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Affective Biases and Heuristics in Decision Making

Emotion regulation as a factor for decision making
competence

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Stanovich and West (2008) explored if measures of cognitive ability ignored some important aspects of thinking itself, namely that cognitive ability alone is not enough to generally prevent biased thinking. In this thesis a series of decision making (DM) tasks is tested to see if emotion regulation (ER) is a factor for the decision process and therefore should be a measured in decision making competence. A set of DM tasks was compiled involving both affective and cognitive dimensions. 400 participants completed an online web-survey. The results showed that ER ability was significantly associated with performance in various DM tasks that involved both heuristic and biased thinking. These findings suggest that ER can be a factor in decision making competence.

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1 Background

One problem with the field of decision making is the question: what is a good decision? Is it an optimal decision strategy or happiness with the outcome of the decision? If you only count the outcomes, then you easily fall into the trap of hindsight, which is given what you know now versus what you knew then the decision you made was a poor one. But to cite Bruine de Bruin et al (2007, p. 490):

“... although good decision-making processes can lead to poor outcomes, that should happen less often than with poor decision-making processes”.

To date, several scales of individual decisions-making have been created, such as the Adult Decision Making Competence, Decision Outcomes Inventory (Bruine de Bruin et al, 2007). The goal of such measures is to be able to capture and measure different decision-making processes and to gain knowledge of when the different strategies are being used in everyday situations. Given the use of such measure it is very important to delimit what “good” or “poor” decision-making processes are.

1.1 Real life decision making

Humans make decisions every day, from small decisions about what to eat for dinner today, to sometimes grand, life changing, decisions for themselves or for others. Nevertheless we have yet to fully understand how these and many other decisions are actually made. One of the earlier and most used normative decision models is expected utility theory (Neumann and Morgenstern, 1947), the idea is that humans are rational and weights gains and losses against each other and computes this with the different probabilities of each outcome. The notion that all information is gathered, categorized and computed for every alternative and every outcome, always, is to say the least a bit optimistic. Humans do not have the capacity, time or the resources to process everything in such a costly way, but somehow we still function fairly well in our everyday life. It is argued by some that humans actually are very rational, but not rational in the sense of expected utility theory.

The questions of human rationality in DM have been wildly debated over at least the last 60 years. Ever since Herbert Simon challenged the concept of the “economic man” with an organism with limited knowledge and ability, that instead of computing everything simplifies the world and problems and base its decision on the simplified model, i.e. bounded rationality (Herbert Simon, 1955). The concept of bounded rationality was intended to have value both for normative and descriptive theory of decision making. In this thesis it is the descriptive part of decision theory that is discussed. My view is as with many others that humans actually are rational beings, however the human rationality is not perfect and sometimes cannot be logically deducted as rational, yet it is, from the current perspective of the human, rational.

Todd and Gigerenzer (2000) present three aspects of rationality, (1) bounded rationality, (2) ecological rationality and (3) social rationality which implies that, (1) realistic amounts of time, information and computational resources are used to make the decision, (2) the decision making agent adapts to the environment and can exploit the information structure in that environment to arrive at more useful outcomes, (3) the interaction with other agents is often the most important aspects of the decision-making agents environment. Personally I feel that they have neglected the notion of emotion in the aspect of rationality and human decision making. However one way of accomplishing all of these rationalities is to change decisions strategy to different context and use shortcuts, rules of thumb, routines i.e. to use Heuristics.

It has already been 25 years since Payne et al (1988) showed that fast and frugal decisions heuristics were more accurate than truncated normative procedures under time constraints. They also argued that humans are flexible in their use of decisions strategies and that decision makers do choose relatively efficient strategies in terms of accuracy and effort when task and contexts demands varies. Since then, the notion of simple heuristics has been widely explored and debated. Todd and Gigerenzer (2000) argues that fast and frugal heuristics performs comparably, or even out performs, more complex algorithms when generalizing to new data. They claim that simplicity leads to robustness and makes us smart. The reason it makes us smart is the ability that fast and frugal heuristics gives us, namely the ability to choose quickly with little information. This is done by exploiting the information structure that is present in the given environment.

Glöckner and Betsch (2012) challenge the idea that decision time and the amount of needed computational steps are positively correlated, which in their view are what models of bounded rationality usually claim. Instead they show with their study that even when more information is added the decision time might decrease, as long as the new information increases the coherence in the available information set. This is due to the parallel constraint satisfaction approach to decision making, which says that information integration is holistic and automatic. They argue that in an environment which support quick information acquisition it is not certain that less information will be processed faster than more. When information acquisition is easy the information is processed in a holistic matter and in such a case the coherence in the information set plays a bigger part than the amount of information, in the information processing and decision making based on that information.

However, once a strategy has been chosen people tend to stick to that decisions strategy even in a changing situation, this tendency was stronger for people using compensatory strategies than for people using non-compensatory strategies (Bröder and Schiffer, 2006). This inability to adapt to a changing situation is a striking contradiction to the ability to adapt to new situations. This might be explained by dual-process theory, in which emotion once again becomes part of the solution.

1.2 Emotions

For the rest of this thesis the term emotion means physiological reactions in the body that gives rise to psychological states, conscious or unconscious and the term affect is when an object or situation either gives a positive or negative emotional response, in similarity with affective properties in Russel (2009).

That emotion can have a biasing effect is something that is intuitively easy to accept, who have not said or done something in anger or been "blinded by love". When you for instance hate someone it is not easy to see their upsides. There is even a halo effect that helps to shape everything you know about at person depending on if you like them or not (Kahneman, 2011). Emotions can change the weight of information and unrelated emotions can have a biasing impact on decision making, which were shown by Yip and Côté (2013). They also demonstrated that emotion-understanding ability was a factor that helped to evade the effect of the bias.

Emotion plays a central role in "dual-process theories" of thinking. Several researchers suggest that there is an interaction between more emotional, experiential systems and deliberative systems, labelled System 1 (fast thinking or intuition) and System 2 (slow thinking), respectively (Kahneman, 2011). One of the characteristics of the experiential system is its emotional basis

(Slovic & Västfjäll, 2010). Although analysis is certainly important in many decision-making circumstances, reliance on emotion as sources of information tends to be a quicker, easier, and more efficient way to navigate in a complex, uncertain and sometimes dangerous world (Schwarz & Clore, 1988). Many theorists have given affect a direct and primary role in decision making (Damasio, 1994; Loewenstein & Lerner, 2003; Slovic & Västfjäll, 2010). Kahneman (2003) notes that the operating characteristics of System 1 are similar to those of human perceptual processes. He points out that one of the functions of System 2 is to monitor the quality of the intuitive impressions formed by System 1. Kahneman and Frederick (2002) suggest that this monitoring is typically rather lax and allows many intuitive judgments to be expressed in behaviour, including some that are erroneous. Kahneman (2011, p. 282) argues that the qualities of the value function are inherent operating characteristics of System 1.

Glöckner and Witteman (2010) propose that the term intuition should be divided into different subcategories of underlying cognitive processes; the autonomous systems, which without the need of controlled attention can control behaviour directly and the pre-attentive systems, which determine what information that get analytically processed by supplying content into the working memory and thus indirectly control behaviour. The autonomous systems contain associative intuition and matching intuition, while the pre-attentive systems contain accumulative intuition and constructive intuition. They argue that this division will help to clarify the relationship between affect and intuition. It is worth to mention their disclaimer that “The proposed processes underlying intuition are not completely distinct from each other” (Glöckner and Witteman 2010, p. 7). Since most of the simpler once can be subsumed by the more complex once but not entirely so, and therefore it is still valuable to make this distinction.

My stance is similar to theirs, with the exception of that the categories of intuition mentioned above are all mainly cognitive processes which gets affected by the emotional processes that is simultaneously occurring. For example take Kleins Recognition-Primed Decision model (1999), first the individual collects cues in the situation which are matched against previously encountered situations. When an analogy is found, the action plan is retrieved while all this is happening the emotional responses to the situation/analogy/action plan are influencing the selections and trust in that option. The emotional responses work as either coherent or incoherent information about the cognitively gathered information at hand, for system 1 and system 2. If for instance a certain option is more affectively positive then the others then that option is more likely to be the chosen one, especially if people are in an extreme visceral state. After all of this, system 2 might run a mental simulation of the action plans to consciously analyze it. And even here do the emotional state affect the weighting of factors in the analysis. Affect might actually work as a bridging function between automatic processes in system 1 and the consciously attended processes in system 2.

According to Norman et al. (2003) the systems of affect and emotion is inseparable from cognition. This system is a set of mechanisms that rapidly evaluates events to provide an initial assessment of their valence or overall value (i.e. positive or negative, good or bad, safe or dangerous, and so on). Although emotion and cognition are conceptually and to some degree neuroanatomically distinct systems, from a functional perspective, when they give rise to behaviour, they are normally deeply intertwined. They are parallel processing systems that require one another for optimal functioning of the organism. There is some evidence that affect changes the processing mode for cognition (Norman et al, 2003). The mechanism is neurochemical stimulation, adjusting the weights and thresholds that govern the operating characteristics of the cognitive mechanisms, biasing them and changing the nature of the ongoing processing. These changes influence how higher-level processing takes place, the locus of attention, and the allocation of attention resources (Norman et al., 2003). Emotions and/or emotional events can affect perception, attentions and memory

processes, both automatic and pre-attentive processes (Dolan, 2002; Dolan & Vuilleumier, 2003; Pessoa, 2005). Attention can be guided by emotion (Dickert & Slovic, 2009). Emotions also impacts memory retrieval and encoding.

Since the stress hormone cortisol is also a catalyst to emotional change, and it has been found that cortisol has an effect on emotion (Sudheimer, 2009). The literature on stress and decision might have an explanation on which effect emotion might have on decision making. The hormone cortisol is discussed as a strong mediator between stress and decisions. Hence the effects that cortisol generates on decision making might be an emotional impact, and I argue that the effects on decision making that stress has, according to Starcke and Brands in the article Decision making under stress: A selective review (2012), is the same effects that emotions have on system 1 and therefore is in line with that emotions affects decision making, if so then maybe the ability to regulate emotions also should affect decision making in some way.

