive styles are used to make quality decisions. It is very difficult to make decisions in structured, semi-structured and unstructured situations. Use of communication technologies, for the problems solving, decision making have given support to organizational and individual decision making ([Phillips-Wren, Power & Mora 2019](#); [Oladotun, 2020](#)). Cognition is related with human decision making because an individual learn and make positive and negative patterns. Positive pattern lead to quality decision making while negative might lead towards poor choices. Human decision process is influenced by stressful situations and time limited situations ([Chatfield, 2016](#); [Power, 2016](#)). According to [Mora, Phillips-Wren, & Wang, \(2018\)](#) cognitive styles help in decision making and managing the risk. Cognitive styles are getting attention since many decades and role of cognitive styles is reported as intervening variable at work place ([Cools, & Broeck, 2007](#); [Kirton & Ciantis, 1986](#)). Moreover, [Allinson and Hayes \(1994\)](#) claimed that cognitive styles be used by organization in team building, recruitment and selection, performance management, career development, training, learning and problem solving.

In the same way, [Sadler-smith and Badger \(1998\)](#) concluded that human resource practitioners can play important role in encouraging innovation by managing cognitive styles. If managers know each individual's cognitive style then performance, and productivity of employees can be easily enhanced. Moreover, knowing the cognitive styles is relevant in the context of decision making, in addition cognitive styles (CS) not only relevant for decision making and processing of information but it is relevant for person-organization fit ([Cools, & Broeck, 2007](#)), or hiring, selecting and turnover of employees ([Sadler-Smith, 1998](#); [Cools, 2007](#); [Busari, Mughal, Khan, Rasool & Kiyani, 2017](#)). Different researchers have introduced different theories on cognitive styles ([Kirton, 1976](#); [Riding & Cheema, 1991](#); [Allinson & Hayes, 1996](#); [Cools, 2007](#)). Based on these theories some researchers have claimed that these all CS theories and concepts are different names of same dimensions of cognitive styles ([Cools, & Broeck, 2007](#); [Sadler-Smith & Badger, 1998](#)). On the contrary, two cognitive styles are studied in many studies in past. The first one is called analytical, rational, deductive and critical while other is inductive, creative and informal. Similar models given by diverse researchers likewise, logical- nonlogical ([Barnard, 1938](#)), analytic-holistic ([Beyler & Schmeck, 1992](#)), and analytic-nonanalytic ([Kemler-Nelson, 1984](#)).

In addition analysis-intuition model was introduced by [Allinson and Hays \(1996\)](#). This got so much popularity in the management literature and organizational settings. Later on, [Cools and Broeck \(2007\)](#) introduced cognitive style indicator by splitting analysis dimension of Analysis-intuition model of [Allinson and Hayes \(1996\)](#), three more dimensions such as knowing, planning and creating styles were introduced by [Cools and Broeck \(2007\)](#). Moreover, [Cools and Broeck \(2007\)](#) has discussed with enough empirical evidences of bipolar and unipolar scales in her article. However, several researchers have developed and validated the own bipolar instrument about cognitive styles dimensions ([Allinson & Hayes, 1996](#)) but [Cools and Broeck \(2007\)](#) has developed unipolar instrument (CoSI) cognitive style indicator by dividing analytical style into

three (3) dimensions as discussed above. In this connection, by concluding lack of the unipolar instrument on intuition cognitive style has motivated the researcher to further develop new instrument about intuition cognitive style such as intuition style instrument (ISI) in different contexts.

On basis of in depth literature review of cognitive styles (Myers & Briggs, 1976; Allinson & Hayes, 1996; Cools, 2007) a four dimensional model of intuition cognitive style is identified (Table-1). Myers and Briggs (1976) called it sensing-intuition/thinking feeling and Allinson and Hayes (1996) called it analytical-intuition but in study I have labeled our styles i.e. experience style, judgment style, thinking style, emotional-gut feeling style. People with experience style prefer for realities, meanings and relationship of experience, secondly, people with judgment style hold a particular attitude and evaluate information first in particular way before making decision, thirdly, the people with thinking style prefer, logical, straight-thinking, reasoning, objective, analytical, natural and understandable thinking, fourth people with emotional-gut feeling style prefer personal values, merit, ethics and moral, instinct, response, while making decisions.

