

Impulsivity and Economic Decision-Making Among Incarcerated Individuals: Evidence from the Brief Behavioural Decision Task

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ABSTRACT

This study examined the relationship between trait impulsivity and economic decision-making tendencies among incarcerated individuals in a correctional facility in northern India. One hundred participants (50 male, 50 female) completed the full Barratt Impulsiveness Scale-11 (BIS-11) and the Brief Behavioural Decision Task (BBDT), a three-item scenario-based instrument assessing delay discounting, financial impulsivity, and risk-taking propensity. The BIS-11 demonstrated expected psychometric properties ($M = 80.4$, $SD = 7.7$; range: 64–100), with male participants scoring significantly higher than female participants (84.7 vs. 76.1), $U = 2071.0$, $p < .001$. Unlike earlier pilot data in which ceiling effects precluded full distributional analysis, the revised BBDT elicited responses across all three option levels for every item. Spearman correlations revealed a significant positive association between trait impulsivity and risk-taking ($\rho = .32$, $p = .001$) and the BBDT composite total ($\rho = .33$, $p = .001$), partially supporting the a priori hypotheses. Financial impulsivity group differences were also significant ($H(2) = 8.13$, $p = .017$). The BBDT demonstrated modest internal consistency ($\alpha = .24$), consistent with its multidimensional design. These findings extend understanding of impulsivity-related decision-making in Indian correctional settings and provide preliminary support for the BBDT as a brief assessment tool.

Keywords: *Impulsivity, BIS-11, Economic Decision-Making, Delay Discounting, Risk-Taking, Incarcerated Individuals, Correctional Psychology, India, Gender Differences*

Impulsivity—broadly defined as the tendency to act without adequate forethought or with insufficient regard for future consequences—is one of the most consistently identified psychological risk factors for antisocial behaviour and criminal involvement (Gottfredson & Hirschi, 1990; Moeller et al., 2001). At the behavioural level, impulsivity manifests across several domains: a marked preference for immediate over delayed rewards (delay discounting), difficulty inhibiting prepotent responses, and elevated risk-seeking under uncertainty (Bickel et al., 2012; Evenden, 1999). These features have direct implications for real-world decision-making, particularly the short-sighted economic choices that may precipitate or sustain criminal involvement.

The intersection of impulsivity and economic decision-making has received considerable attention in behavioural economics and neuroeconomics. Individuals with high impulsivity

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exhibit steeper delay-discounting functions, devaluing future rewards more rapidly than low-impulsivity individuals (Bickel et al., 2012; Petry, 2001). This tendency is theoretically important because many criminal acts can be conceptualised as discounting future punishment in favour of immediate gain (Andrews & Bonta, 2010; Wilson & Herrnstein, 1985). Empirical studies with offender populations confirm steeper delay discounting relative to non-incarcerated controls (Hanoch et al., 2013; Reimers et al., 2009). Beyond delay discounting, impulsivity is associated with maladaptive financial behaviour including impulsive spending, inadequate saving, and risk-seeking under unfavourable odds—all of which have downstream consequences for post-release reintegration and recidivism risk (Bazerman & Moore, 2013; Dolan & Gudjonsson, 2010).

Despite the theoretical and practical relevance of these relationships, research directly examining economic decision-making in incarcerated populations in low-and-middle-income countries, including India, remains scarce. The majority of existing studies have been conducted in Western correctional contexts, and generalisability to different socio-economic and institutional environments cannot be assumed. In practical prison settings, lengthy laboratory paradigms are often infeasible, motivating interest in brief ecologically valid screening tools. Accordingly, the present study employs the Brief Behavioural Decision Task (BBDT), a three-item scenario-based instrument developed in Hindi for Indian correctional contexts. The BBDT covers delay discounting, financial impulsivity, and risk-taking propensity, with monetary values specified in Indian Rupees and explicit probability information provided for the risk item. The present version is a revision of a preliminary instrument: item wording was refined and the response range expanded to enable full distributional coverage.

