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Development and Validation of a Four-Factor Decision-Making Style Inventory for University Leaders

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Research Article

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Abstract

A dual-process theory is key in studying judgment and choice and the Rational Experiential Inventory (REI) measure or a similar one is unlikely to capture how cognitive style will manifest in leadership decision-making in organizations. This study fills this gap by developing and validating the Rational Experiential Decision-Making Style Inventory (REDMSI) a novel scale with a four-factor structure to differentiate between decision-making ability and engagement in rational and experiential domains. The REDMSI was developed and tested on 200 academic heads selected randomly from 27 public and private universities of Lahore, Pakistan by using Cognitive-Experiential Self-Theory (CEST) and bounded rationality tradition. Content validity of 40-items inventory was established with the help of 2 panels of experts through a pilot test (N = 30), which yielded 0.86 value of Cronbach's alpha. The robustness of the four-factor structure Rational Ability (α = 0.88), Rational Engagement (α = 0.84), Experiential Ability (α = 0.85) and Experiential Engagement (α = 0.83) were confirmed through Principal component analysis and confirmatory factor analysis on main sample (N = 200). Further correlational analysis also demonstrated convergent validity within each processing style (r = .73 and .77) and discriminant validity between processing styles (r = .21–.28). The inventory further exhibited criterion-related validity as it identified significant differences by gender and university type. The REDMSI poses a theoretically enacted and nuanced tool that may be enable researchers and practitioners to explore the cognitive origins and foundations of decision making in complex organizational settings more precisely.

1. INTRODUCTION

Organizational decision-making has emerged as a significant field of research over the previous several decades, yet investigations into individual diversity in decision-making style preferences within educational contexts remain surprisingly limited. While extensive research had examined decision processes in corporate and military settings (Kahneman, 2011; Stanovich & West, 2000), the application of dual-process frameworks to educational leadership represented as an underexplored frontier with significant theoretical and practical implications.

This empirical investigation of how academic leaders make decisions wasn't just a concern of indigenous administrative interest. It rather addressed primary questions regarding the stability and expression of cognitive styles across organizational contexts. Dual-process theories remained influential to explain cognitive styles i.e. modes of processing information the theories argued that there are two distinctive modes of processing information. One takes the form of an intuitive and automatic System 1, while the other is of an analytical and deliberative System 2 (Kahneman, 2011; Evans & Stanovich, 2013). Despite this, how these processing modes are translated into on ground decision making behaviour in complex organisational settings is still insufficiently understood. Current measures, most notably the Rational Experiential Inventory (REI) established by Pacini and Epstein (1999), do assess general information-processing styles but likely do not assess how these styles are enacted to consequential decisions of an administrator's professional role. Theoretically, this difference between processing capacity and behavioural engagement is significant: a leader might possess a very high rational ability

and seldom actually engage in it practically, especially under conditions of time pressure, high resource constraint or the complexity of task (Pennycook et al., 2015).

The higher education sector in Pakistan offers an exceptionally valuable natural laboratory for studying these issues. Leaders of academic institutions work within an environment of multiple competing demands. They have to comply and implement external policies imposed by the Higher Education Commission (HEC) Pakistan, manage resource constraints within the university, respond to political pressure and an ever-increasing call of digital transformation imperatives such as data analytics and artificial intelligence (Deniz & Korkmaz, 2024). According to Lipshitz (2025, page 54), uncertainty, time pressure and asymmetrical information are such conditions where precisely the interaction between rational processing and experiential processing is most significant/consequential. Studies of decision-making styles in this context can thus provide insights by illuminating those environmental factors that govern the expression of stable cognitive tendencies

The rational experiential inventory (REI-40) had demonstrated robust psychometric properties across numerous cultural contexts (Björklund & Bäckström, 2008; Purić & Jokić, 2023). However, the REI was specifically designed to measure “thinking styles” in general rather than decision-making styles. The items measure preference for information processing (e.g., I enjoy intellectual challenges) without explicit reference to the judgment and choice situations that constitute organizational leadership. Furthermore, while the REI differentiates between ability and engagement subscales for both rationality and experientiality, this four-factor structure has gained inconsistent consideration by subsequent research. Several research studies instead showed collapsing these distinctions (Phillips et al., 2016). The existing study argued that the ability-engagement distinction is not only psychometric detail but theoretical necessity. Understanding why capable rational thinkers think intuitively and make intuitive decisions requires separate measurement of competence and propensity.

Thus, an instrument that may adapt and extend the REI framework for organizational decision-making was necessary. This research study therefore intended to develop and validate the rational experiential decision-making style inventory (REDMSI). This proposed instrument integrated dual-process theory with the exclusive circumstantial demands confronted by academic University leaders. This four-factor structure separately assesses: (a) rational decision-making ability, (b) rational decision-making engagement, (c) experiential decision-making ability, and (d) experiential decision-making engagement. It draws upon its foundations from established dual-process theory and can also support professional development programs of university academics to meet and address their contextual challenges. By placing this development specifically within the Pakistani higher education context, the study also adds to the literature on the cross-cultural validity of dual-process measures and the institutional factors that influence cognitive style expression.

