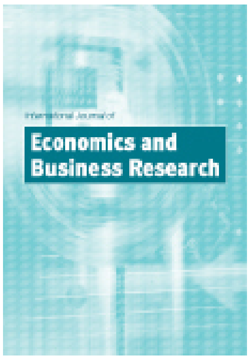


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# Validating the rational and intuitive decision-making styles - RIDMS scale across nine countries

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# Validating the rational and intuitive decision-making styles – RIDMS scale across nine countries


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**Abstract:** The purpose of the present research is to conduct a comprehensive multinational psychometric evaluation of the rational and intuitive decision-making styles (RIDMS) scale across nine culturally heterogeneous national samples. The study involved 1,273 participants drawn from nine countries (Poland = 234, South Korea = 194, Ukraine = 181, India = 131, China = 126, Germany = 100, Portugal = 101, Turkey = 99, and Pakistan = 107). Confirmatory factor analyses (CFA) supported the factorial validity of the RIDMS scale across diverse cultural contexts, with only minor measurement variance observed in some subdimensions. Internal consistency analyses demonstrated acceptable reliability coefficients for all subscales. Independent-samples t-tests revealed no significant gender differences for six of the subdimensions, while significant differences were found for four of them. In addition, cross-country comparisons indicated meaningful variations in decision-making styles across national samples, underscoring the importance of culturally sensitive applications of the RIDMS scale in international research.



**Keywords:** decision-making; intuition; deliberation; validation; cross-cultural study.

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## 1 Introduction

Decision-making is a universal cognitive process integral to human functioning in various socio-cultural contexts. Research in cognitive psychology, behavioural economics, and neuroscience supports a dual-process theoretical framework. This framework posits that two distinct but interconnected systems govern reasoning. The deliberative-rational system involves analytical, sequential, and effortful cognitive processing. The intuitive-experiential system relies on affective, heuristic, and implicit pattern recognition mechanisms (Kahneman, 2011; Evans and Stanovich, 2013; Hodgkinson and Sadler-Smith, 2018). The dual-process tradition emphasises that one system (often labelled system 1 or type 1) is fast, automatic and heuristic-based, whereas the other (system 2 or type 2) is slower, controlled and analytic. Despite the acceptance of this theoretical distinction, substantial inconsistencies remain in how decision-making styles are measured. Furthermore, the cross-cultural validity of widely used measurement paradigms is insufficiently established, raising concerns about their applicability in non-Western populations.

Beyond refining how decision-making styles are measured, it is also important to recognise their relevance behavioural outcomes. Studies show that intuitive and holistic ways of thinking often help people generate creative ideas, recognise new opportunities, and adapt to uncertain or changing situations (Dörfler and Ackermann, 2012; Sinclair, 2020). In contrast, analytical and deliberative thinking styles tend to support careful moral reasoning, structured evaluation, and sound risk management when decisions involve complex trade-offs (Sonenshein, 2007; Kish-Gephart et al., 2010; Kotzian, 2025). In leadership settings, both modes of thought appear essential – effective leaders typically combine quick, experience-based judgments with systematic analysis (Sadler-Smith and Shefy, 2004). For these reasons, the RIDMS is not only a tool for cross-cultural assessment but also a framework that can help explain how different cognitive styles influence meaningful outcomes such as innovation, ethical decision-making, and leadership effectiveness.

Prominent psychometric instruments – including the rational-experiential inventory (REI) (Pacini and Epstein, 1999), general decision-making style (GDMS) measure (Scott and Bruce, 1995), and cognitive style indicator (CoSI) (Cools and Van den Broeck, 2007)

– have provided foundational methodologies for assessing rational-intuitive propensities. Later refinements, such as the types of intuition scale (TIntS) (Pretz et al., 2014) and the unified scale for intuition and deliberation (USID) (Pachur and Spaar, 2015), introduced more variety to how intuition is measured. Nevertheless, these instruments were predominantly developed and validated utilising samples derived from western, educated, industrialised, rich, and democratic (WEIRD) societal contexts (Henrich et al., 2010; Rad et al., 2018). In a recent critique (Kusano et al., 2025), this constrained empirical foundation leads to ethnocentric measurement bias. Apparently, cross-cultural differences may reflect methodological artefacts rather than substantive psychological variation.

Cross-cultural psychology and cultural neuroscience provide compelling evidence that cognitive processes – including decision heuristics, epistemic preferences, and neural substrates of reasoning – are profoundly embedded within culturally constituted norms, values, and ecological affordances (Nisbett et al., 2001; Kitayama and Salvador, 2024; Han et al., 2024). For instance, research finds that East Asian participants exhibit more holistic, context-sensitive cognitive styles, whereas Western participants show more analytic, object-focused styles – reflecting differences in social orientation and culture of cognition (Nisbett et al., 2001). Consequently, the deployment of psychological instruments without examination of measurement invariance across diverse populations poses substantial threats to both theoretical generalisability and practical utility (e.g., in global leadership assessment or cross-national consumer research). As underscored by Cheung et al. (2023), establishing invariance is an essential prerequisite for ensuring the psychometric comparability of latent constructs across cultural groups. The absence of such validation may yield erroneous conclusions regarding the universality versus cultural specificity of psychological constructs.

Current measurement tools have a key limitation: they combine distinct intuitive processes – such as affective, holistic, and spontaneous cognition – into a single, undifferentiated category. This covers important functional differences between them (Sinclair, 2020). The rational and intuitive decision-making styles (RIDMS) scale (Launer and Çetin, 2025) addresses this deficit by delineating a multidimensional taxonomy comprising three rational styles (analytical, planning, knowing) and seven discrete intuitive styles (holistic unconscious, spontaneous, heuristic, slow unconscious, emotional, anticipation/hunches, support by others). In doing so, RIDMS both reflects the two-system logic of dual-process theory (by distinguishing rational vs. intuitive systems) and also integrates cultural-cognition insights (by distinguishing sub-styles of intuition that are sensitive to relational, contextual, and affective variations typical in different cultural cognition traditions). Thus, RIDMS acts as a theoretical bridge between the 'how' of decision-making (dual-process systems) and the 'who/where' of decision-making (cultural cognition differences). This multidimensional operationalisation, theoretically aligned with integrative cognitive-affective models (Dane and Pratt, 2007; Salas et al., 2010). This approach provides more realistic insights because it captures the diverse ways people make decisions. It also recognises that decision-making varies across individuals and situations, making findings more applicable to real-world contexts.