Trait impulsivity was assessed using the full 30-item Barratt Impulsiveness Scale-11 (BIS-11; Patton et al., 1995), yielding Attentional, Motor, and Non-planning subscale scores and a Total score. The study also examined gender differences in impulsivity and decision-making—an underexplored dimension in Indian correctional psychology, where female prisoners are largely absent from the empirical literature. Based on prior literature, we hypothesised that higher trait impulsivity would be associated with (a) greater preference for immediate rewards (H1), (b) increased impulsive spending (H2), and (c) higher willingness to accept risk under unfavourable odds (H3).

METHOD

Participants

Participants were 100 adults (50 male, 50 female) incarcerated at a district prison in Patiala, Punjab, India. Ages ranged from 18 to 45 years ($M = 30.3$, $SD = 5.8$); males ranged from 20 to 45 years ($M = 30.9$, $SD = 6.5$) and females from 18 to 39 years ($M = 29.7$, $SD = 5.0$). Participants were recruited by purposive sampling following coordination with prison administration. Inclusion criteria required participants to be (a) aged 18 or older, (b) serving a custodial sentence (remand detainees excluded), (c) able to communicate in Hindi, and (d) free from documented severe mental illness or intellectual disability. All participants volunteered and provided informed consent prior to participation.

Educational attainment ranged from primary to graduate level: Primary 7% (male 10%, female 4%), Middle 25% (26%, 24%), Secondary 29% (38%, 20%), Higher Secondary 23% (14%, 32%), and Graduate 16% (12%, 20%). Using sample-based percentile cut-offs (Low: BIS-11 < 70; Moderate: 70–81; High: ≥ 82), 43% were classified as High impulsivity ($n = 43$;

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male 70%, female 16%), 51% Moderate ($n = 51$; male 30%, female 72%), and 6% Low ($n = 6$; all female).

Measures

Barratt Impulsiveness Scale-11 (BIS-11)

Trait impulsivity was measured using the full 30-item BIS-11 (Patton et al., 1995), comprising three subscales: Attentional (8 items; range 8–32), Motor (10 items; range 10–40), and Non-planning (12 items; range 12–48). Each item is rated 1 (Rarely/Never) to 4 (Almost Always/Always); Total scores range from 30 to 120 with higher scores reflecting greater impulsivity. Items were administered verbally in Hindi. Internal consistency for the BIS-11 Total in the present sample was acceptable ($\alpha = .78$).

Brief Behavioural Decision Task (BBDT)

The BBDT was developed by the authors to provide a rapid assessment of economic decision-making across three theoretically grounded domains. Each item presents a real-life financial scenario with three ordered response options scored 1 (lowest impulsivity) to 3 (highest impulsivity). Items were constructed in Hindi and back-translated to verify conceptual equivalence.

- **Q1 (Delay Discounting):** "If you are offered a choice between money now or more money later, what would you prefer?" (1 = Wait for ₹1,000 after one month; 2 = Accept ₹700 tomorrow; 3 = Take ₹500 immediately)
- **Q2 (Financial Impulsivity):** "If you receive a sudden amount of money, how would you most likely use it?" (1 = Save for future needs; 2 = Spend some and save some; 3 = Spend it immediately)
- **Q3 (Risk-Taking):** "If given a chance to double your money with some risk of losing it, what would you do?" (1 = Avoid risk, keep money safe; 2 = Take risk only if $\geq 70\%$ chance of winning; 3 = Take risk even at 30–40% chance of winning)

A composite BBDT total is computed by summing the three items (range: 3–9), with higher scores reflecting greater economic impulsivity.

Procedure

Data collection was conducted individually in a quiet supervised room within the facility. A trained researcher administered all instruments verbally in Hindi and recorded participant responses; the BIS-11 was administered before the BBDT. Each session lasted approximately 15–20 minutes. Male and female participants were interviewed in separate settings by appropriately gendered research staff. Standardised explanatory scripts were used to clarify items upon request.

Ethical Considerations

The study received approval from the Institutional Ethics Committee. Prior to participation, each individual received a full explanation of the study's purpose, the voluntary nature of participation, and their right to withdraw at any time without consequence. Written informed consent was obtained. The researcher explicitly confirmed that participation had no bearing on legal status, parole, or prison privileges. All data were anonymised prior to analysis.

