EVALUATION OF STUDENT'S PREDISPOSITIONS TO DECISION MAKING BIASES

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ABSTRACT

The cognitive biases are a very rugged psychological phenomenon that has been demonstrated through a vast number of experiments. Some of these cognitive errors considerably influence the individual decisional process and, for the purpose of this research, we have taken into consideration four of the biases: framing, anchoring, priming and errors generated by haste in situations where a more deep analysis was required. The present research is meant to be the basis for defining a decisional profile that would be validated in the academic context and then further inserted into the business environment through building a managerial decisional profile marked against the organizational decisional profile.

KEYWORDS: *biases, decision making, managerial decisions.*

JEL CLASSIFICATION: *D81, D23, M10*

1. INTRODUCTION

The scientific analysis of the decisional process has been first approached in the public administration and it is due to Mr. Herbert Simon that this method has been inserted into the economic environment. The decisional roles have been seen as very important models by Henry Mintzberg and the impact of the decisional errors are well seen at the individual level, as well.

2. SHORT HISTORY

The decision making process has seen major alterations throughout the history, from making decisions based on the natural phenomenon or based on the gas-induced halucinations (oracols) to the Athenian democracy - let's not forget that one of the outcomes was killing Socrates - and later on to the mathematical models based on Blaise Pascal's or Pierre de Fermat's research and discoveries. The later research conducted by Carl Friedrich Gauss on the distribution of random events have helped the decisional process even in semi-aleatory conditions. Later on, a great economist, Frank Knight, has split the decisional conditions in three categories: certainty, uncertainty and risk. Further on, this new field has been dramatically impacted by the discovery of computers in 1950s, this new field being enriched by the computer-assisted decisions benefiting from a much more sophisticated mathematical models. Along with the IT&C, some other fields have seen important progress and this is how Daniel Kahneman got to be the only psychologist to receive a Nobel Prize for Economy because of his research of the cognitive errors within economics. The differentiation he makes on the way our brain works – System 1 being the

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associative "machine" and System 2 the rational "machine" - has revolutionized the way we see and understand the decisional process.

A book by the American journalist Malcom Gladwell - Blink - has brought to the public the concept of decision making based on intuition but this is also due to extensive research conducted by professors like Garry Klein that proved that this specific phenomenon is not antagonistic with Kahneman's theory, but complementary (Kahneman & Klein, 2009). Dan Ariely is another important professor in the field of behavioral economics that has promoted his extensive research through a series of very relevant research. Sometimes, in order to underline the weakness and consistency of these cognitive errors, the best way is to have a visual exercise, an optical illusion like the one exemplified by Figure 1 below. And even if you use a ruler to measure the two tables and validate the fact that they are equally long, your perception will not suffer any change, but we probably learn through this exercise that when we face such object positioning it is best to thoroughly measure them.

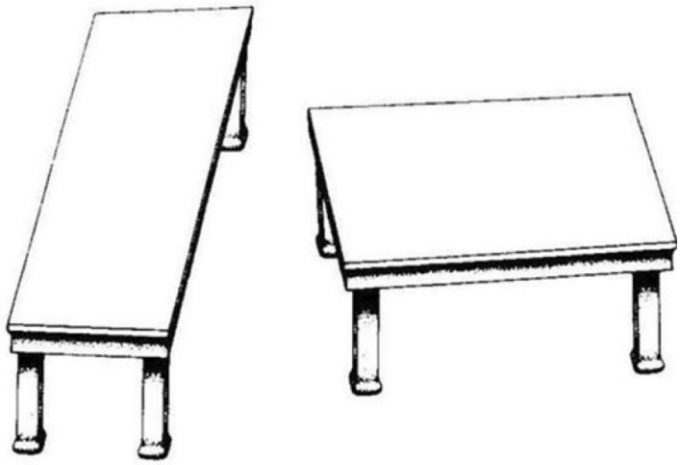

Figure 1. An optical illusion - exemplification

There is a long list of cognitive biases (wikipedia shows us more than a hundred of them) but for the purpose of the present research we have chosen three of them that we consider to have a great impact on the decisional process. We are talking here about framing, anchoring and the errors generated by the superficial responsiveness of System 1 of the Kahneman theory.

