

**PRIMITIVE OR MODERN BRAIN?
HOW DOES LEFT-BRAIN AND
RIGHT-BRAIN DECISION MAKING
IMPACT STUDENTS' PERFORMANCE**

by:

ARTIR MALIQI, BA

**Thesis submitted for the degree of Master of
Science**

Department of Business Administration

Epoka University

June 2017

Approval Page

Thesis Title : Primitive or Modern Brain? How does left-brain and right-brain decision making impact students' performance
Author : Artir Maliqi
Qualification : Master of Science, MSc.
Program : Master of Science in Business Administration
Department : Business Administration
Faculty : Economics and Administrative Sciences
Thesis Date : June 2017

I certify that this thesis satisfies all the legal requirements as a thesis for the degree of Master of Science (MSc).

(Assist. Prof. Dr. Xhimi Hysa)

Head of Department

I certify that I have read this study that is fully adequate, in scope and quality, as a thesis for the degree of Master of Science (MSc).

(Assist. Prof. Dr. Xhimi Hysa)

Supervisor

Exam Board of Thesis

Thesis Title : Primitive or Modern Brain? How does left-brain and right-brain decision making impact students' performance
Author : Artir Maliqi
Qualification : Master of Science in Business Administration.
Date : 30 June 2017

Members

(Assist. Prof. Dr. Xhimi Hysa)

(Assoc. Prof. Dr. Mustafa Üç)

(Dr. Vusal Gambarov)

(Dr. Alba Kruja)

Abstract

This thesis provides insights regarding the cognitive process of decision-making, explaining its evolution through many generations and the importance of this process into our lives. It also describes the effect of right and left brain hemispheres on decision-making and focuses on the comparison of the performance of participants being them whether rational or intuitive decision makers.

A deductive methodology is used mostly and as the primary quantitative data on this research are the results of the analysis gathered from the survey conducted to the students of Bachelor degree. And the secondary data are the internet based scientific resources and other related materials including books, scientific journal articles, reports, academic studies etc.

Therefore as we face with the decision-making process every day into different situations and by these choices that we make we shape our lives, therefore the aim of this research study is to make the people aware of the weight of this process and also to provide better understanding about how the brain hemispheres of people affect their decisions, as it depends on the type of individuals, being them either rational or intuitive decision makers, and describing the effect that this approach has on their performance. The main target is students' whose performance is measured in this case by their CGPA.

Keywords: Decision-making, Right and Left-Brain Hemisphere, Performance, CGPA, Rational and Intuitive Decision-making.

Abstrakt

Kjo tezë ofron njohuri në lidhje me procesin kognitiv të vendimmarrjes, duke shpjeguar evolucionin e tij përmes shumë brezave dhe rëndësinë e këtij procesi në jetën tonë. Ajo gjithashtu përshkruan efektin e hemisferës së djathtë dhe të majtë të trurit në vendimmarrjen dhe fokusohet në krahasimin e performancës së pjesëmarrësve, qoftë të aryre që janë vendimmarrës racional apo intuitiv.

Është përdorur kryesisht metodologji deduktive dhe si të dhëna sasiore primare për këtë hulumtim janë rezultatet e analizës së mbledhur nga sondazhi i kryer ndaj studentëve të nivelit Bachelor. Dhe të dhënat sekondare janë burimet shkencore të bazuara në internet dhe materiale të tjera të lidhura, duke përfshirë libra, artikuj shkencorë të revistave, raporte, studime akademike etj.

Prandaj, meqë ne ndeshemi me procesin e vendimmarrjes çdo ditë në situata të ndryshme dhe me këto zgjedhje që ne bëjmë ne i japim form jetës sonë, kështu që qëllimi i këtij studimi kërkimor është ti bëj njerëzit të vetëdijshëm për peshën e këtij procesi dhe gjithashtu për të ofruar sqarim më të mirë se si hemisferat e trurit ndikojnë në vendimet e tyre, pasi që varet nga lloji i individit, qofshin ata vendimmarrës racional apo intuitiv dhe duke përshkruar efektin që kjo qasje ka në performancën e tyre. Kjo teme trajton kryesisht performancën e studenteve të matur nga mesatarja e notave.

Fjalët Kyçe: Vendimmarrja, Hemisfera e djathtë dhe e majtë e trurit, performanca, vendimmarrja racionale dhe intuitive.

Dedication

I would like to dedicate this work to my family, my dear friends and my professors for their continuous support on my journey as a student.

Acknowledgements

As this master thesis research was initiated approximately one year ago the scope of literature to be reviewed was very huge until the chaotic part of the research was exceeded, and then the path of the study became more thicker and clear toward the achievement of the sustention of thesis hypothesis. Therefore as digging deeper on the literature, the research became indeed a lot more interesting and joyful while discovering new findings and works of many authors from all over the world.

In order to be able to come to the final stage of graduating from the Master of Science degree we passed through many challenges and difficulties, and only through the knowledge and the maturity gained by our dear professors, family and friends we achieved at this point of life. Therefore a remarkable acknowledgement goes to my family, friends and my precious professors.

For the opportunity given to me to conduct this master thesis research I am grateful to many persons for their generosity on assisting this study and I am pleased of having the chance to collaborate with them. A special gratitude I attribute to my admired professor, colleague and friend Xhimi Hysa, who has been such a delightful person throughout this journey of mine as a student, I am also very thrilled to have worked with him for a considerable time as his assistant and very thankful for his advices and a lifelong friendship establishment. Another outstanding gratitude goes to Besjana Ajazi for her great effort on the distribution of the questionnaires to the targeted sample of students. The final gratitude goes to the highly regarded students for their collaboration and acceptance to be part of the research through the completion of the personality test which contributes on the support of the research study purpose.

Declaration Statement

I declare that the information interpreted in this thesis has not been previously submitted wholly or in part for any academic or qualification other than that for which it is now submitted. Also the work is fully cited and referenced, except the original findings and results, in accordance with the rules and regulations of master thesis guidelines.

Table of Contents

Approval Page	i
Exam Board of Thesis	ii
Abstract	iii
Abstrakt	iv
Dedication	v
Acknowledgements	vi
Declaration Statement	vii
Table of Contents	viii
List of Tables.....	x
List of Figures	xi
List of Abbreviations.....	xii
List of Appendices	xiii
CHAPTER 1: Introducing the Study.....	1
1.1 Introduction	1
1.2 Problem Statement and Study Purpose.....	2
CHAPTER 2: Literature Review	4
2.1 General and Interdisciplinary Considerations	4
2.1.1 Group Dynamics	12
2.1.2 Diversion of choice	13
2.1.3 Conformity.....	13
2.1.4 Group Cohesion	15
2.1.5 Crowds and Collective Behavior	16
2.1.6 Modern and Primitive Brain Influence on Decision-Making	18
CHAPTER 3: Methodology	21
3.1 Research Design	21
3.2 Research Approach.....	22

3.3 Research Question	22
3.4 Sample Selection	23
3.5 Data Gathering and Analysis	24
3.6 Quality of research	24
3.6.1 Validity	24
3.6.2 Reliability.....	25
CHAPTER 4: Research Findings.....	26
4.1 Data Presentation.....	26
CHAPTER 5: Final Remarks	31
5.1 Discussion.....	31
5.2 Counter theories.....	33
5.3 Recommendations	33
5.3.1 Brain Hemisphere training.....	33
5.3.2 Brain Skill Management	35
5.4 Limitations.....	35
5.5 Conclusion.....	36
References	37
Appendix 1:.....	40

List of Tables

Table 1: Comparisons in the functions of left and right cerebral hemispheres.....	5
Table 2: Distribution of the total sample results and their decision-making tendencies ..	31
Table 3: Research studies supporting the theory of Brain Hemisphere Division	20

List of Figures

Figure 1: Relation between cognitive abilities and decision performance across the lifespan	8
Figure 2: “Prisoners Dilemma”- Game Theory: Dominant Strategy and Nash Equilibrium	10
Figure 3: Line Cards.....	14
Figure 4: Group Cohesiveness outcomes chart.....	15
Figure 5: Students with a CGPA between $0.0 < 1.0$ and their intuitive level	27
Figure 6: Students with a CGPA between $1.0 < 2.0$ and their intuitive level	28
Figure 7: Students with a CGPA between $2.0 < 3.0$ and their intuitive level	29
Figure 8: Students with a CGPA between $3.0 < 4.0$ and their intuitive level	30
Figure 9: Naming the colors, not the words	33

List of Abbreviations

ABC	-Adaptive Behavior and Cognition
BAF	-Banking and Finance
BINF	-Business Informatics
BUS	-Business Administration
CEN	-Computer Engineering
D.S.	-Dominant Strategy
ECO	-Economics
CGPA	-Cumulative Grade-Point Average
IML	-International Marketing and Logistics
PIR	-Political Science and International Relationships

List of Appendices

Appendix 1: Survey Questionnaire.....	40
----------------------------------------------	----

CHAPTER 1: Introducing the Study

1.1 Introduction

Through the history of human evolution people have been facing decision-making situation during their lives. And these decisions were based mostly on the predictive outcomes, meaning that people were not aware that there actually exists an entire process in which we are involved before making a decision. It is clear for today's scientist to understand this previous behavior of us while making decisions, therefore according to their studies it is apparent that it happened because of the lack of prognostic information and also lack of sufficient communication methods. Most of their decisions were based on their own previous similar experience, which experiences were almost impossible to be transmitted to the others because of their primitive communication channels between each other.

Therefore as people were becoming aware of the process on which they were going through, the decisions started to become more rational, they started generating the possible alternatives, evaluating the consequences of each possible action and choosing to implement the action that would achieve their own best outcomes. Further development on this process led people toward being much more effective and also efficient during their decision-making process which also helped them to find the optimal solution to the situations they faced. As shifting from one generation to the other, many techniques, methods and different programs emerged and developed to improve the quality of the information which has the crucial role while making a choice, the better the quality of the decision the better the outcome, also developments are made on the quality of the flow of this information, to make it able to move fast and efficiently. As these studies were being conducted, on recent decades it came out that people do enjoy two different brain hemispheres (including left and right brain hemisphere), and that the decisions we make depends on the usage of these hemispheres of us. This fact came out to have been present into living creatures brains since the vertebrates emerged approximately 500 billion years ago, through analyzing their feeding process, example taking the fishes, reptiles and toads that tend to strike at prey on their right side, basing their actions on their right eye guidance which part of the body is linked to the left-brain hemisphere, therefore through the studies and experiments of Phillip J. Clapham and his colleagues, now at the Alaska

Fisheries Science Center in Seattle, it was discovered that all of the classes of vertebrate tends to rely on the right-side (linked to the left-brain hemisphere) in the routine tasks such as feeding. And this division seems to have dated since then, and now we as humans tend to retain what was possibly an inherited bias toward the use of brain hemispheres (MacNeilage, Rogers, & Vallortigara, 2009). Since the topic covers a very broad area of study, through this thesis the effect of left and right brain hemisphere on decision-making and their correlation with performance will be examined respectively.

