

Research Paper

Development and Psychometric Validation of a Multidimensional Risk-Taking Behaviour Scale for Undergraduate Students

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ABSTRACT

Risk-taking behaviour among undergraduate students is increasingly associated with academic decision-making, emotional adjustment and emerging concerns such as digital overuse. The present study aimed to develop and psychometrically validate a multidimensional Risk-taking Behaviour Scale (RTBS) for undergraduate students in higher education contexts. An initial pool of 60 items was generated through an extensive review of literature and expert consultation. After content validation and pilot testing, 45 items were retained and administered to a sample of 285 undergraduate students. Reliability analysis indicated high internal consistency (*Cronbach's* $\alpha = .884$). Exploratory Factor Analysis (Principal Component Analysis with Varimax rotation) revealed a four-factor structure. The Kaiser–Meyer–Olkin (KMO) value (.828) and Bartlett's Test of Sphericity ($\chi^2 = 3588.568, p < .001$) confirmed sampling adequacy. The findings support the RTBS as a reliable and valid instrument for assessing risk-taking behaviour in higher education contexts.

Keywords: Risk-taking behaviour, scale development, undergraduate students, exploratory factor analysis, psychometric validation

Risk-taking behaviour in undergraduate settings can be understood as students' willingness to engage in uncertain actions that may influence their academic, social, or digital experiences, often shaped by both individual tendencies and environmental exposure (Steinberg, 2008). Among undergraduate students in higher education contexts, such behaviour manifests across academic, social, emotional and behavioural domains. While moderate levels of risk-taking may facilitate creativity, exploration and adaptive learning, excessive or maladaptive risk-taking is often associated with impulsivity, poor academic adjustment and problematic engagement with digital environments.

In the contemporary digital era, undergraduate students are increasingly exposed to environments that promote instant gratification and risk-oriented decision-making. Empirical evidence suggests that risk-taking behaviour is closely associated with constructs such as sensation-seeking and impulsivity (Zuckerman, 1994), as well as behavioural patterns related to internet use, smartphone dependency and social media engagement. Despite its growing relevance, existing instruments measuring risk-taking behaviour often

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lack multidimensionality and contextual sensitivity, particularly within higher education settings in the Indian context.

The present study is grounded in behavioural and developmental frameworks of risk-taking, which emphasize the dynamic interaction between cognitive control, emotional regulation and environmental influences (Steinberg, 2008). Additionally, sensation-seeking theory (Zuckerman, 1994) provides a theoretical basis for understanding individual differences in risk propensity among students.

In recent years, research has increasingly examined the relationship between risk-taking behaviour and digital engagement patterns among students in higher education contexts. Excessive internet use, smartphone dependency and social media involvement have been linked with heightened impulsivity and risk-oriented decision-making. Consequently, understanding risk-taking behaviour among undergraduate students has become essential not only from a psychological perspective but also in relation to emerging digital behavioural patterns and student adjustment.

In this context, there is a clear need for a psychometrically sound and multidimensional instrument that can capture the complexity of risk-taking behaviour among undergraduate students. Therefore, the present study seeks to develop and validate a multidimensional Risk-taking Behaviour Scale (RTBS) that reflects the diverse academic and socio-digital experiences of students in higher education.

Conceptualization of Risk-taking Behaviour

Risk-taking behaviour in the present study is conceptualized as a multidimensional construct encompassing cognitive, emotional, behavioural and situational tendencies that involve decision-making under uncertainty with potential positive or negative outcomes.

METHODOLOGY

Research Design

A descriptive survey design was adopted to develop and validate the scale. Data were collected from undergraduate students across multiple academic disciplines, enabling a broader representation of risk-taking behaviour within the higher education context.

Participants

The study included 285 undergraduate students drawn from different departments of Raiganj University. Participants were selected using convenience sampling to ensure representation across diverse academic disciplines. All responses were complete, with no missing data, thereby ensuring the robustness of the dataset for statistical analysis.

Development of the Scale

The development of the scale progressed through multiple stages, beginning with item formulation based on literature and expert input, followed by refinement through pilot testing and statistical screening (DeVellis, 2017):

- **Item Generation:** The preliminary item pool was generated by synthesizing findings from behavioural risk literature, undergraduate behavioural studies and expert consultations conducted within the higher education context.
- **Content Validation:** The drafted items were critically examined by subject specialists to assess their conceptual relevance, linguistic clarity and suitability for

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measuring different dimensions of risk-taking behaviour among undergraduate students.

