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The roles of ability emotional intelligence in predicting affective decision-making

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Abstract

Background Decision-making is integral to navigating everyday life, and understanding the cognitive and emotional factors influencing affective decision-making is crucial.

Methods In this study, 149 participants completed the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) to measure ability emotional intelligence, a N-back working memory task, and three affective decision-making tasks: the Iowa Gambling Task (IGT), Balloon Analogue Risk Task (BART), and Columbia Card Task (CCT).

Results The results revealed that understanding emotions, a domain of emotional intelligence, was a significant predictor of superior decision-making on both the IGT and CCT, even after controlling for working memory abilities. This finding suggests that the relationship between understanding emotions and affective decision-making is not merely a reflection of general cognitive abilities, but rather highlights the unique contribution of emotional understanding to strategic decision-making in emotionally charged contexts. However, emotional intelligence was not significantly associated with BART performance.

Conclusions These findings highlight the importance of understanding emotions in strategic decision-making and open avenues for future research to investigate whether training ability emotional intelligence can improve affective decision-making tasks and yield meaningful benefits in real-world contexts.

Keywords Emotional intelligence, Working memory, Decision-making, Risk-taking, MSCEIT

Introduction

Emotional intelligence, first introduced by Salovey and Mayer in 1990 [1], has attracted extensive research interest. Despite this, emotional intelligence remains a subject of conceptual and empirical debate, particularly concerning its predictive validity and distinctiveness from other psychological constructs [2, 3]. Some critics argue that emotional intelligence repackages existing traits, such as those from the Five-Factor Model, rather than offering a unique lens for understanding behaviour [4]. These criticisms are important, as the value of any psychological construct lies in its ability to predict meaningful real-world outcomes. Most research on emotional intelligence has concentrated on its role in predicting interpersonal and occupational success. However, less attention has been given to its potential influence on complex cognitive-emotional processes, such as affective decision-making (the process of making choices that maximise goal-directed outcomes in emotionally charged, high-stakes, or motivationally significant situations) [5].

Emotional intelligence is typically assessed using two dominant approaches: trait models and ability models [6]. Trait emotional intelligence refers to self-perceptions of emotional abilities and is usually measured via

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self-report or peer-report questionnaires [7]. Whilst easy to administer trait emotional intelligence measures are vulnerable to social desirability biases and limited introspective accuracy. Moreover, trait emotional intelligence has shown substantial overlap with personality traits from the Five-Factor Model, especially low neuroticism, raising concerns about conceptual redundancy [8, 9, 10]. Nonetheless, some studies suggest trait emotional intelligence can predict outcomes beyond what personality explains [11, 12].

In contrast, ability emotional intelligence is conceptualised as a set of emotion-related cognitive skills [13]. Ability emotional intelligence is most commonly assessed using the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), a performance-based measure that evaluates four core domains: perceiving emotions (recognising emotional expressions in oneself and others), facilitating thought (using emotions to support reasoning and problem-solving), understanding emotions (comprehending emotional trajectories and causes), and managing emotions (regulating emotional responses in oneself and others) [6, 13]. These domains are organised into two broader areas: experiential and strategic emotional intelligence. The MSCEIT reduces reliance on self-perception by asking participants to solve emotion-related problems, thereby offering a more objective measure of emotional ability. Ability emotional intelligence has shown only weak correlations with personality traits [14], supporting its discriminant validity. However, it demonstrates modest associations with other cognitive abilities, such as executive functioning [15], crystallised intelligence [16], and attention-based tasks that involve "hot" (i.e., emotionally laden) stimuli [17]. These relationships likely reflect a general cognitive competency, as positive correlations are often observed among various cognitive performance-based measures.

Whilst performance-based emotional intelligence assessments avoid the introspective biases of self-report models, one limitation is that they rely on hypothetical scenarios that may not fully engage participants' real-life emotional responses [18]. For example, individuals may identify the "correct" response without necessarily applying it in actual emotionally charged situations. Although advances in immersive technologies (e.g., virtual reality) may one day allow for more ecologically valid assessments [19], these methods remain largely theoretical and have yet to be widely adopted or validated in emotional intelligence research.

Despite this limitation, a substantial body of research supports the predictive validity of ability emotional intelligence. Meta-analyses have shown that higher scores on MSCEIT domains are associated with lower negative affect and higher positive affect [20], more adaptive coping strategies (e.g., cognitive reappraisal, social support seeking) [21, 22], and reduced reliance on maladaptive strategies such as emotional suppression [21]. Ability emotional intelligence has also been linked to lower rates of suicidal ideation [23], depression [24], and externalising behaviours [24], with clinical populations consistently showing lower emotional intelligence than non-clinical groups [25]. Furthermore, effect sizes from studies using ability-based emotional intelligence measures have remained stable over time, unlike self-report emotional intelligence measures, suggesting greater conceptual [26]. Ability emotional intelligence has also been associated with positive outcomes in domains relevant to real-world functioning, including relationship quality [28, 29], life satisfaction [30], reduced engagement in deviant behaviours [31], academic performance [32], and workplace success, such as improved job performance, higher job satisfaction, and lower burnout [33, 34]. Collectively, these findings support the validity of ability emotional intelligence as a construct distinct from personality and general intelligence [14, 27], and point to its value in predicting behaviour across contexts.

