Risk taking in brinkmanship

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**Abstract**

Judgement and decision making are essential functions of the cognitive system. The present paper exposes key elements of the psychological theory which best accounts for human decision making. Decision making can be a flawed process. Loss aversion, framing effects, and differences across individuals are presented to highlight the irrational aspect of human risk taking. We reveal evidence of various cognitive distortions as compared to normalised decisions. It has been shown that expertise acquisition can compensate part of these cognitive distortions. Yet, recent evidence shows that experts in different civilizations retain civilizational risk propensities. Such evidence thus challenges the notion that knowledge is sufficient for perfect rationality in decision making; throwing the idea that politics is served by informed individuals making rational decisions under a severe cloud. The consequences of flawed human decisions regarding risk taking at a grand scale and by educated individuals is discussed. It is demonstrated that risk tolerance in different civilizations leads to different actions. This basic phenomenon is used to demonstrate how powerful states may misread potential reactions of less powerful states, which historically, can and has led to costly wars. Understanding the opponents’ psychology is a well-known factor for chess players, which, so far, has not been explored much in political psychology.

**Risk taking brinkmanship**

# Judgement and decision making

Some decisions such as buying a house or accepting a job offer have deep, long-term consequences. Other decisions, even if they impact only in the short term, are also very important for quality of life; for example, buying a car. Intuitively, we know that decisions are about weighing costs and benefits. Yet, some decisions have costs that are difficult to evaluate. Regardless, most decisions involve a certain level of risk. Von Neumann and Morgernstein [1] formalised decision making under risk; putting forth a mathematical procedure of how decisions should be made. For the psychologist, theirs is a prescriptive theory that does not reflect human thinking but that can be used to highlight when human cognition is not optimal. The prospect theory, a psychological theory developed at the end of the 70s by Kahneman and Tversky, has been dominating the research scene since its creation [2]. Initially only used to account for economic decisions, its impact now goes far beyond this field [3]. In its most common acceptation, the theory posits that decision making is a two-stage process. In the *framing* phase, the decision maker creates a psychological representation of the situation problem. How we mentally build an internal representation of a problem situation has a huge influence on the decision. The process requires the integration of many parameters characterising the problem. Yet, the internal representation is built within the limits imposed by the cognitive system. For example, the attentional span and memory span limit the amount of information that can be considered at any one time. This entails that the decider can acquire only a simplified psychological model of real, very complex situations. The internal representation is used to generate potential solutions, which are called options in most of the economic decision making literature. In the *valuation* phase, each outcome is analysed to generate a probability-value pair. The decider analyses the options one after another by anticipating the consequences. The probability indicates how likely the decider perceives the event to occur. As the probabilities are perceived, or constructed, by the decider on the base of their knowledge, they are called subjective probabilities. The value function, also varying from one person to the next, formalises how the decider puts a value on the potential outcome. Here too, many psychological factors impact on how an individual in a given situation values a potential outcome. Emotional influence, as well as the wealth of the individual, plays a key role in the valuation process. Optimization, the very last step, consists in selecting what is perceived to be the highest reward (mathematically formalised as the combination of probability and potential reward).

Risk, in its most basic form, is the negation of certainty. Hence, any probability different from 0 and one indicates risk. More appropriately, risk has been defined as the variance against the mean [4]. The mathematical formalism developed over decades has enabled the revelation of the various cognitive biases that plague human thinking [5] and also the various risk patterns of individuals when facing risky decisions.

# Laboratory measurable risk

The mathematical formalism introduced by the expected utility theory has allowed formalising human behaviour in situations where risk is measurable. Comparing the prescriptive theory to actual human decision making has brought to light the many key weaknesses in human decision making. A few examples from the literature will highlight the main findings. In the first example, the decider is in charge of making a strategic decision for a company. The business is worth £6,000. The potential outcomes and risks of each option have been evaluated by experts in the field. Three different strategies A, B, and C, are possible. Option A: Your business has a 20% chance of winning £1,000 and 80% chances of winning £0. Option B: Your business will earn £200 for sure. Finally, option C: Your business has a 40% chance of winning £2,000 and a 60% chance of losing £1,000. The question is how do we judge an option? From the point of view of rational decision making, the valuation of an option is called the expected utility. It equals the probability that the event occurs multiplied by its payoff. The notion of *expected utility* is central in understanding how decisions are made and how decisions should be made. Let us compute the expected utility (EU) for each option:

