THE EMOTIONAL FACTOR ON THE BDP (BUSINESS DECISION-MAKING PROCESS)

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<u>Abstract</u>: Supposing that there is an emotional factor on the decision making, we've adopted an experimental evaluation methodology to a group of executives who usually make important decisions about different topics. We've used two cognitive tests and many data on the scientific literature were collected in order to help and check whether the method is valid or not. The results confirmed and showed us that the emotional factor is always together with the executives, and in different ways, which has an effect on the BDP (business decision-making process). We could create an Emotion's Indicator (E.I.) parameter, which is a component from the adopted methodology, in order to evaluate the feeling involving the executives on their decisions, no matter the culture, degree and origin is, facing and during a lot of situations in which they should choose or select options and alternatives to establish the activities' course involving small and big interests.

Key words: emotional factor, decision making, decision-making process, emotion's indicator, expert system, decision support system.

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## 1 - USING THE EXPERT SYSTEM (ES) AND THE DECISION SUPPORT SYSTEM (DSS)

The executives' behavior on the decision-making process usually faces a challenge on the profit's demand. We can also see the creation and development of computer programs to help the executives to deal with these situations, called "systems".

In such case, the ES (Expert System) is a computer program designed to solve problems in a specific field of knowledge that uses a knowledge base of this restrict domain (PASSOS, 1989) to work; so, the ES is a computer technology. Besides that, the DSS (Decision Support System) is a methodological resource, which doesn't exactly need to use the computer, created to help on the decision-making process.

In general, the companies are interested in people who consider all the BDP (Business Decision-Making Process) in a cold and unemotional way. When getting rid of or ignoring the executive's emotion in a BDP, the enterprise can take some risks on its target actions, which can be a real problem in small, medium or high scales. The breakdown of the emotional effects on decision-making processes can clash and damage, when negative, or help and benefit, when positive, existent and future projects of the company, of its third-parties, among others.

KAISER and WEHRLE (1994) have presented an interesting case on the DSS (*Decision Support System*) area about a famous researcher who decided to stay in England, going against his own theory, which indicated that he should go back to New Zealand, his native city. By using an integrated way of thinking to an unreasoning factor, this love for his love, he thought it would be better to stay in England. Both of them were University researchers; the difference was that the man was born in New Zealand and his wife was born in England. Both of them lived in England, where they used to work together; there has been an opportunity for the husband to work and go back to New Zealand. DSS has been used, with the technology of a ES, where there were about 700 items representing some criteria made by the developers. Those criteria were adopted, without taking into account the unreasonable factors on the decision-making process.

The ES developed from the answers given by the researcher had shown about 300 items corresponding to the decision of going back to his native city. On the other hand, he chose to stay in England with his wife, what represented a numerical value on the ES of only 110 items. (KAISER and WEHRLE, 1994, page 24).

Most of the criteria used by the DSS for the decision making indicated some benefits and advantages, professionally speaking, for the researcher to go back to New Zealand, but an unreasonable fact involving his stay with his wife, immeasurable and not incorporated to the model on the agenda, was more relevant for the final decision. This happened because the DSS only accepted logical and rational of the human being, on an unique and restrictive point of view to the company, and ignored unreasonable factors, which are part of the emotional factor on the decision-making process.

The story mentioned above and the answers generated by the ES suggest that a math-computer model for a decision-making process in a company that ignores the emotional side of the professional tend to provide, at least, partial and non-satisfactory results.

A decision making is understood as being only the final act of a choice made among a lot of possibilities/hypothesis. It's as if a choice fall upon a polar or dual confront, usually considered as situations, Boolean variables, parameters of binary conditions processed in a computer program or by human beings in their daily lives. Examples: "yes or no", "accepted it or not", "right or wrong", "apply it or not", "this or that", "do it or not", "this or that thing", "one person or another", "can or cannot", "should or shouldn't" and "positive or negative".

The decision making is a decisive process that elapse since the first moment, whose duration, intensity and thought quality are used by the executives, going by the decisive event; this means that it goes from a choice of an alternative or a way to be followed up to its implementation.

On the case described above and under the employee's view, the emotional factor shouldn't be considered; emotion shouldn't be seen as something precious on the professional area, even less on the decision making and this process. Emotion, on the contrary, would have disturbed the clearness and sense, without affecting action, reaction and expression's fields. So emotion should never exist or have an influence on the decision-making process in any level: personal, professional, interprofessional, organizational and/or interorganizational.

On the other hand, the emotional factor has always been in all of these levels. Emotions, when they are not shown in an appropriate way, can be identified as having a sentimentalist and disorganizing nature, but as a part of the human being and his attitudes, the executive needs to pay attention to its existence in order to improve the management and usage.