**Table 1**  
*Four-Dimensional Intuition Style Model*

Style	Characteristics
Experience Style	Realities, Meanings and Relationship <sup>b</sup>
Judgment Style	Attitude and Evaluate Information first in particular way <sup>b</sup>
Thinking Style	Logical, Straight-thinking, Reasoning, Objective, Analytical, Natural and Understandable Thinking <sup>a,b</sup>
Emotional-gut feeling style	Personal Values, Merit, Ethics and Moral, Instinct, Response <sup>b</sup>

aC. Allinson & Hayes, 1996. Myers & Briggs 1976b.

In the next section method of generating items, Delphi technique, open ended questions, and pilot study are discussed. Further descriptive and inferential statistics are used to check reliability, construct validity, and factor loadings and correlations of the newly developed instrument. The researcher hypothesized that new developed instrument will be validated using EFA and CFA.

## RESEARCH METHODOLOGY

Process of item generation and dimensions involved several steps and stages. In first stage open ended questions were given to respondents working in different organizations. Questions were asked from them how they collect information and make decisions, they were asked to write their views like story/essay writing. From the responses at initial stage five dimensions of intuition cognitive style were emerged and 90 items constructed, 26 items for emotional style, 27 items for experience style, 15 items for thinking style, 10 for feeling style and 12-judgment style.

### Delphi Technique

RAND corporations first introduced Delphi technique in 1950s (Taghipoorreyneh & Run, 2019). The basic purpose of this Delphi technique is to get the expert opinion from different subject specialist in field of cognitive styles. Questionnaires were given to experts to give their feedback in controlled environment. Delphi technique allows the experts to provide their expert opinion

anomalously in their areas of the expertise. 90 items questionnaires with five dimensions of the intuition cognitive style are given to experts. After getting the opinion researcher analyzed that according to expert's emotional style and feeling style are same so these must be used as one variable not separate. Second expert opinion was given to use get feeling instead of feeling so on the recommendations of the expert's researcher has given new name emotional-gut feeling style. In addition, two cognitive style experts checked content and measurement validity and relevance of initial pool of 90 items. It was suggested by experts to retained 29 items which are used for gathering and processing information. Then 29 items were given to language and organizational behavior/psychology scholars and experts to correct wording and content of the items.

### Research Design

As this study was consisted of two stages one is qualitative and second stage is quantitative i.e. exploratory sequential research design was used. Population of the study was educational institutions in which respondents were asked to write an answer of questions asked i.e. open ended questions. After getting responses of open ended questions researchers has transcribed and used template analysis, gives codes and generate themes from open ended responses. Four themes were emerged and initially 95 items were generated for newly developed instrument. The items were checked by experts in relevant field, English grammar was checked by relevant expert.

### RESULTS OF STUDY

Data was collected from public and private services organizations. Total 511 people participated in the study. Number of male respondents was 391 (76.4%) while females were 123 (24.07%). Consequently, further analysis of results revealed that majority of respondents belongs to age of 26-30 years i.e. 38.3% and followed by 31-35 years i.e. 23%. First study was conducted in which final 29 pool of items were used (N=511), after deleting seventeen items 12 items were retained representing four dimensions of the intuition cognitive style. Three items for each construct.