1.2 Problem Statement and Study Purpose

The decision-making as a process has been studied for years and lots of studies take place today as well, and many different approaches emerge by different scientists. Nonetheless, because it is a very dynamic process and even though the general approach is likely to be the same as inherited form our ancestors, still the manners, attitudes and behaviors always are modified depending on the environment and situations we face during our generations lifespan. Inability to understand the functions of the left and right brain hemispheres and their effect on the decision-making will hinder the appropriate evaluation of people. Therefore, it will make us unable to determine the optimal or the most suitable positioning of our friends, colleges, subordinates, family members etc, into our life's. Inspired by the expression of the novelist Edward Bulwer-Lytton "The pen is mightier than the sword" concluded that giving a gun to a soldier and a pen to a writer and not doing the opposite is crucial toward an undisputable success.

Understanding this assumption will increase the efficacy and the efficiency of our everyday work, since each of us tend to lean on one hemisphere of the brain more than the other, meaning that being able to find this attitude of individuals will direct us toward giving the right task to the right person (example giving logical and scientific responsibilities to the persons who have developed more the left-brain hemisphere and giving art and creativity related responsibilities to the persons who have developed more the right-brain hemisphere) (Hellige, 2001).

When it comes to the educational context, it is worth to know that decision-making dominant style might influence the students' performance that is quantitatively measured by their grades finally expressed with the cumulative grade-point average (CGPA). Given that studies related to the investigation of students' analytical or intuitive decision-

making and its impact on their CGPA are missing, then this study proposes a framework for inquiring the present phenomenon. Thus, the aim of the current thesis is to deeply analyze the decision-making process and especially the effect of the right and left-brain hemispheres on students' performance as measured by the CGPA.

CHAPTER 2: Literature Review

2.1 General and Interdisciplinary Considerations

Each of us every day face a lot of situations and cases by which we have to deal with and that most of them requires us to make a decision which have different weights into our life's, can be rather personal, work-related, social, family associated etc. These choices that we make actually define our path and the efforts that we will give to achieve our aims and the destination where we are heading to. "Life is the sum of all your choices" said by Albert Camus, and basing our opinion on this theory it means that our history is made of the choices of all mankind. Therefore it is very important to analyze and understand the situations clearly and gain as much information as possible before making the decision's because a little shift on our sails and we will find ourselves into completely different path, which may led us toward undesirable endings.

Being aware of this important role that decision-making has into our life's, many years ago studies initiated on this field from various famous scientist, philosophers, psychologists, economists, anthropologists etc., since it was a concern related with every aspect of our lifespan cycle. And throughout the history of decision-making there were only two important factors that weighted the most on the famous studies on this field, and these are: to reduce the risk and to increase the outcomes (let them be material or non-material outcomes) and only by taking into consideration these, we would be able to find the optimal solution based on our decisions. As said, before making a decision we analyze the outcomes and consequences by estimating the risk also, therefore during the World War I an economic analyst named Frank Knight concluded the we deal with *risk* when we have the necessary information to calculate the probability of an outcome, but we deal with *uncertainty* when we have lack of information hindering us to derivate the alternatives/probabilities.

Facing with decision-making situations while we have lack of time, limited information, inadequate expertise etc., it becomes a challenge to be rational, therefore we are deferred to use our intuition and emotions. For these type of circumstances many famous scientists have already given their opinion based on their studies relating to this phenomena; mentioning the "fast and frugal" reasoning of Gerd Gigerenzer who implies that we should simplify the models of decision-making by setting certain algorithm, which is a

simple psychological mechanism known as: “*one reason decision-making*”, (meaning that we do not involve all of the information to make the decision) therefore he made some experiments by making a competition between “*take the best algorithm*” and “*the classical rational way*”, and as a result the “take the best algorithm” outperformed significantly (Gigerenzer & Goldstein, 1996).

Even though the idea of the brain hemisphere division emerged into 1800’s when the doctors found that a damage of one hemisphere of the brain would cause disabilities on conducting certain functions, a stronger support to this division was granted by the famous neuropsychologists Sperry and Gazzaniga in the year of 1960, when they introduced a new concept to the world known as “split brain”. They arrived on this conclusion basing their research studies in some patients on whom a surgery was made to cut the corpus callosum (described to be a broad band of nerve fibers joining the two hemispheres of the brain), that actually connect the brain hemispheres, this surgery was done as an epilepsy treatment. Therefore the study resulted that while the two hemispheres of the brain were not connected to each-other meaning that there was no communication between them, the patients reacted differently to the stimuli, concluding that the functions of the brain hemispheres are different.

A summarizing of the theories that support the brain hemisphere functionality division is given below:

Table 1: Comparisons in the functions of left and right cerebral hemispheres

Dominant hemisphere (left hemisphere)	Non-dominant hemisphere (right hemisphere)
Verbal (speech) Linguistic description Reading, writing, drawing, and associated function of language, Grammatical language using script Mathematical Sequential Analytical Direct link to consciousness	Non-verbal Spatial concepts (comprehension) Musical (some elements of music) Geometrical Recognition of faces Pictorial language Temporal synthesis Expressing emotions, reading emotions Global holistic processing

Positive emotions (joy, gratitude, hope)	Understanding of metaphors Discrimination of shapes, e.g., picking out a camouflaged object Negative emotions (ashamed, lied, abused)
Functions shared by both of the hemispheres	
Sensations on both sides of face Sounds heard by both the ears Pain Hunger	

(Agrawal, Biswa, Kumar, & Chinara K., 2014)

For many years scientists have been studying which theory is more valid for us to make optimal decisions, involving the emotions or try to be rational during these processes. Struggling to validate an approach more than the other, a third concept was funded by Herbert Simon, named *Bounded Rationality*, which is described to be the study of how people make decisions under three different circumstances: First is under certainty, where all the information is available and we are able to provide probabilities or possible outcomes; Second is under uncertainty, under which state we have lack of information and we are also not sure about the consequences that may derivate from our decisions; Third is under risk, also on this condition we do not have the necessary information, but at least we are able to make calculations about the probabilities of our actions. Therefore after these studies Herbert Simon concluded that these bounds on rationality make it almost impossible for us to be completely rational into each of our decisions, especially in complex situations, and that we need to rely on the rules of thumb (which refers to principles that are based on practice rather than on theory) (Gigenzer, Gerd; Todd, Peter M.; ABC Research Group, 1999). After the foundation of bounded rationality *ecological* and *social rationality* took place as well on the further studies of Gerd Gigerenzer.

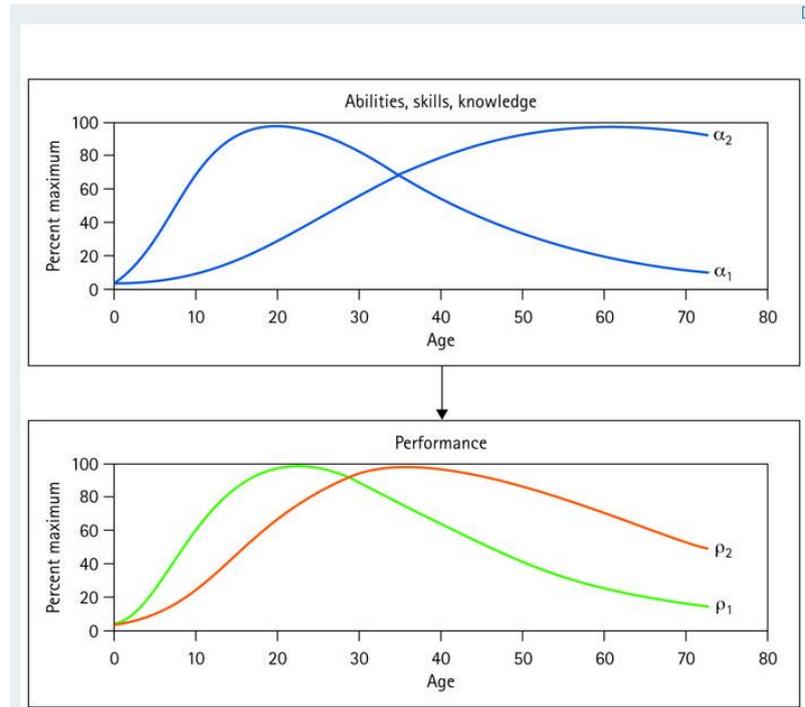
Ecological Rationality states that in order to evaluate an action or decision as rational or irrational we must have the information under which circumstances the decision was made, because the rationality depends on the situation. This is also explained by an

experiment made by ABC Research Group. Part of the experiment were the German and US students, where just a single question was given to them, seeking to understand if they know which city has more habitants, Detroit or Milwaukee? As it was concluded, neither the German students nor the US students knew the answer, but German students gave the correct answer in fact, but they used their intuition relying on the rule of thumb. Meaning that the German students knew about Detroit only because of media, therefore by using simple heuristics they gave Detroit as their answer as they had lack of information for the other city, meaning that German students used recognition heuristic depending only on the information that they enjoyed (Todd, Gigerenzer, & Group, 2012).

During a research made on decision-making from the Nobel Prize on economics Kahneman Daniel and Amos Tversky they concluded that relying on heuristics was actually a reasonable way to make a decision in uncertain environment especially, but based on the analysis of the data that they collected, it results that mostly the usage of heuristics led people astray. From their researches and studies on heuristics and biases insights, and interrelating these two concepts with the capital flow, we now enjoy having the field known as “behavioral economics” (Wendt & Vlek, 1973).

