The Emotional Information Processing System is Risk Averse: Ego-depletion and Investment Behavior

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EXTENDED ABSTRACT

Previous research has shown that self-regulatory strength is crucial to exert willpower. It has been found that a depletion of self-regulatory resources very often leads to detrimental behavior such as overeating and impulsive buying (Vohs and Faber 2007; Vohs and Heatherton 2000). However, not much is known about how the availability of these resources is related to risky decision making.

The current research shows that ego-depletion leads to higher levels of risk aversion in mixed gambles (involving mixtures of gains and losses).

Risk aversion for mixed gambles refers to the tendency of people to reject a gamble with an equal chance to win or lose, even when the expected value of gambling is higher than the expected value of not gambling (Tversky and Kahneman 1992). Recent developments in the field of neuroscience and psychology indicate that anticipatory emotional reactions that are elicited by features of the risky decision alternatives are crucial in understanding risk taking and risk seeking (Damasio 1994; LeDoux 1996; Loewenstein et al. 2001).

In the current research, we adopt a dual-process framework that distinguishes between a rational (cognitive) and an experiential (emotional) information processing system (Epstein and Pacini 1999), in order to explain greater risk avoidance in a state of ego-depletion. In a situation where one has to make a choice between a risky and a less risky alternative, both the rational and the experiential system generate an “advice” concerning the most desirable behavior. The outcome of the rational system is determined by a cognitive assessment of probabilities of decision outcomes and outcome severity, whereas the outcome of the experiential system is determined by an automatic retrieval of accumulated knowledge from previous experiences. Since the experiential system attaches greater weight to previously experienced negative contingencies than to previously experienced positive contingencies of the choice options (De Houwer, Thomas, and Baeyens 2001), it guides the decision maker away from risky alternatives.

Given that the rational system is the slower, analytical system it is in an ideal position to monitor and inhibit the output of the faster, associative experiential system. However, building on previous research that puts forward self-regulatory resources as the necessary fuel for the rational system (Vohs 2006), we hypothesize that a depletion of self-regulatory resources impairs the inhibiting capacity of the rational system. As a consequence, the output of the experiential system is weighted more heavily in the final decision, resulting in more risk-averse behavior among ego-depleted individuals.

Two experiments provide support for this reasoning. In both experiments, the availability of self-regulatory resources was manipulated by a modified version of the Stroop task (Stroop 1935). Inhibiting first responses (which is the general purpose of this task) has been shown to consume self-regulatory resources (e.g., Inzlicht and Gutsell 2007; Muraven, Tice, and Baumeister 1998; Wallace and Baumeister 2002), and is therefore an effective way of inducing a state of ego-depletion.

In Study 1, the Stroop task was followed by an investment task which has previously been used to compare decision making of patients with lesions to the brain’s emotional circuitry and patients with substance dependence to decisions made by a normal control group (Shiv et al. 2005a; Shiv et al. 2005b). The task consists of 20 decision rounds in which one can choose between investing $1 or not investing $1. An investment decision is followed by a coin toss; heads results in losing the $1, tails results in gaining $2.50. If a participant decides not to invest, the game advances to the next round. Since the expected value of risk seeking behavior (invest) is higher than the expected value of risk averse behavior (not invest), a rational decision maker should always decide to invest. Participant’s predisposition to rely on experiential processing was measured with the experientiality subscale of the Rational-Experiential Inventory (Pacini and Epstein 1999).

As the experiential system is an associative information processing system that generates emotional responses based on previous outcomes, we only expected it to influence investment decision making of depleted participants after some experience with the task at hand (i.e. in the second block of 10 trials). Additionally, we expected a moderation of the effect by experientiality. Indeed, if the weighting of the outcomes of the experiential system is dispositionally low, the rational monitoring system should still be able to override the responses generated by the experiential processing system.

As predicted, the three-way interaction between state of self-regulation (control; depleted), experientiality (high; low) and decision block (first block of 10 decisions; second block of 10 decisions) was significant. After having gained some experience with the investment task, ego-depleted participants with a tendency to rely on their experiential “hunches” clearly showed higher levels of risk aversion.

The goal of the second study was to demonstrate that a lower availability of self-regulatory resources can be beneficial for decision making in a situation where the expected value of risk avoidant behavior is higher than the expected value of risk-seeking behavior. After completing the modified Stroop task, participants continued with the Iowa Gambling Task (see Bechara et al. 1994, for exact procedures and pay-off structure). Participants had to choose 100 times between cards from four different decks. Two decks are low-risky decks with a high expected value, and two decks are high-risky decks with a lower expected value. Results showed that ego-depleted participants selected significantly more cards from the low-risky decks with a higher expected value.

In sum, in two experiments we showed that a lower availability of self-regulatory resources increases risk aversion in mixed gambles (study 1 & study 2). This finding can be explained by an increased weighting of experiential processing in decision making (study 1) and implies that ego-depletion is not always detrimental for decision making, but can also guide people towards more beneficial choice options (study 2).

REFERENCES