The primary objective of the present research is to conduct a multinational psychometric evaluation of the RIDMS scale across nine culturally heterogeneous national samples. Specifically, this study addresses four core psychometric objectives to evaluate the RIDMS scale across diverse populations. First, we examine configural invariance to determine whether the hypothesised ten-factor structure demonstrates similar factorial configuration across all cultural groups. Second, we evaluate the internal consistency reliability of each RIDMS subscale (three rational, seven intuitive) using Cronbach's alpha and McDonald omega reliability coefficients. Third, we test gender differences in subscale scores using independent samples t-tests. Lastly, we explore the cross-culture differences in subscale scores using ANOVA. Collectively, these analyses establish the scale's structural validity, measurement precision, demographic and cultural generalisability – critical prerequisites for its application in cross-cultural decision-making research.

## 2 Method

### *2.1 Sample*

The study sample consisted of 1,273 participants drawn from nine countries, representing diverse cultural and decision-making contexts. The distribution of participants across countries indicated that Poland provided the largest proportion of respondents (n = 234, 18.4%), followed by South Korea (n = 194, 15.2%) and Ukraine (n = 181, 14.2%). India (n = 131, 10.3%) and China (n = 126, 9.9%) contributed substantial shares of the sample, while Germany (n = 100, 7.9%), Portugal (n = 101, 7.9%), Turkey (n = 99, 7.8%), and Pakistan (n = 107, 8.4%) represented smaller proportions. Participants ranged in age from 18 to 65 years (M = 30.0, SD = 13.2), with balanced gender representation (males = 48.9%, females = 51.1%). Educational backgrounds varied, including habilitation/professorship (n = 59, 4.6%), post-graduate/doctorate/doctoral/PhDs (n = 182, 14.3%), Master's degree (n = 196, 15.4%), Bachelor's degree (n = 374, 29.4%), apprenticeship/journeyman/practical training on the job with official degree (n = 54, 4.2%), middle school/senior high school diploma (n = 332, 26.1%), junior high school diploma (n = 50, 3.9%), primary diploma (n = 11, 0.9%), and without degree/elementary diploma (n = 15, 1.2%), providing a heterogeneous sample across educational contexts.

### *2.2 Translation study*

The RIDMS scale was adapted for China (Mandarin), Germany (German), India (Hindi/Urdu), South Korea (Korean), Pakistan (Urdu), Poland (Polish), Portugal (European Portuguese), Turkey (Turkish), and Ukraine (Ukrainian) using established international guidelines (e.g., Beaton et al., 2000). Following an initial review, two bilingual experts independently translated the scale from English into each target language. These translations were then combined into a single reconciled version (T1). Different bilingual translators, unfamiliar with the original scale, independently translated T1 back into English. For each country, a multidisciplinary expert committee examined the original scale, the forward translations, T1, and the back-translations. The committee resolved any differences to ensure the meaning, phrasing, real-life relevance, and underlying concepts matched the original, creating a pre-final version (T2). This T2 version was tested with samples of the target population (approximately 15–30 people per country). Participants thought aloud while answering the items and were interviewed to check understanding, relevance, and cultural fit. Their feedback guided final adjustments. The resulting adapted version (T3) was finalised by consensus, prioritising the preservation of the original scale's core meaning across all languages for later psychometric testing.

### *2.3 Statistical procedure*

To establish cross-cultural robustness without assuming measurement equivalence, this study employs a stratified psychometric validation strategy. First, country-specific confirmatory factor analyses (CFAs) test whether the hypothesised ten-factor structure holds within each national context, ensuring the model's configural validity across diverse samples. Second, a total-sample CFA assesses global model fit, verifying the overarching theoretical framework. Third, reliability analyses – examining internal consistency metrics (Cronbach's α/ω) at pan-cultural level – quantify measurement precision. Lastly, we test gender and country differences in subscale scores using independent samples t-tests and ANOVA. This approach addresses critical limitations of prior WEIRD-centric instruments by empirically verifying structural stability within discrete cultural settings rather than imposing universal metric equivalence.

## 3 Results

### *3.1 Country-based results*

The RIDMS scale was tested for factorial validity in nine countries using CFA. Standardised factor loadings for each item are presented in Table 1. Across countries, most items demonstrated strong loadings (>0.60), supporting the robustness of the RIDMS structure in diverse cultural contexts. Exceptions included lower loadings for certain holistic unconscious items in India and Poland (e.g., IN04_02 = 0.225 in India; 0.196 in Poland) and for slow unconscious items in India (e.g., IN07_07 = 0.468), suggesting potential cultural variability in these subdimensions.

For the analytical dimension, factor loadings ranged from 0.649 (India, Ukraine) to 0.917 (Turkey), consistently exceeding the recommended 0.60 threshold (Hair et al., 2019). Planning items showed high loadings in most countries (0.686–0.946), with the lowest observed in Pakistan for IN02_02 (0.493). Knowing items demonstrated acceptable performance (0.625–0.937), with the strongest loading for IN03_03 in Portugal. Holistic unconscious loadings varied substantially, with IN04_02 performing notably weaker in India and Poland but strongly in Germany (0.719) and Pakistan (0.744). The spontaneous and heuristics styles exhibited high factor loadings across all countries (mostly > 0.70), indicating stable cross-cultural performance. The Slow Unconscious dimension showed more variability, with lower loadings in India and moderate to high loadings in other countries. Emotional items performed consistently well across countries (0.669–0.940). Similarly, anticipation/hunches items demonstrated strong loadings, with the highest (0.955) in Germany. Support by others also showed high cross-cultural stability (0.598–0.893).