During our lifespan we face with different decision-making situations, and the weight or significance of these decisions is defined by our cognitive abilities and knowledge that undergoes through radical changes during our self-development process, and our performance and our background (knowledge) are interrelated with each-other as explained on the figure below from a study made on The Max Planck Institute for Human Development:

Figure 1: Relation between cognitive abilities and decision performance across the lifespan



(Max Planck Institute)

The graph above demonstrates the theoretical age slopes for 2 different cognitive factors: α_1 refers to a capability of ours that reaches the peaks at our young age (e.g., fluid intelligence), and α_2 a capability of ours that reaches the peaks at our older age (e.g., crystallized intelligence). The graph below demonstrates the average performance in 2 duties that change in their demands on α_1 and α_2 ; therefore 1 duty in (green color) assesses mostly α_1 , and the other (orange color) assesses both α_1 and α_2 . Consequently, the highest level of performance is achieved earlier in the green color given duty than in the orange color given duty. Given this example we can make the analysis and conclude that our cognitive abilities and skills find their peak level at our young age and then start to decline slowly as we get older, and the opposite happens with the knowledge, which actually has a positive progress and increases during our lifespan. Meaning that our aging process plays very important role on our models and the quality of the decisions that we take (Pachur, Mata, & Schooler, 2009).

Social Rationality explains how individuals are not taking autonomous decision in most of the cases, since we live into a social environment surrounded by others, our existence is relying on the interaction with each-other therefore we are necessarily influence by

others while we make a certain decision or choice. This can be explained by a real example on the European citizens' case on choosing to rather to use the renewable power sources (green energy) or power generated from fossil fuels. Results of a survey concluded that approximately the half of Europe was actually favoring the usage of renewable sources for their energy supply, and only 5% of them were using it into their premises, except a city called Schönau, where 99% of the population is actually using the green energy. This does not mean that the EU citizens' are energy polluters, but the difference is on the system and the policy of the governments, therefore the government of Schönau after a voting process on which 1693 citizens' took place, 1669 of them voted pro the green energy sources to be applied into the houses and they started implementing the same standard system for all the households, and only the ones that had a negative attitude toward it could reject this system and implement the classical energy source. And until today 99% of the houses on this town are operating with the green energy system. This all derives that the inhabitants of this country had chosen to follow a simple heuristics of following a social rationality model: *Do not deviate from the default setting*, and it definitely does not mean that their attitudes toward environment are much friendlier than the other EU inhabitants (Hertwig, Hoffrage, & the ABC Group, 2013).

Many other studies took place as well on finding which strategy to follow that would maximize our outcomes, therefore John Von Neumann (mathematician) and Oskar Morgenstern (economist) after a lot of studies gave to the world the well-known "Game Theory". It is all about interdependencies of variables (called players) interacting between each-other in order to achieve their own self-interest on maximizing their outcomes/payoffs by following a certain strategy. Therefore in order to choose which strategy should be followed we should rely on some rules that are set by a third party. And since this theory aides us toward choosing the most rational decision it is widely used in a number of disciplines into our life's, relating to psychological, political and especially its usage is most often noticed into economic applications. It is mostly referring to intelligent rational decision-makers (Owen, 1995).

John Nash also contributed by his studies and assumptions to fill the gap of this theory by his foundations of "Nash Equilibrium". Since on the game theory during the decision-making process, the best choice of a "player" would be called "dominant strategy" and the bad choice of the other "player" comprising to the other one would be called "dominated strategy", Nash wanted to find the strategy that would benefit both of the

parties involved optimally. And according to his findings the intersection of dominant strategies results on the achievement of equilibrium (the optimal choice for both parties). The “prisoners’ dilemma” example would explain better this theory, following with the example below:

Figure 2: “Prisoners Dilemma”- Game Theory: Dominant Strategy and Nash Equilibrium

		<u>Person X</u>	
		Confess (D.S.)	Not Confess
<u>Person Y</u>	Confess (D.S.)	8 years / 8 years	20 years / 1 year
	Not Confess	1 year / 20 years	3 years / 3 years

As game theory is all about interdependencies, we should take into account all of the parties involved into a certain action and then to analyze the interaction between these parties and try to forecast the outcomes. Therefore each game theory scenario must have three main things, and these are: players (actors, participants, candidates etc), strategies and also payoffs (outcomes, consequences). In our example we have Person X’ and Person Y’ as the players, confessing or not confessing are their strategies that they will choose to follow and the years are their payoffs placed on the matrix based on their strategy that they follow. According to our example, both of these persons have been involved in serious crimes, some major and some minor ones, the police have a lot of information about the minor crimes, but they have lack of information on the major crimes. After the police arrested these two persons, they placed them into two different interrogation rooms. From the moment that they enter into these rooms they had been left by only two strategies, which are to confess or to not confess. As given on the table above it is seen that: if Person X’ confesses and Person Y’ also confesses they will be both in the prison for 8 years each; if Person X’ confesses and Person Y’ does not confess then

Person X' will be in prison for 1 year because of his collaboration with police and Person Y' because of not collaborating with police will be in prison for 20 years; if Person X' does not confess and Person Y' confesses then Person X' will be in prison for 20 years and Person Y' will be in prison for 1 year; if Person X' and Person Y' does not confess then they both will be in prison for 3 years each since police have got some evidence on their minor crimes. Analyzing these outcomes, it is clear that the best situation for both parties is the square including 3 years for them.

But the problem is that their self-interest will not bring them necessarily choose to not confess since they are into two different interrogation rooms and cannot communicate with each other and choose the strategy together. Therefore based on their self-interest they will follow the dominant strategy because it refers to the strategy that's best regardless what the other party (player) does. Therefore the dominant strategy (D.S.) for Person X' is to confess regardless what strategy of Person Y' is, since the lowest number of years in prison are provided by following this strategy without having the information of what the other player will choose, and the same strategy to confess is also the dominant strategy (D.S.) for Person Y' regardless what strategy of Person X' is, since he also will gain the lowest number of years in prison by following this strategy without having the information of what the other player chooses.

After the dominant strategy is chosen from both players, then we deal with Nash Equilibrium theory, which is the intersection of the dominant strategies of the players, it is the situation in which players do not benefit from moving into the other strategy given the strategy the other player has chosen. Therefore it is required to evaluate all the possible combinations within a matrix and try to find the equilibrium for both players where they naturally gravitate to that outcome. In this example the Nash Equilibrium is on the first square defined by the red line referring to the optimal choice for both players, a situation from which they have no benefit to move away (Myerson, 1999)

Through the game theory Nash contributed and played a crucial role on the economic development during the mid 1980's. Also earlier many other famous economists, scientists, philosophers etc through their finding and studies contributed on the economic development and the management practices of the society overall. We can mention Chester Barnard who imported the term "decision-making" from the lexicon of public administration into the business world in 1950's. Also theorists like: James March,

Herbert Simon and Henry Mintzberg contributed to the foundation of the managerial decision-making studies (Buchanan & O'Connell, 2006).

2.1.1 Group Dynamics

Since the democracy system which was initiated in ancient Greece in the 5th century B.C. and then continuing with the democracy in the Middle age succeeding by the fall of Roman Empire (mostly Christianity Ruling), there arose an interest to study and analyze the decision in groups (Robinson, 2004). Being aware that a group decision would absorb any other choice on this system, many anthropologists, sociologists & psychologists studied this phenomena for years, they analyzed the way people interact within groups, their behaviors, actions, reactions, what type of communication channels they use etc. Mentioning some important figures in this field, we can start with Wilhelm Maximilian Wundt who is known as the founder of scientific psychology, who was also engaged in studying groups and in the year of 1916 through his book “*Völkerpsychologie*” (folk psychology) he tried to explain the influence of group membership into each psychological and perceptual process. Then according to Floyd Henry Allport “*the actions of all are nothing more than the sum of the actions of each taken separately*” (Allport, 1924, p. 5). These scientific studies of groups’ dates from the late 1890’s, later to be known as “group dynamics” (as a sub-discipline of social psychology) by Kurt Lewin, a German-American psychologist (1890-1947) who gave this definition about group dynamics: “*the way groups and individuals act and react to changing circumstances*” (Forsyth, 2009, p. 14).

Group Dynamics soon became a critical issue into many fields and aspects of life. Trying to maintain a stable social system and structure including the relations between people, institutions and other parties involved on this interaction and interdependency on each other, sociologists evaluated that the effect that groups of these parties would cause on changing the values, practices and patterns of behaviors is a matter that has to be studied, therefore they gave a significance to it. As the science and technology developed recently, so did the studies of anthropology since it became much easier for anthropologists to access, collect, combine, categorize and comprise the data from all over the world. Therefore the interest to study the group dynamics emerged to them, because it helped them understand better the complexity of cultures during the history and to analyze at full extent the human development (American Anthropological

Association). Also on politics the studies of group dynamics took place since in democratic system people are free to decide for whom to vote and which party to support, therefore through studying groups the political parties used the study analysis to manipulate individuals through different campaigns, meetings, conferences, gathering crowds and giving public speeches etc (Poole & Hollingshead, 2005).

2.1.2 Diversion of choice

As individuals advance on their career and as they pass through overall life processes they depend much more on the interactions with the others in order to survive and achieve their aims. Therefore they are somehow obligated to enter or create groups, being them informal or formal groups. Sequentially for each individual to feel a sense of belonging to these groups they try to adapt to them and keep fruitful and sound relationships especially at their workplace, and the critical point to create stronger connections, reinforce them or disrupt relationships is the decision-making phase. Knowing the consequences of this process or phase, individuals are always affected by the decisions/choices of the others and they define a weight on each group member decision based on their own interests' (Bridbord, 2015).

This phenomenon can be explained through: Conformity "Asch Experiment", Group Cohesion, Crowds and Collective Behavior etc.

2.1.3 Conformity

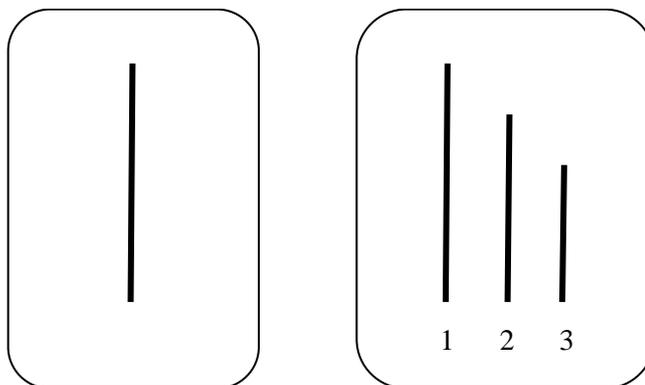
Conformity is a sort of social impact including an adjustment in belief or behavior in order to feel belonging to or fit within a team or group. In order to analyze better our attempt toward feeling conform into society overall and especially into groups/teams, Solomon Asch initiated an experiment in 1951. During this experimental study there were 50 participants (male) from Swarthmore College in the USA (Allen & Levine, 1968).