3. FRAMING

Framing has been brought forward as one of the most important and persistent decisional errors in business literature (Heath, 2014).
In one of the most influential articles, Tversky and Kahneman (1981) expose a series of tests in which the decider changes his option by the way the test's text is written, while faced with the same situation. In the article, they define the decision frame as „the decision-maker's conceptions of the acts, outcomes, and contingencies associated with a particular choice" and clarify that the mentioned decisional frame is made up by both the way the text is phrased and the decider's characteristics of culture (values, norms, habits). Therefore, we are expecting some sort of common profile within a homogenous sample regarding cultural characteristics, but also with some individual, specific approaches.

The framing effect has been demonstrated in a multitude of contexts both related to money and people's lives and can be explained on one side by the adversity towards loses but there are several cases in which the result is independent of. For example, Li and Chapman (2009) are stating that the preference of people towards certitude also affects the way people perceive the general probabilities (100% chances in 70% of the cases are seen as superior to 70% chances in all cases - the "100% effect").
The effect has been demonstrated to be related to the decider's age, the young and the old being more sensitive to the framing effects (Carpenter, Yoon, 2012)
The framing effect is deeply connected to the loss aversion and the most relevant experiment that shows this connection is the one run by Richard Thaler (1979) through the following problem:

a) Assume that you have been exposed to a disease that causes a painless, fast death in less than a week. The probability to have gotten the disease is of 0.001. Which is the maximum amount that you would be willing to pay for a cure?
b) There is a need for volunteers for a research related to the above mentioned disease. All you have to do is to be expose to a chance of 0.001 to get the disease. Which is the minimum amount that you would be requested to volunteer for the research? (you will not have access to the cure)"

The difference between the two situations is of an order or more, the typical responses in the Thaler's research have been $200 and $10,000.

4. ANCHORING

The Anchoring as an influencing cognitive bias has been taken into consideration even from the opening thesis of Kahneman & Tversky (1974), paper that has practically "opened" the field even if for a behavioral approach Herbert Simon (1950) has preached also. Kahneman & Tversky's definition of the anchoring effect is the result being directly and substantially influenced by a value suggested in the opening statement. This value could be suggested by the way the problem is phrased or could be the result of a partial calculus. Furnham and Boo (2011) have made a review of the literature in this field and have identified over 20 studies that validate this systematic error. The source for the anchoring value have been quite diverse, from random numbers (Kahneman, 1974) to the last digits of the social security number (Ariely, 2003). Most frequently, though, the anchoring is made by setting out values that are not really plausible but would substantially influence the result. For example (Strack & Mussweiller, 1997) have asked about the age Mahatma Gandhi died at, anchoring both older than 9 and younger than 144.

The first measurement of the anchoring effects has been conducted in 1995 by Kahneman and Jacowitz and the results have been relevant, showing that the evaluations strongly influenced by the given anchor were considered less trustworthy but in the same time the presence of an anchor would increase the truthfulness level as compared to an answer in its absence.

The interesting fact about the anchoring effect is that the relevance of the anchor doesn't seem to have too much influence (Englich & Mussweiller, 2001) compared to the dimension, meaning that extreme or implausible values could generate larger effects than plausible ones. (Strack & Mussweiller, 1997).

Stanovich and West (2008) have demonstrated that there is a connection between the sensibility to anchoring and the intellectual capacity, but the general sensibility to systematic errors has no

apparent connection with this intellectual characteristic. For example, Jensen demonstrates that a bigger cognitive capacity implies also a bigger sensibility to optical illusions (Jensen, 1998).

5. ERRORS GENERATED BY SYSTEM 1 AND SYSTEM 2

Many researchers have pointed out the dual type of our brain activity based on the two main cognitive processes made famous by Daniel Kahneman under the names of System 1 and System 2 (Kahneman, 2003; Kahneman, 2011). These two functionalities have either been separated into the "associative system" and "normative system" (Sloman, 1996), "experimental system" and "rational system" (Epstein & Curtis, 1991) or into "System 1" and "System 2" (Stanovici & West, 2000). The decision making processes of the two systems are very different: the first is very fast and intuitive, the decision maker has in mind a single, implicit option while the decision making need comes from doubt or distrust, a specific signal that triggers System 2, the critical evaluation of more options and the use of different techniques - like mental accounting - to determine which one is the best.
The credits for determining this approach go to Seymour Epstein who, through a series of research and papers, defined the CEST Theory (Epstein, 1994)

Table 1. Characterization of two form of reasoning.