2. THEORETICAL BACKGROUND AND REVIEW OF THE RELATED LITERATURE

2.1 Dual-Process Theories and Bounded Rationality

The theoretical foundation of this research placed upon dual-process models of human reasoning, which proposed that information processing occurs through two qualitatively distinct systems operating in parallel (Epstein, 1994; Kahneman, 2011; Evans & Stanovich, 2013). Although different terms have been used across various research traditions i.e. System 1/System 2 (Kahneman, 2011), intuitive/analytical (Hammond, 1996), experiential/ rational (Epstein, 1994) yet the major distinction of this discourse had been remained consistent.

Experiential or intuitive processing, known as system 1 is described as automatic, rapid, low-cognitive effort, and associative (also known as “holistic association”). System 1 processing operates at a preconscious stage without awareness and relies on emotional patterns of associations and learned patterns from prior experience. This system produces judgments and decisions without conscious deliberation that are subjectively compelling (Epstein, 1994). By contrast, system 2 is characterized by Rational or analytical processing which is deliberate, effortful, consciously monitored and rule based rational processing of information for decision making. It requires many cognitive resources, logical reasoning, functions sequentially, and involves hypothetical thinking (Evans & Stanovich, 2013). These dual process theories also suggest that these systems are not mutually exclusive but interact continuously. Sometimes, system 2 can evaluate and monitor the working of system 1 and possibly override its output. The process of this interaction may succeed or fail depends on individual differences and situational factors (Pennycook et al., 2015).

Epstein’s (1973, 1994, 2003) Cognitive-Experiential Self-Theory (CEST) explained a preference for one processing style over the other. CEST provides the most comprehensive personality theory that includes individual differences in how people prefer to process information. According to this theory, individuals acquire certain styles of reacting to their two systems shaped by their own dispositional tendencies and learning histories which are influenced by their growth and development. These stylistic preferences influence how people approach problems, interpret information, and ultimately make decisions across diverse life domains.

2.2 Rational Experiential Inventory: A Foundation for measuring and validating CEST

Pacini and Epstein (1999) and Epstein et al., (1996) developed REI to operationalize CEST constructs through self-report measurement. The original REI scale combined two subscales adapted from the NCS (Cacioppo & Petty, 1982) Need for Cognition Scale to assess rational information processing style and a newly developed Faith in Intuition Scale to analyse experiential information processing style. Factor analysis was performed and the results revealed two orthogonal factors across studies. Thus, the findings indicated the independence of the two styles of processing (Epstein et al., 1996).

Pacini and Epstein, (1999) revised 40-item REI and introduced major revision in its structure. through subdivision of each main scale into ability and engagement subscales. The rational ability scale

evaluates self-perceived competence of individuals for analytical and logical thinking in a variety of situations (e.g., I have a logical mind). Correspondingly, The Rational Engagement scale assesses the pleasure and commitment for logical and analytical thinking that a person has. For example, the items include in this subscale are like “I enjoy intellectual challenges”. Likewise, The Experiential ability measures the individual’s perceived intuitive capability and comprises items like “I believe in trusting my hunches”. Whereas the Experiential Engagement captures the individual’s inclination for intuitive processing. This scale comprises the items e.g., “I like to rely on my intuitive impressions.” The four-factor model established strong psychometric properties and had been adapted and utilized in various cultural contexts, including those by Björklund and Bäckström (2008) in Sweden, Purić and Jokić (2023) in Serbia, and Witteman et al. (2009) in Netherlands.

The ability-engagement distinction has considerable theoretical significance. The two terms ability and engagement characterise distinct constructs and can lead to different antecedents and consequences. For instance, a person may have a strong analytical capacity (high ability) but might prefer to use intuitive strategies (low engagement). This could be due to dispositional factors, time restraints or task characteristics. On the other hand, an individual might appreciate and highly involve in analytical and rational analysis (high engagement) despite possessing inadequate rational skills (low ability). Collectively evaluating both dimensions and their interactions enables more extensive predictions about decision making behavior than either measure can accomplish alone.

2.3 From Thinking Styles to Decision-Making Styles

Despite being theoretically robust and sophisticated, REI measures specifically general thinking styles rather than decision-making styles. This distinction between thinking styles and decision-making styles has considerable theoretical significance due to three reasons. To begin with, decision-making is characterized as a subset of cognitive pursuit and represents as a consequential choice among alternatives, often under time constraints, uncertainty and emotional involvement state (Hastie & Dawes, 2010). Measures of general thinking style may not capture how people react to these situations. Secondly, organizational decision-making also takes place in an institutional setting that forms cognitive manifestations through formal policies and procedures, accountability systems, and cultural norms Deniz and Korkmaz (2024). A university academic head usually competent in analytical thinking but would typically prefer intuitive processing when faced with time pressure and too much information and complexed/novel tasks. So, items that reference these contextual factors are required to measure decision- making style. Thirdly, the ability-engagement differentiation is especially noteworthy in decision-making perspectives. Decision making ability of an individual refers to the competence to create, evaluate and choose among possibilities employing either intuitive or rational processes. Decision making engagement concerns the extent of tendency to utilising these processes when making important decisions. The leadership development interventions must target this crucial gap between the capacity and propensity of leaders’ decision-making behaviours.

Thus, this study adapted the REI framework to the organizational decision-making domain by creating a series of items that refer to decision situations, alternatives, outcomes, and institutional contexts. This

modification maintains the important theoretical distinction between ability and engagement and improves ecological validity for university leadership.