The experiment known as Asch Conformity experiment achieved to prove that people adapt, change and modify their behavior, actions and decisions in order to fit with the others.

Experiment procedure: It was conducted into a laboratory where only one person was selected to be the naïve participant out of seven other confederates. They were all

expected to be applicants into a visual judgment test, but actually the purpose was to see the reaction of the “real participant” during the session. Therefore the mentor placed two cards in front of the participants as given below:

Figure 3: Line Cards



(Solomon Asch : Opinions and Social Pressure (1955)).

Subjects were shown two cards. One bore a standard line. The other bore three lines, one of which was the same length as the standard. The subjects were asked to choose this line.

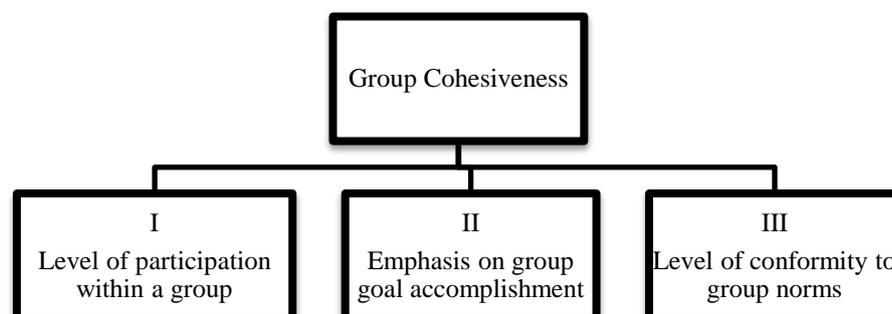
The confederates were already prepared, so that all of their answers were planned accordantly, initially they started giving correct answers regarding the questions of which line respectively to their number is similar to the line given on the left-side paper sheet, thereafter some of them started giving incorrect answers, and then when all of them started giving the same incorrect answer it affected directly the “real participant” who in order to fit in to the group and in order to conform to it, he gave the same incorrect answer as the group did, even though being aware of the fact that the correct answer was different from that. As a result of the experiment, approximately two-third of the participants had chosen to conform to the attitude of the majority. Being more accurate, from 18 trials conducted in total, 12 of the “real participants” gave incorrect answers. When the experiment was concluded most of the participants confirmed that they had given the wrong answer even though they knew which the correct one was, but they did it in order not to appear strange to the others and avoid the possibility to be perceived as ignorant in front of the others. Only few of the participants replied that they believed that the answers given by the group during the trial were actually correct (based on their opinion). This experiment played a crucial role on understanding how much it is important to analyze the circumstances under which the individuals make decisions,

therefore they concluded that while in groups we conform because of two main factors, first is that we want to feel a sense of belonging into the group and also we tend to believe that the other participants of the group possess more information than we do. The experiment also proved that people in these situations choose to rely on right-brain hemisphere (emotional) rather than relying on the left-brain hemisphere (rational) while giving their answers. Meaning that people weight more the emotional part, they decide to take the action that makes them feel interpersonally better in front of the others, rather than choosing the correct answer to follow (Henle, 1961).

2.1.4 Group Cohesion

Group Cohesion as a phenomenon happens when members of a certain group are linked or tied to each-other and therefore establish social, task-related or emotional relationships and they act together to reach a common goal. Organizations are always trying to increase the level of group cohesiveness, therefore to gain a competitive advantage and increase the productivity. The cohesiveness of a group is affected by: the size of the group, how effectively is the diversity managed, group identity and healthy competition and also their success. The outcomes of the group cohesiveness can be derived as below:

Figure 4: Group Cohesiveness outcomes chart



- I. The Cohesiveness increases as the participation within a group increases, this phenomena occurs as the members are actively engaged into group activities, create functional and rapid communication channels, make coordinated moves, pay a high level of interest into the success of the group and its' members etc.
- II. All of these actions are conducted in order to accomplish group tasks or achieve its' goals and objectives, and the members of a successful group or team tend to give their maximum efforts to keep the group in good shape toward their long-term journey.
- III. As the level of cohesiveness increases, this leads obviously to an effective work and therefore managers try to boost these relationships through making different competitions between the groups, so that members come closer in order to win the competition and they also try to keep groups smaller, because they then tend to be more cohesive and have much more time to spend together. However the efficiency drops as their meetings start to be shaped differently by the members, and the topics take another direction as they set up emotional relationships with each other, therefore shifting from rational or task-oriented gatherings to more emotional or relationship oriented. Based on this notorious fact most of the managers try to control the extent to which the group members interact to each-other on the working environments (Mullen & Copper, 1994).

2.1.5 Crowds and Collective Behavior

Moving the focus on crowds and collective behavior, as the term “collective behavior” was firstly used by an American sociologist who focused his studies on urban sociology and had a very powerful role on early studies of U.S. sociology. This event refers to the situations where group dynamics are involved into actions undertaken by people under various social circumstances. These actions are mostly spontaneous in nature, do not last long and are made under pressure and affected by the other participants. Mostly done on unusual and unthinkable situations that require immediate decision-making process. Part of this behavior are: *the acting crowd* , for example a so called mob, it can be expressed as a large group of people gathered disorderly and that have an objective and intent on making violent behaviors, we have also *expressive crowd* which gatherings refer to a

group of people who come together to express their emotions, let's say to support a political party, also the *mass* is part of collective behavior and it is different from the two types of behaviors mentioned previously because these are formed from people of different ages, professions, occupations, genres etc, meaning they are heterogeneous. They are organized more anonymously, lack of poor organization, therefore their actions and requests are unpredictable and rough, and finally we have *the public* which differs from the three other types of crowds mentioned. It differs based on the degree of rationality, because as the other gatherings are done more spontaneously, with less efforts, lack of organization, lack of clear messages provided to the receiver, the public form is much more organized, the participants of these groups gather preliminarily and discuss the issues through which meeting the crucial problems to be raised up are derived, they choose the methods and forms or the tools that they will use to accomplish them, so they base their actions, based on rational reasoning rather than basing them on their intuition (Smelser, 2011).

All of these concepts explained roughly above are highly interrelated with the new concepts introduced lately on 60's known as *emotional intelligence*, used firstly by this term from Michael Beldoch and then spread and studied widely by Daniel Goleman who is known as a famous author, science journalist and psychologist (on 1995 wrote the best seller book named "Emotional Intelligence"). This concept enjoys a special role and impact on the decision-making process because it is conducted of such important variables of an individual's personality as: empathy, interpersonal awareness, self-esteem, decision-making principles, respect and motivation (Druskat & Wolff, 2001).

Daniel Goleman describes emotional intelligence as an aspect of our ability that a successful man or woman must be made of, according to his studies, emotional intelligence refers to the extent to which we are able to handle ourselves and our relationships, and he divides it into four different fields since it is better to analyze deeply the basis that leads us toward a decision-making process through the usage of our intuition: starting with *self-awareness* that means that we know what we are feeling into a certain situation and why we are feeling it; next field is the *self-management*, described as the process of handling our distressing emotions on effective way, on that way so they do not cripple us, meaning they do not hinder our way of doing things. And since every emotion has a function, we must try to tune ourselves toward positive emotions, therefore to feel enthusiastic of what we are doing, and to align our actions with our passions; the

other part to be mentioned is *empathy* which is described as the ability to be able to know what the others are feeling or what are they experiencing. This concept is used a lot by psychologists, because during their sessions with their patients they try to see things from the other persons' perspective, therefore they try to understand and relate it to a similar event that happened to him or her previously, therefore it becomes much easier for them to emphasize; two other fields that Daniel Goleman puts a lot of weight on them are *motivation* describing as the act of an individual to be eager to make a move to do something and also *social skills* as crucial part on creating and maintaining fruitful interactions with the other parties.

Another important aspect to be mentioned is that the emotional or social intelligence is actively supported by the part of the brain known as “the secretary of the brain” which has the function to turn or shift our mind into an auto pilot mode when we face familiar situations. Therefore, from our intuition our mind shifts toward rational decision-making based on our previous experiences, collecting information already stored by our brain from a similar situation that occurred to us. It is seen as a phenomena to be the enemy of learning, because when we face similar situations, activities, actions etc, we lose our interest on listening or being part of them, therefore we might lose the opportunity to learn new things mentioned in between these activities because we shift our focus into different fields. This happens mostly at students, therefore professors try to keep the brain secretary “out to launch”, by making their lectures more interesting, involving class activities, experiments, videos, debates, competitions etc. Advantages of this function of the brain can be many, such as: driving the same course of road while we go home from work and vice-versa, and also other routine works that we do every day, therefore even if we are in completely different scope into our mind we accomplish these actions without giving too much efforts to them such as commitment or focus etc (Goleman, 2005).

2.1.6 Modern and Primitive Brain Influence on Decision-Making

There are many different studies that are made in support of the theory of brain hemisphere division. Starting with the medical science institution study which has explored and shown various types of processes that occurs into our both brain hemispheres and are asymmetrical relating to each other, meaning that there is not a balance into their functioning. Therefore the study gives detailed findings that our

intellectual brain hemispheres act distinctly and accomplish tasks using different approaches, consciousness, problem solving manners etc (Benson & Zaidel, 1985).

The other study to mention is the revision of fifty years of research and experiments made by the neuroscientist Roger Sperry that contributed on the theoretical arguments of the brain split. His studies were focused on mental psychology, brain science and the philosophy of mind. Through the experiments made by analyzing the brain circuits, the brain split was revealed, and the further studies of his experiments described that actually the two parts of the brain integrate their functions through corpus callosum¹ to accomplish a task, but these two parts had different roles, the left brain contributed on the verbal communication and rationality and the right brain contributed on the intuitive skills of the individual (Trevarthen, 1990). A similar study made named “Counting the minds of split-brain patients” supports the same theory as the previous studies given above (Lokhorst, 1996). Also according to philosopher and author Rolland Puccetti who was engaged for a long time professionally on the mind and body problems, through his published article named “*Brain Bisection and Personal Identity*” he supports the brain division basing his studies on the recent researches made on the patients who had their cerebral commissures² removed in order to prevent the spread of the epilepsy. Through his studies he also concludes that there is evident a brain hemispheric conflict, and this is easily noticeable on the individuals that suffer from certain defects on their brain hemispheres (Puccetti, 1973).