Starcke and Brand (2012) argues that stress in itself can be differenced from both information overload and time pressure in how it affects decisions making. Since “Numerous researchers who investigated heuristic vs. analytical judgments do not consider limited cognitive resources to be impedimental to decision making”. Attention is directed toward the relevant aspects of the problem through pre-conscious heuristic processes and that the following analytical processes do not always lead to a better performance. And the conclusion they draw from the numerous studies is that stress triggers different mechanism than time pressure and similar other factors. Stress is more probable to trigger neural and/or hormonal reactions that in turn affects decision making. Starcke and Brand concluded that in most of the studies in their review the effect of stress on decision making was most likely due to a combination of dysfunctional use of strategies, higher reward sensitivity, reduced learning from feedback and a decreased adjustment from automatic responses. Whether this is good or bad depends on the decision situation.

George Loewenstein (1996) tries to tackle the problem with irrational decisions against peoples known self-interest in his article out of control. This is a serious problem for many models in the field of decision theory. Loewenstein presents seven propositions concerning visceral factors on behaviour, future behaviour and predicted behaviour. To summarize them shortly, when predicting the impact that visceral factors will have (or had) to other people or yourself in the future (or in the past), your prediction will most likely be underweighted. But in reality they will have a disproportionate impact on our behaviour (Loewenstein, 1996). He argues that the reason that people make decision that gives a small instant reward instead of a good long-term gain (over and over again) is because of the visceral factors that affects you in the moment. They are too strong to resist here and now, the potential future gain does not compare with the certain immediate gain. Since the potential future gain do not satisfy your current visceral needs.

Once again if we examine Glöckner and Betsch’s (2012) idea of information coherence as a decision factor and construe of emotions as information, then emotion could be a central part of choosing when and which heuristic to use. Since automatic processing often are parallel and that system 1 in general is searching for confirmation rather than to disprove information (Kahneman, 2011). When system 1 have found enough coherence in the information set then our “mind is made up” since system 1 feels that it has been confirmed that one belief is correct. I suggest that the affective heuristic has a strong impact on our decision making and if we feel bad about a decision that we cognitively “know is correct” then this feeling is treated as incoherence in the information set and system 1 will try to find information that is more coherent with our initial feeling. This is when system 2 is brought into the decision making. Since system 2 also is affected by the affective heuristic (Slovic et al, 2002) we might go against our logical reasoning and still chose the option

that *feels better* (for instance, go all in on a pretty bad poker hand since, *you might win anyway and that would be hilarious or this time “feels different than last time you lost with this hand”*). If on the other hand the option feels good and there is no information that is incoherent with that feeling then system 1 will take care of the choice and system 2 would not even bother to check if that choice is correct, and we might be left feeling that no decision was even made, we just did something. If emotion plays an important role in information weighting and decision making then the ability to regulate your emotion would have an impact on the heuristic use.

There are three main classes of choices namely choice under certainty, choice under risk and choice under ambiguity (Shiv et al., 2005). Neurological patients with decision-making impairments have trouble with choices under risk and ambiguity but still can make many decisions when the choices are made under certainty (Baba Shiv et al, 2005). Baba Shiv et al argues in their article “dark side of emotions” that, emotions and mood can play a disruptive or useful part in the process of making decisions. They also argue that the emerging neuroscientific evidence suggest that the three classes of choice are sub served by separate neural mechanisms however they state that it is unclear how emotions impact these mechanisms and if emotions effects one but not the other. Their results in that study showed that individuals with a decreased emotional reaction did not develop an affective heuristic overtime in the same way as the control group did. Hence, they made better decisions in that given task.

To summarize the literature, emotions do have an impact on decision making, exactly how and why on the other hand is not yet fully documented. My proposal is that emotions have an effect on decision making in a similar way that cognition has an impact on decision making. If cognition alone are not enough to determine the decision making competence of a person, then maybe emotion can partially explain what cognition does not, and emotion regulation ability could be a factor in a similar way as cognitive ability on the DM competence.

1.4 Emotion regulation

Emotion regulation is a commonly debated subject in the scientific literature of emotions (Gyurak et al 2011). A blunt and far from exhaustive summary is to say that emotion regulation exists and it works in different ways for different people in regards to the current situation, state and/or the experience the individual have of emotion regulation. In an attempt to organize the findings in emotion regulation Gyurak et al (2011) presents a dual-process framework. This divides the way people regulate their emotions to either explicit or implicit regulating, but with porous boundaries between explicit and implicit. Whereas explicit emotion regulation is categories as: using a certain (conscious) strategies to regulate emotions. Such as reappraisal (Gross, 1998; Ochsner et al., 2002), distractions (Kalisch, Wiech, Herrmann, & Dolan, 2006; McRae et al., 2010), attention control (Urry, 2010), distancing (Kalisch et al., 2005). Implicit emotion regulation on the other hand is divided into five different processes by Gyurak et al; Emotional conflict adaption, Error-related regulation, Emotion regulatory goals and evaluations, Emotion regulation as a result of affect labelling and Habitual emotion regulation. To be defined as implicit the processes have to be uninstructed, effortless and proceeds without awareness.

In their study Halperin et al (2013) showed that an emotion regulation technique, cognitive reappraisal, could change the attitudes toward political actions. People briefly trained in cognitive reappraisal were less supportive if aggressive policies and more supportive of conciliatory policies compared to a control group. They found that negative emotions mediated the effects of reappraisal.

Several scales have been created to measure different emotion regulation strategies. Among them are Difficulties in Emotion Regulation Scale (DERS; Gratz and Roemer, 2004), which do not measure any particular strategy but more how people tend to understand and handle negative emotions. Another scales is Emotion regulation questionnaire (ERQ; Gross and John, 2003), which measures if people use, and to which degree, reappraisal or suppression as their emotion regulation strategy.

1.5 Purpose

The principal research strategy was adapted from Stanovich and West (2008) and involved measuring emotion regulation abilities, cognitive abilities, and performance on various DM tasks. We compiled a set of DM tasks involving both affective and cognitive dimensions. If emotion and more specifically emotion regulation (ER) ability do not have an effect on decision making competence then none of the ER measures in this test should have any significant interaction with the DM tasks: If on the other hand any of the ER measures have a significant interaction then maybe emotion could explain some of the heuristic and biases that exists in peoples' decision making. If there is any effect of ER then an analysis of how the participants deviated from the normative expected results can be a hint to which direction ER ability affects decision making. For example, if individuals low in ER ability show a greater anchoring effect (to over or under estimate a number due to a previously perceived number) than participants high in ER ability, ER would have a systematic effect on biases in DM. Similarly, if individuals high in ER ability would use heuristic strategies (for instance a stronger inverse correlation between perceived risk and benefits of various activities) to a larger extent than individuals low in ER ability, this would be evidence of systematic effects ER on DM. The approach in this thesis is primarily exploratory. Consistent with work on non-experimental factors such as chronological age on DM competence, the approach here is to correlate performance on various DM tasks with self-reported ER ability.

2 Method and Design

Participants, 412 participants (55.2% female) with a mean age of 44.31 years (range 20-74) completed an online web-survey. Twelve of the participants were removed because they took excessive time to complete the survey (more than three hours).

Design. A quasi-experimental study was administered individually on a computer. It was a quasi-experimental study since an experimental variable affect recollection task was introduced and the participants got divided into groups by their results of the different tasks and so no predetermined balancing was conducted for the ER or cognitive ability. First the participants got a general introduction that they should answer the questions intuitively if they could and that in most of the questions there do not exist a correct answer:

During this entire test, we would like you to answer questions fast and rely on your gut feeling. In most of the questions do not have a “correct answer”. Do not dwell on what might be correct; instead answer whatever you find is right for you.

After this the participants did the tests in a semi randomized order, they all started with the cognitive ability tests after which they did a affect recollection task, then a randomized block One, which contained the DM tasks: Panda, Money/kisses, Anchoring and adjustment, Fruit/Chocolate, Affect Heuristic, moral dilemma (see appendix 1). Followed by a randomized block Two, which contained the DM tasks: Conjunction Fallacy, Proportion dominance effect, Jellybeans, Time Discounting Task, Feedback in choices, Gambles Regret (see appendix 1). After which, they answered the randomized emotion regulation questionnaires and finally they completed the cognitive shape test again. Some of the questions were given to every participant, others were divided into different versions and every participant answered either version A or B. The reason the questions was divided into block one and block two was to see if the affect recollection task would have any impact on cognitive and emotional DM task, that effect was assumed to decline overtime which was why the first block were mostly emotional task but also some cognitive tasks.

2.1 Cognitive Ability Tests

Since SAT-scores were not an available measure for cognitive ability, two tests were given instead. The cognitive ability tests consisted of test from Dohmen et al (2010), which had been modified to fit an online questionnaire. The first test (word fluency test) was to write as many animals as possible in 120 seconds. The second test (symbol correspondence test) was a matching test, the participants was shown nine different shapes, each with a unique number connected to it (1-9) and when the participants felt ready they were shown 30 randomized shapes in a row, with the response task to answer as fast as possible the correct digit that the shape was connected to. To categories the participants these two tests, both shape tests were added together, were split by the median and everyone on the median or with higher score got one point for that test, the scores were then added together which divided the participants into three groups, high cognitive ability (with a score of 2), medium cognitive ability (with a score of 1) and low cognitive ability (with a score of 0).

2.2 Affect recollection task

The affect recollection task consisted of a test from Stephen and Pham (2008), where the participants either had to write down two (or ten) occasions where they have trusted their emotions which led to a positive outcome, in the condition with ten occasions they also had a 120 second time limit. Since it is easy to write down two occasions you get a induced trust in your emotionally ability to make decisions and since it is hard to remember ten occasions you start to distrust your ability to emotionally make decisions, this is due to the availability heuristic (for details see Kahneman, 2011 chapter 12). The purpose of the affect recollection task in this study was to get participants to either trust or distrust their emotional responses to see if that affected their ER ability.

2.3 Emotion regulation measures

To assess emotion regulation ability the following questionnaires where used: Emotion regulation questionnaire (ERQ; Gross and John, 2003) and a reduced versions of Difficulties in Emotion Regulation Scale (Gratz and Roemer, 2004; see appendix 1).