2.4 Decision-Making in Educational Administration

The academic leaders possess a distinctive position within university administrative hierarchy. Their position demanded to exercise managerial competence, practise disciplinary expertise, and reflect political acumen simultaneously (Jabeen & Akhter, 2013; Iftikhar et. al., 2022; Rafiq-u-zaman & Jabeen 2024). Their decision-making impact faculty recruitment, placement and development, curriculum design and improvement, resource distribution, students learning achievement and university prestige (Cyrenne & Grant, 2009). So, studying and knowing the way they reach these decisions is theoretically and practically significant.

Research on school administrator decision-making has revealed several stylistic dimensions. According to an investigation of Deniz and Korkmaz (2024) on the Turkish school administrators, it was revealed that participating in sports was highly correlated with self-esteem in the decision-maker, while the avoidant, procrastinated, and panicked types of decision-making were made less frequent. Özgenel (2018) explained a relationship between the critical thinking and creativity dispositions of school administrators with their problem-solving skills and decision-making styles. Analysis of previous research studies suggest that decision-making styles are measurable, personally variable, and are related to personal traits and professional practices. However, the existing literature has largely developed and utilised general decision-style measures such as the Melbourne Decision Making Scale (MDMS) (Mann et al., 1997) or Scott and Bruce's (1995) General Decision-Making Style (GDS). These research instruments were significant and crucial for theoretical development of decision research but did not originate from dual-process theory and therefore might be unable to respond to the discourse of relationship between rational-experiential processing which contemporary cognitive science has identified as crucial to understand judgment and decision making (Evans & Stanovich, 2013).

2.5 Research Hypotheses

Following the theoretical foundations of CEST and the REI framework, this study attempted to test the following hypotheses:

H1:The REDMSI exhibited a four-factor structure corresponding to Rational Ability, Rational Engagement, Experiential Ability, and Experiential Engagement, with high significance loading of items on their respective hypothesized factors.

H2: The four factors model revealed acceptable internal consistency reliability i.e. Cronbach's alpha i.e. $\alpha \geq 0.70$.

H3: Factors within each processing domain (Rational Ability and Rational Engagement; Experiential Ability and Experiential Engagement) showed moderate to strong positive correlations, indicating convergent validity.

H4: Factors across processing domains had weak correlations, indicating discriminant validity between the rational and experiential constructs.

H5: The REDMSI detected significant group differences by gender and institutional type, providing evidence of criterion-related validity.

Based on prior REI research (Pacini & Epstein, 1999), the research also hypothesized that males will score higher on rational subscales and females on experiential subscales. Further it was hypothesized that private university heads will score higher on rational subscales than their public university counterparts.

3. METHOD AND PROCEDURE

3.1 Sampling and Sample size

The target population was all departmental academic heads (deans, directors, chairpersons) in public and private universities in Lahore, Pakistan. From a total population of 646 heads across 27 universities, a random sample of 200 was drawn using stratified random sampling, with strata defined by university type (public/private) and gender.

The final sample consisted of 120 heads from three public universities (73 males, 43 females) and 80 heads from four private universities (61 males, 19 females). An acceptable sample size may be one of the potential limitations inherent in the studies of scale development. A sample size of 200 or more has been considered suitable for stable solutions in factor analysis. It should, however, obviously satisfy communalities (Worthington & Whittaker, 2006). They recommended that with the data sets holding communalities greater than 0.50, the sample of 150–200 is likely to be sufficient. To this end, 200 observations were considered adequate for factor analyses. Adding to this justification Kline (2016) also argued that the sample of 200 respondents is considered adequate and exceeds the minimum criteria for performing factor analysis.

Data collection phase was completed from August to October 2023-24. The researcher visited each university personally to obtain a formal consent and distribute consent form. The anonymity and confidentiality of the participants were guaranteed in order to elicit honest response. The REDMSI survey and the brief demographic questionnaire was completed by the participants which were personally collected by the researcher.

3.2 Instrument Development

The study adhered to the guidelines established by DeVellis (2017) and Worthington & Whittaker (2006) for instrument development process. The procedure began with an extensive review of literature to identify the conceptual domain of each construct. According to several studies, Rational decision-making style comprises cognitive capability to process information logically, gather and analyse facts systematically, identify obstacles, set achievable goals, generate several possible alternatives, predict

the impact of different alternatives for solutions, make a judgment and then implement a solution while carefully evaluating the outcomes. Experiential decision making is the cognitive process by which decisions are made with the help of intuitive impressions, gut feelings, and overall pattern recognition without going through extensive conscious deliberation.

Initially, a pool comprising 44 items was generated. Each of the two processing domains were targeted with an initial pool of 22 items. Within each domain, about 50% of items were designed to tap ability (e.g., I am skilful in making decisions that require cautious logical scrutiny) and about 50% to tap engagement (e.g., I enjoy solving complex problems that require hard thinking). The items were drafted to refer specifically to decision-making contexts, incorporating terminology relevant to university administration decision making, and closely following the wording of the REI-40.

The opinions of two expert panels were sought to determine the content related validity of the items. The first panel comprised four professors of Business Education and Business Studies with a teaching experience of over ten years in public universities. The items were evaluated for clarity, content representativeness, and grammatical soundness. Experts suggested to eliminate two items judged to be ambiguous. The second expert panel consisted of six academic heads with two deans, two directors and two heads of department having 5–20 years' decision-making experience. The panel strongly suggested that each main dimension should be subdivided into two 'ability' and 'engagement' sub-scales. Thus, this recommendation fits well with the theoretical structure of the REI and became a key feature of the final instrument. According to the feedback received, two ambiguous items were omitted, and three others were rephrased to better fit within the local context.