The studies of Tenhouten also support the theory that different functions are processed into two different brain hemispheres basing his beliefs on the studies of the distribution of brainwave activity and brain metabolic activities etc. According to his findings, sociology contributes a lot on the evolution of brain and its hemisphericity claiming that brain is not just a biological product. By his work he claims that the educational system must be changed, because the actual system has a program that emphasizes logic, calculations, reading, writing, quantitative studies (which are all left brain functions), therefore a discrimination to the right brain students is present. An integrating program must be constructed that would integrate the society. He supports his claims by an experiment study that he has made in educational level with Australian Aborigine students and White

¹**Corpus Callosum** is a broad band of nerve fibers joining the two hemispheres of the brain.

² The right and left **cerebral** hemispheres are connected by three tracts of nerve fibers or axons, which are collectively referred to as **commissures, cerebral**.

Australians, the experiments primary data gives that the Aborigine Australians are right brain meaning more intuitive driven students, therefore they have different learning styles, they learn by observing and practicing rather than by talking and reading. Their attitude of being right brain oriented may be related to the context specific, example their family environment and their lifestyle, for instance they are not familiar on answering every question made in the class because they do not enjoy this autonomy at home, they value more the authority than the substance etc. Therefore according to these studies the performance of students is not measured accurately since the educational system is more appropriate to the left brain rather than right brain students (Tenhouten, 1989).

Below are given some evidence of the previous research studies made by certain authors that support the topic of the thesis and the human brain hemisphere division.

Table 2: Research studies supporting the theory of Brain Hemisphere Division

JOURNAL ARTICLES	AUTHORS
<i>"The Dual Brain"</i> Guilford, NY, 1985	Benson D.F. and Zaidel E.
<i>"Brain Circuits and Functions of the Mind"</i> Cambridge: Cambridge University Press, 1990	Trevarthen, Colwyn B.
<i>"Counting the minds of split-brain patients"</i> Logic & Analysis, Sept.–Dec. 1996	Lokhorst, Gert-Jan C
<i>"Brain Bisection and Personal Identity"</i> The British Journal for the Philosophy of Science, Dec. 1973	Puccetti, Roland
<i>"Application of Dual Brain Theory to Cross-Cultural Studies of Cognitive Development and Education"</i> Sociological Perspectives, Summer, 1989	Tenhouten, Warren D.

Some of the main figures on the field of decision making also support the division of brain hemispheres, and they have already published their studies regarding this issue and supporting the intuitive decision making process even though it was a new concept on the academic research initiating on 1970's they emphasized it as very important practice toward achieving desirable decisions.

Firstly Chester Barnard argued that non-logical type of decision making is actually used by the executive bodies in order to balance rational and intuitive decisions and that in order to achieve optimal outcomes it is crucial to use both hemispheres depending on the situations that we face (Barnard, 1968).

According to Simon and Mintzberg intuition is not the opposite of rationality, it is actually considered to be a deep knowledge for an explicit job coming from long experience rather than basing the decisions on the previously similar experiences. They suggest that intuition enables us to overcome the barriers of rationality, especially into unstable environments (Prietula & Simon, 1989).

CHAPTER 3: Methodology

3.1 Research Design

This thesis is identified as a descriptive research study, since through the material collected and transmitted to this thesis increases the knowledge and the awareness of the readers regarding the research topic, it aims to determine the correlation between the independent variable "CGPA" and the dependent variables including the neutral, left - brain and right - brain decision makers. Therefore in order to assess whether there is a direct correlation, a numerical scale was used by grouping the set of data (dependent variables) into 4 different groups and comparing with their performance (independent variable), as it can be seen on the section of data presentation.

Even though the previous studies regarding the thesis topic are few in number, the research is based on the revision and analysis of the existing previous research and theory, therefore the deductive method is used also during the literature review. Through this approach of research, the secondary data obtained from the internet based scientific

resources and other related materials including books, scientific journal articles, reports, academic studies etc, are than compared with the primary data of the thesis which are based on the questionnaires which refers to the finding of the intuitive level of the participants. Both primary and secondary data collected support to the diminution of the uncertainty relating to the research purpose and also answering the research question.

3.2 Research Approach

The research relies on the two main approaches, which are the qualitative research approach and the quantitative research approach. Through the qualitative approach the important facts, information and knowledge are provided to offer a better and deeper understanding of the hypothesis arisen, through this approach it is clarified why does the correlation of decision-making and left and right-brain hemisphere exists and how does it function, what are the factors that contribute to this correlation, when people become aware of this process etc. Therefore, only through the information provided by the qualitative research approach that contributed on the knowledge enrichment and on a deeper understanding of this phenomenon, then derived the opportunity for a quantitative research to take place on this study. The quantitative data were obtained from the distribution of the questionnaires to 158 participants. A structured and systematic order of information gathering is used in order to clarify and complement the data gathered by the qualitative approach. As advantage of the quantitative research is that it helps us to realize objectively the claims and hypothesis arisen, it also provides the generalization of the outcomes from a larger amount of information

(Saunders, Lewis, & Thornhill, 2009).

3.3 Research Question

The following research question has a strong theoretical back-up as develop in the section of literature review disclosed on the previous chapter.

RQ: Do left-brain decision-making oriented students have higher performance in terms of CGPA compared to right-brain decision-making oriented students, or vice versa?

3.4 Sample Selection

While making a quantitative research through questionnaires, it can be chosen between two different samples which are: probability (meaning that the sample chosen to participate on the questionnaire is a random sampling) and non-probability (meaning that the sample chosen to participate on the questionnaire is chosen based on the objective appropriate for the research, it is mostly used on the business research) (Saunders, Lewis, & Thornhill, 2009). Even though the topic of thesis potentially covers a huge number of potential sample of adults with no age, gender, nationality or other differences, it has a specific target group meaning that not anyone could participate and be part of the subject study, since the necessary of information of the survey participants could be provided only for the given sample and also the sample fit the chosen criteria to be applied for the research, therefore there is a non-probability approach used for conducting this research study.

The participants of the sample chosen to be part of the study are bachelor students part of Epoka University located in Tirana (the capital city of Albania), currently enrolled on second and third year of Bachelor degree program. The students are selected from the Faculty of Economics and Administrative Sciences, the Faculty of Architecture and Engineering, and from the Faculty of Law and Social Sciences. The sample is distributed in seven departments: BUS; BINF; BAF; IML; ECO; PIR; CEN. The total number of participants of the sample is 158, from which three (1.89%) students from BAF department; Twenty five (15.82 %) students from BINF department; Forty seven (29.75%) students from BUS department; Thirty (18.99%) students from CEN department; Twenty one (13.29%) students from ECO department; Nine (5.69%) students from IML department; and Twenty three (14.56%) students from PIR department. Since the performance is hard and in some contexts impossible to measure, or to have a clarified performance evaluation, therefore the sample of this kind is selected since the performance of the students (thesis sample) is already measured and evaluated by the university academic staff members and it is clearly provided for this thesis from their evaluation system, making the picture of the comparison of performance with the left and right-brain decision-making much more clear to be interpreted and perceived by the thesis provider and the reader as well.

3.5 Data Gathering and Analysis

The data for this research are collected through the distribution of a questionnaire which aimed to understand if students are mainly left-brain decision makers or right-brain ones. Further, for understanding the relationship between decision-making styles (analytical or intuitive) and performance, it was needed to collect also the students CGPA³ and to check later the match between their decision-making style and their academic performance.

Regarding data analysis, according to Recker data analysis serves for the purpose of acquiring valuable information and increase the utility of this information through the facts gathered using either qualitative or quantitative research approach, so these analysis have the role of: describing, summarizing and simplifying the data, interpreting the correlation between the variables through assembling data into rating scales, scatter plots, tables and figures etc., identifying the key factors that affect the relationship of the performance and the left and right-brain hemisphere (Recker, 2013).

Therefore in order to make it able to clearly understand the correlation between variables, the data gathered is than analyzed, grouped and assigned to the respective categories into the table given on the data presentation section.

3.6 Quality of research

Validity and Reliability are the two variables that serve as a measurement of the quality of a research.

3.6.1 Validity

As described by the professors' Long and Johnson, validity serves to measure if the research is sound enough, if it actually appraises or achieves what it intends to achieve. There are two types of validity: *internal validity* which includes the process of the research, if it is done in the adequate manner, using the appropriate measurements and the credibility and comprehensibility of the data and information given has a crucial role on the internal validity evaluation; (Long & Johnson, 2000) and also *external validity* refers to the degree to which the finding derived from this research are able to be generalized into different contexts and environments, therefore the richness and the transparency of the knowledge provided on the research makes it more applicable on the other domains as

³ The data were disclosed by the respective responsible units of Epoka University as a courtesy for performing this research only for education purpose, and keeping totally privat the identity of participants.

well (Bhattacharjee, 2012). Basing the research on these assumptions the quality of the research matches the criteria's mentioned above, and the validity is easily measurable since the sample number is not huge and also because there are given detailed and concrete and real information regarding the thesis topic and also the same research may be assigned to other samples as well only if their performance is able to be measured by respective mechanisms.