Whilst ability emotional intelligence has been linked to various adaptive outcomes, its role in affective decision-making remains underexplored. Affective decision-making involves selecting between options in emotionally charged, high-stakes, or motivationally significant contexts, with the aim of maximising goal-directed outcomes [5]. Theoretical models suggest that all decision-making processes involve both emotional ("hot") and cognitive ("cool") components [35]. The hot component reflects affective responses to uncertainty and potential loss, while the cool component entails deliberate, analytical reasoning [36, 37]. Importantly, these components are not entirely separable, emotional states, perceived consequences, and motivational drives routinely shape cognitive appraisals and behavioural choices [38, 39]. This emotional-cognitive interplay contributes to substantial individual variability in how decisions are made, particularly in domains such as financial or health-related risk.

Affective decision-making is typically assessed using well-validated, laboratory-based tasks designed to simulate real-world decisions under conditions of uncertainty or risk [5]. These include the Iowa Gambling Task (IGT) [40], Balloon Analogue Risk Task (BART) [41], and Columbia Card Task (CCT) [38]. Each task prompts participants to evaluate potential gains and losses while managing emotional arousal, requiring them to balance impulsive reactions against long-term planning. Though they share a common emotional component, each task presents distinct decision-making demands.

The IGT begins as a task of decision-making under uncertainty, where participants must learn, through trial and error, which decks yield better long-term outcomes. Over time, as outcome patterns become clearer, it shifts toward decision-making under risk [42]. Success requires inhibiting short-term gratification in favour of longer-term gains. In contrast, the CCT presents explicit probabilities and outcome structures from the outset, representing decision-making under risk. By varying reward, loss, and risk levels across trials, it allows researchers to examine how individuals adjust strategies in optimal (e.g., high reward/low risk) versus suboptimal conditions [43].

The BART, on the other hand, captures decision-making under uncertainty, as participants are unaware of the balloon's bursting threshold. Its stochastic design limits reliance on deliberative strategies, instead requiring real-time emotional and experiential feedback regulation [42, 44]. The BART's post-loss pump score reflects whether individuals adopt a more cautious approach or respond with impulsive, risk-compensating behaviour following a balloon pop [43]. The task exemplifies the "description–experience gap" in decision-making, where behaviour diverges depending on whether probabilities are known or learned through experience [45].

Despite being grouped under the umbrella of affective decision-making, these tasks differ in core mechanisms. The IGT and CCT tap into decision-making under risk, learned or explicit, whereas the BART is defined by its unpredictability and reliance on feedback-driven adaptation [42]. These structural differences contribute to weak intercorrelations among the tasks [35, 43, 46], suggesting they measure distinct facets of affective decision-making. Administer together, these tasks provide a multifaceted assessment of how individuals navigate emotionally charged decisions [47, 48]. Importantly, each task has also demonstrated ecological validity: performance on the IGT, BART, and CCT has been linked to real-world behaviours such as gambling, and substance use [47, 48, 95, 96, 97]. This supports their continued use in research seeking to model affective decision-making in everyday life.

A small number of studies have examined emotional intelligence in relation to affective decision-making, although most have focused on trait or mixed models. A recent meta-analysis found that 13 of 15 studies in this area used self-report measures of emotional intelligence [49], with generally null findings between trait emotional intelligence and performance on decision-making tasks such as the IGT, in both children [50] and adults [51]. Similar results were reported for the CCT, with Panno et al. (2015) finding no significant relationship between trait emotional intelligence and decision-making outcomes [52]. However, a few exceptions exist. Telle et al. (2011), using a median split to classify participants as high or low in trait emotional intelligence, found that those higher in emotional intelligence made more beneficial financial decisions [53]. Likewise, Pilárik and Sarmany-Schuller (2009) found that adult females with higher emotional awareness demonstrated more prudent IGT performance [54]. These mixed results may reflect limitations inherent to trait and mixed emotional intelligence models, including conceptual overlap with personality and the use of self-report methods that may not capture true emotional ability.

Research on ability emotional intelligence and affective decision-making remains sparse and largely focused on clinical populations. For example, Romero-Ayuso et al. (2016) found no difference in BART performance between control and cocaine-dependent participants, despite significant deficits in emotional understanding and management among the clinical group [55]. In contrast, other studies have reported associations between lower ability emotional intelligence and impaired IGT performance in individuals with bipolar disorder [56] or prefrontal cortex lesions [57]. Whilst these findings suggest a potential link, generalising from clinical samples to the broader population is difficult. Among non-clinical samples, the evidence is limited and inconsistent. Webb et al. (2014) found no significant association between ability emotional intelligence and IGT performance after controlling for general intelligence, although the study was underpowered ($n = 65$) and did not examine MSCEIT subdomains [58]. Conversely, Alkozei et al. (2019) and Checa and Fernández-Berrocal (2019), found that higher ability emotional intelligence, or training to improve it, predicted better decision-making on the IGT [59, 60]. However, both studies had small samples ($n = 59$ and $n = 28$, respectively), limiting the reliability of effect estimates. Collectively, this body of research provides some evidence of a link between ability emotional intelligence and affective decision-making, but findings remain inconclusive and are constrained by methodological limitations, including small sample sizes and limited exploration of domain-specific emotional intelligence effects. Thus, further research with adequately powered samples and a focus on the distinct domains of ability emotional intelligence is needed to clarify its role in affective decision-making.

The current study

This study aimed to examine whether distinct domains of ability emotional intelligence, as measured by the MSCEIT (perceiving emotions, facilitating thought, understanding emotions, and managing emotions) predict performance on affective decision-making tasks. To capture decision-making across varying levels of risk and uncertainty, we employed three well-established tasks: the IGT, which transitions from decision-making under uncertainty to risk-based learning; the CCT, which presents explicit risk probabilities that fluctuate across trials; and the BART, which involves decision-making under complete uncertainty, requiring participants to respond to risk without prior probability information.