Pilot testing was carried out using the responses of 30 heads of academic institutes (15 from public, 15 from private universities of Lahore) during August-September 2023. The academic heads were asked to fill the 42-item version of the instrument and provide their feedback on item clarity, relevance and comprehension. The rating scale used for their feedback was and ample, clear, slightly ambiguous, and ambiguous. Cronbach's alpha computed for the piloting sample was 0.86, indicating strong internal consistency. After receiving feedback from the pilot testing data, two further items were eliminated to finalize the 40-item version of REDMSI.

3.3 Statistical Analysis

A systematic and sequential approach was followed for analysis and interpretation. Statistical analyses procedures were performed with the help of AMOS Version 24 and SPSS Version 26. At First, the SPSS data file was screened for missing values and measured for normality to warrant appropriateness for applying further analysis. The Kaiser-Meyer-Olkin measure (KMO), along with Bartlett's test of sphericity, was used to assess sampling adequacy and confirming the appropriateness or fitness of dataset for factor analysis (Nkansah, 2018). Subsequently, internal consistency of the instrument was evaluated through Cronbach alpha coefficients whereby an $\alpha \geq 0.70$ is accepted as per Nunnally & Bernstein (1994) and Field (2009).

An exploratory factor analysis (EFA) was undertaken to examine the underlying factor structure of the measurement items employing principal component analysis (PCA) with Varimax rotation. The decisions related to retaining the factors were based on several criterions such as eigen values greater than 1 (Kaiser criterion), examining scree plot and parallel analysis results, safeguarding theoretically meaningful and robust solution.

Next to EFA, confirmatory factor analysis (CFA) was performed to analyse the hypothesized four-factor structure employing maximum likelihood estimation (MLE). This model fit was examined using different well-established indices which includes Comparative Fit Index (CFI), the ratio of chi-square to degrees of freedom (χ^2/df), Root Mean Square Error of Approximation (RMSEA), Tucker-Lewis Index (TLI), and the Standardized Root Mean Square Residual (SRMSR). Using recommended thresholds (Hu & Bentler, 1999), acceptable model fit was determined such that confirming that the measurement model was adequate. Ultimately, multiple approaches were used for establishing the evidence for validity. The factor correlations were assessed to examine convergent and discriminant validity. On the other hand, independent samples t-tests were performed to test for criterion-related validity. As well as to test the differences across gender and university type. Collectively, these analyses highlighted the robustness and comprehensive support for reliability and validity of the measurement scale.

4. RESULTS

The outcomes drawn from the statistical analyses provided comprehensive evidence supporting the appropriateness, reliability, and structural validity of the factor structure of the measurement model. Initially, the analyses suggested that the data were suitable for performing factor analysis. To this end, the value of KMO test to measure the sampling adequacy obtained to be 0.73 showing higher than the recommended level of 0.60 (Hutcheson and Sofroniou, 1999). Further, Bartlett's test of sphericity was found to be statistically significant (χ^2 (860) = 4306.02, $p < 0.001$), thus demonstrating the appropriateness of correlation matrix for further factor analysis procedures.

Based on the reliability analysis demonstrated in Table 1, all subscales exhibited good to excellent internal consistency. The value of Cronbach's alpha coefficient for Rational Ability was 0.88, for Rational Engagement was 0.84, for Experiential Ability was 0.85 and for Experiential Engagement was 0.83; whereas 40 item scale achieved 0.87 level of alpha. As per the criteria of Pett, Lackey, & Sullivan (2003) internal consistency is considered (0.20–0.49) as weak, (0.50–0.79) moderate, and (0.80 and above) high. The results reflected high level of internal consistency throughout the instrument and thus provided empirical support for Hypothesis 2.

Table 1
Reliability Analysis of REDMSI Subscales (N = 200 sample) Item wise

Subscale of REDMSI	No. of items	Sequence Number in final Scale	Cronbach Alpha Reliability
Rational Decision-Making Ability	10	1, 5, 9, 14, 17, 22, 26, 30, 34, 38	0.88
Rational Decision-Making Engagement	10	3, 7, 11, 15, 18, 24, 28, 32, 36, 40	0.84
Rational Decision-Making Style (F1)	20	**1, 3, 5, 7, 9, 11, 14, 15, 17, 18, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40**	0.86
Experiential Decision-Making Ability	10	2, 6, 10, 13, 19, 21, 25, 29, 33, 37	0.85
Experiential Decision-Making Engagement	10	4, 8, 12, 16, 20, 23, 27, 31, 35, 39	0.83
Experiential Decision-Making Style (F2)	20	**2, 4, 6, 8,10,12, 13, 16, 19, 20, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39**	0.84
Overall	40	40	0.87

All the subscales exhibited good to excellent evidence of internal consistency with alphas between 0.83 to 0.88. The values were above the conventional threshold of 0.70 and were equivalent to those found for the REI-40 (Pacini and Epstein, 1999; Björklund and Bäckström, 2008).