**Table 1** The CFA results across countries

| *DM styles* | *Indicator* | *Standardised factor loadings* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *China* | *Germany* | *India* | *South Korea* | *Pakistan* | *Poland* | *Portugal* | *Turkey* | *Ukraine* |
| Analytical | IN01_01 | 0.666 | 0.829 | 0.649 | 0.815 | 0.875 | 0.730 | 0.802 | 0.724 | 0.649 |
| | IN01_03 | 0.678 | 0.894 | 0.663 | 0.769 | 0.891 | 0.853 | 0.810 | 0.917 | 0.663 |
| | IN01_06 | 0.699 | 0.844 | 0.698 | 0.753 | 0.744 | 0.768 | 0.873 | 0.913 | 0.698 |
| Planning | IN02_02 | 0.795 | 0.834 | 0.847 | 0.688 | 0.493 | 0.777 | 0.749 | 0.751 | 0.847 |
| | IN02_04 | 0.797 | 0.931 | 0.792 | 0.764 | 0.853 | 0.770 | 0.880 | 0.946 | 0.792 |
| | IN02_07 | 0.737 | 0.893 | 0.706 | 0.537 | 0.872 | 0.672 | 0.686 | 0.845 | 0.706 |
| Knowing | IN03_02 | 0.408 | 0.916 | 0.693 | 0.650 | 0.636 | 0.646 | 0.691 | 0.814 | 0.693 |
| | IN03_03 | 0.458 | 0.873 | 0.675 | 0.668 | 0.813 | 0.836 | 0.937 | 0.868 | 0.675 |
| | IN03_04 | 0.452 | 0.753 | 0.625 | 0.575 | 0.597 | 0.738 | 0.770 | 0.630 | 0.625 |
| Holistic unconscious | IN04_02 | 0.596 | 0.719 | 0.225 | 0.667 | 0.744 | 0.196 | 0.634 | 0.365 | 0.225 |
| | IN04_03 | 0.587 | 0.967 | 0.746 | 0.715 | 0.724 | 0.824 | 0.804 | 0.799 | 0.746 |
| | IN04_04 | 0.710 | 0.919 | 0.840 | 0.741 | 0.834 | 0.732 | 0.836 | 0.748 | 0.840 |
| Spontaneous | IN05_01 | 0.700 | 0.924 | 0.855 | 0.697 | 0.789 | 0.718 | 0.786 | 0.883 | 0.855 |
| | IN05_02 | 0.669 | 0.935 | 0.740 | 0.790 | 0.836 | 0.734 | 0.854 | 0.755 | 0.740 |
| | IN05_03 | 0.845 | 0.897 | 0.721 | 0.781 | 0.722 | 0.742 | 0.790 | 0.695 | 0.721 |
| Heuristics | IN06_01 | 0.804 | 0.965 | 0.705 | 0.742 | 0.658 | 0.778 | 0.856 | 0.811 | 0.705 |
| | IN06_02 | 0.602 | 0.966 | 0.764 | 0.794 | 0.834 | 0.753 | 0.859 | 0.849 | 0.764 |
| | IN06_06 | 0.637 | 0.842 | 0.580 | 0.649 | 0.785 | 0.638 | 0.656 | 0.717 | 0.580 |
| Slow unconscious | IN07_01 | 0.590 | 0.825 | 0.595 | 0.602 | 0.691 | 0.376 | 0.732 | 0.693 | 0.595 |
| | IN07_05 | 0.630 | 0.810 | 0.532 | 0.688 | 0.722 | 0.629 | 0.838 | 0.776 | 0.532 |
| | IN07_07 | 0.724 | 0.974 | 0.468 | 0.768 | 0.867 | 0.666 | 0.888 | 0.791 | 0.468 |

**Table 1** The CFA results across countries (continued)

| *DM styles* | *Indicator* | *Standardised factor loadings* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *China* | *Germany* | *India* | *South Korea* | *Pakistan* | *Poland* | *Portugal* | *Turkey* | *Ukraine* |
| Emotional | IN08_01 | 0.795 | 0.940 | 0.821 | 0.781 | 0.775 | 0.845 | 0.709 | 0.800 | 0.821 |
| | IN08_03 | 0.658 | 0.937 | 0.772 | 0.788 | 0.811 | 0.922 | 0.884 | 0.886 | 0.772 |
| | IN08_05 | 0.694 | 0.830 | 0.669 | 0.851 | 0.863 | 0.638 | 0.679 | 0.714 | 0.669 |
| Anticipation/hunches | IN11_01 | 0.717 | 0.955 | 0.763 | 0.732 | 0.878 | 0.648 | 0.696 | 0.911 | 0.763 |
| | IN11_02 | 0.760 | 0.907 | 0.772 | 0.719 | 0.817 | 0.707 | 0.925 | 0.861 | 0.772 |
| | IN11_04 | 0.821 | 0.795 | 0.735 | 0.789 | 0.871 | 0.650 | 0.853 | 0.542 | 0.735 |
| Support by others | IN12_01 | 0.648 | 0.893 | 0.860 | 0.658 | 0.809 | 0.789 | 0.693 | 0.791 | 0.860 |
| | IN12_03 | 0.751 | 0.874 | 0.669 | 0.728 | 0.810 | 0.769 | 0.877 | 0.812 | 0.669 |
| | IN12_04 | 0.685 | 0.906 | 0.835 | 0.784 | 0.663 | 0.815 | 0.850 | 0.598 | 0.835 |
| *Model fit measures* | | | | | | | | | | |
| $\chi^2$ | | 603 | 599 | 649 | 590 | 574 | 623 | 543 | 693 | 649 |
| df | | 360 | 360 | 360 | 360 | 360 | 360 | 360 | 360 | 360 |
| CFI | | 0.926 | 0.918 | 0.860 | 0.896 | 0.854 | 0.902 | 0.885 | 0.809 | 0.860 |
| TLI | | 0.890 | 0.901 | 0.830 | 0.874 | 0.824 | 0.882 | 0.861 | 0.769 | 0.830 |
| RMSEA | | 0.0738 | 0.0815 | 0.0666 | 0.0580 | 0.0760 | 0.0559 | 0.0716 | 0.0966 | 0.0666 |