To ensure that any observed associations between ability emotional intelligence and task performance were not merely attributable to general cognitive ability, we controlled for working memory. Previous research has linked working memory to both ability emotional intelligence [15] and affective decision-making [61], making it a relevant covariate when examining unique contributions of emotional intelligence domains. We hypothesised that for the IGT and CCT, understanding emotions and managing emotions would positively predict decision-making performance. These tasks require long-term strategy development, and regulation of impulsive tendencies in pursuit of delayed rewards. For the BART, it was hypothesised that only managing emotions would positively predict performance. Given its reliance on immediate emotional feedback and uncertainty, effective emotion regulation was anticipated to reduce impulsive, compensatory responses following negative outcomes (e.g., balloon bursts).

Method

Participants

Participants were recruited to complete two phases of assessment. The final sample consisted of 149 participants aged 18–58 years ($M = 25.91$; $SD = 7.49$), who were recruited via electronic advertisements posted on social media (e.g., Facebook) and on university notice boards. A total of 31 participants from the original cohort of 181 did not complete the second phase of assessment. Inclusion criteria for the current study required participants to be 18–60 years old, have normal or corrected-to-normal vision, and be free from diagnosed psychological (e.g., mood or anxiety disorders) or neurological disorders (e.g., Alzheimer's, Dementia, ADHD). Demographic details for the final sample are summarised in Table 1.

Materials

Mayer-Salovey-Caruso emotional intelligence test (MSCEIT) he MSCEIT, comprising eight tasks with a total of 141 items, evaluates emotional problem-solving abilities across four domains: (1) perceiving emotions, (2) facilitating thought, (3) understanding emotions, and (4) managing emotions [13]. A detailed overview of these tasks and their corresponding emotional domains is presented in Table 2. Participants' performance results in an index score for each task, which contribute to four domain scores, two area scores (emotional experiencing and strategic emotions), and a total ability emotional intelligence score, reflecting overall emotional intelligence. All MSCEIT scores are norm-standardised ($M = 100$; $SD = 15$), with higher scores indicating better emotion-related skills. The MSCEIT showed variable test-retest reliability at the task level (r =.48-0.86) [62], necessitating cautious interpretation of individual task results, although it exhibits stronger reliability for domain scores, with test-retest reliability ranging from r =.74 to 0.89 [13].

Iowa gambling task (IGT) The IGT involves five blocks of 20 trials where participants choose cards from four decks (see Fig. 1) to maximise hypothetical earnings, starting with $2000 [40]. Two decks offer high rewards (e.g., $100) but carry the risk of larger losses (e.g., -$1250), while the other two decks offer smaller rewards (e.g., $50) and losses (e.g., -$250). Cards are randomised within each deck without replacement, to bias outcomes. Over time, consistently choosing high-reward decks leads to net losses, whereas selecting the lower-reward decks results in overall gains. Affective decision-making is assessed based on the frequency of choosing from the advantageous decks in the last 60 trials (final 3 blocks). The initial 40 trials (the first two blocks) are excluded from this assessment because they represent a learning phase where participants are still gathering experiential feedback to understand the long-term consequences of each deck. During this phase, participants gather experiential feedback to discern which decks yield long-term gains versus immediate but costly rewards. By focusing on the final 60 trials, we capture participants' adaptive decision-making abilities after they have had sufficient opportunity to learn from the feedback provided. Higher selection rates from advantageous decks in this phase indicate better affective decision-making, reflecting adaptation to the negative consequences associated with the less advantageous decks [40].

Table 1 Participant demographic information ($N = 149$)

	n	%
Gender	62	41.6
Male	87	58.4
Female		
Highest Level of Education Completed	52	34.9
High School	17	11.4
Certificate 3 or 4	13	8.7
Diploma or Advanced Diploma	66	44.3
Bachelor or Honours Degree	1	0.7
Doctorate		

Table 2 Description of the tasks, domains, and areas comprising the MSCEIT

MSCEIT Component	Description
Emotional experiencing	Individual's ability to perceive, respond to, and manipulate emotional information.
Perceiving emotions	Awareness of emotions in oneself and others.
Faces	Participants evaluate four facial expressions, rating the intensity of an emotion (e.g., happiness, fear) on a 1 to 5 Likert scale. This task measures the ability to identify emotions in facial expressions.
Pictures	Six pictures, typically landscapes, are presented for participants to rate the extent to which each reflects an emotion (e.g., happiness, sadness) on a 1 to 5 Likert scale, assessing the ability to link emotions with environmental imagery.
Facilitating thought	Using emotions to assist cognitive processes (e.g., reasoning and problem-solving)
Facilitation	resented with five scenarios (e.g., decorating for a birthday), participants rate the usefulness of various moods (e.g., annoyance, joy) for each scenario on a 1 to 5 scale. This measures understanding of how moods facilitate thinking.
Sensation	Participants imagine experiencing an emotion in given scenarios and rate its appropriateness on a 1 to 5 scale, assessing the ability to generate suitable emotional responses.
Strategic emotions	Individual's ability to manage and understand emotions in themselves and others.
Understanding emotions	Knowledge of emotional blends and transitions.
Changes	With 20 items describing scenarios with evolving emotions, participants identify the most likely emotional transition (e.g., frustration to anger) from a list, measuring understanding of emotional dynamics.
Blends	Participants connect 12 real-world situations to the most appropriate emotion from a list, assessing the ability to link specific situations with corresponding emotions.
Managing emotions	Ability to generate appropriate emotional responses and regulating emotions.
Emotional management	Given five emotionally challenging situations, participants rate the effectiveness of four potential coping strategies on a 1 to 5 scale, measuring the recognition of effective emotional regulation techniques.
Social management	Participants assess the effectiveness of three behavioural responses in three social scenarios on a 1 to 5 scale, gauging understanding of how actions influence others' emotions.