**Table 2**  
*Reliabilities and Factor Loadings*

Variables	Items	Mean	S.D	ITC	Alpha	Exploratory Factor Analysis			
						F1	F2	F3	F4
Experience Style	I use experience in solving Problems	5.48	1.23	0.669	0.826	0.888			
	Use skill in making logical decisions	5.52	1.19	0.675		0.842			
	I try new things for new experiences	5.54	1.23	0.706		0.831			
Judgment Style	I am Judgmental by nature	5.49	1.19	0.662	0.803		0.856		
	Judgment is best way to solve problems	5.52	1.23	0.667			0.859		
	I analyze problem first, then I decide	5.57	1.20	0.618			0.826		
Thinking Style	Decision making are rational process	5.37	1.14	0.650	0.801			0.908	
	Intuitive thinking leads to p-solving	5.47	1.14	0.652				0.798	
	Thinking brings better analysis /results	5.42	1.17	0.636				0.755	
Emotions/Gut Feeling Style	I consider ethical values in decision	5.56	1.18	0.702	0.842				0.951
	My prediction power is strong	5.60	1.18	0.691					0.707
	I think gut feeling ii my risky decision	5.67	1.19	0.727					0.691
KMO	0.946, BTS=3431.988, p<0.01								

KMO: Kaiser Meyer Olkin, ITC: item total correlation, S.D: standard deviation

By following Cools and Broeck (2007) first focus was given on instrument development i.e. (Item, factor and reliability analysis) after that attention was given to scale evaluation i.e. (Construct reliability and average variance extracted).

### Instrument Development

29 items were used in the study. Mean, standard deviation, item total correlation and cronbach alpha were used. Those items having standard deviation less than 0.40 item total correlation less than 0.4 and factor loadings less than 0.4 were deleted and excluded from further analysis. On the basis of above mentioned criteria seventeen items were excluded and 12 items were retained. Table-2 represented that mean and standard deviation of all items. Results revealed that all items having mean scores greater than 5 and standard deviation is also greater than cut off level i.e. 0.40. Further analysis of results revealed that item total correlation i.e. ITC values for all items is higher than 0.4. Cronbach alpha for experience style is 0.826, cronbach alpha for judgment style is 0.838 while cronbach alpha for thinking style is 0.801 and for emotions/gut feeling style alpha value is 0.842. Exploratory factor analysis was run to check validity of instrument.

Various rules of thumb given by Field (2013) were taken into account while conducting EFA. According to Tabachnik and Fidell (2007) Kaiser Mayer Olkin measure of sampling adequacy must be greater than the 0.50. In addition, Hair et al., (2017) BTS value must be significant. Likewise, Field (2013) suggested those factors should be retained having Eigen values greater than 1. Principal component analysis could be used if the researcher wants to reduce number of items and cut off level for items factor loadings is 0.40. In study 1 KMO was 0.946, while BTS was 3431.988,  $p < 0.01$ . Four factor were retained three items for each having factor loadings greater than 0.4. These factors were retained because of Eigen values greater than 1. We also used the criteria that those items having primary loadings of 0.4 or higher but no secondary loadings greater than 0.3 (Cools & Broeck, 2007). Factor 1 represents experience style, factor 2 judgment style, factor 3 represents thinking style and four represents emotions/gut feeling style.

### Convergent Validity & Discriminant Validity

experience style construct reliability is 0.888 and AVE is 0.725, like, judgment style Construct reliability is 0.850 and AVE is 0.659, similarly thinking style CR is 0.862, and AVE is 0.677, emotions/gut feeling CR is 0.831, and AVE is 0.627 respectively. In this regard, discriminant validity was checked by using Fornell-larcker criteria. In this connection, the criteria for the discriminant validity is, and it must be less than or equal to 0.85 (Hair et al., 2017). In this connection, It can be said that convergent validities and discriminant validities are established. Table-3.

**Table 3**

#### *Convergent Validity and Discriminant Validity*

Variables	CR	AVE	Fornell-Larcker
Experience Style	0.888	0.725	0.851
Judgment Style	0.850	0.659	0.811
Thinking Style	0.862	0.677	0.822
Emotions/gut feelings	0.831	0.627	0.791

CR; construct/composite reliability, AVE; Average Variance Extracted.