Option A: EUA = 1,000 \* .20 = £200

Option B: EUB = 200 \* 1 = £200

Option C: EUC = 2000 \* .40 - 1,000 \* .60 = £200

The key point is that all three options lead to the same expected value. The difference across the options was the level of risk. People take different options and thus this simple problem highlights individual differences in risk taking. Interestingly, if the problem is about gains, then individuals tend to be risk avoidant. For example, is the problem is reduced to option A and B the majority of deciders will take B. In the domain of loss people tend to risk seeking and thus between a sure loss of £200 and a 20% chance of losing £1,000 people will chose the second option. What happen when the bet is about losing or gaining £200. Participants, who were offered whether to take or not the bet, decide usually not to. It is thus said that losses loom larger than gains.

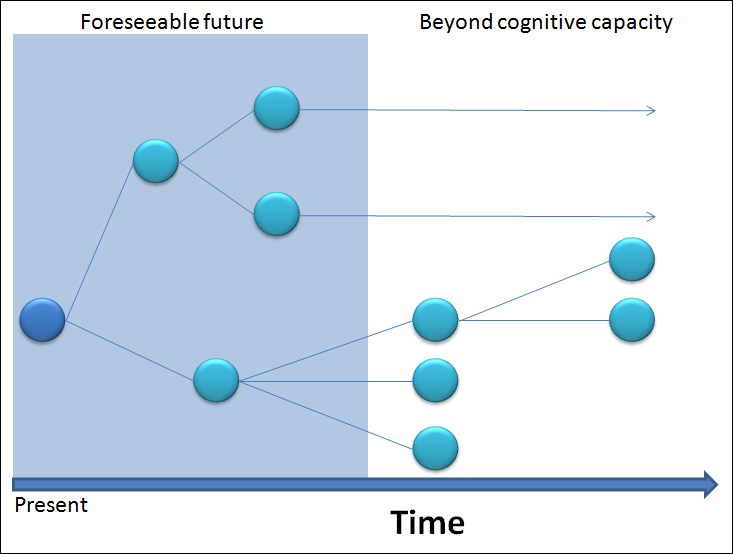
Another way to influence decisions is to introduce emotional factors in the decision. Let us consider the following problem [6]. Imagine that the UK is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. We assume that the exact scientific estimates of the consequences of the programs are as follows: If Program A is adopted 400 people will die. If Program B is adopted there is 1/3 probability that nobody will die, and 2/3 probability that 600 people will die. Previous research has indicated that most people chose program B [6]. The same options can be presented differently. If Program A is adopted 200 people will survive for certain. If Program B is adopted there is 1/3 probability that everyone survives, and 2/3 probability that all die. Previous research has indicated that most people flip between the risk taking option and the sure option according to the framing [6]. Presenting the problem in terms of death rather than saved lives drives deciders to go for the riskless option. The framing here was influenced by the fact that the events following the decision were presented as people surviving (positive) or as people dying (negative). It is a clear illustration of the influence of the way information is presented on decisions.

A third factor influencing human decision making shall be mentioned at this stage. Another key notion here is the one of reference point, best illustrated with the idea of repetitive gambles. Let us consider the case of John, a poker player. After a couple of hours he has lost £2,000. Now he can bet £500 to win £2,000. He has 10% chances to win and 90% to lose his bet. Should he bet? From the perspective of decision making theory he should not since the probability to win £2,000 is only 10%, which makes an expected utility of £200, an inferior amount compared with that put forth. Yet, from the point of view of John, the reference point is that he is -£2,000, and so this is seen as a chance to average out the results.

These studies thus highlight many key weaknesses in human decision making processes. Surprisingly, these decisions are, in theory, the easiest ones to make. Indeed, the framing of the situation consists in a clearly defined and limited set of parameters. The options were described in terms of outcome payoff and probability of outcome. Hence, the valuation does not take place since the potential payoffs are provided; similarly the probability of occurrence is provided. These two factors, provided in many psychology problems, constitute a difficult and complex process in real life decisions. For example, it is not possible to determine the exact probability that the car I am considering buying will break within two years. In laboratory experiments with quantifiable risk, all of the options lead to quantifiable outcomes with identified probabilities. But real world decisions differ from those presented in the laboratory in that the outcomes and probabilities of occurrence are often difficult if not impossible to define with precision. The main difficulty we face in most decisions is that it is not possible to compute all possible futures. Our decisions are thus based on partial information.