3 Result and discussion

The ERQ and DERS scales were used to divide the participants into different kind of emotion regulators and the results below the emotion regulation ability (ER) that is presented is the one that had the biggest impact on each question, since this thesis was about if ER have an impact and not which kind of impact each ER have. The emotion trust manipulation gave no systematic effects and was therefore disregarded for the analysis presented below. "

For the analysis the questions was divided into two parts, the first part was assumed to be more cognitive and the second to be more emotional. Since the participants was not a student sample with a homogenous and high cognitive abilities, as argued by Stanovich and West (2008), we expected the difference in cognitive ability differ more than it had for Stanovich and West.

3.1 Correlations between the measures

DERS and suppression correlated $r = .363$, $p = .01$ $n = 391$, DERS and reappraisal had a negative correlation $r = -.214$ $p = 0.01$ $n = 391$, and reappraisal and suppression had a negative correlation $r = -.117$ $p = .05$ $n = 400$. Cognitive ability and reappraisal did not correlate $r = .010$ $n = 400$, while DERS and cognitive ability had negative correlation $r = -.103$ $p = .05$ $n = 391$, and cognitive ability and suppression had also a negative correlation $r = -.140$ $p = .01$ $n = 400$.

Since DERS and suppression had a positive correlation and both were negatively correlated with reappraisal, DERS and suppression seems to explain a different kind of ER ability than reappraisal. However there is a difference between suppression and DERS as well, even though they have a positive correlation they might explain different things, since suppression is the ability to suppress your emotions and DERS is a measure of how you well you handle negative emotions. Therefore suppression is somewhat interchangeable but not always.

3.2 Cognitive tasks

Below are the DM tasks that were assumed to be primarily cognitive.

3.2.1 Jellybeans

The Jellybean task was to choose which bowl to draw a jellybean from, either bowl A with 9% chance of winning or bowl B with 10% chance of winning, the A bowl had more jellybeans overall in it (Peters et al., 2006) see appendix 1.

The normative answer to the jellybean task should be to take bowl B since that bowl has a higher expected gain. The only significant finding was cognitive ability were participants with higher cognitive ability was more likely to choose bowl B, $F(2, 397) = 5.046$, $p = .007$, $\eta^2 = .025$. High $m = 9.28$, $STD = 4.290$, middle $m = 8.84$, $STD = 4.554$, low $m = 7.51$, $STD = 4.899$, which was expected.

3.2.2 Proportion dominance effect

The Proportion dominance effect questions were adapted from Stanovich and West (2008) and were to be supportive of an investment that could save 150 lives in version A or 98% of those lives in version B. A higher number means more supportive of the investment in task 1. In the second task the question was how likely you were to invest in a seatbelt to your new car that saves 500 lives (version A) each year or 98% of those lives in version B. A lower number indicates that you were more willing to invest (see appendix 1).

The normative answer to the proportion dominance questions is that in both cases version A should have a higher value than B since the expected gain is higher for alternative B, also there should be no difference between the high and low conditions of ER. As can be seen in table 1, reappraisal was a significant factor in both of the proportion dominance effect questions, the participants with a higher reappraisal were more positive to invest in safety, in all conditions.

Table 1: Proportion Dominance Effect

PD1	Reap					SUPP					CA							
	V	High	Low	F(1,396)	P	Eta	V	High	Low	F(1,396)	P	Eta	V	High	Middle	Low	F	p
a	4.44	3.87	ER	ER	ER	a	4.36	3.91	ER	ER	ER	a	4.09	4.15	4.28	CA(2,394)	CA	CA
	(1.525)	(1.385)	11.535	.001	.028		(1.323)	(1.664)	.120	.729	.000		(1.564)	(1.451)	(1.474)	.227	.758	.001
b	4.49	4.08	V	V	V	b	4.14	4.48	V	V	V	b	4.41	4.17	4.29	V(1,394)	V	V
	(1.398)	(1.455)	.788	.375	.002		(1.398)	(1.471)	1.337	.248	.003		(1.460)	(1.538)	(1.284)	.609	.436	.002
			ER*V	ER*V	ER*V				ER*V	ER*V	ER*V					CA*V(2,394)	CA*V	CA*V
			.318	.573	.001				7.190	.008	.018					.466	.628	.002
PD2	Reap					DERS					CA							
	V	High	Low	F(1,396)	P	Eta	V	High	Low	F(1,387)	P	Eta	V	High	Middle	Low	F	p
a	3.15	3.75	ER	ER	ER	a	3.36	3.43	ER	ER	ER	a	3.33	3.73	3.13	CA(2,394)	CA	CA
	(1.648)	(1.512)	4.918	.027	.012		(1.448)	(1.758)	.128	.721	.000		(1.504)	(1.521)	(1.779)	.641	.528	.003
b	3.49	3.60	V	V	V	b	3.64	3.45	V	V	V	b	3.40	3.44	3.83	V(1,394)	V	V
	(1.790)	(1.387)	.361	.548	.001		(1.417)	(1.724)	.863	.353	.002		(1.697)	(1.550)	(1.535)	.989	.321	.003
			ER*V	ER*V	ER*V				ER*V	ER*V	ER*V					CA*V(2,394)	CA*V	CA*V
			2.324	.128	.006				.610	.435	.002					3.344	.036	.017

Table 1 shows the results from both of the Proportion Dominance Effect tasks, where Reap is reappraisal, SUPP is suppression, CA is cognitive ability, V is version, ER stands for emotion regulation. Version A is total lives and version B is 98%.

3.2.3 Time Discounting Task

The Time Discounting Task was adapted from (Peters et al, 2006). The task was to either to take money now or a larger amount after a period of time. A higher number means more likely to take more money later (see appendix 1).

The normative answer in the both the questions are to take the alternative that gives more money but at a later point in time. In both Time Discounting Task the higher the cognitive ability the more likely the participants were to take the larger amount of money after a longer period of time, the difference was greater for the second questions were the time frame was smaller and the proportion of the amount was greater, even though the total amount was smaller. ER did not give any significant results but nearly as can be seen in table 2, however the tendencies did not hold for both the cases.

Table 2: Time Discounting Task

TD1	Reap					DERS					CA						
	High	Low	F(1,398)	P	Eta	High	Low	F(1,389)	P	Eta	High	Middle	Low	F	p	Eta	
	4.68 (4.141)	5.49 (4.134)	ER 3.842	ER .051	ER .010	5.27 (3.971)	4.77 (4.319)	ER .1.417	ER .235	ER .004	5.89 (4.277)	4.75 (4.107)	4.61 (3.980)	CA(2,397) 3.739	CA .025	CA .018	
TD2	Reap					SUPP					CA						
	High	Low	F(1,398)	P	Eta	High	Low	F(1,398)	P	Eta	High	Middle	Low	F	p	Eta	
	7.50 (3.983)	7.68 (3.662)	ER .213	ER .645	ER .001	7.28 (3.818)	7.99 (3.815)	ER 3.468	ER .063	ER .009	8.70 (3.555)	7.32 (3.792)	6.75 (3.905)	CA(2,397) 9.021	CA .000	CA .043	

Table 2 shows the results from both of the Time Discounting tasks, where Reap is reappraisal, DERS is Difficulties in Emotion Regulation Scale, CA is cognitive ability, ER stands for emotion regulation.

3.2.4 Conjunction Fallacy

The Linda task was adapted from Tversky & Kahneman (1983) and was a two choice alternative, either A: bank teller or B bank teller and...(See appendix 1). The dice task (Kahneman, 2011) had three alternatives, where the first alternative had the combination with the highest possibility (see appendix 1). The last Conjunction fallacy test was made for this study and was similar to the Linda problem (see appendix 1).

In the Linda tasks there was a significant difference between the answers were most participants fell for the conjunction fallacy; N = 400, p < .0001 where the answer distribution was Linda is a bank teller 28.3% and Linda is a bank teller and.. 71.8% no other significant interaction was found.

In the Dice task there was a significant difference between the answers were most participants fell for the conjunction fallacy; RGRRR 7.5%, and the wrong answers 92.5% (GRGRRR 87.0% GRRRRR 5.5%), n = 400 p < .0001 with no other significant interactions.

In the New York Giants task there was not a significant difference between the answers were most participants still fell for the conjunction fallacy; with the distribution (in valid percent) of picking the right answer as number one (most likely) 48.2% and the right answer as not first 51.8% (as number two, second most likely: 24.2% as number three, least likely: 27.6%), n = 359.

3.2.5 Framing

The cognitive framing tasks were adapted from Stanovich and West (2008), where the participants were asked if they would make a 10 minute drive to buy a calculator (question 1) or a jacket (question 2) for 10 dollar less than the price at the current store (see appendix 1). The normative answer is that it should not be a difference between the jacket and the calculator, since you always save ten dollars.

In the cognitive framing tasks 65% would and 35% would not buy the calculator at the other store (n = 400), but only 41.8% would and 58.3% would not buy the jacket at the other store (n = 400).

3.2.6 Anchoring and Adjustment

Anchoring and adjustment problems which were adapted from (Ariely et al, 2003; Stanovich and West, 2008), the first three questions were about buying wine/truffles/roses (see appendix 1) the anchor was the last two digits in the participants social security number, every participant with a number of 50 or higher was counted as version A. Questions four was about how many countries in Africa is in the United Nations and questions five was about how high a redwood tree can become, in both questions version A was the higher anchor (see appendix 1).

The normative answer to all the anchoring and adjustment questions should not be significant between the versions since the anchor value should have no effect on the participants' guess/preference. The results from the anchoring and adjustment questions are presented in table 1, As expected an anchoring effect was systematically found between the different versions of the questions. Also, as expected cognitive ability did not have any systematic effects on the anchoring effect, for some reason people who are good at regulation their emotions, high reappraisal and/or low DERS pays significantly more for the roses. This could possibly be explained by an affective value contributed to the roses and the situations where roses are present.