Notes. MSCEIT = Mayer-Salovey-Caruso emotional intelligence test. Darkest shade of grey indicates the two emotional areas, lighter shade of grey indicates the four domains, and unshaded rows signifies the eight tasks comprising the MSCEIT

Fig. 1 Screenshot of the IGT used in the Current Study

Balloon analogue risk-taking task (BART) The BART involves three sets of 10 trials where participants aim to maximise profits [41]. Each trial presents a simulated balloon (see Fig. 2). Participants can choose to inflate the balloon, earning $1 per pump, or collect the accumulated hypothetical money at any point. However, each additional pump, after the first two, increases the risk of the balloon popping (e.g., 1/18, 1/17, 1/16, etc.), which results in no earnings for that trial. The explosion algorithm, unknown to participants, sets the average burst point at 11 pumps, with a guaranteed pop at the 20th pump [63]. Affective decision-making was assessed by utilising the "post-loss pumps" scoring method, which compared the average number of pumps on trials where the balloon pops to the number of pumps on the following successful trials where money is collected [64]. The post-loss pumps

Fig. 2 Screenshot of the BART used in the current study

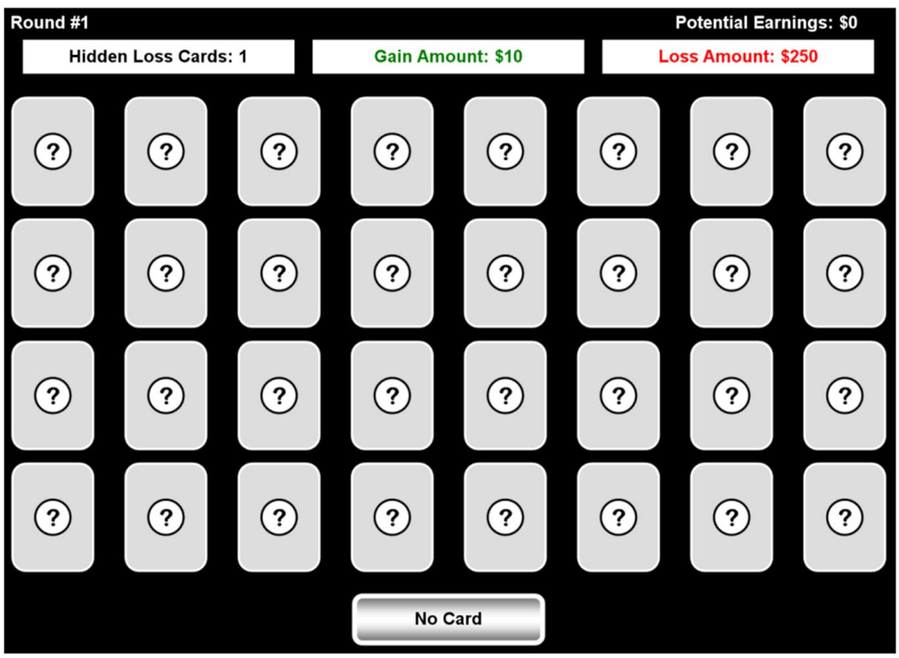

Fig. 3 Screenshot of the CCT used in the current study

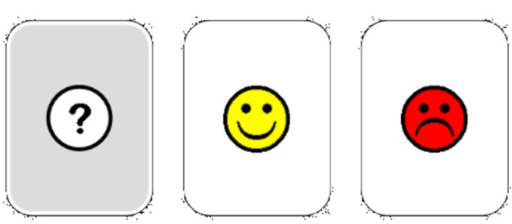

Fig. 4 The facedown, gain card, and loss card stimuli for the CCT. *Note*. Question mark indicates facedown card, smiley face indicates gain card, and sad face indicates loss card

score evaluates how participants adjust their risk-taking strategies in response to negative outcomes (i.e., balloon pops). Lower scores indicate superior affective decision-making as participants avoided compensatory risk-taking behaviour [43].

Columbia card task (CCT) The CCT "hot version" used in this study consisted of 24 trials [65]. In each trial, participants face 32 simulated cards laid out in four rows of eight (see Fig. 3). Each card represents either a monetary gain or loss (see Fig. 4), with the trial ending immediately upon turning a loss card. Participants aim to maximise earnings by flipping cards one at a time but can choose to end the trial at any point to secure the accumulated amount without a loss. Trial conditions vary in the number of loss cards (1 or 3), gain per card ($10 or $30), and loss amount ($250 or $750). These conditions are presented in a fixed sequence, with each combination repeated three times over the 24 trials, with the current trial's criteria displayed on the screen. Affective decision-making is assessed by comparing the average number of cards turned in optimal trials (1 loss card, $30 gain per card, $250 loss per card) against suboptimal trials (3 loss cards, $10 gain per card, $750 loss per card). A higher "optimal-suboptimal difference" score indicates prudent decision-making, with fewer cards turned in less advantageous trials relative to more advantageous trials, demonstrating superior affective decision-making. This scoring method captures the adaptive nature of the CCT's decision-making under conditions where risk and reward are explicitly presented [43].