By generalizing the example above, it can be understood that the identification and characterization on the point about the decision making that ignore the emotional factor become problematic, delimiter and wrong for a company.

## 2 - THE EXECUTIVE, THE BDP (BUSINESS DECISION-MAKING PROCESS) AND THE EMOTIONAL FACTOR

An executive is considered a responsible professional by his small or big decision making, including the ones that are strategic and essential for the company. The decisions can be related, for example, to planning and performance parts, personal policy or on the productive process.

The BDP (Business Decision-Making Process) is defined as a set of activities of an executive, which relate themselves, according to the original data, with the information about the point or the problem (*inputs*), its processing or change, and the results (*outputs*) for the decision and action (Picture 1 below).



Picture 1 - Basic Steps of a BDP

The inclusion of the emotional factor came from the suspect about the dichotomy between sense and emotion – the Cartesian duality during the reasoning on the decision by the executives. If it's ignored, it'll bring negative and unexpected consequences for the companies and for the executive himself (Picture 2).

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Picture 2: The presence of the Emotional Factor on the Reasoning of the Executives Affecting the BDP

## 3 - NOTICE ABOUT THE DECISIONS THAT LEAD TO SUCCESS

There are lots of available material about decisions that led to success, no matter the emotional factor is, which goes against the hypothesis, the goals and the content of this approach. Some authors say<sup>4</sup> that the success from some decisions comes mainly from total or unique rational decisions. Others<sup>2</sup> state that the success or losses come from some factors such as de "company's performance" and "macroeconomic conditions". There are some authors<sup>2</sup> that say that one of the best ways to avoid these kinds of situations that affect, in a negative way, the decisions is trying to keep the rational side as active as possible.

For other researchers<sup>3 4 5</sup> the unreasonable factor on the decision making is part of a intuitive thought which uses psychological strengths in a low level of consciousness<sup>5</sup>, or that are considered as an "non-logical process"<sup>6</sup>, or part of an implied knowledge and emergent strategies<sup>7</sup>.

BAZERMAN (2002), for example, treats the decision-making process with in an embracing, a peculiarity and precious way, reporting to values and preferences from the decision maker. GOMES et al (2006) considers the managing decision making, based on a multicriteria focus<sup>8</sup> that values the human factor, but doesn't link to and unreasonable aspect or specifically to an emotional factor linked to the decision-making process as an important and benefic part. GOMES et al (2006, p.21) states in KAUFMANN (1999), when talking about the decision-making theory and processes, that the influence of the emotional aspects is one of the three sources of cognitive restriction for more complex decision problems.

<sup>&</sup>lt;sup>4</sup>Papers and authors found through a research made with a scientific database about the emotional factor and decision making.

<sup>&</sup>lt;sup>5</sup> BARNARD, C. I. 1938. *The functions of the executive*, Cambridge: Harvard University Press.

<sup>&</sup>lt;sup>6</sup> HARRISON, E.F., 1995. *The managerial decision making process.* 4ed. Boston, MA: Houghton Mifflin.

<sup>&</sup>lt;sup>7</sup> MINTZBERG, H. 1987, The Strategy concept I: Five ps for strategy. *California Management Review* 30(1): 11-. NONAKA, I. 1994, A dynamic theory of organizational knowledge creation, *Organization Science* 5(1): 14-37. POLANYI, M., 1967, *The tacit dimension,* London: Routledge.

<sup>&</sup>lt;sup>8</sup> A lot of criteria have been attributed to get to a decision. It's possible to enumerate the criteria ("AHP" method – one of the first methods made for the multicriteria decision-making environment, see SAATY, 1992), establish hierarchy, attribute appropriate values for each one, according to the decision makers' preferences, among others.

These people who are for the rational decisions, when talking about the unreasonable factor, say that it disturbs the BDP, reducing or even eliminating<sup>9</sup>, instead of helping or giving good results.

However, on the scientific literature, there are references about the Cartesian duality. For example, DAMÁSIO (1995) question Descartes or point out the "Descartes error", when there have been seen people with brain disorders, whose damages happened on the emotion level, were not able to make decisions.

KAHNEMAN and TVERSKY (1979), 2002 Economy Nobel Prize winners, broadly mentioned by the rational defenders, saw that people show a highest impulse to avoid losses that to acquire something. Besides that, they evaluate the loss feeling with twice bigger intensity as the gain feeling on risky decisions.

What does this loss or gain feeling in terms of "impulsive or compulsive" decision making mean? Would it be a rational factor? What happens with people who decide with risks? Is there any decision with no risk at all in a business level? Is it possible to eliminate the relationship between feeling and impulse on the executives' decisions?

