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The role of cognitive versus emotional intelligence in Iowa Gambling Task performance: What's emotion got to do with it?

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ABSTRACT

Debate persists regarding the relative role of cognitive versus emotional processes in driving successful performance on the widely used Iowa Gambling Task (IGT). From the time of its initial development, patterns of IGT performance were commonly interpreted as primarily reflecting implicit, emotion-based processes. Surprisingly, little research has tried to directly compare the extent to which measures tapping relevant cognitive versus emotional competencies predict IGT performance in the same study. The current investigation attempts to address this question by comparing patterns of associations between IGT performance, cognitive intelligence (Wechsler Abbreviated Scale of Intelligence; WASI) and three commonly employed measures of emotional intelligence (EI; Mayer–Salovey–Caruso Emotional Intelligence Test, MSCEIT; Bar-On Emotional Quotient Inventory, EQ-i; Self-Rated Emotional Intelligence Scale, SREIS). Results indicated that IGT performance was more strongly associated with cognitive, than emotional, intelligence. To the extent that the IGT indeed mimics "real-world" decision-making, our findings, coupled with the results of existing research, may highlight the role of deliberate, cognitive capacities over implicit, emotional processes in contributing to at least some domains of decision-making relevant to everyday life.

1. Introduction

The relative role of emotional versus cognitive processes in driving judgment and decision-making in everyday life remains a topic of substantial interest in the empirical literature (see Kahneman, 2011; Vastfjall & Slovic, 2013). The Iowa Gambling Task (IGT) is among the most extensively used neuropsychological paradigms designed to assess "real-world" decision-making (Bechara, 2004; Toplak, Sorge, Benoit, West, & Stanovich, 2010; for a detailed description of the IGT see Bechara, Damasio, Damasio, & Anderson, 1994; Bechara, Damasio, & Damasio, 2000). In its most common form, the IGT is presented as a simple card game with the explicit goal of winning as much money as possible by selecting cards, one at a time, from any of four decks. With each card selection, the participant wins or loses varying amounts of money. As the game progresses, the participant has the opportunity to learn from experience that some of the decks produce relatively large wins but even larger losses (i.e., "bad decks"), while other decks have modest wins but even smaller losses (i.e., "good decks"). Consistently selecting from the bad decks will ultimately lead to total loss, while selecting consistently from the good decks will lead to long term gain. Early work with the IGT showed that healthy participants begin the game by selecting randomly among the decks, but they soon appear to learn the contingencies as the game proceeds, progressively avoiding the bad decks in favor of the good ones. Critically, during the early phases of the game, healthy individuals also begin to show increased skin conductance responses when considering "bad" deck selections, even before they claim any conscious awareness of the contingencies of the task. This

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increase in skin conductance has been suggested as evidence that participants have begun to learn the deck values at a pre-conscious, emotional level, before they have formed an explicit cognitive understanding of the task (Bechara et al., 2000, 1994). However, the extent to which successful IGT performance is driven more by implicit, emotion-based versus explicit, cognitive processes remains a matter of significant debate (Demaree, Burns, & DeDonno, 2010; Maia & McClelland, 2004).

The IGT is believed to mimic real-life decision-making in that it incorporates the experience of rewards and losses, as well as factoring uncertainty of outcomes and risk (Bechara, Damasio, Tranel, & Damasio, 1997). Whereas overt decision-making is thought to rely on explicit knowledge and reasoning, patterns of IGT performance initially reported in the literature indicated that participants are able to decide advantageously without declarative knowledge of the best strategy (e.g., Bechara et al., 1997). Such findings have been used to bolster the argument that successful IGT performance may be driven more by implicit, emotion-based processes (i.e., "hot" decision-making), rather than primarily through explicit insight of the most favorable strategy derived from data-oriented cost/benefit analyses (i.e., "cold" decision-making; Dunn, Dalgleish, & Lawrence, 2006).