- **Pilot Testing:** A preliminary administration of the scale was conducted with a small group of undergraduate students to identify ambiguities, improve item wording and enhance the overall structure of the instrument.
- **Item Analysis:** Following statistical evaluation, including item discrimination and item–total correlation analysis, 45 items demonstrating satisfactory psychometric properties were retained for the final version of the scale

Statistical Analysis

Data were analysed using SPSS. The following techniques were applied:

- Cronbach's Alpha for reliability
- Corrected Item–Total Correlation
- Exploratory Factor Analysis (PCA with Varimax rotation)
- KMO and Bartlett's Test
- ANOVA (Tukey's Test for nonadditivity)

RESULTS

Reliability Analysis

Table 1: Reliability Statistics

Cronbach's Alpha	Standardized Alpha	Number of Items
0.884	0.882	45

The reliability analysis revealed a Cronbach's alpha coefficient of *0.884* for the 45-item Risk-taking Behaviour Scale (RTBS), indicating a high level of internal consistency among the items. The close similarity between the obtained alpha value (*0.884*) and the standardized alpha value (*0.882*) suggests consistency in item responses and stability in the measurement properties of the scale. These findings indicate that the items collectively function in a coherent manner in assessing risk-taking behaviour among undergraduate students.

Item Analysis

Table 2: Summary of Item Discrimination

Category	Criteria	Total
Strong	$\geq .40$	18
Acceptable	.30 – .39	18
Marginal	.20 – .29	3
Poor / Problematic	$< .20$	6

The corrected item–total correlation analysis was performed to assess the extent to which individual items were aligned with the overall measurement of risk-taking behaviour among undergraduate students. The analysis indicated that most items demonstrated satisfactory levels of association with the total scale score, suggesting adequate internal consistency across the instrument. Among the retained items, 18 exhibited strong correlation values ($\geq .40$), indicating substantial contribution to the measurement of the construct. A further 18 items produced correlation coefficients within the acceptable range (.30–.39), reflecting reasonable discriminatory capacity and consistency with the overall scale. In addition, 3

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items showed moderate associations ranging from .20 to .29, indicating comparatively lower but still meaningful relationships with the construct being measured. However, 6 items recorded correlation values below .20, suggesting weaker discriminatory effectiveness and comparatively limited contribution to the homogeneity of the scale.

Following the statistical analysis, all lower-performing items were carefully re-examined in relation to their conceptual significance, wording clarity and contextual relevance to undergraduate students' behavioural experiences. Necessary refinements were introduced to improve item comprehensibility, linguistic accuracy and contextual appropriateness without compromising theoretical representation of the construct dimensions. The revision process ensured that the final form of the instrument maintained both psychometric adequacy and conceptual comprehensiveness. Overall, the item analysis findings support the appropriateness of the retained items for subsequent validation and application in educational and behavioural research contexts.

Scale Statistics

Table 3: Scale Statistics

Mean	Variance	Std. Deviation	N of Items
157.68	287.359	16.952	45

The descriptive statistics showed a mean score of 157.68 and a standard deviation of 16.952, indicating noticeable variation in participants' responses. The obtained variance value (287.359) suggests that the RTBS was able to capture differences in levels of risk-taking behaviour among undergraduate students from different academic backgrounds. The distribution of scores further indicates that the scale possesses adequate sensitivity for identifying individual variations in behavioural tendencies.

Inter-Item Correlation

Table 4: Inter-Item Statistics

Mean	Minimum	Maximum
0.143	-0.123	0.591

The inter-item correlation analysis demonstrated that the items were reasonably associated while avoiding excessive overlap in content. The range of correlation coefficients indicates that the scale captures multiple but related dimensions of risk-taking behaviour. Lower correlations among certain items reflect conceptual diversity across dimensions, whereas higher correlations suggest stronger relationships within specific behavioural domains represented in the scale.

ANOVA (Test of Additivity)

Table 5: ANOVA with Tukey's Test

Source	F	Sig.
Between Items	2068.149	.000
Nonadditivity	78.099	.000

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The ANOVA results showed statistically significant variation among the scale items ($F = 2068.149, p < .001$), indicating that the items differed meaningfully in their contribution to the assessment of risk-taking behaviour. The significant nonadditivity effect ($F = 78.099, p < .001$) further suggests the presence of multidimensional relationships among item groups rather than a strictly uniform response structure. These findings are consistent with the multidimensional nature of the RTBS identified through factor analysis.