Data Analytic Strategy

Descriptive statistics were computed for all variables. Because BBDT responses were ordinal, Kruskal-Wallis H tests compared BIS-11 Total across three response groups per item; significant Kruskal-Wallis tests were followed by pairwise Mann-Whitney U tests.

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Spearman's ρ quantified continuous associations between BIS-11 Total and each BBDT item. Gender differences were examined using Mann-Whitney U tests. Internal consistency of the three BBDT items was estimated using Cronbach's α and inter-item Pearson correlations. Statistical significance was set at $\alpha = .05$ (two-tailed). Analyses were conducted in Python 3.12 using SciPy.

RESULTS

Descriptive Statistics

Mean BIS-11 Total was 80.4 ($SD = 7.7$; range: 64–100). Subscale means were: Attentional $M = 21.1$, $SD = 3.8$; Motor $M = 27.4$, $SD = 3.3$; Non-planning $M = 31.9$, $SD = 4.9$. A large, significant gender difference was observed: male participants ($M = 84.7$, $SD = 5.9$) scored substantially higher than female participants ($M = 76.1$, $SD = 6.8$), $U = 2071.0$, $p < .001$. Age was not significantly associated with BIS-11 Total, $\rho = -.004$, $p = .971$.

BBDT Response Distributions

The revised BBDT elicited responses across all three option levels for each item. For Q1 (delay discounting): 16% chose Option 1 (wait; $n = 16$), 39% Option 2 ($n = 39$), and 45% Option 3 (take immediately; $n = 45$; item $M = 2.29$, $SD = 0.73$). For Q2 (financial impulsivity): 9% chose Option 1 (save; $n = 9$), 41% Option 2 ($n = 41$), and 50% Option 3 (spend immediately; $n = 50$; item $M = 2.41$, $SD = 0.65$). For Q3 (risk-taking): 23% chose Option 1 (avoid risk; $n = 23$), 40% Option 2 ($n = 40$), and 37% Option 3 (risk at 30–40%; $n = 37$; item $M = 2.14$, $SD = 0.77$). The BBDT composite total ranged from 3 to 9 ($M = 6.84$, $SD = 1.35$), spanning the full possible range.

BBDT Internal Consistency

The three BBDT items showed modest internal consistency ($\alpha = .24$), with inter-item correlations of .26 (Q1–Q2), .18 (Q1–Q3), and $-.16$ (Q2–Q3). These values are consistent with the multidimensional design of the instrument and represent a substantial improvement over earlier pilot data ($\alpha = -.16$).

Hypothesis Testing

Full results including group means, Kruskal-Wallis statistics, pairwise Mann-Whitney comparisons, and Spearman correlations are presented in Table 1.

H1 (Delay Discounting) — not supported. No significant overall association emerged between BIS-11 Total and Q1, $\rho(98) = .18$, $p = .079$, and the Kruskal-Wallis test was non-significant, $H(2) = 4.48$, $p = .107$. However, a significant pairwise difference was detected between Option 1 (wait; M BIS = 76.8) and Option 3 (take immediately; M BIS = 81.4), $U = 235.0$, $p = .041$, suggesting a directional trend consistent with H1.

H2 (Financial Impulsivity) — partially supported. The Spearman correlation between BIS-11 Total and Q2 was non-significant, $\rho(98) = .05$, $p = .609$. However, the Kruskal-Wallis group comparison was significant, $H(2) = 8.13$, $p = .017$: participants who chose to save (Option 1; M BIS = 74.4) had significantly lower BIS-11 scores than those choosing mixed spending (Option 2; M BIS = 82.1; $U = 74.0$, $p = .005$) and immediate spending (Option 3; M BIS = 80.0; $U = 118.0$, $p = .025$). H2 was thus supported at the group-difference level.