Table 3: Anchoring and Adjustment

1 Reap						DERS						CA						
V	High	Low	F(1,378)	P	Eta	V	High	Low	F(1,370)	P	Eta	V	High	Middle	Low	F	p	Eta
a	33.34 (36.07)	31.24 (34.76)	ER .877	ER .350	ER .002	a	33.81 (40.07)	31.80 (29.30)	ER .417	ER .519	ER .011	a	32.55 (35.34)	30.20 (32.75)	35.10 (39.27)	CA(2,376) .035	CA .965	CA .000
b	28.57 (28.96)	24.75 (21.90)	V 3.167	V .076	V .008	b	27.46 (28.46)	25.35 (21.72)	V 4.023	V .046	V .011	b	27.00 (26.18)	27.93 (28.74)	25.00 (21.70)	V(1,376) 3.497	V .062	V .009
			ER*V .74	ER*V .786	ER*V .000				ER*V .000	ER*V .000	ER*V .987					CA*V(2,376) .507	CA*V .603	CA*V .003
2 Reap						SUPP ***						CA						
V	High	Low	F(1,374)	P	Eta	V	High	Low	F(1,374)	P	Eta	V	High	Middle	Low	F	p	Eta
a	24.54 (18.98)	24.15 (19.27)	ER 1.072	ER .301	ER .003	a	23.46 (19.90)	25.74 (17.75)	ER .001	ER .978	ER .000	a	24.88 (14.53)	24.90 (22.38)	22.90 (19.46)	CA(2,372) .037	CA .964	CA .000
b	22.41 (18.17)	18.98 (15.14)	V 3.898	V .049	V .010	b	21.71 (18.30)	19.53 (14.81)	V 4.508	V .034	V .012	b	19.63 (13.66)	20.70 (15.44)	21.73 (20.67)	V(1,372) 3.589	V .059	V .010
			ER*V .677	ER*V .411	ER*V .002				ER*V 1.415	ER*V .235	ER*V .004					CA*V(2,372) .397	CA*V .672	CA*V .002
3 Reap						DERS						CA						
V	High	Low	F(1,377)	P	Eta	V	High	Low	F(1,369)	P	Eta	V	High	Middle	Low	F	p	Eta
a	45.71 (27.62)	37.27 (21.63)	ER 10.324	ER .001	ER .027	a	38.88 (24.88)	45.78 (25.33)	ER 5.804	ER .016	ER .015	a	45.55 (24.09)	41.73 (25.28)	36.88 (26.36)	CA(2,375) .967	CA .381	CA .005
b	38.48 (26.52)	31.03 (19.18)	V 7.414	V .007	V .019	b	32.51 (23.83)	37.74 (23.05)	V 8.190	V .004	V .719	b	34.69 (20.77)	35.18 (19.271)	34.56 (29.90)	V(1,375) 6.833	V .009	V .018
			ER*V .039	ER*V .843	ER*V .000				ER*V .109	ER*V .741	ER*V .000					CA*V(2,375) .900	CA*V .407	CA*V .005
4 Reap						DERS						CA						
V	High	Low	F(1,396)	P	Eta	V	High	Low	F(1,387)	P	Eta	V	High	Middle	Low	F	p	Eta
a	43.45 (32.52)	41.77 (29.52)	ER 2.834	ER .093	ER .007	a	45.99 (33.26)	38.97 (28.68)	ER .827	ER .364	ER .002	a	44.88 (26.25)	38.33 (39.84)	45.64 (27.29)	CA(2,395) 2.061	CA .129	CA .010
b	22.60 (23.81)	15.67 (10.99)	V 83.799	V .000	V .175	b	18.45 (20.88)	20.72 (16.55)	V 76.583	V .000	V .165	B	22.31 (15.63)	16.99 (11.06)	18.78 (27.03)	V(2,395) 83.659	V .000	V .175
			ER*V 1.032	ER*V .310	ER*V .003				ER*V 3.148	ER*V .77	ER*V .008					CA*V(2,395) .414	CA*V .661	CA*V .002
5 Reap						DERS						CA						
V	High	Low	F(1,395)	P	Eta	V	High	Low	F(1,387)	P	Eta	V	High	Middle	Low	F	p	Eta
a	178.2 (181.0)	141.19 (87.47)	ER .146	ER .703	ER .000	a	157.3 (166.5)	166.2 (116.0)	ER 1.337	ER .248	ER .003	a	171.4 (87.95)	153.7 (155.3)	156.3 (179.5)	CA(2,393) .498	CA .608	CA .003
b	749.8 (575.0)	819.6 (602.5)	V 212.646	V .000	V .350	b	835.7 (622.2)	726.2 (551.8)	V 202.733	V .000	V .344	b	709.3 (550.2)	825.4 (567.5)	802.6 (644.0)	V(1,393) 206.053	V .000	V .344
			ER*V 1.553	ER*V .213	ER*V .004				ER*V 1854	ER*V .174	ER*V .005					CA*V(2,393) .924	CA*V .398	CA*V .005

Table 3 shows the results from the Anchoring and Adjustment tasks, where Reap is reappraisal, SUPP is suppression, DERS is Difficulties in Emotion Regulation Scale, CA is cognitive ability, V is version, ER stands for emotion regulation, Version A is high anchor and version B is low anchor. Question 1/2/3 was about how much you would pay for wine/truffles/roses, question 4 was number of many African countries are in the UN and question 5 was about how high a Redwood tree can be.

3.3 Emotional Tasks

Below are the DM tasks that were assumed to be more affect-rich and therefore should be relatively more (than cognitive tasks) affected by ER. Overall, the normative response should be that there is no difference between the versions of all the questions (except the Money/kisses task) and that there is no significant difference between the ER groups or the cognitive ability groups.

3.3.1 Money/kisses

The Money/kisses questions were adapted from (Rottenstreich and Hsee, 2001), MK1 was about winning coupon that could be spent on a vacation in Europe and MK2 was about winning coupon that could be spent on purchasing food. MK3 was about paying to eliminate a risk of an electric shock and MK4 was about paying to eliminate the risk of getting a 20\$ fine. In all the questions version A was a 1% chance/risk and version B was a 99% risk (See appendix 1).

The normative response should be that the versions are significantly different from each other. Nor should it be any difference between version A for MK1 and MK2 and version B should also be the same for those two questions.

The results from the Money/kisses questions are presented in table 4, As can be seen cognitive ability have and impact of on the versions with 1% chances were the participants with higher cognitive ability accepted a significant lower amount of money to skip the gamble. That group was also willing to pay less to remove the 1% risk of getting the fine. These results might be interpreted that people with high cognitive ability might be less prone to follow prospect theory (Kahneman and Tversky, 1979) and overestimate small probabilities, compared to people with lower cognitive ability, however for the 99% probabilities high cognitive ability did not have the same strong systematic impact. ER did not seem to have an equal effect, but on the risk cases participants with a High DERS score, which indicate a lower ER-ability, were willing to pay more to avoid the risk of the fine which was a significant result.

It was also a difference between version A in MK1 and version A in MK2 $F(1,180) = 36.927, P = .000, \text{Eta} = .170$ (Repeated measures with Greenhouse-Geisser correction), With a significant interaction with cognitive ability $F(2,180) = 3.540, P = .031, \text{Eta} = .038$ (Repeated measures with Greenhouse-Geisser correction). And in version B between MK1 and MK2 were there not a significant difference, but the same tendency $F(1,175) = 3.542, P = .061, \text{Eta} = .020$ ((Repeated measures with Greenhouse-Geisser correction), with a nearly significant interaction with cognitive ability $F(2, 175) = 3.001, p = .52, \text{Eta} = .033$ (Repeated measures with Greenhouse-Geisser correction). The version with a higher affect value resulted in more reluctance to give up the chance of winning the prize.

Table 4: Money/Kisses

MK1 Reap						SUPP						CA						
V	High	Low	F(1,360)	P	Eta	V	High	Low	F(1,360)	P	Eta	V	High	Middle	Low	F	p	Eta
A	199.2 (315.8)	178.9 (273.9)	ER .001	ER .970	ER .000	A	178.7 (292.2)	204.9 (303.2)	ER .728	ER .394	ER .002	A	112.3 (188.2)	158.2 (264.6)	299.0 (376.0)	CA(2,358) 2.037	CA .132	CA .011
B	422.4 (296.0)	440.5 (265.9)	V 63.684	V .000	V .150	B	421.0 (283.3)	447.0 (275.9)	V 62.787	V .000	V .149	B	441.2 (238.0)	445.6 (288.5)	404.1 (310.1)	V(1,358) 64.548	V .000	V .153
			ER*V .0400	ER*V .527	ER*V .001				ER*V .000	ER*V .997	ER*V .000					CA*V(2,358) 5.033	CA*V .007	CA*V .027
MK2 Reap						SUPP						CA						
V	High	Low	F(1,381)	P	Eta	V	High	Low	F(1,381)	P	Eta	V	High	Middle	Low	F	p	Eta
A	108.9 (218.3)	118.2 (258.9)	V 112.072	V .000	V .227	A	119.5 (262.4)	105.0 (201.6)	V 110.772	V .000	V .225	A	53.58 (112.2)	82.83 (188.8)	215.3 (340.8)	V(1,379) 108.980	V .000	V .223
B	388.5 (296.5)	393.3 (248.7)	ER .073	ER .788	ER .000	B	391.3 (267.0)	390.4 (283.1)	ER .084	ER .772	ER .000	B	350.9 (225.7)	264.8 (298.6)	381.5 (302.0)	CA(2,379) 4.370	CA .013	CA .023
			ER*V .007	ER*V .933	ER*V .000				ER*V .066	ER*V .798	ER*V .000					CA*V(2,379) 4.275	CA*V .015	CA*V .022
MK3 Reap						DERS						CA						
V	High	Low	F(1,384)	P	Eta	V	High	Low	F(1,376)	P	Eta	V	High	Middle	Low	F	p	Eta
A	62.53 (127.5)	61.59 (123.2)	ER .342	ER .559	ER .001	A	68.09 (132.8)	46.27 (100.8)	ER 2.526	ER .113	ER .007	A	25.91 (47.88)	72.85 (131.5)	81.87 (155.2)	CA(2,382) 4.738	CA .009	CA .024
B	79.68 (146.7)	64.90 (128.1)	V .579	V .447	V .002	B	84.22 (141.8)	63.56 (137.2)	V 1.564	V .212	V .004	B	53.63 (120.5)	69.47 (127.2)	100.7 (168.4)	V(1,382) 1.154	V .283	V .003
			ER*V .265	ER*V .607	ER*V .001				ER*V .002	ER*V .966	ER*V .000					CA*V(1,382) .504	CA*V .604	CA*V .003
MK4 Reap						DERS						CA						
V	High	Low	F(1,382)	P	Eta	V	High	Low	F(1,373)	P	Eta	V	High	Middle	Low	F	p	Eta
a	3.40 (5.962)	2.68 (5.293)	ER 1.782	ER .183	ER .005	a	4.08 (6.634)	1.79 (3.879)	ER 15.367	ER .000	ER .040	a	1.05 (2.285)	2.93 (5.696)	5.50 (7.179)	CA(2,380) 3.410	CA .034	CA .018
b	9.71 (7.496)	8.65 (7.170)	V 84.355	V .000	V .181	b	10.40 (7.484)	7.51 (6.801)	V 83.116	V .000	V .182	B	9.56 (6.859)	8.70 (6.865)	9.28 (8.216)	V(1,380) 82.374	V .000	V .178
			ER*V .068	ER*V .795	ER*V .000				ER*V .210	ER*V .647	ER*V .001					CA*V(1,380) 3.997	CA*V .019	CA*V .021

Table 4 shows the results from the Anchoring and Adjustment tasks, where Reap is reappraisal, SUPP is suppression, DERS is Difficulties in Emotion Regulation Scale, CA is cognitive ability, V is version, ER stands for emotion regulation. Version A = 1% and version B = 99%, MK1 is a chance of winning a travel coupon, MK2 is a chance of winning a food coupon, MK3 is a risk of receiving an electric shock and MK4 is a risk of getting a fine.