N-back task The N-Back Task involved the presentation of a series of yellow letters (c, g, h, k, p, q, t, w) displayed on a black background (see Fig. 5). Participants were instructed to determine if the current letter matched the one presented either two, three, or four positions earlier in the sequence, depending on the specified N-back level [66]. Each letter was shown for 500 milliseconds, followed by a 2500-millisecond interstimulus interval during which participants could respond by pressing the "A" key if they recognised a match. The task consisted of three N-back levels (2-back, 3-back, and 4-back), containing nine trials, with three trials per level. Each trial included six target stimuli and 14 + n non-target stimuli (where n represents the current N-back level). A working memory performance score was calculated as the difference between the total number of correct identifications (hits) and the number of false alarms (commission errors) across all trials, divided by the total number of trials. Higher scores indicated a greater ability to update and manage working memory by accurately retaining and processing relevant information.

Procedure
Individuals who expressed interest in participating were emailed the "Information to Participants Involved in Research" form, outlining the study's objectives and procedures, along with two hyperlinks. The study was completed across two phases of assessment. Phase 1 was self-administered online using two links. The first link, via Inquisit Version 6 [67], gathered informed consent and included a demographic survey and computerised affective decision-making tests (IGT, BART, CCT), presented in one of three counterbalanced orders to minimise fatigue confounding results. The second link led to the MSCEIT via Multi-Health Systems Online Assessments®.

For Phase 2, participants were scheduled for an online Zoom® session at their convenience, occurring 1 to 266 days after Phase 1 ($M = 35.48$; $SD = 56.05$). During this session, after reconfirming informed consent, participants completed a cognitive test battery and personality questionnaire as part of a larger study. This session included the administration of the N-back via Inquisit Version 6. Participants received a $20 gift card and the option of a brief personality report as compensation.

Statistical design
Prior to the primary analysis, descriptive statistics and Person's correlation values were obtained for the N-back, three measures of affective decision making, and four domain scores from the MSCEIT. All continuous variables analysed showed normal distribution, with skewness and kurtosis statistics divided by their respective standard error falling within the acceptable range of -3 and 3 [68]. Examination of Z-scores identified four univariate outliers across the administered measures, which were transformed to values three standard deviations from the mean, minimising outlier effects as per established practices in factor analysis.

The primary analysis involved three hierarchical multiple regressions conducted with IBM® SPSS® version 27. In the first step of each model, the N-back score was included as the sole predictor variable to control for the effect of working memory, which serves as a proxy for cognitive abilities more generally. The second step included the four domains of ability emotional intelligence as predictors (perceiving emotions, facilitating thought, understanding emotions, and managing emotions). The dependent variables in these regressions were the scores from the three affective decision-making tasks (IGT, BART, and CCT). Notably, one participant lacked a post-loss pump score for the BART due to not encountering a balloon pop during the task. Collinearity statistics for all models were within acceptable limits, with variance inflation factor values below the cut-off of 10, and tolerance values above the cut-off of 0.1. Additionally,

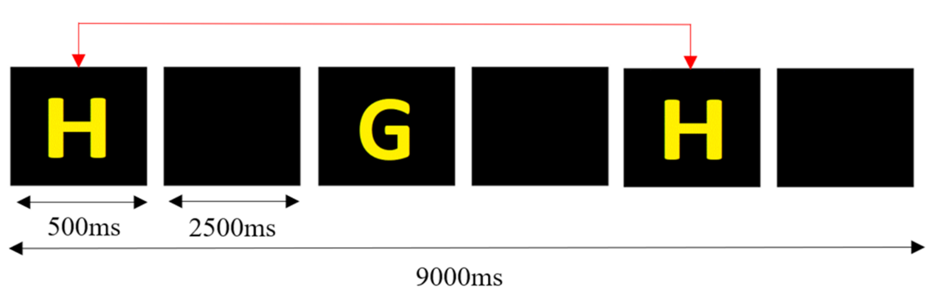

Fig. 5 Example 2-back Sequence used in the current study. *Note*. Pressing the "A" key was required whenever the current stimulus matched the stimulus two positions back in the sequence

Table 3 Descriptive statistics and Pearson's correlations for working memory, emotional intelligence, and affective Decision-Making tasks (*N* = 149)

	M(SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Age	25.91(7.49)	-	−0.052	−0.027	−0.101	0.065	−0.018	0.059	< 0.001	0.157
2. N-back	2.02(1.23)		-	0.058	0.273**	0.122	−0.053	0.053	0.270**	0.016
3. IGT adjusted advantage	33.23(11.75)			-	0.186*	0.028	0.097	0.090	0.241**	< 0.001
4. CCT optimal-suboptimal difference	5.93(5.91)				-	0.029	−0.037	−0.068	0.212**	−0.069
5. BART post-loss pumps[a]	0.42(1.48)					-	0.060	0.074	0.183*	0.024
6. Perceiving Emotions	103.58(14.65)						-	0.602**	0.334**	0.339**
7. Facilitating Thought	98.75(12.91)							-	0.362**	0.301**
8. Understanding Emotions	99.24(9.66)								-	0.108
9. Managing Emotions	98.66(7.25)									-

Notes. BART = Balloon analogue risk-taking task; CCT = Columbia card task; IGT = Iowa gambling task; *M* = Mean; *SD* = Standard deviation

*p <.05

**p <.01

[a]N=148

Table 4 Hierarchical multiple regression predicting Iowa gambling task performance from working memory and emotional intelligence (*N* = 149)

	R^2	b	SE B	β	t	*p*	Partial	Part
Step 1	0.003							
N-back		0.552	0.789	0.058	0.700	0.485	0.058	0.058
Step 2	0.060							
N-back		−0.036	0.818	−0.004	−0.044	0.965	−0.004	−0.004
Perceiving emotions		0.026	0.085	0.033	0.308	0.759	0.026	0.025
Facilitating thought		−0.004	0.096	−0.005	−0.044	0.965	−0.004	−0.004
Understanding emotions		0.287	0.112	0.236	2.566	**0.011**	0.210	0.208
Managing emotions		−0.057	0.141	−0.035	−0.401	0.689	.-0.034	−0.033

Notes: b = beta values; SE B = standard errors; β = standardised beta values

there were no multivariate outliers, as the highest Mahalanobis distance value was 16.29, which falls below the critical threshold of 20.52 for models with five predictors.