Model fit indices are also presented in Table 1. Across countries, the majority of CFA models met or approached conventional thresholds for good fit (CFI ≥ 0.90, TLI ≥ 0.90, RMSEA ≤ 0.08). China demonstrated the best overall fit (CFI = 0.956, TLI = 0.947, RMSEA = 0.038), followed by Germany (CFI = 0.918, TLI = 0.901, RMSEA = 0.0815). India, Pakistan, Poland, and Portugal yielded acceptable model fits (CFI = 0.854–0.902, RMSEA = 0.0559–0.0760). South Korea's model indicated marginally acceptable fit (CFI = 0.896, RMSEA = 0.0580). Turkey and Ukraine exhibited comparatively weaker fits, with CFI values of 0.809 and 0.860, respectively, and RMSEA values exceeding 0.09 in Turkey.

Overall, the findings support the factorial validity of the RIDMS scale across multiple cultural contexts, while highlighting minor measurement variance in selected subdimensions (particularly Holistic Unconscious and Slow Unconscious) that may reflect cultural differences in the salience or interpretation of intuitive processes.

## *3.2 Overall results*

The CFA was conducted to evaluate the hypothesised ten-factor measurement model (see Table 2) for the whole sample. The model demonstrated a good fit to the data, $\chi^2(360) = 1{,}013$, $p < 0.001$, CFI = 0.956, TLI = 0.947, RMSEA = 0.038, 90% CI [0.035, 0.041]. These fit indices meet or exceed commonly recommended thresholds (CFI and TLI ≥ 0.95; RMSEA ≤ 0.06; Hu and Bentler, 1999), indicating an acceptable model fit. All standardised factor loadings were statistically significant ($p < 0.001$) and ranged from 0.477 to 0.846, demonstrating that each indicator strongly contributed to its respective latent construct. The 'analytical' factor had standardised loadings between 0.769 and 0.822, while 'planning' loadings ranged from 0.731 to 0.823. For 'knowing', factor loadings varied from 0.672 to 0.790. The 'holistic unconscious' dimension showed somewhat more variability, with loadings from 0.477 to 0.790, the lowest loading observed in the model. The 'spontaneous' factor exhibited high and consistent loadings (0.789–0.795), as did 'heuristics' (0.686–0.802). The 'slow unconscious' factor demonstrated loadings between 0.622 and 0.796. The 'emotional' dimension displayed strong loadings (0.753–.846), while 'anticipation/hunches' ranged from 0.750 to 0.808. Finally, the 'support by others' factor showed consistently high loadings (0.779–0.791). Overall, these results provide empirical support for the distinctiveness and reliability of the proposed ten-factor structure, with all indicators making meaningful contributions to their respective constructs and the overall model achieving robust fit indices.

Internal consistency reliability was evaluated for each subscale using Cronbach's alpha ($\alpha$ and McDonald's omega ($\omega$). Reliability coefficients across the 12 subscales ranged from acceptable to excellent, with no evidence that removing any single item would improve scale reliability. The analytical subscale demonstrated strong internal consistency ($\alpha = 0.831$, $\omega = 0.833$), with item-rest correlations between 0.672 and 0.727. The planning subscale also showed high reliability ($\alpha = 0.819$, $\omega = 0.821$; item-rest correlations = 0.653–0.719). The knowing subscale exhibited acceptable reliability ($\alpha = 0.757$, $\omega = 0.763$), with item-rest correlations from 0.534 to 0.649. The holistic unconscious subscale had the lowest, yet still acceptable, reliability ($\alpha = 0.710$, $\omega = 0.734$), with item-rest correlations between 0.417 and 0.609. In contrast, the spontaneous subscale demonstrated excellent reliability ($\alpha = 0.835$, $\omega = 0.836$), with item-rest correlations from 0.693 to 0.701. The heuristics subscale showed good reliability (α = 0.800, ω = 0.806), with item-rest correlations between 0.580 and 0.693. The slow unconscious subscale displayed adequate internal consistency (α = 0.741, ω = 0.751), with item-rest correlations from 0.539 to 0.622. The emotional subscale achieved the highest reliability (α = 0.849, ω = 0.852), with item-rest correlations between 0.677 and 0.746. The anticipation/hunches subscale showed good reliability (α = 0.771, ω = 0.782), with item-rest correlations from 0.541 to 0.668. The support by others subscale also performed well (α = 0.829, ω = 0.829), with item-rest correlations between 0.682 and 0.690. Across all subscales, deleting any single item resulted in negligible changes to α and ω, indicating that all items contributed meaningfully to their respective constructs. These results support the internal consistency of the measurement instrument across its multidimensional structure.

**Table 2** The CFA and internal consistencies for the whole sample

| *DM styles* | *Indicator* | *Std. loading* | *α* | *ω* | *Item-rest correlation (range)* |
|---|---|---|---|---|---|
| Analytical | IN01_01 | 0.769 | 0.831 | 0.833 | 0.672–0.727 |
| | IN01_03 | 0.822 | | | |
| | IN01_06 | 0.782 | | | |
| Planning | IN02_02 | 0.762 | 0.819 | 0.821 | 0.653–0.719 |
| | IN02_04 | 0.823 | | | |
| | IN02_07 | 0.731 | | | |
| Knowing | IN03_02 | 0.683 | 0.757 | 0.763 | 0.534–0.649 |
| | IN03_03 | 0.790 | | | |
| | IN03_04 | 0.672 | | | |
| Holistic unconscious | IN04_02 | 0.477 | 0.710 | 0.734 | 0.417–0.609 |
| | IN04_03 | 0.788 | | | |
| | IN04_04 | 0.790 | | | |
| Spontaneous | IN05_01 | 0.789 | 0.835 | 0.836 | 0.693–0.701 |
| | IN05_02 | 0.791 | | | |
| | IN05_03 | 0.795 | | | |
| Heuristics | IN06_01 | 0.801 | 0.800 | 0.806 | 0.580–0.693 |
| | IN06_02 | 0.802 | | | |
| | IN06_06 | 0.686 | | | |
| Slow unconscious | IN07_01 | 0.622 | 0.741 | 0.751 | 0.539–0.622 |
| | IN07_05 | 0.695 | | | |
| | IN07_07 | 0.796 | | | |
| Emotional | IN08_01 | 0.827 | 0.849 | 0.852 | 0.677–0.746 |
| | IN08_03 | 0.846 | | | |
| | IN08_05 | 0.753 | | | |