3.6.2 Reliability

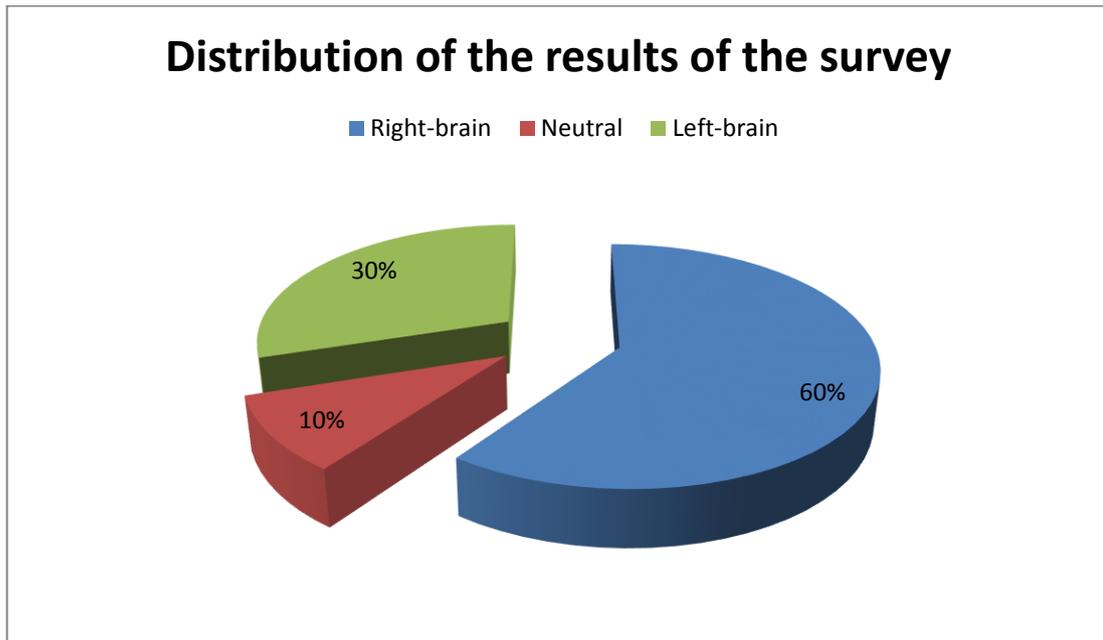
Recker concludes that the reliability of a research refers to the degree of consistency of the results of research study, if the research is repeated by using the same settings and criteria to conduct the research. A quantitative research is mostly much reliable than a qualitative research since on the qualitative approach the study is relied more subjectively on the researcher and his/her interpretations. As said that the reliability is higher on the quantitative research studies it means that it is highly depending on the objectivity of the study, therefore as the sample changes the results may change as well, and as a consequence the reliability faces difficulties on generalizing the results into different contexts and environments (Recker, 2013). Being aware of this actuality, the information interpreted on the thesis is provided in a very high level of simplicity, detailed information, clear content and adequate description of the subject in matter. The qualitative approach used to make the literature review consists of information gathered from eminent books, scientific journal articles, reports and academic studies. And also the sample used to make the quantitative approach research is chosen carefully in order to make a better and much effective comparison of the thesis variables and receiving the seeking results that leads toward the approval or the disapproval of the hypothesis arisen, and answering the research question. For the reason of creating a simple comparison of the variables and avoiding any kind of misinterpretation, the span of the potential sample was limited and all of the irrelevant subject were excluded. Nonetheless, results cannot be generalized since the questionnaire fulfilled by participants must be repeated over time in order to avoid the bias/error (of mood, situation, etc.) and also must be applied in other settings for testing the consistency.

CHAPTER 4: Research Findings

4.1 Data Presentation

After gathering the information from the survey distribution, which enjoyed a sample of 158 participants, the data that came out from the students' answers aided the research to assess their tendencies toward the usage of intuition during the decision-making process. As the questions of the survey are taken from the book of named "Intuition and Organization", a book written by the professor Weston H. Agor, it is proven that the answers provided from this questionnaire leads to a certain assessment of people tendencies toward their intuitive tendencies on decision-making. It was crucial to obtain the CGPA of the participants of the survey, therefore this information is provided from the competent persons of the Epoka University. The data presentation will be divided into four different scenarios in order to create a better understanding of the relationship of the variables. These are the scenarios: Students with a CGPA between $0.0 < 1.0$ and their intuitive level; Students with a CGPA between $1.0 < 2.0$ and their intuitive level; Students with a CGPA between $2.0 < 3.0$ and their intuitive level: and Students with a CGPA between $3.0 < 4.0$ and their intuitive level. CGPA of the students is given referring Epoka University system in compatibility with the American systems and Bologna's principles, where the lowest CGPA is 0.0 and the highest is 4.0.

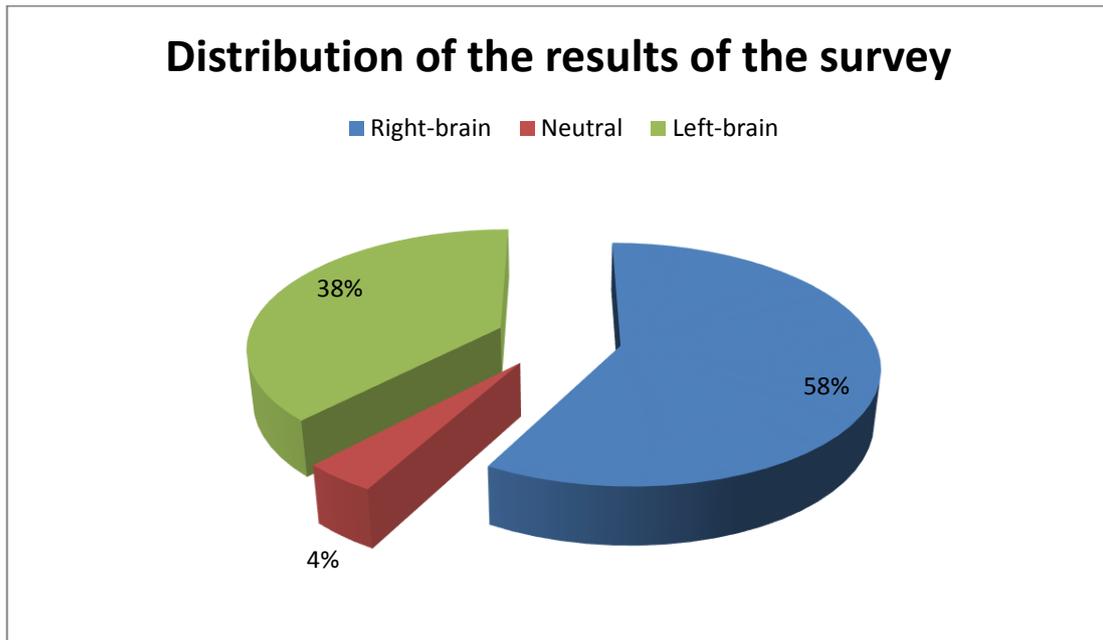
Figure 5: Students with a CGPA between $0.0 < 1.0$ and their intuitive level



Relationship between students' performance (CGPA = $0.0 < 1.0$) and their intuitive level

From the total number of 158 participants as mentioned previously, 10 of them have a CGPA between $0.0 < 1.0$, and as it is seen on the pie chart above the highest percentage of the sample (60%) rely their decisions on their right-brain hemisphere, then shifting to left-brain decision makers (30%) and the lowest percentage (10%) is attributed to the neutral decision makers. Through these results it is clear that that they do not base their decisions on the rationality of the situations they face, therefore they are not rational decision makers. The colors represent the decision-making type of the participants. This sample given on this section constitutes 6.33% of the total sample, and as it can be concluded that the students with the poorest performance are intuitive decision makers.

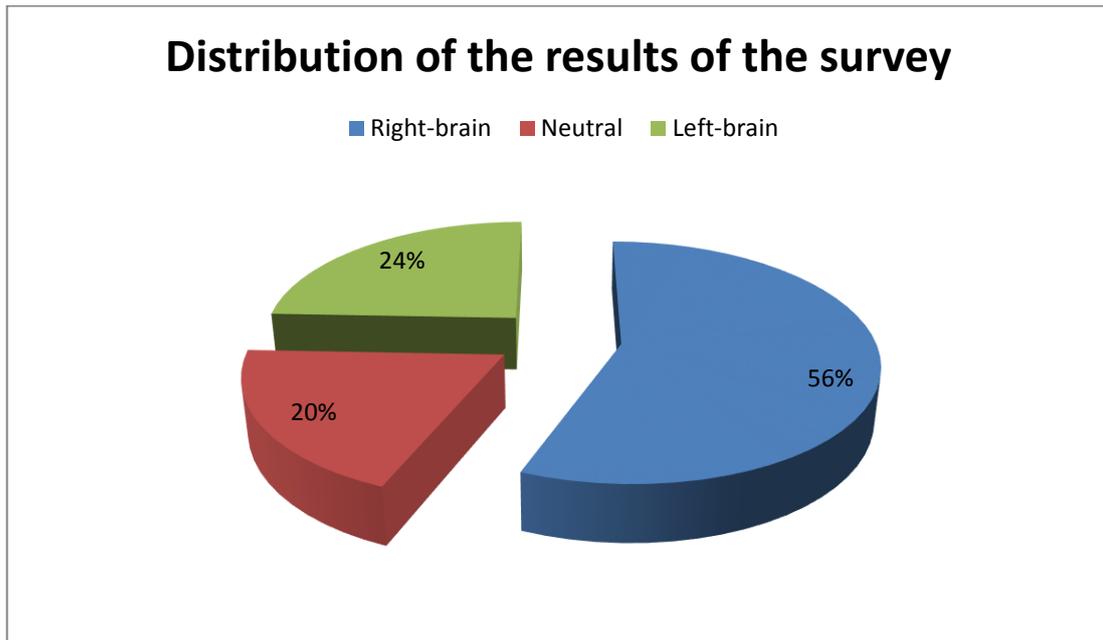
Figure 6: Students with a CGPA between $1.0 < 2.0$ and their intuitive level



Relationship between students' performance (CGPA = $1.0 < 2.0$) and their intuitive level

From the total number of 158 participants as mentioned previously, 50 of them have a CGPA between $1.0 < 2.0$, and as it is seen on the pie chart above the highest percentage of the sample (58%) rely their decisions on their right-brain hemisphere, then shifting to left-brain decision makers (38%) and the lowest percentage (4%) is attributed to the neutral decision makers. Through these results it is clear that that they do not base their decisions on the rationality of the situations they face, therefore they are not rational decision makers. The colors represent the decision-making type of the participants. This sample given on this section constitutes 31.64% of the total sample, and as it can be concluded that the students with the second poorest performance are also intuitive decision makers.