3.3.2 Framing

The emotional task framing question was adopted from Tversky & Kahneman (1981), and was about choosing a program to handle an outbreak of an Asian disease, version A was a positive framing and version B a negative framing (see appendix 1).

Asian version A had a significant framing effect, with the distribution answer A 76.7% (valid percent) answer B 23.3% (valid percent) $n = 202$ $p < .0001$ with no significant interactions.

Asian version B had a significant framing effect, with the distribution answer A 35.9% (valid percent) answer B 64.1% (valid percent) $n = 198$ $p < .0001$. There was only one significant interaction and that was cognitive ability in Asian version B, High cognitive ability = 19(answer A) / 45 (answer B) Middle cognitive ability = 20(answer A) /49 (answer B) Low cognitive ability = 32(answer A) / 33(answer B). $n = 198$, $p = .023$, $\text{Eta} = .195$ (Cramer's V).

3.3.3 Panda

The panda question was about how much money you would donate to a panda (Rottenstreich & Hsee 2004), in version A the panda was anonymous and in version B the panda was given a name and a picture (see appendix 1).

In the panda question people with a high DERS value gave significantly more money to the panda than people with low DERS (i.e. better ER-ability), with the tendency that the difference between the groups was greater in the picture version, which can be seen in table 5. The other finding was that a low cognitive ability was a factor that increased the amount of money donated to the panda.

Table 5: Panda

Panda	Reap					V	DERS					V	CA					
	High	Low	F(1,396)	P	Eta		High	Low	F(1,387)	P	Eta		High	Middle	Low	F	p	Eta
a	40.38 (97.67)	30.90 (73.50)	ER 1.667	ER .197	ER .004	a	40.68 (84.50)	30.89 (91.06)	ER 7.658	ER .006	ER .019	a	22.54 (72.48)	21.75 (50.12)	69.52 (125.4)	CA(2,394) 11.955	CA .000	CA .057
b	56.04 (112.7)	41.11 (97.46)	V 1.872	V .172	V .005	b	69.53 (122.4)	27.40 (63.71)	V 1.927	V .177	V .005	b	27.16 (68.43)	38.22 (78.69)	83.27 (138.1)	V(1,394) 1.570	V .211	V .004
			ER*V .083	ER*V .773	ER*V .000				ER*V 2.971	ER*V .086	ER*V .008				CA*V(2,394) .151	CA*V .860	CA*V .001	

Table 5 shows the results from the Panda task, where Reap is reappraisal, SUPP is suppression, CA is cognitive ability, V is version, ER stands for emotion regulation. Version B the panda had a name and a picture unlike version A.

3.3.4 Fruit/chocolate

The Fruit/chocolate questions were adapted from (Shiv and Fedorikhin, 2002), in questions one the participant got to chose between a chocolate cake and a fruit salad. In questions two the choice was between luxury yoghurt and low-fat plain yoghurt. Version A of each question was in text and in version B it was a picture and text (See appendix 1).

In the fruit salad versus chocolate cake question nothing significant was found, but in the yoghurt question participants who scored higher on suppression was less likely to pick the luxurious yoghurt than people who scored low on suppression. What was strange was that the higher the cognitive ability the more likely the participants was to take the luxurious yoghurt as well, as can be seen in table 6.

Table 6: Fruit/Chocolate

CF1		Reap					SUPP					CA						
V	High	Low	F(1,396)	P	Eta	V	High	Low	F(1,396)	P	Eta	V	High	Middle	Low	F	p	Eta
a	3.05 (1.958)	3.30 (1.767)	ER .107	ER .744	ER .000	a	3.21 (1.796)	3.13 (1.963)	ER .047	ER .524	ER .001	a	3.21 (1.895)	3.23 (1.798)	3.07 (1.943)	CA(2,394) 1.175	CA .310	CA .006
b	3.47 (2.002)	3.10 (1.792)	V .317	V .574	V .001	b	3.37 (1.874)	3.20 (1.965)	V .360	V .549	V .001	b	3.37 (1.958)	3.50 (1.856)	2.97 (1.913)	V(1,394) .332	V .571	V .001
			ER*V 2.575	ER*V .109	ER*V .006				ER*V .046	ER*V .830	ER*V .000				CA*V(2,394) .338	CA*V .713	CA*V .002	
CF2		Reap					SUPP					CA						
V	High	Low	F(1,396)	P	Eta	V	High	Low	F(1,396)	P	Eta	V	High	Middle	Low	F	p	Eta
a	4.83 (1.616)	4.61 (1.470)	ER .325	ER .569	ER .001	a	4.51 (1.495)	4.97 (1.579)	ER 11.268	ER .001	ER .028	a	4.97 (1.488)	4.64 (1.521)	4.54 (1.629)	CA(2,394) 5.629	CA .004	CA .028
b	4.68 (1.603)	4.73 (1.312)	V .004	V .950	V .000	b	4.48 (1.535)	5.04 (1.307)	V .014	V .907	V .000	b	5.18 (1.118)	4.55 (1.398)	4.43 (1.746)	V(1,394) .000	V .996	V .000
			ER*V .793	ER*V .374	ER*V .002				ER*V .121	ER*V .728	ER*V .000				CA*V(2,394) .486	CA*V .615	CA*V .002	

Table 6 shows the results from the Fruit/Chocolate tasks where Reap is reappraisal, SUPP is suppression, CA is cognitive ability, V is version, ER stands for emotion regulation. CF1 is choice between fruit sala and chocolate cake, CF2 is a choice between luxurious or plain yoghurt.

3.3.5 Feedback in choices

The feedback in choices question collected from (Zeelenberg et al, 1998), the task was to say if you would invest in a Government Bond, in version A it was explicitly stated that you would be given feedback of the results of the Bond if you did not invest, this was removed in version B (See appendix 1).

The normative answer would be that there was no difference between the versions. The only significant find in the feedback questions was that participants with high DERS was slightly more likely to invest than participants with low DERS $F(1,387)=9.896$ $p = .002$ $Eta = .025$.

3.3.6 Gamble Regret

The Gamble Regret task was taken from (Marcatto and Ferrante, 2008) and version B just stated that you did not win and version A stated “If you had selected this wheel you would have won 1000USD.” (See appendix 1). As can be seen in table 7 the version of the gamble questions gave significant results for the emotions anger, sadness and regret where in all the cases version A gave a stronger emotional response. An interpretation of this might be that anger, sadness and regret are more affected by additional information than the rest of the emotions presented here.

Participants with a high DERS score gave significant more weight to every emotion, except disappointed. A high reappraisal value gave a significant lower value of regret and reappraisal also has a tendency to lower sadness. A higher cognitive ability correlated with lower happiness and significantly more disappointment.