Notes: Model fit: $\chi^2(360) = 1{,}013$, $p < 0.001$, CFI = 0.956, TLI = 0.947, RMSEA = 0.038, 90% CI [0.035, 0.041]; standardised factor loadings from CFA are reported. Reliability indices are for each subscale.

**Table 2** The CFA and internal consistencies for the whole sample (continued)

| *DM styles* | *Indicator* | *Std. loading* | *α* | *ω* | *Item-rest correlation (range)* |
|---|---|---|---|---|---|
| Anticipation/hunches | IN09_02 | 0.782 | 0.771 | 0.782 | 0.541–0.668 |
| | IN09_03 | 0.808 | | | |
| | IN09_05 | 0.750 | | | |
| Support by others | IN12_01 | 0.784 | 0.829 | 0.829 | 0.682–0.690 |
| | IN12_03 | 0.779 | | | |
| | IN12_04 | 0.791 | | | |

Notes: Model fit: $\chi^2(360) = 1,013$, $p < 0.001$, CFI = 0.956, TLI = 0.947, RMSEA = 0.038, 90% CI [0.035, 0.041]; standardised factor loadings from CFA are reported. Reliability indices are for each subscale.

## *3.3 Gender differences*

Independent-samples t-tests were conducted to examine gender differences across the ten decision-making styles (see Table 3). For variables where Levene's test indicated unequal variances – holistic unconscious, slow unconscious, and emotional – Welch's t-tests were used; for all others, standard Student's t-tests were applied. Descriptive statistics, test results, and 95% confidence intervals for mean differences are presented in Table 3. Significant gender differences emerged in four styles. Males reported higher scores than females on analytical (t(1,094) = 2.87, p = 0.004, d = 0.17, 95% CI [0.061, 0.323]), knowing (t(1,078) = 3.06, p = 0.002, d = 0.19, 95% CI [0.075, 0.341]), spontaneous (t(1,117) = 2.83, p = 0.005, d = 0.17, 95% CI [0.064, 0.357]), and heuristics (t(1,125) = 3.36, p < 0.001, d = 0.20, 95% CI [0.096, 0.364]).

Three additional styles showed marginal gender effects (p < 0.10): planning (t(1,080) = 1.75, p = 0.080, d = 0.11), slow unconscious (t(1,121) = 1.83, p = 0.068, d = 0.12), and emotional (t(1,123) = –1.68, p = 0.093, d = –0.10). No significant gender differences were found for holistic unconscious, anticipation/hunches, or support by others. Although the statistically significant effects were small in magnitude (ds ranging from 0.17 to 0.20), the pattern consistently indicated that males reported stronger preferences for analytical and experience-based decision styles.

## *3.4 Country level differences*

For the country level differences, Levene's test of homogeneity of variances indicated that the assumption of equal variances was violated for all decision-making styles (all p < 0.001). Therefore, Welch's robust one-way ANOVA was employed for group comparisons across countries. Welch's ANOVA revealed significant cross-national differences in several decision-making styles. Specifically, significant group effects were found for knowing (F(8, 393) = 4.20, p < 0.001), spontaneous (F(8, 404) = 3.47, p < 0.001), heuristics (F(8, 410) = 3.46, p < 0.001), slow unconscious (F(8, 413) = 2.22, p = 0.025), emotional (F(8, 417) = 9.27, p < 0.001), anticipation/hunches (F(8, 422) = 11.01, p < 0.001), and support by others (F(8, 420) = 3.89, p < 0.001). In contrast, analytical (F(8, 396) = 1.88, p = 0.062), planning (F(8, 394) = 1.70, p = 0.096), and holistic unconscious (F(8, 398) = 1.07, p = 0.380) styles did not differ significantly across countries.

**Table 3** Gender differences in decision-making styles (N = 1,060–1,193)

| *Decision-making style* | *Males (n = 528–568)* | *Females (n = 551–597)* | *Test statistic* | *p* | *Mean difference [95% CI]* | *Assumption/ test used* |
|---|---|---|---|---|---|---|
| | *M (SD)* | *M (SD)* | | | *(male–female)* | |
| Analytical | 4.56 (1.06) | 4.37 (1.15) | t(1,094) = 2.87 | 0.004 | 0.192 [0.061, 0.323] | Levene's p > 0.05, student's t |
| Planning | 4.54 (1.10) | 4.42 (1.08) | t(1,080) = 1.75 | 0.080 | 0.116 [–0.014, 0.246] | Levene's p > 0.05, student's t |
| Knowing | 4.27 (1.10) | 4.06 (1.13) | t(1,078) = 3.06 | 0.002 | 0.208 [0.075, 0.341] | Levene's p > 0.05, student's t |
| Holistic unconscious[a] | 4.30 (1.13) | 4.27 (0.94) | t(1,050) = 0.42 | 0.674 | 0.026 [–0.096, 0.149] | Levene's p < 0.05, Welch's t |
| Spontaneous | 4.01 (1.25) | 3.80 (1.25) | t(1,117) = 2.83 | 0.005 | 0.211 [0.064, 0.357] | Levene's p > 0.05, student's t |
| Heuristics | 4.21 (1.15) | 3.98 (1.15) | t(1,125) = 3.36 | <0.001 | 0.230 [0.096, 0.364] | Levene's p > 0.05, student's t |
| Slow unconscious[a] | 3.99 (1.22) | 3.86 (1.09) | t(1,121) = 1.83 | 0.068 | 0.125 [–0.009, 0.259] | Levene's p < 0.05, Welch's t |
| Emotional[a] | 3.63 (1.39) | 3.76 (1.24) | t(1,123) = –1.68 | 0.093 | –0.130 [–0.283, 0.022] | Levene's p < 0.05, Welch's t |
| Anticipation/ hunches | 3.71 (1.24) | 3.81 (1.15) | t(1,163) = –1.38 | 0.169 | –0.096 [–0.233, 0.041] | Levene's p > 0.05, student's t |
| Support by others | 4.11 (1.22) | 4.04 (1.22) | t(1,156) = 1.09 | 0.277 | 0.078 [–0.063, 0.219] | Levene's p > 0.05, student's t |