H3 (Risk-Taking) — supported. A significant positive association was observed between BIS-11 Total and Q3, $\rho(98) = .32$, $p = .001$. The Kruskal-Wallis test was also significant,

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$H(2) = 13.92, p = .001$. Participants who avoided risk (Option 1; M BIS = 75.4) scored significantly lower than those accepting risk under unfavourable odds (Option 3; M BIS = 82.6; $U = 218.5, p = .002$). The BBDT composite total was significantly positively correlated with BIS-11 Total, $\rho(98) = .33, p = .001$.

Table 1 Descriptive Statistics, BBDT Response Distributions, and Associations with Trait Impulsivity ($N = 100$)

Measure / Response	n (%)	M (SD) BIS-11	Kruskal- Wallis H	Pairwise U (opt. 1 vs. 3)	Spearman ρ	p
Age	—	30.3 (5.8)	—	—	-.004	.971
BIS-11 Total	—	80.4 (7.7)	—	—	—	—
Male (n = 50)	—	84.7 (5.9)	—	U = 2071.0, p < .001	—	—
Female (n = 50)	—	76.1 (6.8)	—	—	—	—
Q1: Delay Discounting	—	—	H(2) = 4.48	—	.177	.079
Opt. 1 – Wait: ₹1,000/month	16 (16%)	76.8 (6.6)	p = .107	—	—	—
Opt. 2 – ₹700 tomorrow	39 (39%)	80.6 (8.3)	—	U = 235.0, p = .041 ^a	—	—
Opt. 3 – ₹500 right now	45 (45%)	81.4 (7.2)	—	—	—	—
Q2: Financial Impulsivity	—	—	H(2) = 8.13	—	.052	.609
Opt. 1 – Save for future	9 (9%)	74.4 (5.8)	p = .017*	U = 118.0, p = .025*	—	—
Opt. 2 – Spend some, save some	41 (41%)	82.1 (8.0)	—	—	—	—
Opt. 3 – Spend immediately	50 (50%)	80.0 (7.2)	—	—	—	—
Q3: Risk-Taking	—	—	H(2) = 13.92	—	.324	.001**
Opt. 1 – Avoid risk entirely	23 (23%)	75.4 (6.0)	p = .001**	U = 218.5, p = .002**	—	—
Opt. 2 – Risk if ≥70% chance	40 (40%)	81.2 (6.5)	—	—	—	—
Opt. 3 – Risk at 30–40% chance	37 (37%)	82.6 (8.5)	—	—	—	—
BBDT Composite (3–9)	—	M = 6.84 (1.35)	—	—	.326	.001**

Note. BIS-11 = Barratt Impulsiveness Scale-11 (full 30-item version). M (SD) BIS-11 = mean BIS-11 Total for each response group. Spearman ρ reflects the correlation between continuous BIS-11 Total and each ordinal BBDT item. BBDT $\alpha = .24$; inter-item r: Q1–Q2 = .26; Q1–Q3 = .18; Q2–Q3 = -.16. ^a Pairwise Mann-Whitney U for Opt. 1 vs. Opt. 3; full pairwise comparisons reported in text.

* $p < .05$. ** $p < .01$.

DISCUSSION

The present study examined impulsivity and economic decision-making in a mixed-gender incarcerated sample in India, using the full BIS-11 and a revised BBDT. Three findings are of particular theoretical and applied significance. First, a large and robust gender difference in BIS-11 Total was observed, with males scoring approximately nine points higher than females. Second, the revised BBDT successfully elicited responses across all three option levels, confirming that the earlier ceiling effect was an artefact of the original item format rather than a genuine characteristic of the population. Third, two of three hypotheses were supported—risk-taking significantly (H3) and financial impulsivity at the group-level (H2)—and the BBDT composite demonstrated a significant positive correlation with trait impulsivity.

Gender Differences in Impulsivity

The substantial gender difference in BIS-11 scores is consistent with the wider literature documenting higher self-reported impulsivity in incarcerated males relative to females (Dolan & Gudjonsson, 2010; Moeller et al., 2001). The near-complete concentration of males in the High impulsivity category (70%) relative to females (16%), alongside the predominance of females in the Moderate and Low categories, highlights the importance of examining gender separately rather than treating incarcerated samples as homogeneous. Future studies should explicitly test gender as a moderator of the impulsivity–decision-making relationship.