Table 7: Gamble Regret

G_1		Reap					DERS					CA						
V	High	Low	F(1,393)	P	Eta	V	High	Low	F(1,385)	P	Eta	V	High	Middle	Low	F	p	Eta
a	35.98 (34.03)	38.20 (30.95)	ER 3.838	ER .051	ER .010	a	43.68 (31.33)	31.01 (32.89)	ER 19.887	ER .000	ER .049	a	34.98 (32.46)	36.12 (32.75)	39.79 (32.62)	CA(2,391) .770	CA .464	CA .004
b	23.87 (26.57)	33.56 (28.27)	V 7.592	V .006	V .019	b	35.25 (28.26)	20.92 (25.15)	V 9.360	V .002	V .024	b	25.41 (28.09)	30.23 (28.07)	30.18 (27.05)	V(1,391) 7.320	V .007	V .018
			ER*V 1.511	ER*V .220	ER*V .004				ER*V .076	ER*V .784	ER*V .000				CA*V(2,391) .173	CA*V .842	CA*V .001	
G_2		Reap					DERS					CA						
V	High	Low	F(1,394)	P	Eta	V	High	Low	F(1,386)	P	Eta	V	High	Middle	Low	F	p	Eta
a	48.80 (34.16)	54.21 (30.34)	ER 3.330	ER .069	ER .008	a	56.13 (30.31)	47.82 (33.91)	ER 7.958	ER .005	ER .020	a	54.32 (32.75)	54.04 (32.57)	46.07 (31.74)	CA(2,392) 2.263	CA .105	CA .011
b	41.33 (29.11)	47.24 (29.24)	V 5.409	V .021	V .014	b	48.54 (28.20)	39.27 (29.69)	V 6.714	V .010	V .017	b	48.10 (31.28)	43.47 (28.97)	39.90 (26.59)	V(1,392) 5.974	V .015	V .015
			ER*V .006	ER*V .935	ER*V .000				ER*V .024	ER*V .877	ER*V .000				CA*V(2,392) .234	CA*V .792	CA*V .001	
G_3		Reap					DERS					CA						
V	High	Low	F(1,390)	P	Eta	V	High	Low	F(1,383)	P	Eta	V	High	Middle	Low	F	p	Eta
a	20.26 (30.63)	14.53 (21.83)	ER .448	ER .505	ER .001	a	19.95 (26.70)	13.05 (24.23)	ER 9.555	ER .002	ER .024	a	7.288 (18.17)	15.35 (23.06)	28.61 (32.61)	CA(2,388) 32.073	CA .000	CA .142
b	19.67 (30.53)	21.65 (27.66)	V 1.342	V .247	V .003	b	24.58 (29.94)	14.62 (25.60)	V 1.293	V .256	V .003	b	8.424 (15.69)	18.21 (28.23)	39.82 (33.99)	V(1,388) 3.677	V .056	V .009
			ER*V 1.872	ER*V .172	ER*V .005				ER*V .315	ER*V .575	ER*V .001				CA*V(2,388) 1.306	CA*V .272	CA*V .007	
G_4		Reap					DERS					CA						
V	High	Low	F(1,393)	P	Eta	V	High	Low	F(1,385)	P	Eta	V	High	Middle	Low	F	p	Eta
a	47.94 (35.51)	56.40 (34.13)	ER 3.966	ER .047	ER .010	a	57.32 (33.20)	47.79 (36.32)	ER 9.086	ER .003	ER .023	a	56.86 (36.32)	50.19 (35.75)	49.97 (33.18)	CA(2,391) .210	CA .811	CA .001
b	36.51 (29.00)	41.21 (31.98)	V 16.249	V .000	V .040	b	43.94 (30.61)	33.46 (29.32)	V 17.435	V .000	V .043	b	37.39 (28.47)	39.38 (33.00)	39.70 (29.74)	V(1,391) 16.263	V .000	V .040
			ER*V .324	ER*V .570	ER*V .001				ER*V (.020)	ER*V .887	ER*V .000				CA*V(2,391) .774	CA*V .462	CA*V .004	
G_5		Reap					SUPP					CA						
V	High	Low	F(1,395)	P	Eta	V	High	Low	F(1,395)	P	Eta	V	High	Middle	Low	F	p	Eta
a	59.59 (35.31)	67.64 (28.68)	ER 1.548	ER .214	ER .004	a	58.93 (32.46)	68.45 (31.93)	ER 3.965	ER .047	ER .010	a	72.92 (27.96)	63.68 (34.15)	55.17 (32.35)	CA(2,393) 7.931	CA .000	CA .039
b	61.20 (32.80)	61.25 (32.42)	V .537	V .464	V .001	b	59.86 (32.16)	63.47 (33.25)	V .377	V .540	V .001	b	67.22 (30.95)	61.82 (33.19)	52.32 (32.29)	V(1,393) 1.144	V .285	V .003
			ER*V 1.510	ER*V .220	ER*V .004				ER*V .802	ER*V .371	ER*V .002				CA*V(2,393) .129	CA*V .879	CA*V .001	
G_6		Reap					DERS					CA						
V	High	Low	F(1,388)	P	Eta	V	High	Low	F(1,381)	P	Eta	V	High	Middle	Low	F	p	Eta
a	11.53 (24.22)	15.71 (23.56)	ER 2.701	ER .101	ER .007	a	19.90 (26.52)	6.921 (19.18)	ER 26.326	ER .000	ER .065	a	5.831 (14.15)	10.39 (18.22)	23.67 (31.79)	CA(2,386) 27.399	CA .000	CA .124
b	14.08 (23.89)	17.93 (24.93)	V .957	V .329	V .002	b	21.34 (26.29)	9.651 (20.62)	V .752	V .386	V .002	b	4.682 (12.15)	16.56 (24.32)	29.92 (29.19)	V(1,386) 2.597	V .108	V .007
			ER*V .005	ER*V .947	ER*V .000				ER*V .072	ER*V .877	ER*V .000				CA*V(2,386) 1.101	CA*V .333	CA*V .006	

Table 7 shows the results from the Anchoring and Adjustment tasks, where Reap is reappraisal, SUPP is suppression, DERS is Difficulties in Emotion Regulation Scale, CA is cognitive ability, V is version, ER stands for emotion regulation. Version A is with more negative information. All the questions is about a specific emotion, where G_1 is Angry, G_2 is Sad, G_3 is Happy, G_4 is Regretful, G_5 is Disappointed, G_6 is Fearful.

3.3.7 Moral dilemma

The moral dilemmas consisted of three questions (Greene et al, 2008) where question one was if it was appropriate to kill an injured man to save the lives of others, question two was to kill a man to save the life of others and question three was if you would take money from a wallet you found. To this question there are no normative answers (See appendix 1).

As can be seen in table 8, a bit surprisingly, is that reappraisal was no indication at all to the outcome of the questions. DERS on the other hand showed that participants with a lower ER-ability was more likely to answer yes to all three dilemmas (taking the money, throw the person overboard, push the stranger) than participants with higher ER-ability. Higher cognitive ability (in the case of money and the stranger) was also a significant factor in choosing not to take the money or push the stranger. An interpretation of this is could be that the ability to regulate your emotions has a synergy effect with becoming less of a utilitarian.

Table 8: Moral Dilemma

MD1	Reap					DERS					CA					
	High	Low	F(1,398)	P	Eta	High	Low	F(1,389)	P	Eta	High	Middle	Low	F	p	Eta
	3.93 (1.817)	3.87 (1.578)	ER .136	ER .713	ER .000	3.67 (1.638)	4.16 (1.732)	ER 8.200	ER .004	ER .021	3.82 (1.748)	4.05 (1.656)	3.80 (1.718)	CA(2,397) .948	CA .389	CA .005
MD2	Reap					DERS					CA					
	High	Low	F(1,398)	P	Eta	High	Low	F(1,389)	P	Eta	High	Middle	Low	F	p	Eta
	4.79 (1.532)	4.68 (1.402)	ER .568	ER .453	ER .001	4.37 (1.536)	5.19 (1.206)	ER 34.624	ER .000	ER .082	5.02 (1.221)	4.75 (1.466)	4.44 (1.657)	CA(2,397) 4.820	CA .009	CA .024
MD3	Reap					DERS					CA					
	High	Low	F(1,398)	P	Eta	High	Low	F(1,389)	P	Eta	High	Middle	Low	F	p	Eta
	5.29 (1.345)	5.15 (1.275)	ER 1.095	ER .296	ER .003	4.92 (1.451)	5.58 (1.028)	ER 26.293	ER .000	ER .063	5.49 (1.126)	5.26 (1.246)	4.91 (1.505)	CA(2,397) 6.122	CA .002	CA .030

Table 8 shows the results from the Anchoring Moral Dilemma tasks, where Reap is reappraisal, DERS is Difficulties in Emotion Regulation Scale, CA is cognitive ability, ER stands for emotion regulation. MD1 is the Lifeboat task, MD2 is the Footbridge task, MD3 is the Lost Wallet task.

3.3.8 Affect Heuristics

The Affect Heuristics task was a series of statements where risk and benefit of the statements was estimated by the participants (See appendix 1), the statements was collected from (Weber et al, 2002).

The results of the affect Heuristics might be a bit counter intuitively as the bias of risk and benefit, namely that when the perceived risk goes up the perceived benefit goes down and vice versa, was greater for participants with higher cognitive ability, with low cognitive ability you answered that the risk and benefit went together. The same goes for ER-ability; participants with high ER (i.e. low DERS) perceived risk and benefit to be unrelated, as can be seen in table 9 and table 10.

This was however not true for reappraisal in the question of unprotected sex, high reappraisal shrinks the gap between perceived risk and benefits in this case, the same goes for suppression in the question of downloading software. Why these questions yielded this result is however unclear.

Table 9: Affect Heuristics

HA1	Reap						DERS				CA							
	High	Low	PHigh	PLow	Fisher r-to-z		High	Low	PHigh	PLow	Fisher r-to-z		High	Middle	Low	PHigh	PMed	PLow
Risk Benefit	.259 (205)	.330 (189)	ER .000	ER .000	Z -.077	P .441	.402 (201)	.086 (185)	ER .000	ER .246	Z 3.31	P .001	.095 (127)	.380 (149)	.339 (118)	CA .287	CA .000	CA .000
															H-M Z -2.5	P .012		
															H-L Z -1.99	P .047		
HA2	Reap						DERS				CA							
Risk Benefit	High	Low	PHigh	PLow	Fisher r-to-z		High	Low	PHigh	PLow	Fisher r-to-z		High	Middle	Low	PHigh	PMed	PLow
	.037 (205)	-.057 (189)	ER .597	ER .433	Z .93	P .352	.054 (201)	-.083 (185)	ER .445	ER .263	Z 1.34	P .180	-.106 (127)	-.012 (149)	.092 (118)	CA .237	CA .883	CA .323
															H-M Z -.77	P .441		
															H-L Z -1.53	P .126		
HA3	Reap						SUPP				CA							
Risk Benefit	High	Low	PHigh	PLow	Fisher r-to-z		High	Low	PHigh	PLow	Fisher r-to-z		High	Middle	Low	PHigh	PMed	PLow
	-.222 (205)	-.106 (189)	ER .001	ER .147	Z -1.17	P .242	-.125 (225)	-.257 (169)	ER .062	ER .001	Z 1.34	P .180	-.074 (127)	-.247 (149)	-.150 (118)	CA .409	CA .002	CA .105
															H-M Z 1.46	P .144		
															H-L Z .59	P .555		
HA4	Reap						DERS				CA							
Risk Benefit	High	Low	PHigh	PLow	Fisher r-to-z		High	Low	PHigh	PLow	Fisher r-to-z		High	Middle	Low	PHigh	PMed	PLow
	-.107 (205)	-.182 (189)	ER .127	ER .012	Z .75	P .453	-.032 (201)	-.251 (185)	ER .649	ER .001	Z 2.19	P .029	-.215 (127)	-.177 (149)	-.063 (118)	CA .015	CA .031	CA .500
															H-M Z -.032	P .749		
															H-L Z -1.2	P .230		
HA5	Reap						DERS				CA							
Risk Benefit	High	Low	PHigh	PLow	Fisher r-to-z		High	Low	PHigh	PLow	Fisher r-to-z		High	Middle	Low	PHigh	PMed	PLow
	-.118 (203)	-.098 (186)	ER .094	ER 1.85	Z -.2	P .842	-.009 (198)	-.228 (183)	ER .899	ER .002	Z 2.16	P .031	-.238 (127)	-.150 (144)	.022 (118)	CA .007	CA .073	CA .810
															H-M Z -.74	P .459		
															H-L Z -2.04	P .041		
															M-L Z -1.38	P .168		

Table 9 shows the results from the Affect Heuristic tasks 1 to 5, where Reap is reappraisal, SUPP is suppression, DERS is Difficulties in Emotion Regulation Scale, CA is cognitive ability, ER stands for emotion regulation. The correlation between Risk and Benefit for the groups are presented and Fishers t-to-z to see if there is a significant difference between the correlations. See appendix 1 to view the questions.