Notes: [a]Welch's t-test used due to significant Levene's test (p < 0.05).
Group codes: 1 = male, 2 = female. Mean difference calculated as male – female.

Games-Howell post hoc tests identified several significant pairwise differences:

- Knowing: Participants from Poland scored significantly lower than those from China (p = 0.046), South Korea (p = 0.003), Turkey (p = 0.001), and Ukraine (p < 0.001).
- Spontaneous: South Korea scored higher than Poland (p = 0.002).

Additionally, China reported higher scores than Poland (p = 0.034).

- Heuristics: South Korea reported significantly higher scores than Poland ($p = 0.010$), and Pakistan also scored higher than Poland ($p = 0.002$).
- Slow unconscious: No robust pairwise effects reached significance after correction.
- Emotional: China and South Korea scored higher than Germany ($p = 0.002$; $p = 0.004$, respectively), while Poland scored lower than China ($p < 0.001$), South Korea ($p < 0.001$), and Ukraine ($p < 0.001$).
- Anticipation/hunches: China and South Korea scored higher than Germany ($p < 0.001$). Poland scored significantly lower than China ($p < 0.001$), South Korea ($p < 0.001$), and Pakistan ($p = 0.009$).
- Support by others: Participants from Pakistan scored significantly higher than those from Poland ($p = 0.009$).

**Table 4** The ANOVA results across countries

| *DM style* | *F (df1, df2)* | *p* | *Sig. difference* |
|---|---|---|---|
| Analytical | 1.88 (8, 396) | 0.062 | ns |
| Planning | 1.70 (8, 394) | 0.096 | ns |
| Knowing | 4.20 (8, 393) | <0.001 | Yes |
| Spontaneous | 3.47 (8, 404) | <0.001 | Yes |
| Heuristics | 3.46 (8, 410) | <0.001 | Yes |
| Slow unconscious | 2.22 (8, 413) | 0.025 | Yes |
| Holistic unconscious | 1.07 (8, 398) | 0.380 | ns |
| Emotional | 9.27 (8, 417) | <0.001 | Yes |
| Anticipation/hunches | 11.01 (8, 422) | <0.001 | Yes |

Inspection of the group means (see Appendix) revealed consistent trends. Respondents from China, South Korea, and Pakistan generally reported higher reliance on emotional, heuristic, and intuitive processes compared to respondents from Germany and Poland, who tended to score lower on these styles. Meanwhile, Turkey and Ukraine often aligned with the higher-scoring group on knowing, spontaneous, and anticipation/hunches dimensions.

## 4 Discussion

This study provides robust empirical support for the cross-cultural structural validity and reliability of the RIDMS scale across nine diverse national contexts. Our findings offer a practical solution to criticism of addressing the WEIRD-centric limitations (Henrich et al., 2010) in decision-making measurement. The confirmation of configural invariance indicates that the hypothesised ten-factor structure (three rational, seven intuitive styles) maintains equivalent factorial configuration across all cultural groups. This addresses a fundamental gap in cross-cultural decision science by demonstrating that the multidimensional nature of rational-intuitive processing – particularly the differentiation of intuitive subtypes proposed by Launer and Çetin (2025) – is not merely a Western construct but reflects a culturally robust organisational framework for decision-making tendencies. This stability suggests that the core cognitive structure underlying decision systems may be universal, even if cultural contexts shape motivational and affective preferences in how these systems are used (Nisbett, 2003; Gutchess and Rajaram, 2023).

**Table 5** The Games-Howell post hoc tests

| *Decision-making style* | *Comparison (country 1 vs. country 2)* | *Mean difference* | *p* |
|---|---|---|---|
| Knowing | Poland < China | –0.27 | 0.046 |
| | Poland < South Korea | –0.39 | 0.003 |
| | Poland < Turkey | –0.41 | 0.001 |
| | Poland < Ukraine | –0.54 | <0.001 |
| Spontaneous | South Korea > Poland | 0.49 | 0.002 |
| | China > Poland | 0.35 | 0.034 |
| Heuristics | South Korea > Poland | 0.38 | 0.010 |
| | Pakistan > Poland | 0.46 | 0.002 |
| Emotional | China > Germany | 0.55 | 0.002 |
| | South Korea > Germany | 0.52 | 0.004 |
| | Poland < China | –0.67 | <0.001 |
| | Poland < South Korea | –0.62 | <0.001 |
| | Poland < Ukraine | –0.70 | <0.001 |
| Anticipation/hunches | China > Germany | 0.63 | <0.001 |
| | South Korea > Germany | 0.58 | <0.001 |
| | Poland < China | –0.74 | <0.001 |
| | Poland < South Korea | –0.69 | <0.001 |
| | Poland < Pakistan | –0.44 | 0.009 |
| Support by others | Pakistan > Poland | 0.42 | 0.009 |

The internal consistency reliability of all subscales (α and ω > 0.70) across heterogeneous samples substantiates the RIDMS's measurement precision. Critically, the invariance in item contributions reinforces that the operational definitions of constructs like holistic unconscious and slow unconscious retain conceptual coherence despite linguistic and cultural translation. This empirically validates the scale's core theoretical advancement: its resolution of the intuitive synthesis problem (Sinclair, 2020) by separating intuition into seven functionally distinct processes. The reliability of discrete intuitive dimensions (e.g., distinguishing emotional from anticipation/hunches) enables future research to investigate culture-specific patterns in intuitive specialisation that have previously been aggregated into monolithic constructs. Such detailed dimensioning aligns with cultural-cognition theory, which posits that relational/affective processing styles are more prevalent in collectivistic and high-context cultures (Markus and Kitayama, 1991; Nisbett et al., 2001).