Characteristic	Associative system	Rule-based system
Principles of operation	Similarity and contiguity	Symbol manipulation
Source of knowledge	Personal experience	Language, culture, and formal systems
Nature of representation		
Basic units	Concrete and generic concepts, images, stereotypes, and feature sets	Concrete and generic concepts; abstracted features; compositional symbols
Relations	(a) Associations	(a) Causal, logical, and hierarchical
	(b) Soft constraints	(b) Hard constraints
Nature of processing	(a) Reproductive but capable of similariy-based generation	(a) Productive and systematic
	(b) Overall feature computation and constraint satisfaction	(b) Abstraction of relevant features
	(c) Automatic	(c) Strategic
Illustartive cognitive functions	Intuition	Deliberation
	Fantasy	Explanation
	Creativity	formal analysis
	Imagination	Verification
	Visual revognition	Ascription of purpose
	Associative memory	Strategic memory

Source: Sloman, 1996

Table 2. Comparison of the Experiential and Rational Systems

	Experiential system		**Rational system**
1	Holistic	1	Analytic
2	Affective: Pleasure-pain oriented (what feels good)	2	Logical: Reason oriented (what is sensible)
3	Associationistic connections	3	Logical connections
4	Behavior mediated by "vibes" from past experiences	4	Behavior mediated by conscious appraisal of events
5	Encodes reality in concrete images, metaphors, and narratives	5	Encodes reality in abstract symbols, words, and numbers
6	More rapid processing: Oriented toward immediate action	6	Slower processing: Oriented toward delayed action
7	Slower to change: Changes with repetetive or intense experience	7	Changes are more rapidly: Changes with speed of thought
8	More crudely differentiated: Broad generalization gradient; stereotypical thinking	8	More highly differentiated
9	More crudely integrated: Dissociative, emotional complexes; context-specific processing	9	More highly integrated: Cross-context processing
10	Experienced passively and preconsciously: We are seized by our emotions	10	Experienced actively and consciously: We are in control of our thoughts
11	Self-evidently valid: "Experiencing is believing"	11	Required justification via logic and evidence

Note: From "Cognitive-Experiental Self Theory: An Integrative Theory of Personality" by S. Epstein, in R. C. Curtis, The Relational Self: Theoretical Convergences in Psychoanalysis and Social Psychology, New York: Guilford Press. Copyright 1991 by Guilford Press. Adopted by permission.

The questions from the CRT test (Shane, 2005) have been used by other researchers as well (Kahneman, 2011).

(1) A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? _____ cents
(2) If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? _____ minutes
(3) In a lake, there is a patch of lily pads. Every day the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half the lake? _____ days

Note: The CRT test. Source (Shane, 2005)

5. RESEARCH

The objective of our research in this working paper is to define a students' decisional profile through identifying the sensibility to a series of decisional biases and through analyzing the approach towards the cognitive processes of the two systems. The investigations used an electronic questionnaire available for only 10 minutes that would not only quantify the manifestation of the biases - phenomenon validated within other research - or conclusions related to a larger sample, but mostly identify the group profile of the relatively homogenous sample of the 3rd year students of the Management Faculty. The questionnaire used standard and recognized questions like the CRT model used, the ones utilized by Kahneman and Tversky but also questions that had been adapted in order to further point out specific phenomena.

You can find below some of the results:

You receive 10 lei if you extract a red ball from an urn. Choose which urn you extract the

a. An urn with 10 balls from which one is red;
b. An urn with 100 balls from which 8 are red

Figure 2 Effect of decision framing

- A fountain pen and ballpoint pen cost 110 lei. The fountain pain is with 100 lei more expensive than the ballpoint pen. How much is the pen?

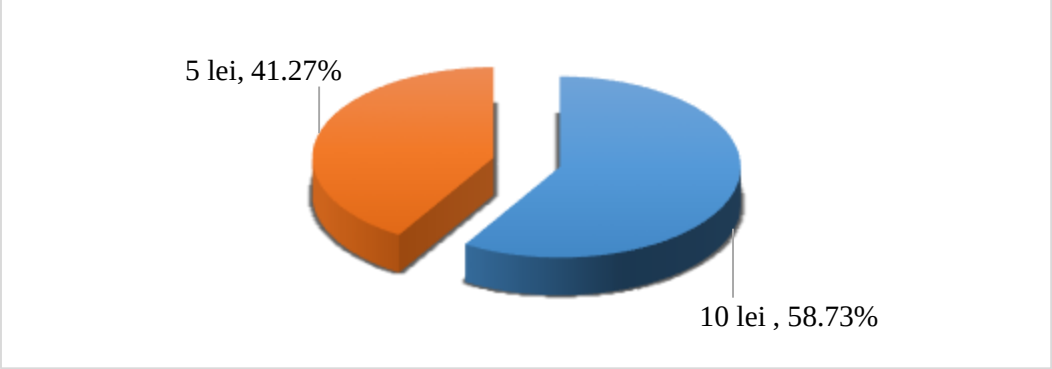

Figure 3 Effect of incorrect use of intuition

Anchoring

We know that the population of Island is 0.3 million people and the population Mongolia is bigger than the population of Island. What is the population of Mongolia?