4.1 Exploratory Factor Analysis (EFA)

Principal Component Analysis (PCA) was performed using Varimax rotation to assess the underlying factor structure. Four factors emerged with eigenvalues greater than 1 and thus accounted for 56.59% of the total variance collectively. Factor 1 (Rational Ability) explained 38.81% of variance (eigenvalue = 14.11), Factor 2 (Rational Engagement) explained 6.92% (eigenvalue = 2.12), Factor 3 (Experiential Ability) explained 6.74% (eigenvalue = 2.10), and Factor 4 (Experiential Engagement) explained 4.12% (eigenvalue = 1.06). The scree plot (Fig. 1) clearly revealed that a slight levelling off occurred after factor number four, making it reasonable to retain four factors.

Table 2 provided rotated factor loadings for all 40 items (Appendix A). All the item loaded above .40 on its hypothesized factor and had minimal cross-loadings (i.e., < .30 on the other factors), reflecting a fine factor structure corresponding to the theorized model.

4.2 Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) was undertaken to validate the proposed four-factor structure. and two theoretically plausible alternatives: (a) a two-factor model (Rational and Experiential domains collapsed across ability/engagement) and (b) a single-factor model (all items loaded on one factor). Several Fit indices for the proposed model were presented in Table 3.

Table 3
Model Fit Comparisons: Confirmatory Factor Analysis:

Model	**χ^2**	**df**	**χ^2/df**	**CFI**	**TLI**	**RMSEA (90% CI)**	**SRMR**	**AIC**
Four-factor (hypothesized)	1483.77	794	1.87	0.91	0.90	0.073 (0.067–0.079)	0.071	1875.77
Two-factor (Rational/Experiential)	2146.32	805	2.67	0.82	0.81	0.098 (0.092–0.104)	0.094	2576.32
One-factor	2893.65	812	3.56	0.71	0.69	0.124 (0.118–0.130)	0.112	3309.65

The hypothesized four-factor model showed acceptable fit across several fit indices. According to Kline (2016), χ^2/df ratio below than conservative criteria of 2.0 was considered excellent fit, so the value of 1.87, represented an excellent parsimonious fit. The CFI and TLI scores of 0.91 and 0.90 respectively, met the conventional threshold of acceptability (≥ 0.90). However, they did not meet the strict threshold of 0.95 that is sometimes used for excellent fit (Hu & Bentler, 1999). The RMSEA of 0.073 (90% CI: 0.067–0.079) is acceptable (≤ 0.08) but exceeding the 0.06 criteria for a good fit. Moreover, an SRMR value of 0.071 indicated a good fit as well.

Further analysis of other indices like GFI (0.70) and AGFI (0.62) revealed notably lower values than the recommended criteria of more than 0.90. GFI and AGFI are said to be sensitive to greater model complexity and larger sample size. The GFI and AGFI often yield lower values for more complex models (Sharma et al., 2005). Since the four-factor model involved 40 items and 84 estimated parameters, some attenuation of the fit index was to be expected. More importantly, the hypothesized model performed much better than both alternative specifications: the two-factor model fit significantly worse ($\Delta\chi^2$ (11) = 662.55, $p < 0.001$; ΔCFI = 0.09) while the one-factor model also was poorly fit. Despite some fit indices limitations, the pattern in Table 4 supported retention of four-factor structure, which was consistent with the recommendations made by Marsh et al. (2004) to evaluate fit in a holistic rather than rigid fashion cut off the fit measures.

The CFA showed significant factor loadings ($p < 0.001$) ranged from 0.42 to 0.78 revealing that all the items were appropriate indicators of their hypothesized factors. Standardized factor loadings were displayed in the following Table 4.

Table 4
CFA Standardized Factor Loadings by Subscale

Subscale	Range of Loadings	Mean Loading
Rational Ability	0.42–0.73	0.58
Rational Engagement	0.41–0.72	0.56
Experiential Ability	0.41–0.76	0.59
Experiential Engagement	0.46–0.78	0.61

4.3 Factor Intercorrelations

The analysis in Table 5 indicated correlation coefficients among four REDMSI factors. Strong positive correlations appeared within each decision-making style domains. Rational ability was strongly correlated with rational engagement ($r = 0.73$, $p < 0.01$) and Experiential ability was strongly correlated with Experiential engagement ($r = 0.77$, $p < 0.01$). These figures showed a significant amount of shared variance (53% and 59%, respectively) but are also far below levels considered redundant ($r > 0.85$).

Critically, cross-domain correlations were weak: Rational Ability correlated modestly with Experiential Ability ($r = 0.28$, $p < 0.01$) and Experiential Engagement ($r = 0.21$, $p < 0.01$); Rational Engagement correlated weakly with Experiential Ability ($r = 0.24$, $p < 0.01$) and Experiential Engagement ($r = 0.27$, $p < 0.01$). These mentioned weak correlations in cross-domain association provided compelling evidence for discriminant validity, suggesting that rational and experiential decision-making styles were unique constructs, rather than two ends of one continuum.

Table 5
Intercorrelations Among REDMSI Factors

Factor	1	2	3	4
1. Rational Ability	1.00			
2. Rational Engagement	0.73**	1.00		
3. Experiential Ability	0.28**	0.24**	1.00	
4. Experiential Engagement	0.21**	0.27**	0.77**	1.00
Note. **p < 0.01 (2-tailed). N = 200.				