## 4 - PREVIOUS STATEMENTS ABOUT THE EXISTENCE OF THE EMOTIONAL FACTOR AFFECTING THE BDP

GOLEMAN (2001) stated that a vision of the human nature that <u>ignore the power of the emotions is</u>, <u>unfortunately</u>, a myopic view from the reality, and, in a gentle way, but wrongly, of building up goals and interactive processes. LEDOUX (2001) argued that <u>the thought does not involve logical laws that are only rational</u>, and the cognition is not as logical as it seemed to be and that not always emotions are so unreasonable. FORGAS and GEORGE (2001), after a research work on Experimental Social Psychology and Business Behavior, showed the <u>"penetrating influence of the emotional states"</u>, or humor, in judgments, decision making situations and behavior at companies. LABOUVIE-VIEF (2003) has developed a model which involves emotional aspects, positive and negative, together with a cognitive aspect.

GRAY (2004) has suggested an appropriate view in which <u>the emotional and cognitive controls are</u> <u>integrated.</u> BUCK et al (2004) have presented a tridimensional model, showing <u>appropriate solutions for the problem</u> <u>between sense x emotion</u>. BECHARA (2004) has consubstantiated a neurological evidence, about the <u>substantial</u> <u>presence and influence (quantitative and qualitative) of emotions over the decision making</u>. SVENSON and SALO (2005) researched about how alternatives of the decision makers are when dealing with important decisions in real life, such as: leave the partner, choose something to study, to live. They indicated many results that joined the emotional factor to the <u>decision making</u>.

About the decision making with doubts, that have some risks, PAULUS et al (2002) stated that: <u>the</u> <u>decision making with uncertainty is a complex process that involves both factors: cognitive and emotional.</u> Besides that, both (errors margin and foreseeing) are implied on the selection process of answering during this decision making period.

PRADO (2005) talked about the subject: logics on the judicial decision and <u>the influence of the judge's</u> <u>emotion</u>. URSU and CARTER (2005) used the expression <u>emotional theory on the decision</u> that would imply the need for studies using neuroimages about the decision-making process.

MARTÍNEZ-MIRANDA and ALDEÃ (2005) noticed the value of emotions, its presence on human life and presented some models to simulate emotions on decision-making processes. KAKABADES et al (2005) stated that, although each purpose is full of theories and models, there was <u>little effort to develop an integrated that would embrace</u> <u>completely the interactions between the cognitive or intellectual dimension, emotional dimension and behavioral dimension</u>, which is shown in Picture 3.

<sup>&</sup>lt;sup>9</sup> This research and authoring current doesn't see how impossible it is to eliminate the executive's emotion and his decision making. Another point is that of using the emotional factor to take a better decision.



Picture 3 - Factors that influence on a decision of an executive

MCKENNA and MARTIN-SMITH (2005), disagreeing of the classic rational models, suggested a model called "dynamic chaotic cycle of the decision-making process". They included some aspects, such as beliefs, values, ways of communication, political interactions, emotions that affect the behavior and decision-making process at the companies.

SCHRAMM-NIELSEN (2001) reviewed a huge literature from many famous authors and <u>studies about the</u> <u>decision making involving the cultural diversity.</u> ASHKANASY et al (2002) studied two contemporary research areas about <u>business behavior: diversity and emotions</u>.

VALLASTER (2001) looked forward to understand the process through which the members of a multicultural group from China and Switzerland developed and supported a consent, the way they interpreted, gave the meaning, providing sense (*make sense*) to what happened <u>during the strategic decision-making process</u>. This author (2001, page 35) showed that <u>the integration and inter-relationship of the emotional dimensions</u> (i.e., a way of emotion, confirming what is mentioned in Picture 3), cognition and communication must be seriously considered.

## **5 – EMOTIONAL FACTORS MENTIONED ON SCIENTIFIC DATABASE**

Many mastership and doctorate papers and scientific articles have been seen at CAPES database, that analyzed the BDPs, included some key words related to emotions on decision-making processes, such as: emotion, stress, multiculture, cultural diversity, decision making. Tables 1, 2 and 3 present these words.