Results

The descriptive statistics and Person's correlations for the N-back, four MSCEIT domain scores, and the three affective decision-making tasks are presented in Table 3.

The first hierarchical multiple regression analysis revealed that both steps were statistically non-significant. This indicates that neither N-back performance at step 1 $F(1, 147) = 0.489$, $p = .485$, nor the four domains of emotional intelligence at step 2 $F(5, 143) = 1.811$, $p = .114$, could significantly predict performance on the IGT, as shown in Table 4. Despite the overall non-significance of the models, understanding emotions emerged as a positive predictor of IGT adjusted advantage score, even after controlling for working memory. Specifically, participants who exhibited a superior ability to understand their own and others' emotions were more adept at making adaptive decisions on the IGT, through choosing cards from the advantageous decks during later blocks.

The second hierarchical multiple regression analysis revealed that the model was not significant at both step 1 $F(1, 146) = 2.196$, $p = .140$, and step 2 $F(5, 142) = 1.157$, $p = .333$, indicating that neither N-back performance or ability emotional intelligence significantly predicted performance on the BART (see Table 5). Furthermore, coefficient values revealed that no variable emerged as a unique significant predictor of post-loss pumps. This suggests that working memory and emotional intelligence were not associated with performance on the BART.

The final multiple regression analysis showed that the model was significant at both step 1 $F(1, 147) = 11.837$, $p < .001$, and step 2 $F(5, 143) = 3.839$, $p = .003$, indicating that performance on the N-back and ability emotional intelligence did significantly predict performance on the CCT (see Table 6). However, including the four emotional intelligence domains at step 2 did not lead to a statistically significant increase in explained variance ($p = .137$). N-back performance and understanding emotions emerged as unique significant predictors of the CCT optimal-suboptimal difference score. Specifically, participants with superior capacity to update the content of working memory, and those who were better at understanding their own and others' emotions were more likely to select a greater number of cards during CCT trials where criteria were favourable, compared to trials where criteria were unfavourable.

Table 5 Hierarchical multiple regression predicting balloon analogue risk task performance from working memory and emotional intelligence ($N = 148$)

	R^2	b	SE B	β	t	*p*	Partial	Part
Step 1	0.015							
N-back		0.146	0.099	0.122	1.482	0.140	0.122	0.122
Step 2	0.039							
N-back		0.095	0.104	0.079	0.914	0.362	0.076	0.075
Perceiving emotions		0.001	0.011	0.006	0.054	0.957	0.005	0.004
Facilitating thought		0.001	0.012	0.010	0.094	0.925	0.008	0.008
Understanding emotions		0.024	0.014	0.155	1.663	0.098	0.138	0.137
Managing emotions		0.000	0.018	0.001	0.013	0.990	0.001	0.001

Notes: b = beta values; SE B = standard errors; β = standardised beta values

Table 6 Hierarchical multiple regression predicting Columbia card task performance from working memory and emotional intelligence ($N = 149$)

	R^2	b	SE B	β	t	*p*	Partial	Part
Step 1	0.075							
N-back		1.315	0.382	0.273	3.440	**< 0.001**	0.273	0.273
Step 2	0.118							
N-back		1.093	0.399	0.227	2.744	**0.007**	0.224	0.215
Perceiving emotions		0.005	0.042	0.013	0.123	0.903	0.010	0.010
Facilitating thought		−0.066	0.047	−0.145	-1.424	0.157	−0.118	−0.112
Understanding emotions		0.125	0.055	0.204	2.289	**0.024**	0.188	0.180
Managing emotions		−0.045	0.069	−0.055	−0.656	0.513	−0.055	−0.052

Notes: b = beta values; SE B = standard errors; β = standardised beta values

Discussion

The aim of this study was to examine the relationship between ability emotional intelligence and affective decision-making. Our findings partially supported our hypotheses. As predicted, the understanding emotions domain significantly and positively predicted performance on the IGT and CCT, even after controlling for working memory. However, contrary to expectations, the managing emotions domain did not significantly predict performance on any of the three tasks. As anticipated, the perceiving emotions and facilitating thought domains, components of the emotional experiencing branch, were not associated with decision-making performance.

Specifically, participants with higher understanding emotions scores were more likely to make advantageous selections in the IGT and to take optimal risks in the CCT. These findings suggest that a greater ability to comprehend emotional processes contributes to more adaptive decision-making in emotionally charged, high-stakes contexts. This aligns with past research showing that ability emotional intelligence training can improve decision-making outcomes [59], and that healthy adults outperform clinical populations on such tasks [56]. However, prior studies have typically relied on global emotional intelligence scores, offering limited insight into which specific domains drive these effects [26]. Our findings extend this work by identifying understanding emotions as a critical predictor across two distinct affective decision-making tasks.