4.4 Criterion-Related Validity: Group Comparisons

Table 6 presented the results from independent samples t-tests to assess whether there exists any significant gender difference on REDMSI scores. Consistent with REI research (Pacini & Epstein, 1999), male academic heads scored significantly higher than females on Rational Ability ($t(194) = 2.73$, $p = 0.005$, Cohen's $d = 0.41$) and Rational Engagement ($t(194) = 3.34$, $p = 0.001$, $d = 0.50$). Conversely, female heads scored significantly higher on Experiential Ability ($t(194) = -3.17$, $p = 0.012$, $d = 0.47$) and

Experiential Engagement (t (194) = -2.91, p = 0.004, d = 0.43). Effect sizes were moderate, indicating meaningful differences.

Table 6
Gender Differences in REDMSI Subscales through Independent sample t Test

Subscale	**Male (n = 134) *M (SD)***	**Female (n = 62) *M (SD)***	***t***	***df***	***p***	**Cohen's d**
Rational Ability	30.12 (4.14)	27.23 (5.51)	2.73	194	0.005	0.41
Rational Engagement	28.97 (2.35)	27.08 (4.07)	3.34	194	0.001	0.50
Experiential Ability	29.29 (3.43)	31.61 (5.34)	-3.17	194	0.012	0.47
Experiential Engagement	25.89 (3.28)	27.57 (4.62)	-2.91	194	0.004	0.43

Table 7 presents comparisons between public and private university heads. Private university heads scored significantly higher on Rational Ability (t (198) = -3.60, p = 0.011, d = 0.52) and Rational Engagement (t (198) = -3.16, p = 0.022, d = 0.46). Public university heads scored significantly higher on Experiential Ability (t (198) = 2.76, p = 0.004, d = 0.40) and Experiential Engagement (t (198) = 3.39, p = 0.001, d = 0.49).

Table 7
University Type Differences in REDMSI Subscales

Subscale	**Public (n = 120) *M (SD)***	**Private (n = 80) *M (SD)***	***t***	***df***	***p***	**Cohen's d**
Rational Ability	26.39 (4.16)	30.43 (4.34)	-3.60	198	0.011	0.52
Rational Engagement	26.14 (2.78)	29.96 (3.01)	-3.16	198	0.022	0.46
Experiential Ability	32.76 (3.56)	28.39 (5.14)	2.76	198	0.004	0.40
Experiential Engagement	24.65 (2.93)	21.80 (3.71)	3.39	198	0.001	0.49

These group differences provide initial evidence for criterion-related validity, demonstrating that the REDMSI detects theoretically meaningful variations across demographic and institutional categories.

5. DISCUSSION

This study developed and validated the Rational Experiential Decision-Making Style Inventory (REDMSI), a 40-item instrument assessing four distinct dimensions of decision-making style: Rational Ability, Rational Engagement, Experiential Ability, and Experiential Engagement. The results strongly supported the hypothesized four-factor structure, with all 40 items loading significantly on their respective factors

and demonstrated good internal consistency reliability (α = 0.83–0.88). Confirmatory factor analysis confirmed that the four-factor model provided a significantly better fit to the data than more parsimonious alternatives, and factor intercorrelations supported both convergent validity within domains and discriminant validity between domains.

5.1 Theoretical Implications

These findings contributed to dual-process theory in several important ways. First, they demonstrated that the ability-engagement distinction, originally validated for general thinking styles in the REI, extends meaningfully to domain-specific decision-making styles. The significant moderate to strong correlations between ability and engagement in each domain (r = 0.73–0.77) revealed substantial intersection, but they were not so high that it would make sense to merge the two constructs. The pattern suggested that the competence and propensity to make decisions were related but separable constructs, such that a person's capability of rational analysis does not necessarily warrant its deployment in real decision-making situation.

This distinction has imperative theoretical implications for the "rationality paradox." Adding to this discourse, Stanovich and West (2000) and Pennycook et al. (2015) had well-documented the fact that individuals often fail to employ rational analysis still when they are able to do so. Firstly, The REDMSI distinguished ability and engagement measurement so that researchers could disentangle these domains and could study the determinants and consequences of each separately. For instance, researchers working on professional development programs or Interventions that target rational decision-making might (1) enhance ability (by training people in analytical techniques) or (2) increase engagement (by motivating them and setting up accountability structures), depending on which component was the most lacking.

Secondly, the cross-domain relationships were weak (r = 0.21–0.28), leading to substantial evidence concerning the independence of these rational and experiential processing modes. These findings were consistent with those of documented by the CEST (Epstein, 1994), and the REI validation studies (Pacini & Epstein, 1999; Björklund & Bäckström, 2008). Those who reported high rational ability did not consistently report low experiential ability, showing varying dimensions independently. The finding challenged simplistic classifications of decision makers as "analytical" or "intuitive" types and supported a more nuanced view in which individuals may possess varying combinations of both capabilities and preferences.

Thirdly, although the CFA results tend to be favourable, they need to be interpreted cautiously. Although, the ratio of chi-square over the degree of freedom is (χ^2/df = 1.87), the values of CFI (0.91) and the RMSEA level (0.073) demonstrated acceptable fit for the four-factor model, yet the GFI and AGFI values were lower than satisfactory level and suggested avenue for refinement. The observed pattern may arise from the inherent challenge of measuring four correlated constructs using 40 items or it may indicate that the factor structure could be improved in the future. One possibility is that the ability and

engagement factors are distinct but more closely correlated than originally hypothesized, putting some strain on the model. This interpretation was further strengthened by the strong within-domain correlations (0.73–0.77). Adding to this discourse, future research may investigate whether a bifactor model - that is the combination of a Rational ability and Experiential ability, with specific factors Ability and Engagement, would yield a better fit while retaining theoretical distinctions.