Table 10:

HA6		Reap					SUPP					CA					
Risk	Benefit	High	Low	PHigh	PLow	Fisher r-to-z	High	Low	PHigh	PLow	Fisher r-to-z	High	Middle	Low	PHigh	PMed	PLow
		-.082 (205)	-.398 (189)	ER .242	ER .000	Z 3.34 P .001	-.226 (225)	-.284 (189)	ER .001	ER .000	Z .062 P .535	-.315 (127)	-.323 (149)	-.170 (118)	CA .000	CA .000	CA .066
														H-M	Z .07	P .944	
														H-L	Z -1.19	P .234	
HA7		Reap					DERS					CA					
Risk	Benefit	High	Low	PHigh	PLow	Fisher r-to-z	High	Low	PHigh	PLow	Fisher r-to-z	High	Middle	Low	PHigh	PMed	PLow
		-.126 (205)	-.038 (189)	ER .073	ER .602	Z -.87 P .384	.000 (201)	-.154 (185)	ER .996	ER .037	Z 1.51 P .131	-.104 (127)	.009 (149)	-.173 (118)	CA .247	CA .918	CA .061
														H-M	Z -.93	P .352	
														H-L	Z .54	P .589	
HA8		Reap					DERS					CA					
Risk	Benefit	High	Low	PHigh	PLow	Fisher r-to-z	High	Low	PHigh	PLow	Fisher r-to-z	High	Middle	Low	PHigh	PMed	PLow
		-.023 (204)	-.054 (189)	ER .743	ER .458	Z .31 P .757	.032 (201)	-.049 (185)	ER .651	ER .505	Z .79 P .430	-.225 (126)	-.057 (149)	-.010 (118)	CA .011	CA .491	CA .912
														H-M	Z -1.4	P .162	
														H-L	Z -1.69	P .091	
HA9		Reap					SUPP					CA					
Risk	Benefit	High	Low	PHigh	PLow	Fisher r-to-z	High	Low	PHigh	PLow	Fisher r-to-z	High	Middle	Low	PHigh	PMed	PLow
		-.222 (205)	-.206 (187)	ER .001	ER .005	Z -.016 P .873	-.098 (223)	-.382 (169)	ER .146	ER .000	Z 2.96 P .003	-.450 (127)	-.246 (148)	-.038 (117)	CA .000	CA .003	CA .687
														H-M	Z -1.91	P .056	
														H-L	Z -3.44	P .001	
HA10		Reap					DERS					CA					
Risk	Benefit	High	Low	PHigh	PLow	Fisher r-to-z	High	Low	PHigh	PLow	Fisher r-to-z	High	Middle	Low	PHigh	PMed	PLow
		-.067 (205)	.002 (189)	ER .339	ER .983	Z -.068 P .497	.074 (201)	-.139 (185)	ER .296	ER .058	Z 2.08 P .038	-.222 (127)	.111 (149)	-.090 (118)	CA 0.12	CA .179	CA .333
														H-M	Z -2.76	P .006	
														H-L	Z -1.05	P .294	
														M-L	Z 1.62	P .105	

Table 10 shows the results from the Affect Heuristic tasks 6 to 10, where Reap is reappraisal, SUPP is suppression, DERS is Difficulties in Emotion Regulation Scale, CA is cognitive ability, ER stands for emotion regulation. The correlation between Risk and Benefit for the groups are presented and Fishers t-to-z to see if there is a significant difference between the correlations. See appendix 1 to view the questions.

4 General Discussion

This study showed that ER has a systematic effect on DM. ER influenced the answers to several questions in to the same magnitude as cognitive ability. This study showed that ER was associated with DM tasks in way that is different from how cognitive ability is associated with DM tasks (Stanovic & West, 2008). It is important to note that the effects of ER however were modest, in different circumstances, such as an stressful environment or when the decision maker is in a extreme emotional state, it might have an much greater impact on the decision making. Therefore I believe it important to continue to investigate how and when emotion regulation ability affects decision making in real life situations. It is a logical consequence that if emotions are part of the decision making then the ability to regulate your emotional state has an implicit impact on the final decision. Since effects was found in the DM tasks it shows that it also is be a factor of the general construct decision making competence.

Reappraisal seemed to have no effect on framing in this study. This could at first glance be interpreted as a conflict with results from Miu and Crisan (2011), which showed that reappraisal, weakened the framing effect for framing. If the differences between the studies are highlighted on the other hand this might not be a conflict after all, since Miu and Crisan (2011) explicitly instructed the participants to use reappraisal as strategy when making the decisions and in this study this was not the case.

Stanovich and West's (2008) argument that intelligent people where not much less prone to be affected by biases unless they were explicitly told about the bias in advance, might be true for ER strategies as well. This is also strengthened in the article by Wout et al (2010), where they told participants to use a reappraisal, suppression, or normal strategy. What they found was that participants whom used reappraisal accepted more bids in the Ultimatum Game and therefore gained more money than the other groups. However they compared the strategies with the participants' baseline that was measured either before or after the strategy was introduced, and there was no significant difference between the two baseline measures. It did not make any difference if they had a regulation instruction and practice on their performance if they were not explicitly told to use the regulation strategy.

But what does this mean for the DM tasks where ER already correlated with a difference in the outcome to the tasks? It might be that these tasks are either more like normal situations when people usually regulate their emotions or the tasks contained more cues that prompt the participants to use ER abilities. This could be interesting for future studies to conclude.

This brings up the questions can you train people to use emotion regulations strategies in their everyday life without explicit instructions on when to do so, and if so how much practice does it take? Might this be one way of increasing peoples decision making competence and help them to generally improve their life.

If we compare the results from this study with the results from the previously discussed article (Wout et al, 2010; Halperin, 2013; Miu ad Crisan, 2011; Yip and Côté, 2013), then the framework for conceptualizing individual differences on heuristics and biases tasks (Stanovich and West 2008) would work for emotions as well as cognitive ability and maybe the same processes is going on simultaneously for emotions as well as cognitive ability.

5 Conclusion

DERS was the ER measure that was significantly associated most frequently with the DM tasks, more so on the more emotional questions. ER seemed to be a factor in the participants' decision making competence, where difference in reappraisal had more significant results in the DM tasks that was assumed to be cognitive, than the other measures of ER in those tasks. In one way this is not surprising since reappraisal is reevaluating the situation and therefore more like problem focused thinking, which is considered a more cognitive process. But, on the other hand, when reappraisal reached a level of significance cognitive ability did not. In every DM task reappraisal did not correlate with cognitive ability, except for some questions in the affect heuristic. Overall was reappraisal, which according to earlier studies should correlate with decision outcomes, especially in moral and risk judgments (Halpertin et al 2013), was not a prominent factor in the emotional DM tasks.

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Appendix 1

Block One

Block One consisted of the following questions:

Panda

Version *a*:

A group of scientists have discovered a wild Panda in a remote region of China. They are now raising money to save that panda.

How much would you be willing to donate to help save that panda?

Indicate a dollar amount between 0-500USD: _____

In version *b* the panda was given a name and a picture.

Moral dilemmas

Lifeboat

You are on a cruise ship when there is a fire on board, and the ship has to be abandoned. The lifeboats are carrying many more people than they were designed to carry. The lifeboat you're in is sitting dangerously low in the water—a few inches lower and it will sink.

The seas start to get rough, and the boat begins to fill with water. If nothing is done it will sink before the rescue boats arrive and everyone on board will die. However, there is an injured person who will not survive in any case. If you throw that person overboard the boat will stay afloat and the remaining passengers will be saved.

Is it appropriate for you to throw this person overboard in order to save the lives of the remaining passengers?

Yes (completely sure), yes somewhat certain –yes uncertain - NO uncertain, NO somewhat certain, no completely certain

Footbridge

A runaway trolley is heading down the tracks toward five workmen who will be killed if the trolley proceeds on its present course. You are on a footbridge over

the tracks, in between the approaching trolley and the five workmen. Next to you on this footbridge is a stranger who happens to be very large.

The only way to save the lives of the five workmen is to push this stranger off the bridge and onto the tracks below where his large body will stop the trolley. The stranger will die if you do this, but the five workmen will be saved.

Is it appropriate for you to push the stranger on to the tracks in order to save the five workmen?

Yes (completely sure), yes somewhat certain –yes uncertain - NO uncertain, NO somewhat certain, no completely certain

Lost Wallet

You are walking down the street when you come across a wallet lying on the ground. You open the wallet and find that it contains several hundred dollars in cash as well the owner's driver's license.

From the credit cards and other items in the wallet it's very clear that the wallet's owner is wealthy. You, on the other hand, have been hit by hard times recently and could really use some extra money. You consider sending the wallet back to the owner without the cash, keeping the cash for yourself.

Is it appropriate for you to keep the money you found in the wallet in order to have more money for yourself?

Yes (completely sure), yes somewhat certain –yes uncertain - NO uncertain, NO somewhat certain, no completely certain

Money/kisses

Question 1 a / b:

Imagine the following scenario: you have dreamed of going to Europe for a long time, and you plan to take your first trip there this summer. You will visit Paris, Venice, and Rome.

Imagine that you have a 1% (99% in b) chance of receiving a coupon worth of \$500 that can be redeemed toward expenses associated with a summertime European vacation.

How much money would you have to be offered so that you decline the chance of winning?

Question 2 a / b:

Imagine that you have a 1% (99% in b) chance of receiving a coupon worth of \$500 that can be redeemed to purchase food.

How much money would you have to be offered so that you decline the chance of winning?

Question 3 a / b:

Imagine that you have a 1% (99% in b) risk of receiving a short, painful, but not dangerous electric shock.

