

Decision-Making: A Narrative Review

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ABSTRACT

The risks that have been presented in this current literature on decision-making include elevated arousal, COVID-19, independent medical decisions, gaming disorder, and gambling addiction. Several predictors of decision-making have appeared in this current literature including reversible decisions, experiential information, social media use, and ChatGPT advice. Only two potential underlying biological mechanisms have appeared in this literature on decision-making including the influence of dopamine and activation of the temporoparietal junction. Several methodological limitations can be noted for this literature including issues regarding sampling, variable selection and missing topics like interventions.

Decision-making has been defined as the cognitive process of selecting a logical choice or course of action from two or more available alternatives. According to the Merriam- Webster definition, it is the act or process of deciding something that is often carried out within a group or by an individual. The standard decision-making process has typically involved seven steps. Those include identifying the problem, gathering relevant information, identifying alternatives, weighing the evidence and potential consequences, choosing among the alternatives, taking action to implement the choice, and reviewing the decision and evaluating its results.

The literature search for this narrative review involved entering the terms decision-making and the years 2024 to 2026 in PubMed and PsycINFO. Exclusion criteria included proposals, case studies, and non-English language papers. This review includes 12 papers on decision-making. The papers can be categorized as risks of decision-making (5 papers), predictors of decision-making (5 papers), and potential underlying biological mechanisms (2 papers). These sections are followed by a discussion on methodological limitations of this current literature. Potential interpretations are given throughout the paper.

Risks of Decision-Making

The classification of variables as risks or predictors is somewhat arbitrary. The risks have been defined as negative and the predictors as positive for the purposes of this paper. The risks that have been presented in this current literature on decision-making include elevated arousal, COVID-19, independent medical decisions, gaming disorder, and gambling addiction.

In a paper entitled “Arousal and performance: Revisiting the famous inverted-U-shaped curve, peak performance on decision-making was associated with a **moderate arousal level** [1]. These results were not surprising given that performance on several different tasks has been associated with moderate arousal levels. Elevated arousal is typically associated with anxiety, and low arousal levels are associated with apathy and depression. These emotions have negatively related to performance consistent with the inverted-U-curve noted in this current study.

Inferior decision-making has been noted in college students during the **COVID-19 pandemic** which the authors of this study labeled “pandemic- brain” [2]. These results were derived from samples that were taken pre-COVID (N = 722) and during COVID (N = 161). They were based on the Adult Decision -Making Competence Scale. These data are not surprising as inferior performance on any task would be expected during the anxiety-provoking, depressive pandemic, although these results are tenuous given the extremely different sample sizes (722 vs. 161). The significant change in decision-making likely relates to the small sample recruited during COVID.

Independent decision-making has been notably inferior to shared decision-making or at least shared information by patients and healthcare professionals [3]. This finding was not surprising given that additional information from different perspectives would contribute to more reliable decisions, especially when they involve the welfare of patients. However, the results of this study may not be generalizable to samples of patients who are cognitively or physically impaired in which case decisions would likely be independently made by the healthcare professionals.

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These data are also confounded by the reality that most medical decisions currently involve multiple healthcare professionals who have likely influenced the patients' decision-making.

Addictions like gaming disorder and gambling are serious risks for decision-making given the cognitive dysfunction and risk-taking behavior that typically accompany these disorders. In research on **gaming disorder** and its association with decision-making, greater impulsivity was noted in those with gaming disorder (N=46) versus healthy controls (N=92) [4]. EEGs suggested that greater beta activity occurred in the frontal and central regions of the brain. Once again, these results are tenuous given that the healthy control group included exactly twice as many individuals as the gaming disorder group (92 vs. 46).

In a paper, entitled "Differences in cold and hot decision-making between gambling and other addictions", the Decisional Styles and the Loss Aversion scales were given to those with **gambling addiction** (N= 42 with gambling addiction and N=43 with biological addictions) [5]. The gambling addiction group had less rational styles as well as greater loss aversion, sensitivity to feedback, and less consistency in their decisions.