We know that the population of Indonesia is 238 million people and the population of New Zeeland is bigger than the population of Island. What is the population of New Zeeland?

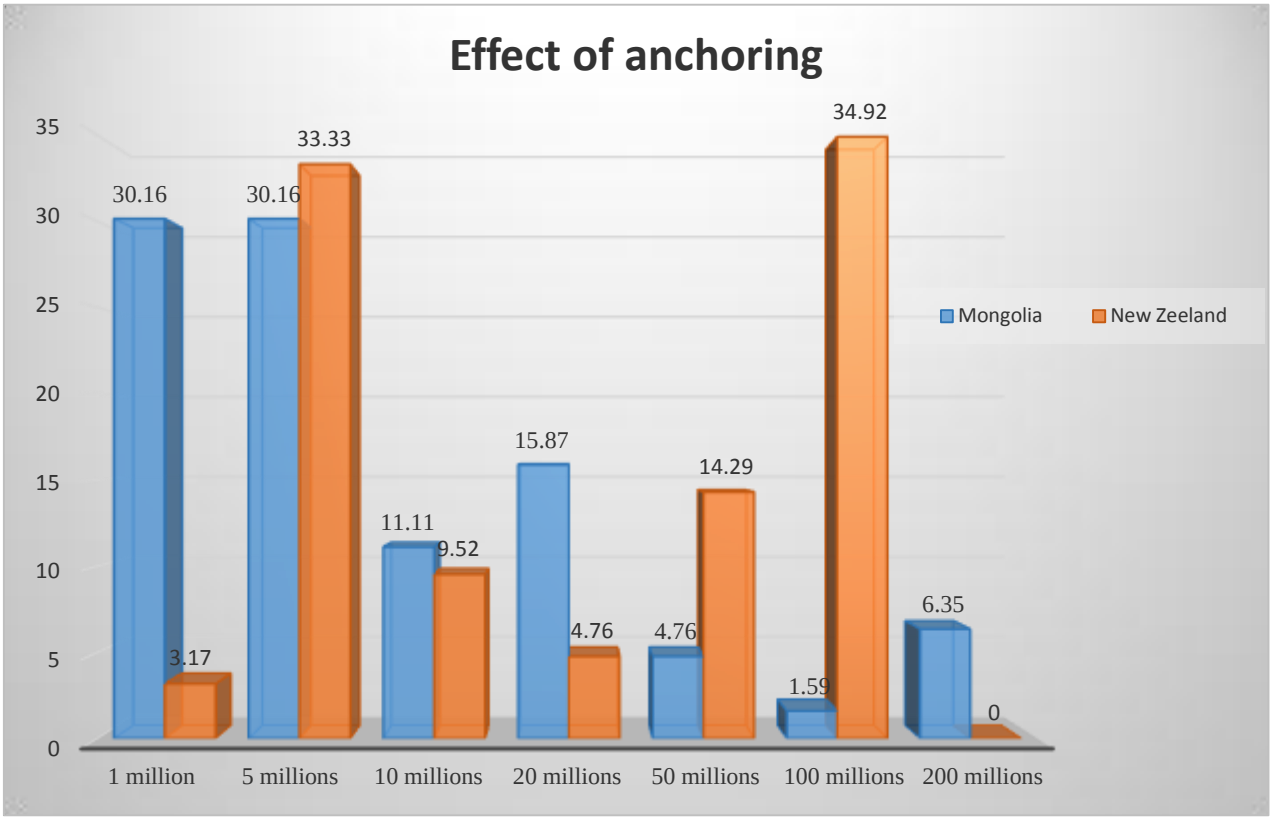

Figure 4 – Effect of anchoring

In this case we can observe a very interesting case of anchoring regarding Mongolia. The extreme value of 200 millions is generated not only by the population of Island but also by other factors (the area of the country and the population of China which is nearby).

Framing

Imagine that our country is preparing for the outbreak of a disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows:

Problem 1

a. A cure A that saves the life of 200 people
a. A cure B there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved.