Factor Analysis

Sampling Adequacy

Table 6: KMO and Bartlett's Test

Measure	Value
KMO	0.828
Bartlett's χ^2	3588.568
df	990
Sig.	.000

The obtained KMO value indicated sufficient sampling adequacy for extracting latent dimensions from the dataset. In addition, Bartlett's Test of Sphericity was found to be statistically significant ($\chi^2 = 3588.568, df = 990, p < .001$), indicating the existence of meaningful relationships among the scale items. Together, these results supported the adequacy of the dataset for extracting underlying dimensions of risk-taking behaviour among undergraduate students.

Factor Structure

Exploratory Factor Analysis yielded four factors representing distinct dimensions of risk-taking behaviour.

Table 7: Factor Structure (Summary)

Factor	Description
Factor 1	Belief
Factor 2	Impulsivity
Factor 3	Behaviour
Factor 4	Sensation Seeking

Exploratory Factor Analysis identified a four-factor structure comprising Belief, Impulsivity, Behaviour and Sensation Seeking. The extracted dimensions indicate that risk-taking behaviour among undergraduate students operates through interconnected cognitive, emotional and behavioural processes. The identified factors reflect students' perceptions toward risky activities, impulsive tendencies in decision-making, behavioural expressions of risk-taking and the motivational drive to seek novel or stimulating experiences. The factor structure also suggests that risk-taking behaviour is influenced by both personal characteristics and experiences associated with contemporary academic and digital environments.

Correlation among Dimensions

To examine the relationships among the extracted dimensions of the Risk-taking Behaviour Scale (RTBS), Pearson product-moment correlations were computed among the four

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factors. The analysis provides insight into the degree of association among the dimensions while also indicating their conceptual distinctiveness.

Table 8: Correlation Matrix among Dimensions of RTBS

<i>Dimensions</i>	D1 (Belief)	D2 (Impulsivity)	D3 (Behaviour)	D4 (Sensation Seeking)
<i>D1 (Belief)</i>	1.00			
<i>D2 (Impulsivity)</i>	.238**	1.00		
<i>D3 (Behaviour)</i>	.468**	.492**	1.00	
<i>D4 (Sensation Seeking)</i>	.324**	.237**	.280**	1.00
<i>Total RTBS</i>	.755**	.750**	.785**	.494**

The inter-dimensional correlation analysis revealed statistically significant positive relationships among all four dimensions of the Risk-taking Behaviour Scale. The correlations ranged from low to moderate magnitude, indicating that although the dimensions are related, they represent distinct aspects of risk-taking behaviour. The strongest association was observed between the Behaviour and Impulsivity dimensions ($r = .492, p < .01$), suggesting a close relationship between impulsive tendencies and behavioural expressions of risk-taking among undergraduate students.

Similarly, the Belief dimension demonstrated moderate positive associations with Behaviour ($r = .468, p < .01$) and Sensation Seeking ($r = .324, p < .01$), indicating that students' cognitive orientations and perceptions may influence their engagement in risk-related activities. The relatively lower correlations among certain dimensions further support the discriminant nature of the factors.

In addition, all four dimensions showed significant positive correlations with the total RTBS score, with Behaviour exhibiting the highest association ($r = .785, p < .01$). This finding suggests that each dimension contributes meaningfully to the overall construct of risk-taking behaviour while maintaining conceptual uniqueness. Overall, the correlation pattern supports the multidimensional structure and construct validity of the scale.

DISCUSSION

The results of this study demonstrate that the Risk-taking Behaviour Scale (RTBS) functions as a reliable and valid tool for measuring risk-taking tendencies among undergraduate students in higher education. Strong internal consistency, together with a well-defined factor structure, indicates that the scale effectively captures the underlying dimensions of the construct. In addition, data collected from students across multiple departments of Raiganj University contribute to the contextual relevance of the findings and support their applicability to similar higher education environments.

The factor analytic results revealed a four-dimensional structure comprising Belief, Impulsivity, Behaviour and Sensation Seeking, highlighting the multifaceted nature of risk-taking behaviour. The Belief dimension reflects the cognitive orientation of students, including their perceptions, attitudes and justifications related to engaging in risky activities. The Impulsivity dimension captures the tendency to act without adequate forethought, indicating reduced self-regulation in decision-making processes. The Behaviour dimension

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represents observable actions and patterns through which risk-taking is manifested in real-life contexts. Finally, Sensation Seeking reflects the intrinsic motivation to pursue novel, stimulating and potentially risky experiences.