# Real world uncertainty

Our ability to process information is bounded [7]. For example, memory can capture only a limited amount of information at any time [8]. We foresee only a fraction of what will occur. These limits are the source of most of our difficulties in making optimal decisions. Figure 1 illustrates the fact that our ability to forecast the future is very limited; there is a horizon of event beyond which we cannot make clear predictions. Such a decision tree helps to formalise the key concepts. Since many factors might influence the unfolding of events, there is a non-zero chance that things turn out differently than expected. It is here that the difference with laboratory experiments appears: in real-life decision making, the probability of occurrence is not given, it has to be estimated. The estimate is known to be not exact by the decider, hence the notion of uncertainty. To compensate these limits, the mind has to deploy cognitive strategies, which are not optimal due to the plethora of cognitive biases. Yet, they usually offer a sufficient degree of correctness for the individual to remain competitive. Considering that all individuals are under the same cognitive constraints, it is the cognitive strategies put in place by an individual to compensate the weaknesses that will make the difference between that specific individual and other members of the same group.



*Figure 1. The notion of decisions tree and its consequences. Each dot represents a decision. Lines represent the evolution of the situation until a new state is reached.*

As illustrated in the above, many of the experiments carried out in decision making use fictional situations where key information about probability and valuation is provided. Reality does not offer such comfort. Whilst real-world decisions have been studied, for ethical reasons, it is difficult to test experimentally as participants will likely feel distress if their decisions lead to negative consequences for others. A central finding from real life decision making in economics is that participants are more risk seeking when the outcome is not substantial [9]. It is natural to reason that when the value is negligible the individual does not engage with an exact analysis of the consequences. The question is thus how to understand decision making in a real life context with actual consequences for the individual.

# Expert risk

Research in learning and expertise acquisition has demonstrated how complex, sophisticated forms of knowledge, encapsulated in complex memory units, compensate initial cognitive biases [10-12]. For example, chunking allows fusing several items into a single unit, thus compensating for the severe limit in working memory capacity. Knowledge is so efficient in guiding experts’ decisions that experts usually make correct strategic decisions in reasonable time [12-13]. Formal training is thus central in developing high level performance within many disciplines. It is worth noting that the decisions that experts make might impact hugely on society. For example, policies in education or health are often informed if not decided by panels of experts. Similarly, police investigations and legal procedures in many domains receive input from experts. It is thus important that experts’ decisions are good. Though most of the literature shows that experts are correct most of the time [14], some research has shown that experts’ decisions are sometimes misguided [15]. An important consideration here is whether knowledge compensates for more differences in risk tolerance. Research on chess players has shown that different civilizations express different levels of risk [16]. Specifically, baseline level of risk taking varies significantly across civilizations, with civilization differences in risk taking as high as around 20%; indicating that risk taking is a highly variable trait. Crucially, some civilizations are more likely to settle for peace without conflict, while others nearly never agree in order to avoid confrontation. The research highlights that in a confrontational situation various civilizations underpinned by different values adopt a very different attitude to risk when facing the *same* situation. Hence the difference does not pertain to perceived risk, but to attitude to risk. This result is striking as it demonstrates that knowledge does not erase the individual differences in risk tolerance when the situation is complex and entails uncertainty. The field in which such a result has the most crucial impact is political decisions.

# The reality of brinkmanship

States continuously strive for the increase of resources and influence. In such an adversarial context, high-stake competitions engender conflicts of interest which are, usually, resolved through diplomatic means. Brinkmanship is the strategy that consists in the stronger party threatening outright confrontation in order to impose negotiations detrimental to the weaker party. Brinkmanship is widely used by states and multinational companies to exert pressure on weaker states and local companies. Though it commonly leads to minimal gain without risk, the conflict occasionally crystalizes and degenerates into a major crisis, ultimately leading to military action [17]. In some cases, states misread the attitude of the competition, inspiring an uncontrollable chain of events which leads to disaster; see the case of World War I [18]. These examples have usually been analysed primarily as situations wherein deciders miscalculated the probabilities of occurrence of war. It is also believed that these miscalculations have led to a natural misperception of the situation by the leaders of the country under pressure. Yet, the present paper points to the fact that not only are deciders biased in their decisions but they also are inherently different in the level of risk they are willing to take. Hitler’s very aggressive use of invasion of Poland is a good example. It is believed that by this time a strong response from European countries might have changed the course of history. The bold move to Poland was rewarded and thus probably called for other bold moves such as invading other countries. It is difficult to say a posteriori whether the German leader misread the situation. If he did not it would suggest that he simply was ready to take much more risk than the other nations. Very often, deciders are provided with evaluations of the potential extent of casualties and the probability of failure of missions. As pointed by McDermott [17], the situation is assessed globally and in context. The argument presented in this paper would suggest that the decider’s personal inclination to risk also play a key role in a final decision. The inclination to risk might change within an individual with time and formal training, however, it is established that expertise does not necessarily entail that people make rational decisions. As such, regardless of the degree to which an individual is informed in their decision making, there is always the risk that personal inclination might play a key role.