**Table 4**  
*Pearson Product Correlation between Items of Intuition style*

	ES1	ES2	ES3	JS1	JS2	JS3	TS1	TS2	TS3	GF1
ES1	1									
ES2	0.585**	1								
ES3	0.608**	0.590**	1							
JS1	0.425**	0.449**	0.449**	1						
JS2	0.404**	0.414**	0.427**	0.628**	1					
JS3	0.453**	0.469**	0.486**	0.643**	0.683**	1				
TS1	0.516**	0.529**	0.504**	0.539**	0.497**	0.539**	1			
TS2	0.504**	0.504**	0.499**	0.497**	0.512**	0.581**	0.665**	1		
TS3	0.515**	0.518**	0.523**	0.525**	0.512**	0.588**	0.649**	0.641**	1	
GF1	0.510**	0.488**	0.471**	0.554**	0.500**	0.597**	0.629**	0.590**	0.632**	1
GF2	0.468**	0.438**	0.453**	0.480**	0.488**	0.524**	0.668**	0.592**	0.612**	.638**

\*\* . Correlation is significant at the 0.01 level (2-tailed).

The association were examined through correlation wherein table-4 shows that there is positive significant relationship amid all items. The relationship among all items is moderate and highly significant.

**Table 5**  
*Reliabilities and Factor Loadings*

Variables	Items	AVE	CR	Confirmatory Factor Analysis				Fornell-Larcker
				F1	F2	F3	F4	
Experience Style	I use experience in solving Problems	0.598	0.817	0.77				0.773
	I use experience in making logical decisions			0.77				
	I try new things for new experiences			0.78				
Judgment Style	I am Judgmental by nature	0.647	0.846		0.77			0.804
	Judgment is best to identify & solve problems				0.79			
	I analyze problem first, then I decide				0.85			
Thinking Style	Thinking & decision are rational process	0.656	0.851			0.82		0.809
	Intuitive thinking leads to problem solving					0.80		
	Thinking brings better analysis /results					0.81		
Emotions/Gut Feeling Style	I consider ethical values in making decision	0.619	0.830				0.80	0.786
	My prediction power is strong						0.79	
	I think gut feeling in risky decision making						0.77	

The data was then run in AMOS-SEM. Objective of investigating data in SEM was to confirm the findings and to report more sophisticated results of newly developed instrument. Measurement model was developed in the structural equation modeling (SEM). Measurement model requires two types of validities, convergent and discriminant validities. Convergent validities are based on composite reliability (CR) and average variance extracted (AVE) while discriminant validity based in Fornell-larcker criterion (Hair et al., 2017). Convergent validity explained the purpose whether items measures concepts while discriminant validity help researchers to investigate whether items and constructs discriminates from each other. Table-5 represented the findings of measurement model. Figure-1 indicated the factor loadings of the items and goodness of fit indices, i.e. RMSEA: root mean square error of the approximation, GFI: Goodness of Fit, IFI: Incremental fit index, CFI: Comparative fit index, TLI: Tucker Levis index, NFI: Normal fit index, RFI: Relative fit index, ChiSq/df: chi square and degree of freedom. All the factor loadings are higher than 0.7 and goodness of fit indices met threshold values suggested by Hair et al (2018).

It was also indicated that all the values of AVE, CR and Fornell-larcker criterion meth the threshold criterion on basis of this discussion it can be said that convergent and discriminant validates are established and measurement model and instrument is considered as valid and reliable.

## **DISCUSSION**

The originality of this study lies in developing and validating newly developed instrument i.e. intuition style instrument. To the best of author's knowledge this is the first instrument which is developed and validated in the developing economies perspective. This study is the first study conducted in South East Asia perspective which will help the organizations to the make better decisions. Limited literature and lack of the empirical evidences were available on intuition style and its new instrument. Thus, due to relatedness of the cognitive styles in the management and organizational settings new model of the cognitive style has been developed in this study. After extensive literature review and mix methods approach used in the study four dimensions of new intuition style are introduced and new instrument is developed. Convergent, discriminant validity and construct reliability has shown usefulness of the newly developed cognitive style. Cronbach alpha, exploratory and confirmatory factor analysis has shown valid reliabilities and validities for the new scale. There are four dimensions of the intuition style in this study. Thus, first dimension is experience style, an individual can use his/her intuition for solving problems and making the decisions after getting lot of the experience and there is no short cut of the experience.