Conceptualised as a higher-order emotional skill [69], understanding emotions refers to the capacity to recognise how emotions evolve over time and to anticipate their consequences in various contexts. This ability likely enables individuals to mentally simulate the emotional outcomes of risky or impulsive decisions and adjust their behaviour accordingly. For example, in the IGT, participants must learn to resist the lure of short-term rewards from disadvantageous decks in favour of long-term gains; in the CCT, they must calibrate risk-taking based on fluctuating reward structures. In both cases, individuals with a stronger understanding of emotional trajectories may have been better equipped to anticipate the affective costs of poor decisions, leading to more prudent choices and enhanced performance.

Beyond our study, this domain has been implicated in a range of real-world behaviours. For example, higher scores in understanding emotions have been associated with better interpretation of facial cues in decision-making tasks designed to simulate airport security screening [70], while lower scores have been linked to impulsive behaviours such as substance use and compulsive spending [71]. These associations support the ecological validity of our findings by demonstrating that emotional understanding influences not only performance on laboratory tasks, but also decision-making in personally and socially meaningful contexts. Whilst our use of hypothetical money in tasks like the IGT and CCT may limit direct generalisability to real-life financial or health-related decisions, the affective and cognitive mechanisms involved, particularly emotional anticipation, regulation, and risk evaluation, closely mirror those in everyday high-stakes decision-making.

At a neural level, both affective decision-making and ability emotional intelligence, particularly the understanding and managing emotions domains, have been linked to activity in the ventromedial and orbitofrontal regions of the prefrontal cortex [40, 72, 73, 74]. These areas integrate emotional and sensory information, enabling individuals to evaluate risk and reward and guide adaptive behaviour. Grey matter volume in the ventromedial prefrontal cortex has been shown to correlate with performance on the MSCEIT, and lesions in this area result in impairments in strategic emotional intelligence domains [75, 76]. Our findings demonstrating an association between affective decision-making and understanding emotions are therefore consistent with emerging neuroscientific models of stimulus appraisal and decision-making processes.

Interestingly, understanding emotions did not predict performance on the BART. This may reflect fundamental differences in the task's design compared to the IGT and CCT. The BART is stochastic in nature, balloon explosions occur unpredictably and without a consistent learning structure, limiting participants' ability to adjust behaviour based on affective feedback [44, 77]. Whilst the post-loss pump score is intended to capture affective decision-making by assessing behavioural adjustment after a negative outcome, the random distribution of balloon pops reduces the reliability of this score and undermines opportunities for emotion-informed learning. Unlike the IGT and CCT, which allow participants to detect patterns and apply emotional insight over time, the BART provides little context for strategic emotional regulation. This lack of structure may explain the absence of associations between BART performance and the other two tasks, as well as with emotional intelligence more broadly [43].

Furthermore, alternative BART metrics, such as the average number of balloon inflations, are often interpreted as indicators of risk propensity [78], which refers to a general tendency to engage in risky or uncertain behaviours. This differs conceptually from affective decision-making, which involves the regulation of emotional responses to guide behaviour toward long-term goals [5]. While someone with high risk propensity may inflate the balloon more often, this measure may not adequately capture the nuanced emotional regulation processes that are central to affective decision-making. Our findings support this distinction: although emotional intelligence has been associated with reduced engagement in real-world risk behaviours [79] and with reduced number of balloon pumps on the BART [80], the absence of a predictive relationship in our study suggests the post-loss pump score may not capture affective decision-making processes as robustly as the IGT and CCT.

Contrary to expectations, managing emotions did not emerge as a significant predictor of affective decision-making, despite being conceptualised as a higher-order emotional skill [69]. One possible explanation lies in the limited emotional salience of the experimental tasks, which involved hypothetical rather than real monetary rewards. Xu et al. (2018) found that participants exhibited greater risk aversion and stronger neural responses to loss when real money was at stake compared to hypothetical incentives [81]. This suggests that the emotional engagement in our study may have been insufficient to trigger the kinds of emotional regulation demands that would allow the managing emotions domain to meaningfully influence task performance. Without real stakes, participants may not have experienced enough emotional arousal to require active emotion regulation during decision-making.

A second explanation relates to limitations in how managing emotions is assessed within the MSCEIT. The domain is evaluated using hypothetical social scenarios in which participants select the "most effective" response from multiple options, based on expert consensus. This format may not capture real-time emotional regulation but instead reflect participants' knowledge of socially appropriate behaviour, an aspect potentially influenced by social desirability bias [3, 58, 82]. Additionally, evidence suggests that this domain may have limited discriminative power, particularly among individuals with moderate to high emotional intelligence [2]. As a result, managing emotions scores may not reflect genuine emotion regulation ability, but rather an individual's capacity to identify normative responses within socially scripted scenarios [83]. These concerns align with broader critiques of emotion regulation measures, particularly those resembling the MSCEIT's managing emotions domain, which have shown weak or inconsistent associations with affective decision-making tasks and may not generalise well to emotionally charged, non-social contexts such as the IGT, BART, and CCT [50, 51, 52].

As expected, the emotional experiencing branch, comprising the domains of perceiving emotions and facilitating thought, did not significantly predict performance on any of the affective decision-making tasks. This aligns with theoretical models positioning these domains as foundational emotional skills, most relevant in interpersonal contexts where recognising and interpreting others' emotional cues is critical [84]. For instance, perceiving emotions involves identifying emotional expressions in faces and visual scenes, skills essential for effective communication but less directly applicable to the intrapersonal, emotionally regulated decision-making demanded by tasks such as the IGT, BART, and CCT.