In the context of brinkmanship, the ability to anticipate the level of risk that the opponent may take, such as settling or entering outright confrontation, is the key informative factor of whether the strategy itself should be used. Strikingly, psychological variance in risk taking has not received its due attention in a multi-cultural world. As indicated, recent research on chess players has demonstrated that, contrary to expectations, strategic risk at expert level varies across cultures [16]. Chess experts across different civilizations take different levels of risk from the outset of the game. Hence, intrinsic psychological factors affect risk-taking attitudes in adversarial situations differently depending upon cultural values. This finding put in the context of a competitive world has deep implications on strategic decision making in governments and multinational companies.

When facing a crisis, states will undertake different actions, due not to differences in risk-perception, but to a higher inclination towards risk-taking. In line with this finding, psychological and historical evidence points towards some states engaging in conflict regardless of potential loss [17]. Should a powerful state pose a threat to such risk-blind state with the intention of gaining a small reward, then war could follow. Anticipating that the potential loss from the weaker state will drive the leaders to be loss avoidant and thus settle in is a severe misperception. Such states, underpinned by strong values, will consider that the only escape to the threat is entering conflict. Using brinkmanship against these states can be an extremely misguided strategic decision, likely responded to by war. Moreover, states using simple economic measures to restrict the power of tyrannical states can actually strengthen trigger risk-taking behaviours. For example, economic restrictions usually employed to weaken a state to create a rebellion against its dictator can be perceived as an attempt to annihilate the population. The threat of anticipated loss might change the threshold of risk-taking, thus promoting extreme decisions, and the state’s population, due to simple group dynamics [19], will support their leaders rather than turn against them. Here, too, brinkmanship can be taken as a declaration of war. Before deciding on brinkmanship, precise intelligence about the other parties’ risk-taking propensity should be collected. In a similar vein, companies with very aggressive strategies will refuse to retreat when threatened, particularly when on the brink of losing their core value. Knowing how the other parties perceive the situation is not sufficient to make decisions about the strategy. Knowledge of their attitude towards risk-taking, on the other hand, is of central importance. This internal, psychological factor is more difficult to assess, but more predictive of the decision that could be made.

# Brinkmanship might mean war

Brinkmanship is, by its very essence, toying with the emotional experience of the competitive party in order to achieve a material advantage at no cost. Loss aversion might make the weaker competitor take high risk decisions, particularly since the risk taking threshold varies greatly from one civilization to the next. The decision of one state or one company is thus not only dictated by external factors, such as potential loss, but also by internal factors, such as attitude to risk. Both factors are to be evaluated in devising a correct strategy, to determine whether brinkmanship should be effective or may lead to a costly conflict. Similarly to states, large companies penetrating a new market should benefit from acquiring evidence of the actual risk taking attitude of local competitors prior to engaging in brinkmanship. For countries and companies alike, strong and weak parties both have a threshold of acceptable loss. Any further loss below this threshold for the weaker party incites direct aggression, through the perception that the potential loss threatens its most central values. This breaking point varies from one civilization to the next and its psychological consequences, in terms of motivation to fight, are not to be underestimated.

It is believed that the larger the difference in firing power between two states, the easier the battle. Powerful states have repeatedly fallen prey to overconfidence when assessing competitors’ risk taking, and have subsequently underestimated the costs. As the battle of the Thermopylae brilliantly illustrates, the larger the difference between the powerful and the weak, the more the situation is perceived as a loss by the weaker party and thus the lower the threshold to engage in an all risk strategy. Such an event should ultimately be extremely costly for the stronger party. The evidence provided by behavioural sciences highlights the need for caution when employing methods that will push a weaker opponent to the brink of collapse.

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