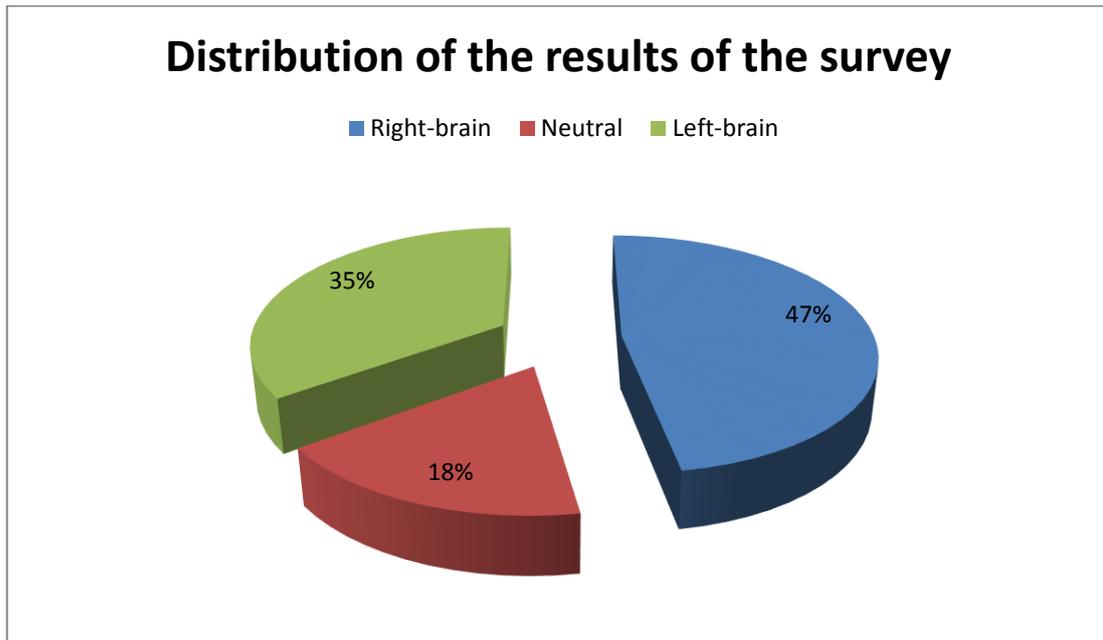
Figure 7: Students with a CGPA between $2.0 < 3.0$ and their intuitive level



Relationship between students' performance (CGPA = $2.0 < 3.0$) and their intuitive level

From the total number of 158 participants as mentioned previously, 41 of them have a CGPA between $2.0 < 3.0$, and as it is seen on the pie chart above the highest percentage of the sample (56%) rely their decisions on their right-brain hemisphere, then shifting to left-brain decision makers (24%) and the lowest percentage (20%) is attributed to the neutral decision makers. Through these results it is clear that that they do not base their decisions on the rationality of the situations they face, therefore they are not rational decision makers. The colors represent the decision-making type of the participants. This sample given on this section constitutes 25.95% of the total sample, and as it can be concluded that the students with the second highest performance are also intuitive decision makers.

Figure 8: Students with a CGPA between $3.0 < 4.0$ and their intuitive level



Relationship between students' performance (CGPA = $3.0 < 4.0$) and their intuitive level

From the total number of 158 participants as mentioned previously, 57 of them have a CGPA between $3.0 < 4.0$, and as it is seen on the pie chart above the highest percentage of the sample (47%) rely their decisions on their right-brain hemisphere, then shifting to left-brain decision makers (35%) and the lowest percentage (18%) is attributed to the neutral decision makers. Through these results it is clear that that they do not base their decisions on the rationality of the situations they face, therefore they are not rational decision makers. The colors represent the decision-making type of the participants. This sample given on this section constitutes 36.07% of the total sample, and as it can be concluded that the students with the highest performance are also intuitive decision makers.

The data provided on the table below include the correlation between the students (survey participants) performance which is specified by the respective letters based on their CGPA and their tendencies of decision-making, as starting from 0 to 12 (questionnaire results), meaning that the students that are in between 0 to 5 are actually right-brain decision makers, students with intuitive level of 6 are actually neutral decision makers and the students that are in between 7 to 12 are actually left-brain decision makers.

The results gathered from the survey analysis show that most of the students are intuitive decision makers, meaning that they rely their decisions mostly on their right brain

hemisphere. Interesting fact is that taken into percentage allocation it is given that as shifting from A to D, meaning from the students that enjoy high performance toward the poorest performance students, the percentage of right-brain decision makers increases and reaches its peak of 60% at the section of the students that have their performance at the lowest level. By these facts it can be concluded that there is a direct correlation between the performance and the right and left-brain hemisphere, and that they have an inverse relationship, meaning as our performance increases our intuitive level decreases and we become more rational decision makers, and as our performance decreases our intuitive level increases and we become more intuitive decision makers.

Table 3: Distribution of the total sample results and their decision-making tendencies

CGPA	A		B		C		D		Total
Intuitive Level		%		%		%		%	
0 - 5	20	35%	10	24%	19	38%	3	30%	52
6	10	18%	8	20%	2	4%	1	10%	21
7 - 12	27	47%	23	56%	29	58%	6	60%	85
Total	57	100%	41	100%	50	100%	10	100%	158

A = 3.0 < 4.0	B = 2.0 < 3.0	C = 1.0 < 2.0	D = 0.0 < 1.0
---------------	---------------	---------------	---------------

CHAPTER 5: Final Remarks

5.1 Discussion

The research made during the preparation of the thesis contributes to the increase of the awareness of the readers and also on the reinforcement of the previous studies, that spot the decision-making as the most important process of ours toward reaching the desirable outcomes for ourselves and the others with the focus on the left and right brain hemispheres effect on this process. As reviewing the literature many different theories of

famous scientist, academics and philosophers are explained and analyzed in order to make the interpretation of the results more meaningful and reliable. Since the subject of decision-making covers a lot of aspects and it includes a large scope of disciplines, “the effect of left and right-brain hemisphere on decision-making” was chosen as the case of the research in order to focus the thesis and make it more specific.

Through studying all of the theories including: Game Theory of Neumann and Morgenstern; Nash Equilibrium; Social Rationality; Bounded Rationality; Rule of Thumb; Heuristics; Group Cohesion; Conformity etc., and making a correlation of them by identifying the facts that have a direct relationship to the subject of the thesis, a clear analysis were obtained and interpreted. Based on these studies and theories it is clear that the decision-making as a process is studied for many years and from many different individuals, groups, institutions etc., since it is a dynamic process and it takes another form and changes and the circumstances changes. As the studies became more valid and reliable since the innovative equipments, facilities and the other related conditions emerged, the data collection and analysis became much easier to be conducted, therefore the deeper studies that took place shows that there exists two brain hemispheres and that their effect on decision-making is significant and an important attention should be given to this phenomena. The research suggests that all of the individuals have a certain tendency to rely into one of their brain hemispheres more than the other, even though these hemispheres are interrelated with could not act without depending on each other.

The study supports the hypothesis saying “The performance depends on our decision-making approach, being more rational decision maker leads us toward greater performance”. It is supported by the literature review and also by the survey results, which are clearly presented and interpreted on the respective chapter of data presentation. Also, the answer to the research question is provided, giving that being able to rely on both of the brain hemispheres equally derives the optimal outcomes only if we achieve to have a balance brain hemisphere development, which could be done by training our brain. In general, this research study stresses the significance of the influence of our brain hemispheres on the decision-making process within an individual.

5.2 Counter theories

There are many studies and theories that do not support the claims of the thesis topic at some points. Most of the counter theories describe that there does not exist a clear-cut division of the left and right brain hemispheres, according to some research studies as following by “Top brain, bottom brain” (Kosslyn & Miller, 2013), the brain functions are conducted into two different brain hemispheres, example language in the left hemisphere and music into the right hemisphere, but there is no dominance of people to rely on one side more than the other. Therefore according to their studies while making a decision both brain hemispheres communicate to each other and are depended on each other, and also they do not believe that the personality tests results are valid and reliable, since it is not proven biologically this kind of tendency exists in neuroscience.

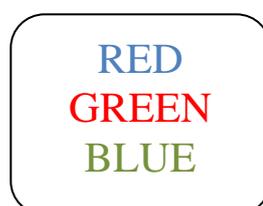
5.3 Recommendations

5.3.1 Brain Hemisphere training

Being aware of the fact that even after finding out through personality tests whether we are left or right brain decision makers, for most of the individuals it may be in certain circumstances hard to find the job that fit the most to them. Therefore it is very important to follow different programs that contribute on training the hemisphere of the brain that we rely less, because we need both hemisphere while making decisions in order to achieve the optimal decision-making results.

There are many training programs, as for example the one given by the Saltbox Training and Events Center where there are many different tests which would describe on which side of our brain we do rely most. Example if we do easily remember the names of people/objects etc, or if we take spontaneous decisions, another example would be the experiment of John Ridley Stroop known as the “Stroop Effect” (which is a test that help us understand the conflict of information that the brain faces during the management of certain processes), naming of the colors and not the words as given below:

Figure 9: Naming the colors, not the words



In this case the right-brain hemisphere has the function of calling out the color of the letters and the left-brain hemisphere focuses on the word's meanings. Facing these kind of situations people will have difficulties initially, especially people with brain damage, but we can exercise our brain through practicing these tasks more often, therefore it will become much easier and we will be able to make faster decisions of this nature in the future. Mentioning some tips to improve our brain hemispheres:

- Improving skills that are controlled by left brain hemisphere:
 1. Engage into filling up different crosswords and puzzles;
 2. Practice writing. Writing of any kind would help us increasing the ability of our left hemisphere, including the essays, academic writing which includes many elements like structure, special format, limitations etc.
 3. Try to change the routine, trying not to follow the same path and tools to accomplish a certain task, for example trying not to always follow the same road to work etc.
 4. Use calculations, try to avoid the usage of calculators especially while facing simple mathematical tasks.
- Improving skills that are controlled by the right brain hemisphere.
 1. Try to learn new things, learn new exercises at gym, start a dancing course etc.
 2. Participate on the meditation programs, through participating on programs of this nature it will encourage the improvement of the imagination as we visualize what we hear etc.
 3. Try to engage on activities like singing, drawing, painting etc.
 4. Use the non-dominance side of your body, example while changing the TV channel through the TV command controller, do it by your non-dominant hand, while brushing your teeth, throwing a ball etc.

All of these exercises mentioned above are important for exercising our brain hemispheres in order to accomplish a brain hemispheric balance, and at the same time these are also healthy and necessary for our daily life.

(Saltbox)

5.3.2 Brain Skill Management

Another recommendation would be the “brain skill management”, which is a practice founded by the writer of the book named “Intuitions in Organizations”. Though this program professor Agor aims to reduce the downsizing level of firms and help firms to achieve a more effective process of integration between each other while conducting a certain merger or acquisition. It is a program that involves a process composed of three components, first one is the testing part of the individuals, second one is the norm-based placement and the last one is the training of the brain hemispheres. According to Agor the firms should consider this program before making any downsize because the change of the employees positions/roles within the firm itself based on this program would lead to a very effective and efficient work and a boost the productivity as the individuals with the similar attitudes or brain skills coming together will enhance and inspire each other therefore they reach the highest performance. Even though this program supports the training of the brain hemisphere of individuals which they have more developed after the assessment process, it also concludes that the individuals that combine both their intuitive and cognitive styles effectively are the most successful people to be leaders (Agor, 1995).