Risk-Taking and Trait Impulsivity

The significant association between BIS-11 Total and Q3 ($\rho = .32, p = .001$) represents the clearest support for the theoretical framework linking impulsivity to maladaptive economic behaviour. Participants with higher trait impulsivity were more willing to accept financial risk under explicitly unfavourable odds (30–40% chance of winning), consistent with models of impulsivity as excessive discounting of future losses (Bickel et al., 2012) and empirical findings from prospect theory (Kahneman & Tversky, 1979). The inclusion of explicit probability information in the revised Q3 appears to have contributed to its discriminant sensitivity—a methodological lesson for future brief instrument development.

Financial Impulsivity

H2 received partial support: the continuous Spearman correlation was non-significant, but the Kruskal-Wallis comparison was significant ($H = 8.13, p = .017$), driven by the markedly lower BIS-11 scores of the nine participants choosing to save. This divergence between continuous and group-level analyses reflects the small, unequal group sizes for Q2. While the continuous correlation was insufficiently powered to detect the extreme group difference given the skewed distribution, the group-level test was sensitive to the rank-ordering across categories. Future BBDT revisions should calibrate item wording to produce more balanced response distributions.

Delay Discounting

H1 was not supported at the Kruskal-Wallis or Spearman level, although a marginally significant pairwise difference emerged between the most patient and most impatient response groups ($p = .041$). The failure to detect a significant overall association likely reflects the crude temporal framing of Q1, which presents only a single one-day versus one-month comparison. Future revisions should employ multiple delay intervals or continuous response formats analogous to the Monetary Choice Questionnaire (Kirby et al., 1999) to provide finer-grained discrimination.

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Psychometric Properties and Implications for BBDT Use

The modest internal consistency ($\alpha = .24$) is consistent with the BBDT's design as a multidimensional battery rather than a unidimensional scale. The improvement from $\alpha = -.16$ in earlier pilot data to $\alpha = .24$ in the present version confirms that item revisions improved inter-item coherence, even while the instrument retains its multidimensional character. Dalley and Robbins (2017) have argued that delay discounting, risk-taking, and motor impulsivity dissociate at both behavioural and neurobiological levels; accordingly, composite BBDT scores should be interpreted alongside item-level analyses until convergent validity across facets has been more thoroughly established.

Limitations and Future Directions

Several limitations warrant acknowledgement. First, the sample ($N = 100$) from a single facility limits statistical power for detecting small effects and restricts geographic generalisability. Second, the BBDT uses hypothetical monetary scenarios; while hypothetical and real-incentive discounting tasks generally produce comparable results (Madden & Bickel, 2010), this equivalence has not been established for this specific instrument. Third, no non-incarcerated comparison group was included, preventing conclusions about whether observed patterns are specific to correctional populations. Fourth, no data were collected on offence type, sentence length, or substance use history, which are potential confounders of both impulsivity and economic decision-making. Future research should: (a) test the BBDT in larger and more geographically diverse correctional samples; (b) include performance-based impulsivity measures (e.g., Balloon Analogue Risk Task, Go/No-Go paradigms) to triangulate self-report findings; (c) revise Q1 to include multiple delay intervals; (d) include non-incarcerated comparison groups; and (e) examine longitudinal associations between BBDT scores and post-release outcomes including recidivism.

CONCLUSION

The present study provides preliminary evidence for the validity of the Brief Behavioural Decision Task as a practical screening instrument for economic decision-making tendencies in incarcerated individuals. In contrast to earlier pilot findings, the revised BBDT elicited responses across all option levels, enabling meaningful hypothesis testing. Significant associations between trait impulsivity, risk-taking behaviour, and the BBDT composite were observed, and a large gender difference in BIS-11 scores was documented. These findings extend the literature on impulsivity-related decision-making to a South Asian correctional context and support continued development and validation of the BBDT as a brief, culturally appropriate assessment tool for use in Indian prisons.

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Conflict of Interest

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