Problem 2

b. A cure A that useless for 400 people and they will die
b. A cure B there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved.

31.75% change their preferences as a result of a different framing.

Conclusions and the perspectives of our research

The decision biases it is a robust phenomenon and have a great impact in decision making process. The managerial decision making should be aware about this and as studies proves the decision biases are influenced by different environment factors and also by the characteristics of the individual. Having a profile at a level of the organization and

As a result of our research we now have a decisional profile of the group that we can use as a benchmark for an individual like in figure above:

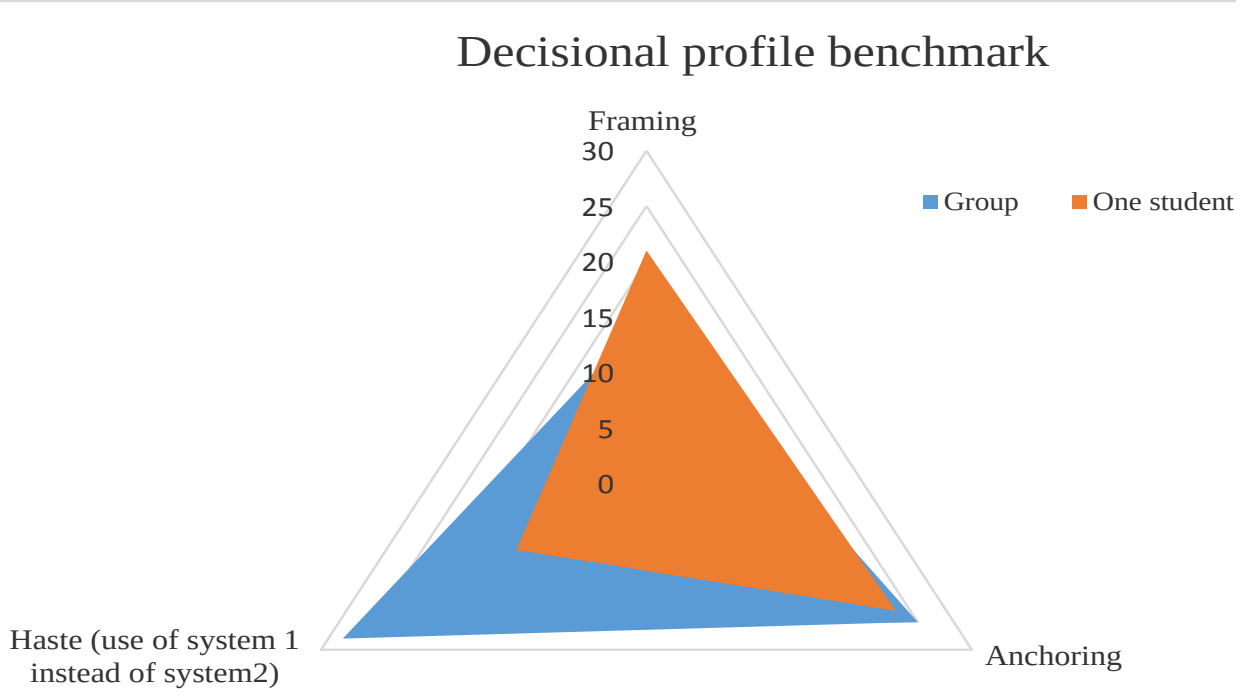

Figure 5 – Decisional profile benchmark

For the future we plan to introduce a more complex analysis measuring and translate this research from academic environment to the business environment with three profiles that we benchmark: an ideal profile for a given position in organization, an average profile at the level of the organization and an individual profile. The profile it will include more criteria grouped in philological characteristics and managerial competence.

REFERENCES

Kahneman, D. (2011). Thinking, Fast and Slow, Penguin books

Tversky, A., Kahneman D. (1981). The framing of decisions and the psyhology of choice, *Science*, 211 (4481), 453 - 458, DOI: 10.1126/science.7455683

Khaneman, D., Tversky, A. (1979). Prospect theory: An analysis of decision under risk, *Econometrica*, 47, 129 - 166

Nutt, P. C. (1998). Framing Strategic Decisions, *Organizational Science*, 9(2), 195-216

Meng Li, Gretchen B. Chapman, A big fish or a small pond? Framing effects in percentages, Organizational Behavior and Human Decision Processes, Volume 122, Issue 2, November 2013, Pages 190-199, ISSN 0749-5978, http://dx.doi.org/10.1016/j.obhdp.2013.07.003.