The somatic marker hypothesis (SMH; Damasio, Tranel, & Damasio, 1991; Damasio, 1994, 1996, 2004) provides an explanatory framework for understanding how emotion-based decision-making processes may be driving successful IGT performance. More specifically, the SMH posits that, through prior experience with stimuli or situations, individuals acquire emotion-based biasing signals generated from the physiological systems of the body ("somatic markers"), and that these signals are re-activated when considering analogous response options in the future. These somatic markers may be experienced as visceral "hunches" or "gut feelings" that can bias decision-making (Damasio, 2004). These markers are proposed to help direct attention toward or away from particular response options and thus facilitate more streamlined and efficient decision-making. Interestingly, individuals with damage to a specific region of the brain, the ventromedial prefrontal cortex (VMPFC), appear to be impaired in this process, and tend to exhibit relatively poor performance on the IGT, despite otherwise preserved intellectual capacities (Bechara et al., 1994). It is important to note that although VMPFC lesion patients tend to have generally intact cognitive abilities, they often show profound deficits in social–emotional domains, including deficits in emotion expression, affective experience and regulation, and frequently show a pattern of maladaptive decision-making in their everyday lives (Damasio, 1994). The term "myopia for the future" has been applied to these VMPFC lesion patients as they often display a relatively heightened preference for immediate reward, while neglecting longer-term consequences. It is also critical to point out that, while these VMPFC lesion patients exhibit relatively normal skin conductance responses (SCRs) after a win or loss, they fail to show the anticipatory SCRs exhibited by healthy controls when contemplating a high-risk choice on the IGT (Bechara, Tranel, Damasio, & Damasio, 1996). This pattern of findings has formed the crux of the SMH, suggesting that the VMPFC may be a key brain region involved in integrating physiological responses with cognitive data to form a feeling or hunch that biases decision selection (Bechara et al., 1996). Other regions proposed to underlie the "somatic marker circuitry" (SMC) include the amygdala, insula, anterior cingulate, basal ganglia and somatosensory cortex (Bechara & Damasio, 2005; Dunn et al., 2006). Indeed, one hypothetical model posits that emotional intelligence capacities rely heavily upon the SMC (Bar-On, Tranel, Denburg, & Bechara, 2003). Additionally, a recent review found IGT performance to be generally uncorrelated with traditional "cold cognition" types of executive function tasks (Toplak et al., 2010), suggesting that emotional, rather than cognitive or executive, abilities may primarily drive performance on the IGT.

However, the role of emotion in biasing decision-making on the IGT has not been universally observed. For example, Maia and McClelland (2004) reported results contradicting the notion that IGT participants decide advantageously without declarative knowledge of the best strategy (Bechara et al., 1997). Specifically, the study showed that when participants performed advantageously in the IGT, they tended to be consciously aware of the "goodness" and "badness" of relative decks. Paralleling these findings, Guillaume et al. (2009) showed that better performance on the IGT was associated with explicit knowledge of the underlying contingencies. Moreover, conscious knowledge was not associated with anticipatory SCRs in that study, suggesting that explicit awareness and somatic cues may have two distinct influences on decision-making (Guillaume et al., 2009). Despite the large body of research examining the influence of emotion or cognitive ability separately on IGT performance, there is a surprising paucity of research that aims to disentangle the relative contributions of cognitive versus emotional processes within the same study. To our knowledge, only one study (Demaree et al., 2010) has directly compared the influences of cognitive intelligence (IQ) versus emotional intelligence (EI) on IGT performance in a healthy sample. Interestingly, findings from the latter study showed IQ to be a better predictor of IGT performance than EI, suggesting that the IGT may, in fact, tap cognitive processes to a greater extent than emotional ones (at least EI).

However, the conclusions of the Demaree et al. (2010) study are limited by several factors. First, the authors used a single, self-report measure of emotional intelligence, the Schutte Emotional Intelligence Scale (SEIS; Schutte et al., 1998), which implicitly assumes that patients can reliably access and accurately report on their EI abilities. As noted by the authors, a self-report measure of emotional intelligence may not be sensitive to the fact that participants might rely, at least in part, on implicit, rather than on explicit, knowledge of emotional cues to make their decisions on the IGT, thereby likely limiting the validity of the self-report SEIS. In an attempt to address this limitation, in the current study we employed concurrent EI measures utilizing self-report methodologies (i.e., Bar-On Emotional Quotient Inventory; EQ-i; Bar-On, 2002; Self-Rated Emotional Intelligence Scale; SREIS; Brackett, Rivers, Shiffman, Lerner, & Salovey, 2006), as well as the most commonly used performance-based measure of EI (Mayer–Salovey–Caruso Emotional Intelligence Test; MSCEIT; Mayer, Salovey, Caruso, & Sitarenios, 2003). Second, to assess cognitive ability, the Demaree et al. study relied on the Mill Hill Vocabulary Scale rather than on a "gold standard" measure of IQ (i.e., Wechsler or Stanford–Binet intelligence scales). Thus,