The multidimensional structure identified in the study suggests that risk-taking behaviour among undergraduate students emerges from the interaction of individual traits, cognitive beliefs and surrounding environmental influences. The findings suggest that students' beliefs, emotional regulation and surrounding academic and digital contexts collectively contribute to the development of risk-taking tendencies (Steinberg, 2008; Zuckerman, 1994). The differentiation among these factors indicates that undergraduate students engage in risk-taking through multiple pathways, depending on their beliefs, emotional regulation, behavioural tendencies and desire for stimulation.

The findings of the present study also have important implications in the context of emerging digital behaviours among undergraduate students. Each identified dimension can be meaningfully linked to digital engagement patterns. For instance, impulsivity may be associated with excessive or uncontrolled use of digital platforms, while sensation seeking may drive exploration of novel online experiences. Similarly, beliefs about digital usage and behavioural patterns in online environments can influence the extent to which students engage in risky digital practices. This aligns with recent research indicating that digital technologies are closely related to risk-oriented behaviours, including distraction, social exposure and impulsive decision-making (Kuss & Griffiths, 2017; Elhai et al., 2017).

Overall, the present study contributes to the existing body of knowledge by offering a psychometrically sound and theoretically grounded instrument that captures the multidimensional nature of risk-taking behaviour. The scale holds significant potential for advancing research in educational psychology, particularly in areas related to student behaviour, digital engagement and adjustment in higher education.

CONCLUSION

The present study successfully developed and validated a 45-item multidimensional Risk-taking Behaviour Scale encompassing four key dimensions: Belief, Impulsivity, Behaviour and Sensation Seeking. The scale demonstrates strong psychometric properties, including high internal consistency and a well-defined factor structure. As a result, it provides a reliable and comprehensive tool for assessing risk-taking behaviour among undergraduate students.

The RTBS can be effectively utilized in academic research, psychological assessment, counselling practices and studies related to digital behaviour and student adjustment. Its multidimensional framework enables a deeper understanding of the diverse factors influencing risk-taking behaviour in contemporary higher education contexts.

Implications

The findings of the present study offer several important implications for research and practice in higher education contexts:

- The developed Risk-taking Behaviour Scale (RTBS) serves as a reliable and multidimensional tool for identifying undergraduate students who exhibit elevated levels of risk-taking tendencies across cognitive (belief), affective (impulsivity),

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behavioural and motivational (sensation seeking) domains. This enables early identification and targeted intervention.

- The scale provides a helpful framework for researchers examining behavioural patterns associated with digital engagement, as dimensions such as impulsivity and sensation seeking are particularly relevant to excessive internet use, smartphone dependency and social media interaction among undergraduate students.
- The multidimensional structure of the RTBS allows for a nuanced understanding of how different aspects of risk-taking behaviour relate to student adjustment, including academic performance, emotional regulation and social functioning.
- The scale can inform the development of structured intervention programmes and counselling strategies by addressing specific dimensions of risk-taking behaviour—for instance, enhancing self-regulation to manage impulsivity or reshaping beliefs that justify risky actions.
- The RTBS is especially useful for investigating behavioural risks in digital learning environments, where students are increasingly exposed to factors such as distraction, social comparison and immediate gratification, which may influence their behavioural and decision-making patterns.

Limitations and Future Directions

While the present study offers valuable insights into the development and validation of the Risk-taking Behaviour Scale (RTBS), certain limitations should be acknowledged. First, the sample was limited to undergraduate students drawn from different departments of Raiganj University, which may restrict the generalizability of the findings to other institutional, regional, or cultural contexts. Future investigations may include undergraduate students from multiple universities and diverse academic backgrounds to improve the broader applicability and generalizability of the findings.

Second, the study was based on self-reported responses collected from undergraduate students, which may have been influenced by personal perceptions and socially desirable responding. Future research may incorporate qualitative approaches or behavioural assessment techniques to obtain a more comprehensive understanding of risk-taking behaviour among students.

Third, although exploratory factor analysis established a clear multidimensional structure, further validation using Confirmatory Factor Analysis (CFA) is recommended to test the stability and fit of the proposed model across different samples.

Future research may also explore the applicability of the scale in examining the relationship between risk-taking behaviour and emerging digital phenomena, such as smartphone addiction, social media usage and online learning engagement. Additionally, longitudinal studies may be conducted to understand how risk-taking behaviour evolves over time and influences academic and psychosocial outcomes among undergraduate students.

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Conflict of Interest

The author(s) declared no conflict of interest.

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