How much money would you pay to eliminate the risk of getting the shock?

Question 4 a / b:

Imagine that you have a 1% (99% in b) risk of a 20\$ fine.

How much money would you pay to eliminate the risk of getting the fine?

Anchoring and adjustment

Question 1:

First, please write down the last two digits of your social security number:

Now, Imagine that you want to purchase a bottle of fine Cabernet Sauvignon wine, bottled in 2001. The brand is very well known and respected and the wine is described as having full body, a dry texture, good balance, and incorporating such flavors as rose petal, raisin, black licorice, black cherry, cassis, cranberry, and plum.

Would you buy this bottle of wine for a dollar amount equal to the last two digits of your social security number?

Yes or No

What is the maximum amount you would be willing to pay for this bottle of wine?

Question 2:

Now, imagine you are purchasing a box of luxury chocolate truffles from a fine chocolatier. The box contains 25 assorted truffles of various flavors including caramel, coconut, roasted almond, mint, French vanilla, chocolate raspberry, dark chocolate, and more.

Would you buy these truffles for a dollar amount equal to the last two digits of your social security number?

Yes or No

What is the maximum amount you would be willing to pay for these truffles?

Question 3:

Finally, imagine you want to purchase a dozen red roses arranged in a glass vase from a local florist. You plan to have these roses delivered to someone very close to you on a special occasion. Would you buy these roses for a dollar amount equal to the last two digits of your social security number?

Yes or No

What is the maximum amount you would be willing to pay for these roses?

Question 2 version a:

1. Do you think there are less than 65 African countries in the United Nations?

Yes or No

How many African countries do you think are in the United Nations?

Question 2 version b:

Do you think there are more than 12 African countries in the United Nations?

Yes or No

How many African countries do you think are in the United Nations?

Question 3 version a:

Is the tallest redwood tree in the world more than 85 feet tall?

Yes or No

How tall do you think the tallest redwood tree in the world is?

Question 3 version b:

Is the tallest redwood tree in the world more than 1000 feet tall?

Yes or No

How tall do you think the tallest redwood tree in the world is?

Fruit/Chocolate

Question 1 a:

Imagine that you have a choice between a fruit salad and a chocolate cake. They are equally priced in a local store.

Which would you prefer? The chocolate or the fruit salad?

Chocolate 1 2 3 4 5 6 Fruit salad

In version b a picture of a chocolate cake and a fruit salad was shown.

Question 2a:

Imagine that you have a choice between a low-fat, but less tasty, plain yogurt and more luxury and more tasty yogurt. They are equally priced in a local store.

Which would you prefer, right now? The plain or the luxury yogurt?

Plain yogurt 1 2 3 4 5 6 Luxury yogurt

In version b a picture of a bowl of yogurt was shown.

AFFECT HEURISTIC

For each of the following statements,

*Rate and indicate **how risky you perceive** each situation. Provide a rating from 1 to 5, using the following scale:*

1 2 3 4 5
Not at all risky Moderately risky Extremely risky

Then rate and indicate **the benefits** you would obtain from each situation. Provide a rating from 1 to 5, using the following scale:

1	2	3	4	5
No benefits at all		Moderate benefits		Great benefits

1. Admitting that your tastes are different from those of a friend.
Risk: ___ Benefit: ___
2. Disagreeing with an authority figure on a major issue.
Risk: ___ Benefit: ___
3. Betting a day's income at a high-stake poker game.
Risk: ___ Benefit: ___
4. Investing 5% of your annual income in a very speculative stock.
Risk: ___ Benefit: ___
5. Approaching your boss for a raise.
Risk: ___ Benefit: ___
6. Engaging in unprotected sex.
Risk: ___ Benefit: ___
7. Gambling a week's income at a casino.
Risk: ___ Benefit: ___
8. Choosing a career that you truly enjoy over a more prestigious one.
Risk: ___ Benefit: ___
9. Downloading proprietary software from the Internet.
Risk: ___ Benefit: ___
10. Speaking your mind about an unpopular issue in a meeting at work.
Risk: ___ Benefit: ___

Block Two

Block Two consisted of the following questions.

Conjunction Fallacy

Questions 1:

Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.

Which is more probable?

- 1: Linda is a bank teller.
- 2: Linda is a bank teller and is active in the feminist movement.

Questions 2:

Consider a regular six-sided die with four green faces and two red faces. The die will be rolled 20 times and the sequence of greens (G) and reds (R) will be recorded. You are asked to select one sequence, from a set of three, and you will win \$25 if the sequence you choose appears on successive rolls of the die.

- 1: *RGRRR*
- 2: *GRGRRR*
- 3: *GRRRRR*

Questions 3:

Suppose New York Giants (NYG) reaches the Super Bowl this year. Please rank the following outcomes from most to least likely.

- 1: *NYG will lead after the first quarter but win the Game*
- 2: *NYG will win the Game*
- 3: *NYG will lead after the first quarter but lose the Game*

Proportion dominance effect

Question 1 version a:

Imagine that highway safety experts have determined that a substantial number of people are at risk of dying in a type of automobile fire. A requirement that every car have a built-in fire extinguisher (estimated cost, \$300) would save the 150 people who would otherwise die every year in this type of automobile fire. Rate the following statement about yourself:

I would be supportive of this requirement.

- | | | | | | |
|--------------------------|---|---|---|---|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| <i>Strongly disagree</i> | | | | | <i>strongly agree</i> |

In version b the question was change to *save 98% of the 150 people*

Question 2 version a:

You have recently graduated from the University, obtained a good job, and are buying a new car. A newly designed seatbelt has just become available that would save the lives of the 500 drivers a year who are involved in a type of head-on-collision. (Approximately half of these fatalities involve drivers who were not at fault.) The newly designed seatbelt is not yet standard on most car models. However, it is available as a \$500 option for the car model that you are ordering.

How likely is it that you would order your new car with this optional seatbelt?

- | | | | | | |
|--------------------|---|---|---|---|----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| <i>Very likely</i> | | | | | <i>Very unlikely</i> |

In version b the question was change to *save 98% of the 500 drivers*

Imagine that if you selected a colored bean, you would WIN \$5. Would you prefer to pick from bowl A or bowl B?

Bowl A 6 5 4 3 2 1 0 1 2 3 4 5 6 Bowl B

A picture of the bowls and the percentage of colored jellybeans in that each bowl underneath.

Time Discounting Task

Question 1/2:

Imagine that you participate in a lottery where you are asked to choose one of two prizes. The prizes vary in amount and when they will be given to you. Circle how likely you are to choose prize A or B.

Prize A. \$100 that would be given to you right now. /\$10 that would be given to you right now.

Prize B. \$110 that would be given to you in a month. /\$15 that would be given to you in a week.

Much more likely to choose prize A 6 5 4 3 2 1 Slightly more likely to choose prize A

Slightly more likely to choose prize B 1 2 3 4 5 6 Much more likely to choose prize B

Feedback in Choices

Version a:

A relative has just died and left you \$1000. You now have to decide how to invest the money for next five years. Your uncle has also left your sister \$1000, but her money is already invested for the same five years period in a Government Bond, which is guaranteed to pay back a total sum between \$1000 and \$1800 at the end of the five years.

You can choose to invest your money in this type of investment too. A friend has just told you about another type of investment which you could choose, a High Interest Account, which is guaranteed to pay back a total sum between \$1250 and \$1350 at the end of the five years.

You know that at the end of the five years you will find out how much money you would have made if you had chosen the Government Bond because your sister will tell you.

Rate how likely you are to invest:

1	2	3	4	5	6	7
Definitely would not invest						Definitely would invest

In version b "You know that at the end of the five years you will find out how much money you would have made if you had chosen the Government Bond because your sister will tell you." was removed before the rating.

Gambles Regret

Imagine taking part in a gambling game. Consider the two following wheels of fortune:

Wheel A:

50% chance of winning 500USD

50% chance of winning Nothing

Wheel B:

25% chance of winning 1000USD

75% chance of winning nothing

*Wheel A gives you a 50% chance of winning 500 USD
and wheel B gives you a 25% chance of winning 1000 USD.*

Version A

*You have to choose the wheel you wish to play and then
to push the start button: The arrows inside the wheels will
begin to spin, and if the arrow inside your chosen wheel
stops on the gray sector, you will win the money prize!*

*You consider your choice, and then decide to play
wheel A. You push the start button. The arrows on both
wheels begin to spin quickly. After approximately ten
seconds they stop: Unfortunately the arrow of your wheel
has stopped on the white sector and you have not won
anything! The arrow of wheel B, instead, has stopped on
the grey zone: If you had selected this wheel you would
have won 1000USD.*

On a scale from 0 to 100, how would you feel?

Angry

Sad

Happy

Regretful

Disappointed

Fearful

Version B

*You have to choose the wheel you wish to play and then to
push the start button: The arrow inside the chosen wheel
will begin to spin, if it stops on the gray sector, you will
win the money prize!*

*You consider your choice, and then decide to play
wheel A. You push the start button. The arrow on the
wheel begins to spin quickly. After approximately ten
seconds it stops: Unfortunately it has stopped on the
white sector and you have not won anything*

On a scale from 0 to 100, how would you feel?

Angry
Sad
Happy
Regretful
Disappointed
Fearful

DERS

The reduced version of DERS contained the following items:

I am clear about my feelings.

I pay attention to how I feel.

I experience my emotions as overwhelming and out of control.

I have no idea how I am feeling.

I have difficulty making sense out of my feelings.

I am attentive to my feelings.

I know exactly how I am feeling.

I care about what I am feeling.

I am confused about how I feel.

When I'm upset, I have difficulty getting work done.

When I'm upset, I become out of control.

When I'm upset, I believe that I will remain that way for a long time.

When I'm upset, I believe that I'll end up feeling very depressed.

When I'm upset, I believe that my feelings are valid and important.

When I'm upset, I have difficulty focusing on other things.

When I'm upset, I feel out of control..

Emotion regulation quick question

Emotion regulation quick question which was the following two questions:

When experiencing negative emotion I usually:

Focus on what caused the feeling to change how I am feeling

Not at all 1 2 3 4 5 6 Very much

Focus on changing the feeling by doing something else (distract myself, think about it differently, etc)

Not at all 1 2 3 4 5 6 Very much