Notable cross-cultural variance emerged in the holistic unconscious and slow unconscious subdimensions. This aligns with cultural neuroscience evidence demonstrating culturally embedded neural patterning in intuitive processing (Han et al., 2024; Kitayama and Salvador, 2023). For instance, elevated holistic unconscious scores in East Asian samples (China, South Korea) may reflect cultural epistemologies emphasising contextual interdependence (Nisbett et al., 2001) and holistic perceptual habits linked to interdependent self-construal (Markus and Kitayama, 1991). Likewise, variations in slow unconscious could relate to cultural differences in uncertainty tolerance (Gelfand et al., 2011) and long-term relational decision norms typical in collectivistic societies (Hofstede, 2001). These findings affirm that while the structure of decision-making is invariant, the cultural adaptation of specific intuitive pathways need deeper investigation.

Regarding demographic generalisability, the absence of gender differences in planning, slow unconscious, holistic unconscious, emotional, anticipation/hunches, and support by others styles suggests these dimensions operate independently of gender socialisation across cultures. However, males reported significantly higher scores in analytical, knowing, spontaneous, and heuristics. While effect sizes were small, this pattern supports findings on gender differences and cognitive styles (Sladek et al., 2010). These differences may reflect culturally pervasive socialisation and role expectations – where agentic, independent thinking styles are more commonly reinforced among men, whereas women often face stronger expectations toward communal and relational sensitivity (Eagly and Wood, 2012; Meyers-Levy and Loken, 2015). Importantly, our results should not be interpreted as biologically fixed or universal traits; instead, they likely represent culturally situated tendencies shaped by social norms that vary in strength across societies. The cross-cultural consistency of these differences shows they're reliable demographic factors in decision-making studies. But also it points to the need for future research examining how gender-role flexibility and changing norms influence decision-style development.

This study also investigated cross-national differences in decision-making styles. Significant differences emerged for knowing, spontaneous, heuristics, slow unconscious, emotional, anticipation/hunches, and support by others, whereas analytical, planning, and holistic unconscious styles showed no significant variation across countries. This suggests that structured, deliberative strategies are less culturally sensitive, while intuitive and affective processes vary more across contexts. Analyses revealed that participants from China, South Korea, and Pakistan generally reported higher reliance on emotional, heuristic, and intuitive decision-making than respondents from Germany and Poland. Turkey and Ukraine often aligned with the higher-scoring group, particularly on knowing, spontaneous, and anticipation/hunches. These patterns indicate that collectivist cultural contexts may foster greater use of experiential and relational decision processes, whereas European contexts emphasise analytical precision and autonomy. This is consistent with cultural-dimensions research showing that collectivist, high-context, and high-uncertainty-avoidance cultures rely more on affective and socially embedded cognition (Hofstede, 2001; Nisbett, 2003), whereas individualist and low-context cultures tend to adopt more analytic and independent decision strategies. Overall, the findings highlight that cultural context shapes intuitive and affective decision-making more strongly than rational strategies. These results have implications for multinational teams and organisations, suggesting that cultural differences should be considered when designing decision-making processes and cross-cultural collaboration strategies.

## *4.1 Theoretical and practical implications*

This study provides an empirical evidence that the RIDMS scale achieves configural invariance across culturally distinct regions – including Western Europe (Germany, Portugal), Eastern Europe (Poland, Ukraine, Turkey), East Asia (China, South Korea), and South Asia (India, Pakistan). This study also addresses the critiques regarding the WEIRD bias in psychological instrumentation (Henrich et al., 2010; Savani and Job, 2017). By confirming that the ten-factor structure generalises beyond Western contexts, it addresses a critical limitation in decision-making research: distinguishing universal thinking patterns from those shaped by specific cultures. This makes the RIDMS a key tool for comparing decision-making processes across cultures.

The cross-cultural stability of the seven intuitive subscales (holistic unconscious, spontaneous, heuristic, etc.) empirically validates Launer and Çetin's (2025) theoretical decomposition of intuition into discrete functional components. Crucially, it enables researchers to investigate how cultural logics selectively amplify specific intuitive pathways – for example, whether collectivist societies (e.g., China, South Korea) exhibit heightened engagement of holistic unconscious processing compared to individualist contexts (Germany, Poland), or whether high-uncertainty-avoidance cultures (e.g., South Korea, Turkey) rely more heavily on slow unconscious deliberation. Thus, such detailed analyses were revealed with differentiated intuition measurements.

Organisations operating in multinational contexts can leverage the RIDMS to enhance culturally human resource practices. Such as identifying candidates whose decision-style profiles align with role-specific demands (e.g., prioritising analytical styles for financial analysts in Germany vs. holistic unconscious for innovation teams in India). Diagnosing and training leaders in contextually adaptive decision-making – e.g., coaching western expatriates in support by others styles for collaborative decisions in Pakistan. Unlike prior WEIRD-normed tools that carries risks of misclassifying culturally normative decision modes as 'deviant', the RIDMS decreases the risk of ethnocentric misalignment.

The present findings also contribute to decision-making theory by demonstrating that intuitive, emotional, and heuristic styles are culturally contingent, whereas analytical and planning strategies are relatively stable across nations. This supports dual-process models of decision-making (e.g., Kahneman, 2011) and cross-cultural frameworks (e.g., Hofstede, 2001; Nisbett, 2003), highlighting that affective and experiential processes are more sensitive to cultural context. Additionally, the results extend prior research by showing systematic differences among a diverse set of countries, suggesting that models of decision-making must account for national and cultural influences to fully capture variability in human judgment.