Second judgment style explained a particular style of person and prediction of future problem. Third thinking styles its mental process needs lot of thinking, analytical reasoning and before making decisions an individual has to understand the situation first. Last emotions and gut feeling it means sixth sense. Results and findings show that there are 12 items found reliable and valid for the newly developed instrument called intuition style instrument (ISI). Mean and standard deviation shows that all the items have mean score higher than 5 and the standard deviation is also higher than cut off level i.e. 0.40, similarly, it was also noted that all the items have item total correlation more than 0.40, and alpha values of greater than 0.70 (Field, 2013; Hair et al., 2017). Thus, the current study has significantly extended and contributed to body of knowledge of the cognitive styles, the intuition styles and the decision making styles. This study has significant contribution towards cognitive styles theories and decision making theories. In addition, this study has empirically tested measurement model of newly developed instrument and validated it in the organizational perspective in the Asian perspective. Cognitive styles have significant relevance with the decision making in organizations (Cools & Broeck, 2007; Micheli et al., 2019; Albejaidi, Kundi & Mughal, 2020; Hsieh, Yao, Yang, Yang & Wang, 2020; Lu, 2015).

Studies have tried to developed the instruments on both analytic and intuition cognitive styles and their focus was to differentiate between analytic and intuition. The main contribution of current study was only intuition thinking and to split intuition into four dimensions. Though cognitive styles are complex variables and difficult to understand with multi dimensions but in current study only one dimensions was focused which were relatively overlooked and ignored in past studies as focus of past studies were analytic and intuition thinking and to understand the difference between the two. This study has successfully differentiated it from analytic and introduced new scale. This study has identified a new model and theory of intuition style with



four dimensions, the new instrument is psychometrically sound and convenient scale. Thus, the validation procedure of the existing study led the researcher to the reliable as well as valid instrument.

## CONCLUSION

The ISI is newly developed instrument in field of cognitive style. The contribution of this study is extension of analytic-intuitive model given by (Allinson & Hayes, 1996) and further CoSI (Cools & Broeck, 2007) introduced three dimensions (Knowing, planning and creating style). Now this new ISI is developed and introduced for the future research. This has four dimensions (Experience, judgment, Thinking and Emotion/gut feeling styles). Future researcher can added dimensions of intuition style. Overall, findings show that there is difference in four dimensions of intuition style. Organizations can attain competitive advantage by using and implementing the instrument style for making decisions in their organizations (Vranic et al., 2019; Oladotun, 2020). Cognition would help managers, leaders and organizations to make quick decisions saving time and cost moreover, it was revealed that decision making and especially cognitive styles have positive and negative effect on the leaders and followers organizational citizenship behavior (Armstrong & Qi, 2020; Costantini, Kwong, Smith, Lewcock, Lawlor, Moran, Tilling, Golding & Pearson 2021; Pryor, Hirth & Jin 2021). This study extended the body of knowledge through lens of cognitive style theories and decision making theories. It is clear that managers might get competitive advantage to make quick and quality decisions based on intuition style. It is also concluded that individuals from several industries such as health, business, tourism, hospitality, leisure, marketing, sales, and manufacturing industries can get benefit for solving problems and decisions. People travels from different places, they need to make decision which place to choose, when to visit specific places, individuals have some feelings and emotional link with diverse cities which they like, this scale help them to make decision for choosing favorite destinations.

## Future Research & Managerial Implications

Intuition style instrument is extension of cognitive style theories and models introduced in the past. The ISI is self-reported instrument, so researcher could influence the results and findings. Future academicians and researcher can investigate the other dimensions of intuition style and predictive validity of ISI in the organizational settings. In order to enhance the theoretical and practical effect of ISI model developed in this study, future research is essential. There is need to strengthen the construct validity of the new instrument, the future studies may study this concept with theoretical similar concepts. The future studies may increase theoretical influence and practical relevance of the intuition style instrument. To enhance quality decision policy makers are advised to raise awareness regarding use of cognitive styles especially intuition style to make spontaneous and quick decisions. It is necessary to raise awareness about intuition style and individuals should know their preferred way of data collection and decision making style.

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