Stephenie M Carpenter Carolyn Yoon (2012). Aging and consumer decision making, Annals of the New York Academy of Sciences, ISSN 0077-8923, New York, 2012

Heath C., Heath D., (2014).The Four Villans of Decision making, Rotman Management , Winter 2014, p 61 - 65

Ariely D., Huber J., Wertenbroch K. (2005) When Do Losses Loom Larger than Gains, Journal of Marketing Research, Vol. 42, No. 2 pp 134 - 138

Novemsky N., Kahneman D. (2005). The boundaries of Loss Aversion, Journal of Marketing research. Vol. 42, 119 - 128

Amos T., Kahneman D. (1991) Loss Aversion in Riskless Choice: A reference - dependent Model, Quaterly Journal of Economics, 106(4), 1039 - 1061

Kahneman D., Knetsch J. L., Thaler R. H. (1991) Anomalies: The endowment Effect, Loss Aversion, and Status Quo Bias, The Journal of Economic Perspectives, 5(1), pp 193-206

Thaler R., (1980). Toward a Positive Theory of Consumer Choice, Journal of Economic Behavior and Organization ,1, 39 - 60.

Tversky A., Kahneman D., (1974). Judgment under Uncertainty: Heuristics and Biases, Science, New Series, Vol. 185, No. 4157, pp 1124 – 1131

Furnham A., Boo C. H., (2010). A litrature review of the anchoring effect, The Journal of Socio-Economics 40 (2011) 35–42

Ariely D, Lowenstein, G., Prelec, D. (2003). Coherence Arbitrariness - stable demand curves without stable preferences. The Quaterly Journal of Economnics 118, 73 - 105

Epley N, Gilovich (2001) Putting adjustement BACK IN THE ANCHORING AND ADJUSTMENT HEURISTIC: Differential Processing of Self-Generated and Experimenter-Provided Anchors, Psyhological Science, Vol. 12, No. 5 September 2001

Epley N, Gilovich (2006) The Anchoring-and-Adjustment Heuristic Why the Adjustments Are Insufficient, PSYCHOLOGICAL SCIENCE, Volume 17—Number 4, 2006

Epley N, Gilovich (2005) When Effortful Thinking Influences Judgmental Anchoring: Differential Effects of Forewarning and Incentives on Self-generated and Externally Provided Anchors, Journal of Behavioral Decision Making, 18: 199–212

Mussweiler T., Englich B, (2005) Subliminal anchoring: judgemental consequences and underlying mechanism, Organizational Behavior and Human Decision Processes 98 ,133–143

Jensen, A.R. (1998) 'The g Factor: The Science of Mental Ability.' Westport CT: Praeger

Strack, F., & Mussweiler, T. (1997). "Explaining the enigmatic anchoring effect: Mechanisms of selective accessibility". Journal of Personality and Social Psychology, 73(3), 437–446.

Jacowitz K., Kahneman D. (1995) Measures of anchoring in Estimations Tasks, Personality ans Social Psichology Bulletin, vol. 21 no. 11, 1161-1166

Epstein (1994) – Frederick S., (2005) Cognitive Reflection and Decision Making, Journal of Economic Perspectives-Volume 19, Number 4 - 25-42

Norris, P., Epstein, S. (2011). "An experiential thinking style: Its facets and relations with objective and subjective criterion measures". Journal of Personality 79: 1044–1080.

J Pers Soc Psychol. 1991 Feb; 60(2):181-92. Thinking too much: introspection can reduce the quality of preferences and decisions. Wilson TD1, Schooler JW.

Steven A. Sloman S. A. (1996) The Empirical Case for Two Systems of Reasoning, Psychological Bulletin, 1996, Vol. 119, No. 1,3 -:22

Ap Dijksterhuis,* Maarten W. Bos, Loran F. Nordgren, Rick B. van Baaren (2006) - On Making the Right Choice: The Deliberation-Without-Attention Effect, Science Vol 311 17

Kahneman D., (2005) Maps of Bounded Rationality: Psychology for Behavioral Economics, The American Economic Review, Vol. 93, No. 5

Lipshitz R., Klein G., Orasanu J., Salas E., (2001) Focus Article: Taking Stock of Naturalistic Decision Making, Journal of Behavioral Decision Making, 14 331 - 352

Kahneman D.,Klein G., (2009) Conditions for Intuitive Expertise – A failure to disagree, American Psyhologist, Vol. 64, No. 6, 515 – 526