While the present study confirmed configural invariance, supporting the structural equivalence of the RIDMS across cultural contexts, future research should extend this work by testing metric and scalar invariance. Establishing these higher levels of invariance would enable more precise cross-cultural comparisons of mean scores and ensure that observed differences reflect genuine psychological variations rather than measurement artefacts. Additionally, the gender differences observed in decision-making profiles, though statistically significant, were relatively small in effect size. These results should therefore be interpreted cautiously until validated through behavioural or performance-based assessments that clarify their practical significance. Finally, future studies could adopt longitudinal and outcome-oriented designs to examine how distinct RIDMS profiles predict real-world decision outcomes – such as strategic innovation, ethical decision-making, or leadership performance – across diverse cultural settings. Such evidence would further strengthen the external validity of the RIDMS and deepen understanding of how decision systems operate in dynamic, multicultural environments.

## 5 Conclusions

This research demonstrates the utility of the RIDMS in capturing both universal and culture-specific patterns, providing a solution for the psychological instruments beyond WEIRD populations. Collectively, the evidence positions the RIDMS as a decision-making scale to support both universalist (structure-focused) and relativist (style-salience-focused) research paradigms. By explicitly mapping cross-cultural variations, this study informs both theoretical models of decision-making and the practical design of interventions in multicultural contexts. In terms of substantive findings, the results confirm a ten-factor structure and demonstrate reliable, culturally robust assessment of both rational and intuitive styles. These findings suggest that decision-style preferences are not merely cognitive traits but culturally conditioned strategies that individuals employ in complex, real-world judgment contexts.

The implications of this work extend beyond measurement contributions. Because decision-making styles influence how individuals interpret information, resolve uncertainty, and act under pressure, the RIDMS provides a foundation for empirical research linking style profiles to meaningful outcomes such as ethical judgment, innovation behaviour, entrepreneurial problem-solving, and leadership performance (Dane and Pratt, 2007; Akinci and Sadler-Smith, 2020). Specifically, intuitive and holistic decision modes have been associated with creativity and innovation under complex or uncertain conditions (Dörfler and Ackermann, 2012; Sinclair, 2020), while analytical and deliberative styles often underpin ethical reasoning and rule-based moral decisions (Sonenshein, 2007; Kish-Gephart et al., 2010). Moreover, effective leadership performance frequently depends on the ability to balance analytical evaluation with intuitive insight (Sadler-Smith and Shefy, 2004). Practically, organisations may use RIDMS to design training programs, enhance leader development systems, and improve cross-cultural decision-support mechanisms.

## Declarations

All authors declare that informed consent was obtained from the patient for the publication of this study

All authors declare that they have no conflicts of interest.

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# Appendix

**Table 6** Descriptive statistics for countries

| *Country* | *Analytical M (SD)* | *Planning M (SD)* | *Knowing M (SD)* | *Holistic unconscious M (SD)* | *Spontaneous M (SD)* | *Heuristics M (SD)* | *Slow unconscious M (SD)* | *Emotional M (SD)* | *Anticipation/ hunches M (SD)* | *Support by others M (SD)* |
|---|---|---|---|---|---|---|---|---|---|---|
| Germany | 4.06 (1.47) | 4.09 (1.46) | 4.27 (1.31) | 4.27 (1.37) | 3.63 (1.72) | 3.92 (1.59) | 3.64 (1.62) | 3.34 (1.57) | 3.25 (1.58) | 3.65 (1.56) |
| China | 4.54 (0.84) | 4.45 (1.01) | 4.16 (0.86) | 4.35 (0.85) | 4.08 (1.01) | 4.16 (1.01) | 4.12 (0.95) | 4.10 (1.02) | 4.17 (0.80) | 4.30 (0.92) |
| India | 4.52 (1.00) | 4.36 (1.02) | 4.21 (1.13) | 4.34 (1.07) | 3.76 (1.32) | 4.16 (1.16) | 3.97 (1.23) | 3.68 (1.39) | 3.85 (1.18) | 4.00 (1.32) |
| South Korea | 4.48 (0.99) | 4.58 (0.87) | 4.25 (1.00) | 4.26 (1.03) | 4.14 (1.10) | 4.21 (1.06) | 4.01 (1.05) | 4.06 (1.22) | 4.11 (1.04) | 4.25 (1.03) |
| Pakistan | 4.33 (1.28) | 4.57 (0.94) | 4.19 (1.15) | 4.20 (1.28) | 3.98 (1.34) | 4.37 (1.07) | 3.96 (1.31) | 3.75 (1.49) | 3.92 (1.23) | 4.35 (1.21) |
| Poland | 4.39 (1.14) | 4.46 (1.09) | 3.79 (1.17) | 4.22 (0.88) | 3.67 (1.15) | 3.80 (1.13) | 3.77 (1.00) | 3.22 (1.30) | 3.37 (1.12) | 4.13 (1.23) |
| Portugal | 4.54 (1.19) | 4.59 (1.07) | 4.18 (1.14) | 4.11 (1.22) | 3.88 (1.25) | 4.22 (1.14) | 3.82 (1.34) | 3.90 (1.18) | 3.53 (1.38) | 4.10 (1.19) |
| Turkey | 4.68 (1.25) | 4.67 (1.25) | 4.48 (1.23) | 4.51 (1.05) | 4.19 (1.28) | 4.27 (1.22) | 4.08 (1.22) | 3.46 (1.33) | 3.92 (1.13) | 4.08 (1.18) |
| Ukraine | 4.57 (0.90) | 4.52 (1.05) | 4.34 (0.98) | 4.33 (0.81) | 3.94 (1.11) | 4.03 (0.99) | 4.03 (0.89) | 3.85 (1.08) | 3.83 (1.03) | 3.82 (1.20) |