5.2 Comparison with Existing Measures

Findings showed that REDMSI converge with and complemented existing measures. The resemblance of its four-factor structure to the REI-40 (Pacini & Epstein, 1999) demonstrated that its ability-engagement distinction generalized from general thinking styles to decision making contexts. The REDMSI, however, is different from these instruments in important ways: its items primarily refer to decision situations (i.e. I am skilled in making decisions that require cautious logical scrutiny) rather than general cognitive preferences (i.e. I have a logical mind). This contextual characterization of the instrument augments ecological validity for the research and practice of organizational decision making.

In comparison with other decision-style measures like the General Decision-Making Style GDMS (Scott & Bruce, 1995) or the Melbourne Decision Making Scale MDMS (Mann et al., 1997), the REDMSI possess more robust theoretical foundations in dual-process frameworks. Because of this theoretical grounding, predictions concerning the cognitive mechanisms that generate decision behaviour can be made more precisely. This theoretical soundness also facilitates its amalgamation with the broader literature on cognitive science and likewise judgement and decision making.

5.3 Contextual Interpretation

The findings regarding gender difference were closely consistent with earlier REI research study (Pacini & Epstein, 1999) and the literature on cognitive style differences (Sladek et al., 2010). The high scores of male heads on rational dimensions and of female heads on experiential dimensions could be due to the socialisation process, the occupational self-selection process and the true dispositional variations. However, it is imperative to note that the effect sizes were quite moderate ($d = 0.41–0.50$), reflecting a significant within-gender variations, and the reasoning behind these examined variations was not clear. So, these findings need to be interpreted cautiously. Further research may need to determine whether these patterns represent stable traits or context-specific expressions influenced by institutional cultures and role expectations.

The variations regarding different types of universities are particularly interesting theoretically. The higher rational scores of private university heads may reflect their institutions' higher emphasis on efficiency, accountability, and outcome measurement as seen in market-oriented businesses. The higher experiential decision-making scores of public university heads' may demonstrate their need to cope with the complications of bureaucracy, the political sensitivity involved, and unclear accountability practices and procedures, where intuition turns out to be a fitting adaptation. The consistency pattern across the above areas implies that decision styles are not merely dispositional; they may be influenced by institutional environments. These findings have broader implication for the future literature which will

explore person-situation interactions in organizational behaviour. Longitudinal Investigations following heads over time as they switch between institution types could shed light on whether decision-making styles are stable or malleable.

5.4 Practical Implications

The REDMSI presents a range of practical implications for universities. Firstly, it can be served as a diagnostic instrument for leadership development. Leadership assessments can help academic heads identify their default decision-making styles and the type of situations where alternative approaches could be more efficient. Research on decision literature consistently suggesting (Hodgkinson and Sadler-Smith. 2003) that those decision-makers who can effortlessly switch between styles and flexibly adapt different styles as per demand of the environment, situations and the task, outperform those leaders who rigidly adopt one single style.

Secondly, the tool can provide information regarding team composition, design, and role assignment. Decision-making teams can be benefitted from the diverse cognitive styles. of rational members making sure thorough examination of decision options, and experiential members making rapid responses and ensuring creativity. The ability-engagement distinction offered by the REDMSI helps to analyse these applications in greater nuance. That is, a team member with a rational ability but low rational engagement might, when prompted, contribute analytical capacity but might otherwise default to intuitive approaches of decision making.

Thirdly, institutional utilization of amalgamated REDMSI data can identify the culture of decision-making in organizations and explore the targeted avenues for intervention. Universities that find themselves with a predominately experiential culture may decide to invest in analytical training and decision support systems. Conversely, institutions with a predominately rational culture may try to instil intuition through experience-based leader development and mentorship programs.

5.5 Limitations

There are several limitations inherent in this study to consider. Firstly, the sample was taken only from universities in Lahore, Pakistan which means the findings may not generalize to other regions, sectors, and contexts. Due to the purpose of the study, the sample was kept limited and specific to a degree intentionally. So, future research studies will interesting explore the REDMSI's psychometric properties in different settings involving other countries, industries, organizations and organizational levels.

Secondly, this research collected all data through self-reports, which may be subject to social desirability bias as well as partial and biased self-awareness. For stronger criterion validity, behavioural measures of decision-making (e.g. simulated decision tasks, observer ratings, archival indicators of decision quality) should be incorporated for future validations. One promising avenue is represented by the Meseekna Decision-Making Performance Index approach that replicates environments to measure the actual decision behaviour (Satish, 2021). Thirdly, the current study used the cross-sectional design which does not allow causal inference on relationships between the variables and cannot establish test-retest

reliability There is a need for longitudinal research to examine the stability of the REDMSI score over time and its intervention sensitivity.

Fourthly, however, the four-factor structure established good fit, the GFI and AGFI values were quite low than desirable values. Upcoming research studies may try model modifications such as allowing for correlated errors for similar items or testing bifactor specifications to increase values of fit indices, even without impeding theoretical integrity. Cross-validation of the independent samples is essential to avoid capitalizing on sample specific variation.