Table 1: Risks of Decision-Making (And First Authors)

Risks	First Authors
Moderate Arousal Level	Nieuwenhuis
COVID-19 Pandemic	Buelowe
Independent Decision-Making	Chambers
Gaming Disorder	Liao
Gambling Addiction	Meca

Predictors of Decision-Making

Several predictors of decision-making have appeared in this current literature. They include reversible decisions, experiential information, social media use, and ChatGPT advice.

In a paper entitled "Decision reversals in sequential decision – making", the authors suggest that decision reversals are usually made to correct errors [6]. They also suggested that when decisions are reversible, less time is spent on the decisions initially. In addition, they claimed that uncertainty drives the **decision reversals**.

In research entitled "The impact of information presentation on self – other risk decision – making", **experiential information** led to more conservative choices for others and more risk aversion [7]. In gain situations more risk aversion was noted when deciding for others. Greater risk aversion and the associated conservative choices would be expected when choosing for others because of potential failure and rejection.

Decision-making has been informed by both **learned and perceived information** [8]. In this study, participants' choices and gaze deployment showed a trade – off between the impact of learned and perceived information. In addition, individuals' tendency to primarily rely on one source or the other was a stable individual trait. More successful experiences with learned or perceived information would likely lead to a preference for one or the other.

Shared decision-making was the focus of research entitled "Honoring informed consent and shared decision-making: Ethical considerations [9]. In this study, the authors reported that the use of the Internet, social media, and artificial intelligence (AI) helped inform patients in their decision-making. Multiple sources of information deriving from knowledgeable databases would lead to more accurate decision-making.

In research entitled "Inconsistent advice by ChatGPT influences decision-making in various areas", the impact of AI on decision-making was said to be similar to experts' advice except those based on negative emotions [10]. In this sample(N=1925), individuals with a greater tendency for personal fear were more likely to be influenced by **both expert and AI advice**. AI has been noted to be neutral and emotionless. Those with personal fear may be fearful of ignoring AI advice.

Table 2: Predictors of Decision-Making (And First Authors)

Predictors	First Authors
Decision Reversals	Bao
Experiential Information	Chou
Learned and Perceived Information	Nahan
Shared Decision-Making	Joyner
Both Expert and AI advice	Ikeda

Potential Underlying Biological Mechanisms

Only two potential underlying biological mechanisms have appeared in this literature on decision-making. Those include the influence of dopamine and activity at the temporoparietal junction.

In the study on **dopamine effects** entitled "Bidirectional modulation of reward – guided decision-making by dopamine", a male sample (N= 31) performed reward – guided decision-making under L – dopa [11]. The L-dopa increased the degree to which choices were influenced by both reward magnitude and reward probability.

Activation of the temporoparietal junction was also noted as a potential underlying biological mechanism for decision-making [12]. Based on 35 fMRIs, neural activation of the mentalizing network including the temporoparietal junction was reported. These results are not surprising given that dopamine and this region of the brain have been associated with reward in many studies. However, the data are based on an exclusively male sample making them not generalizable to non-male samples.

Table 3: Potential Underlying Biological Mechanisms (And First Authors)

Risk Factors	First Authors
Dopamine Effects	Dias
Activation of the Temporoparietal Junction	LeHoucq

Methodological Limitations of this Literature

Several methodological limitations can be noted for this literature. They include issues regarding sampling, variable selection and missing topics like interventions.

The samples have been primarily pathological including, for example, individuals with gaming disorder and gambling addiction. Surprisingly, none of the studies compared personality characteristics that could relate to decision-making, for example, impulsive versus fearful individuals. Most of the samples did not include a healthy control group. The groups that were included had unequal sample sizes.

The predictor and risk variables were both positive and negative with most of them being negative. Only two mechanism studies appeared in this literature on potential underlying biological mechanisms for decision-making. Although decision-making has some risks, no intervention research appeared in this literature.

Despite these methodological limitations, this literature has been informative and suggestive of future research directions. Examples of these are the comparison of multiple predictor variables within the same study, the process of decision-making and personality characteristics that would seemingly influence decision-making, for example, impulsivity versus fearfulness. Impulsivity could lead to more errors and decision reversals, while fearfulness could lead to indecisiveness and the lack of decision-making. A comparison between decisive and indecisive individuals could inform intervention research.

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