Similarly, facilitating thought reflects the ability to harness emotions to support reasoning and problem-solving, assessed in the MSCEIT through hypothetical judgments about how emotions might influence cognition [84]. This domain is conceptually distinct but strongly correlated with perceiving emotions, likely due to its reliance on accurate emotion recognition [14, 85, 86]. However, affective decision-making tasks are structured to elicit emotional responses through intrapersonal experiences, risk, uncertainty, and feedback, rather than social interactions. Success in these tasks depends more on higher-order regulatory processes than on recognising emotions in others. Prior research supports this distinction: emotional experiencing abilities are consistently associated with outcomes related to interpersonal effectiveness, such as improved family relationships and conflict management [87, 88], but show little connection to cognitive functions such as executive functioning or intelligence [17, 32]. Our findings reinforce this separation by demonstrating that these lower-order domains of ability emotional intelligence do not meaningfully influence affective decision-making. In doing so, this study contributes to a more differentiated understanding of how specific emotional intelligence domains map onto distinct psychological processes.

Limitations and future direction

The findings of this study should be interpreted in light of several limitations. First, a large portion of the sample comprised university students within a narrow age range, limiting generalisability. As affective decision-making has been shown to vary with age [89, 90], future research should examine whether the predictive role of ability emotional intelligence differs across developmental stages, particularly in adolescents and older adults. Second, the use of hypothetical monetary rewards may have weakened the emotional salience of the decision-making tasks. Previous research has shown that real incentives elicit stronger affective responses and more risk-averse behaviour [81]. Incorporating real monetary stakes in future studies could clarify whether stronger emotional engagement enhances the predictive power of ability emotional intelligence, particularly in domains like managing emotions.

Third, while we accounted for working memory to control for cognitive ability, we did not include dispositional measures such as risk readiness or uncertainty tolerance. These factors may moderate or confound the relationship between emotional intelligence and decision-making, and should be considered in future research to better isolate the unique contribution of emotional abilities. Fourth, although the IGT, BART, and CCT are widely used and have demonstrated ecological validity, they remain laboratory-based tasks. Further research should examine whether specific ability emotional intelligence domains, particularly understanding emotions, predict real-world behaviours and decisions, such as financial planning, health-related choices, or responses to social dilemmas [91]. Much of the existing research in these areas has relied on trait or mixed emotional intelligence models [49, 92], highlighting the need for studies focused on ability emotional intelligence.

Given the unique predictive role of understanding emotions observed in this study, future research should investigate whether this domain can be enhanced through targeted interventions and whether such improvements translate into better decision-making. Meta-analytic findings suggest that ability emotional intelligence is trainable through structured programs [93], but questions remain regarding the mechanisms of change, long-term effectiveness, and behavioural generalisation [94]. Another important direction involves re-evaluating the tools used to assess ability emotional intelligence. The MSCEIT relies on responses to hypothetical social scenarios, which may not fully capture the complexity of real-world emotional regulation. More immersive, technology-enhanced assessments, such as virtual or computerised simulations, could offer more ecologically valid measures of emotional problem-solving and regulation [19].

Finally, emerging perspectives of ability emotional intelligence suggest a shift in theoretical understanding. Fiori et al. (2023) propose that ability emotional intelligence, as assessed by the MSCEIT, may reflect hypersensitivity to emotional cues and the ability to regulate that sensitivity adaptively [82]. Given longstanding critiques of the MSCEIT, particularly regarding its limited predictive validity for theoretically related outcomes [2, 3], future research is needed to test these new conceptualisations and clarify which emotion-related abilities the MSCEIT truly captures.

Conclusion

In conclusion, this study offers new insights into how specific domains of ability emotional intelligence contribute to affective decision-making. Our findings show that the understanding emotions domain uniquely predicts performance on tasks involving both known risk (CCT) and learned risk (IGT), even after accounting for working memory. This suggests that the capacity to interpret and anticipate emotional outcomes supports making strategic, goal-directed decisions, skills critical for navigating real-world contexts. In contrast, perceiving emotions and facilitating thought were unrelated to performance, consistent with their primary relevance in interpersonal rather than intrapersonal settings.

These findings highlight the importance of recognising the distinct roles played by different ability emotional intelligence domains and suggest that interventions should be tailored accordingly, for example, targeting understanding emotions may enhance affective decision-making, while targeting perceiving emotions may support interpersonal functioning.

The lack of predictive value for managing emotions invites a re-evaluation of how this domain is measured. As currently assessed by the MSCEIT, managing emotions may not adequately reflect the dynamic, in-the-moment regulation required during real-life decision-making. This highlights the need for more ecologically valid, performance-based assessments that better capture the complexities of emotional regulation in affective contexts. Overall, this study contributes to a more nuanced understanding of the relationship between emotion and cognition in decision-making, moving beyond global emotional intelligence scores to highlight the distinct role of specific emotional abilities in guiding behaviour.

Abbreviations

BART	Balloon analogue risk task
CCT	Columbia card task
IGT	Iowa gambling task
MSCEIT	Mayer-Salovey-Caruso emotional intelligence test

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SS was responsible for data collection and analysis, and initially drafted the manuscript. ES and MB contributed to revising the manuscript and assisted in data interpretation. All authors have reviewed and approved the final manuscript.

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Data availability
The datasets generated and analysed during the current study are not publicly available due to ethical constraints but are available from the corresponding author on reasonable request and permission from the appropriate human research ethics committee.

Declarations

Ethics approval and consent to participate
This study was conducted in accordance with the National Statement on Ethical Conduct in Human Research 2023, and was reviewed and approved by the Victoria University Human Research Ethics Committee (approval number HRE19-185, dated December 11, 2019). Informed consent was obtained from all participants. The Victoria University Human Research Ethics Committee operates under Terms of Reference that are aligned with the National Statement, the Australian Code for the Responsible Conduct of Research, and relevant Commonwealth and state laws.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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