Lastly, the study did not explore relationships between REDMSI scores and other variables such as decision quality, leadership effectiveness, and institutional outcomes. Determining such relationships for ensuring predictive validity will be an important step to show the practical utility of the instrument.

6. CONCLUSION

The research contributed a theory grounded, methodologically sound and contextually relevant instrument for assessing decision-making styles of university leadership. The four-factor model of REDMSI better distinguishes ability versus engagement within a rational and experiential framework. It also provided a more discriminating four-factor structure than its several existing alternatives and was synchronized by contemporary dual-process theories of cognition. With demonstrated reliability, factorial validity, and sensitivity to group differences, it was suitable for research and practice. Whereas its limitations suggested important directions for continued research and development. The REDMSI offered a tool that can improve theoretical understanding of decision-making style and allow the practical application of this research within higher education and beyond. This instrument had the potential to be a bridge within cognitive science and organizational behaviour fields.

Declarations

Author Contribution

SJ and SA contributed to the conception and design of the study. SJ and SA were responsible for data collection and preliminary analysis. SA provided methodological guidance and supervised the research process. SJ led the data analysis and manuscript drafting. SJ and SA critically write, review, revise, and refine the manuscript for important intellectual content. Both authors read and approved the final manuscript and agree to be accountable for all aspects of the work.

Data Availability

Data will be shared with editors and reviewers upon request. Thank you

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Figures

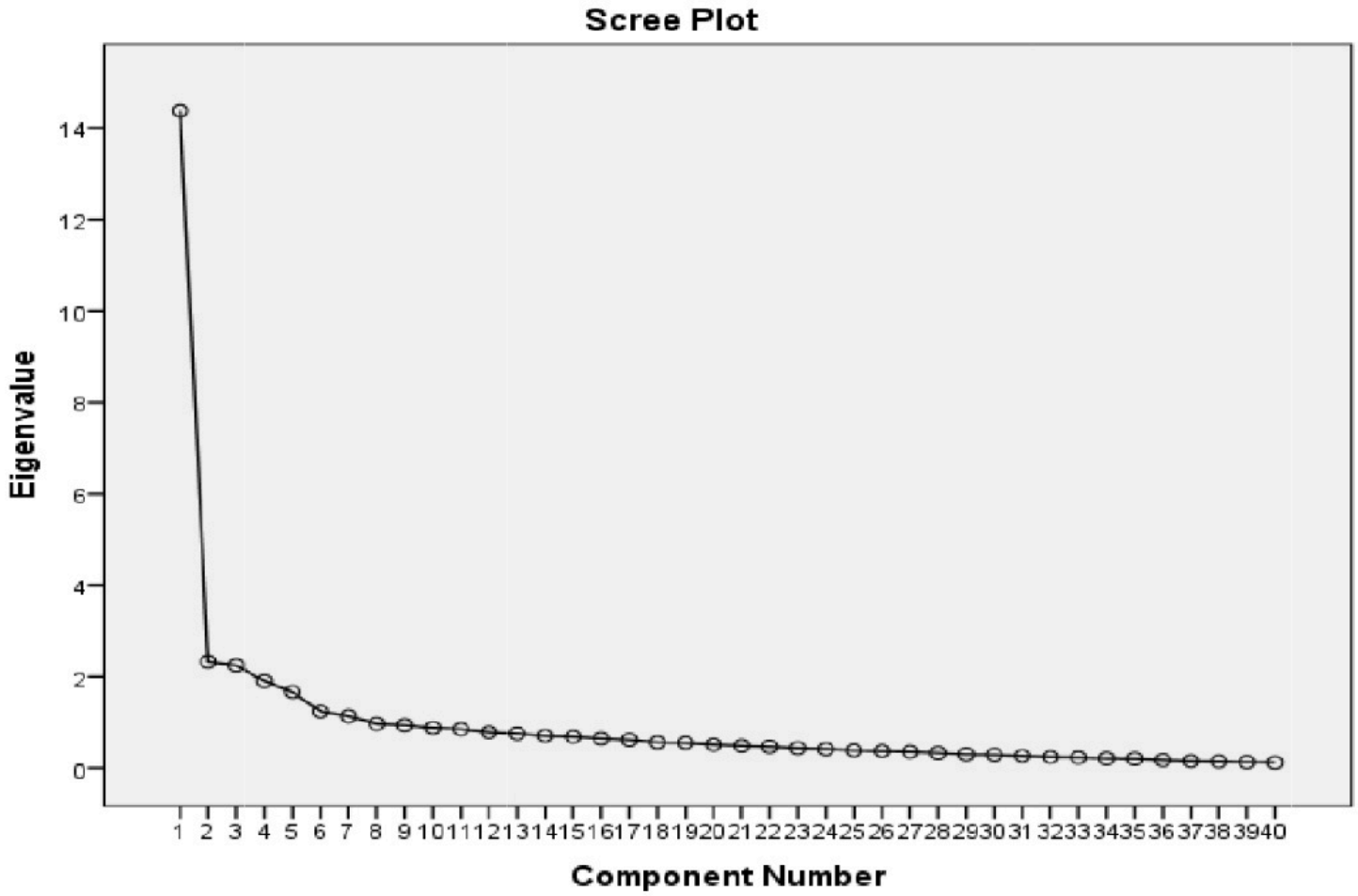


Figure 1

Scree plot illustration for factors extraction