5.4 Limitations

The thesis is limited in some aspects including the dynamic nature of decision-making processes relying on the environmental and other interrelated changes, therefore the reliability and the validity of information refers to a closer time interval from the research accomplished date. Also the decision-making is known to be a very broad as an act and process as well, therefore being the study does not cover all of its aspects, divisions, fields of study and all of its dimensions. The sample is relatively small, since it was impossible to gather data regarding the students CGPA from the other Universities, because of the time limit and because of their attitude toward this issue considering a violation of the privacy of their own students by providing the requested data to us. Another limitation would be the nationality and demographics of the participants, since the survey is not distributed abroad, but only within the state of Albania, therefore the mentality is different, and the culture, ethnicity, quality of the education etc. that have a direct affect on the research results and findings. As limitation are considered also many other variables that affect the performance of the students and at the same time the answers that they provided to the questionnaire, example given the efforts that they give

to achieve their results, their approach toward the multiple question form of questionnaire etc.

5.5 Conclusion

All of the research components including: books, scientific journal articles, reports, academic studies and also all of the research approaches as mentioned on the methodology chapter, concludes that it is crucial for us to pay a significant attention to the decision-making process. As the expression claims “Life is the sum of all your choices” said by Albert Camus, it means that our history is made of the choices of all mankind, therefore we should be aware of the decision-making phases, factors affecting it and its functions into our lives’. The focus of the thesis shifts to the brain hemisphere differences and their effect on the decision-making with the purpose of supporting the theories and studies that support this brain functionality division, since it affects our performance as described by the empirical findings gathered from the analysis of the survey.

In absolute terms, within the highest interval of performance (CGPA 3-4), the percentage of right-brain decision makers is higher compared to the left-brainers (47% vs. 35%). That means that the role of intuition is higher compared to the systematic/analytical thinking.

The above result is not significant since the intuitive thinkers are always superior as a percentage even in the other intervals of lower performance.

Within the same intuition/rationality level or category as resulted by the test (i.e. 1-5; 6; 7-12), the variation of performance in terms of CGPA shifting from one interval to the other is irregular and consequently difficult to draw conclusions.

References

- Agor, W. H. (1995). Brain Skill Management. *R&D Innovator* .
- Agrawal, D., Biswa, M. B., Kumar, S., & Chinara K., P. (2014). Split brain syndrome: One brain but two conscious. *Journal of Health Research and Reviews* .
- Allen, V. L., & Levine, J. M. (1968). Social Support, dissent and conformity. *American Psychological Association* , 138-149.
- Allport, F. H. (1924). *Social Psychology*. Boston: Houghton Mifflin.
- American Anthropological Association. (n.d.). *Cultural Anthropology*. Retrieved 10 25, 2016, from American Anthropological Association: www.americananthro.org
- Barnard, I. C. (1968). *The Functions of the Executive* . Massachusetts: Harvard University Press.
- Benson, F. D., & Zaidel, E. (1985). *The Dual Brain: Hemispheric Specialization in Humans*. New York: The Guilford Press.
- Bhattacharjee, A. (2012). *Social Science Research: Principles, Methods, and Practices*. Florida: Creative Commons Attribution.
- Bridbord, K. (2015). *Introduction to the Sound Relationship Workplace*. Seattle: The Gottman Institute.
- Buchanan, L., & O'Connell, A. (2006). A Brief History of Decision Making. *Harvard Business Review* .
- Dhami, M. K. (2003). Psychological models of professional decision making. *Psychological Science* , 175-180.
- Druskat, V. U., & Wolff, S. B. (2001). Building the Emotional Intelligence of Groups. *Harvard Business Review* .
- Forsyth, D. R. (2009). *Group Dynamics*. Belmont: Wadsworth, Cengage Learning.
- Gigerenzer, Gerd; Todd, Peter M.; ABC Research Group. (1999). *Simple Heuristics that make us smart*. New York: Oxford Uni. press.
- Gigerenzer, G., & Goldstein, D. G. (1996). Reasoning the Fast and Frugal Way: Models of bounded rationality. *Psychological Review Journal* .
- Goleman, D. (2005). *Emotional Intelligence*. New York.
- Hellige, J. B. (2001). *Hemispheric Asymmetry*. USA: Harvard University Press.
- Henle, M. (1961). *Documents of Gestalt Psychology*. Berkeley & Los Angeles: University of California Press.

- Hertwig, R., Hoffrage, U., & the ABC Group, R. (2013). *Simple heuristics in a social world*. New York: Oxford University Press.
- Kosslyn, S. M., & Miller, W. G. (2013). *Top Brain, Bottom Brain*. New York: Simon & Schuster.
- Lokhorst, G.-J. C. (1996). Counting the minds of split-brain patients. *Logique & Analyse, Nouvelle serie* , 315-324.
- Long, T., & Johnson, M. (2000). Rigour, reliability, and validity in qualitative research. *Clinical Effectiveness in Nursing* , 30-37.
- MacNeilage, P. F., Rogers, L. J., & Vallortigara, G. (2009). Origins of the Left & Right Brain. *Scientific American* .
- Marshall, C., & Rossman, G. B. (2006). *Designing Qualitative Research*. California: Sage Publications, Inc.
- Max Planck Institute. (n.d.). *The Lifespan Development of Decision Making*. Retrieved 04 12, 2017, from Max Planck Society: <https://www.mpib-berlin.mpg.de/en/research/adaptive-rationality/research-areas/the-lifespan-development-of-decision-making>
- Mullen, B., & Copper, C. (1994). The relation between group cohesiveness and performance: An integration. *Psychological Bulletin* , 210-227.
- Myerson, R. B. (1999). Nash Equilibrium and the History of Economic Theory. *Journal of Economic Literature* , 1067-1082.
- Owen, G. (1995). *Game Theory*. Bingley: Emerald Group Publishing .
- Pachur, T., Mata, R., & Schooler, L. J. (2009). Cognitive aging and the adaptive use of recognition in decision making. *Psychology and Aging* , 24, 901-915.
- Poole, M. S., & Hollingshead, A. B. (2005). *Theories of Small Groups: Interdisciplinary Perspectives*. New York: SAGE Publications, Inc.
- Prietula, M. J., & Simon, H. A. (1989). The Experts in Your Midst. *Harvard Business Review* , 120-4.
- Puccetti, R. (1973). Brain Bisection and Personal Identity. *The British Journal for the Philosophy of Science* , 339-355.
- Recker, J. (2013). *Information Systems Research as a Science*. Berlin: Springer Berlin Heidelberg.
- Robinson, E. W. (2004). *Ancient Greek Democracy*. Cornwall: Blackwell Publishing Ltd.

Saltbox . (n.d.). *Saltbox Training and Events*. Retrieved 05 15, 2017, from [www.saltbox.co.uk: http://www.saltbox.co.uk/uploads/1/0/1/9/10196192/_balancing_right_and_left_brain_thinking.pdf](http://www.saltbox.co.uk/uploads/1/0/1/9/10196192/_balancing_right_and_left_brain_thinking.pdf)

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research Methods for Business students*. Harlow: Pearson Education Limited.

Schermerhorn, J. R., Hunt, J. G., Osborn, R. N., & Uhl-Bien, M. (2010). *Organizational Behavior*. New Jersey: John Wiley & Sons.

Smelser, N. J. (2011). *Theory of Collective Behavior*. New Orleans, Louisiana: Quid Pro LLC.

Solomon Asch : Opinions and Social Pressure (1955). (n.d.). Retrieved 12 02, 2016, from [Panarchy - Panarchie - Panarchia - Panarquia: http://www.panarchy.org/asch/social.pressure.1955.html](http://www.panarchy.org/asch/social.pressure.1955.html)

Tenhouten, W. D. (1989). Application of Dual Brain Theory to Cross-Cultural Studies of Cognitive Development and Education. *Sociological Perspectives* , 153-167.

Todd, P. M., Gigerenzer, G., & Group, t. A. (2012). *Ecological rationality: Intelligence in the world*. New York: Oxford University Press.

Trevarthen, C. B. (1990). *Brain Circuits and Functions of the Mind*. New York: Cambridge University Press.

Wendt, D., & Vlek, C. A. (1973). *Utility, Probability, and Human Decision Making*. Rome: Springer Netherlands.

Appendix 1:

Appendix 1: Survey Questionnaire

Instructions

Answer each of the following questions.

1. Do you prefer to:

(a) be given a problem and left free to do it? (b) get clear instructions on how to solve a problem before starting?

2. Do you prefer to work with colleagues who are:

(a) realistic? (b) imaginative?

3. Do you most admire:

(a) creative people? (b) careful people?

4. Do your friends tend to be:

(a) serious and hardworking? (b) exciting and emotional?

5. When you ask for advice on a problem, do you:

(a) seldom or never get upset if your basic assumptions are questioned?

(b) often get upset with such questions?

6. When you start your day, do you:

(a) seldom make or follow a specific plan? (b) usually make and follow a plan?

7. When working with numbers, do you make factual errors:

(a) seldom or never? (b) often?

8. Do you:

(a) seldom daydream and really not enjoy it? (b) often daydream and enjoy it?

9. When working on a problem, do you:

(a) prefer to follow instructions or rules? (b) often enjoy bypassing instructions or rules?

10. When trying to put something together, do you prefer:

(a) step-by-step assembly instructions? (b) a picture of the assembled item?

11. Do you find that people who irritate you most appear to be:

(a) disorganized? (b) organized?

12. When an unexpected crisis comes up, do you:

(a) feel anxious? (b) feel excited by the challenge?

Scoring

Total the number of "a" responses circled for questions 1, 3, 5, 6, 11; enter the score here [A = ____]. Total the number of "b" responses for questions 2, 4, 7, 8, 9, 10, 12; enter the score here [B = ____]. Add your "a" and "b" scores and enter the sum here [A + B = ____]. This is your *intuitive score*. The highest possible intuitive score is 12; the lowest is 0. (Schermerhorn, Hunt, Osborn, & Uhl-Bien, 2010)