KEY WORD	THESIS BASE (since 1987) ABOUT THE BDP
Stress	2142
Emotion	308
Decision making	1800
Stress and emotion	9
Stress and decision making	6
Emotion and decision making	3
Emotion, stress and decision making	0

Table 1 – Frequency of the words related to the emotional factor on the papers related to the CAPES Database

KEY WORD	ISI Web of Knowledge Result – ISI CrossSearch	ISI Web of Knowledge Result – Web of Science
Stress	100.581	100.000
Emotion	14.861	100.000
Decision making	103.010	100.000
Stress and emotion	1759	1732
Stress and decision making	1863	1795
Emotion and decision making	415	415
Affective and decision making	500	499
Stress, emotion and decision making	0	22
Stress and affective and decision making	27	26
Faith and decision making	121	120

Table 2	- Frequency of English word	is related to the emo	tional factor on th	e electronic add	Iresses on CAPES	database
(1	SI Web of Knowledge Result	- Web of Science e	CrossSearch; En	igenharias – Eng	genharia de Produç	ão)

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CAPES DATABASE					
KEY WORD	EMERALD	PROQUEST/ EBI INFORM	SCIENCE DIRECT	SCIENCE DIRECT	
			All Journals	All Full-text Sources	
Stress	7516	122.677	> 10.000	> 10.000	
Emotion	1119	71.768	4971	5040	
Decision making	18.666	72.132	> 10.000	> 10.000	
Stress and emotion	420	1564	513	517	
Stress and decision making	3571	881	261	263	
Stress and memory	694	1413	1916	1919	
Stress and memory and attitudes	0	0	0	0	
Stress and decision making and memory	364	10	2	2	
Affective and decision making	937	147	80	81	
Stress and affective and decision making	337	9	2	2	
Emotion and decision making	698	428	90	89	
Stress, emotion and decision making	252	18	1	1	
Multiculturalism and affective and decision making	7	3	0	0	
Cross-cultural and affective and decision making	169	5	0	0	
Culture and affective and decision making	504	5	1	1	
Holistic being and performance	2748	0	10	10	
Holistic being and strategy and performance	2138	0	1	1	
Holistic being and strategy	2592	0	24	24	
Faith and decision making	1068	194	24	24	
Pet and emotion	24	190	55	68	
Marketplace and emotion	179	71	2	1	
Motivation and emotion	488	539	261	270	

CAPES DATABASE					
KEY WORD	EMERALD	PROQUEST/ EBI INFORM	SCIENCE DIRECT	SCIENCE DIRECT	
			All Journals	All Full-text Sources	
Systems and emotion	683	1722	713	719	
Total being and organizational	9907	1	29	28	
Total being and organization	15.857	4	212	214	
Burnout	413	3571	783	786	
Emotion and information process	1072	1	115	116	
Emotion and knowledge	1686	631	202	204	
Emotion and system limbic	19	0	101	101	
Amygdale	0	1	4	4	
Emotional unconscious	591	1	48	48	

Table 3 - Frequency of English words related to the emotional factor on the addresses *Emerald, Proquest/EBI Inform, Science Direct* of the CAPES Database

There were no direct or specifically topics related to the emotional factor in these searches, despite the identification of some important parts on the contents about the consulted articles. These references were not enough to talk about the permanent influence of the emotional factor on the BDP's executives.

## 6 – METHODOLOGY

Two kinds of cognitive tests have been used on the methodology – Raven (MATRIZES PROGRESSIVAS ESCALA AVANÇADA, 2003; SPREEN e STRAUSS, 1998) (*Advanced Progressive Matrices – APM*) and Stroop (STROOP, 1935; SPREEN e STRAUSS, 1998).

The executives who took part of the methodology were under emotional tension conditions, despite the use of, also, a favorable "stimulus environment". The "positive stimulus" happened at the interviews, when there was no worry about time and the person was really relaxed to decide. The interviewer used some "negative stimulus" to identify some trouble or tension in a clear and strong way, reaching the goal of identifying and quantifying the emotional factor during the executive reasoning.

Initially, the methodology consisted of presenting two original drawings (GAZ, 2006) to the interviewed executives, who came from different origins and professional areas. Picture 4 was the first one to be explained to them during a period from 1 to 2 minutes, focusing on making them aware of the decision-making process since a simple idea, making choices, projecting, deciding until the action itself.

An executive makes a decision after a set of activities, usually during a period, which here will be called "Complete Cycle of the BDP" (Picture 4). Each group of steps was represented by one or more symbols, usually different geometric shapes. The complete cycle of the BDP has four steps:

- 1. Project: perception, identification and formulation of preventive and correction problems.
- 2. Processing: looking for alternatives of solution and evaluating them.
- 3. Decision: choice(s) of the alternative (s) of solution.
- 4. Action: beginning of the operation, implementation and control of the alternative (s) of solution.



## Picture 4: Complete Cycle of the BDP (GAZ, 2006)

Then, Picture 5 was shown to the executives to help them think and answer, when required by the researcher, about the value of his emotion.



Picture 5 - Emotional variety that can happen in a BDP (adapted from GAZ, 2006)

The interviewer has also used a graph (Picture 6) with a scale to measure the level of emotion in many situations at the executive's life (called "Emotion Indicator" - E.I.). Besides that, it's customized and used by the researcher on the interview steps to register the executives' emotions.





Then, the following concepts were considered: approach attempts and initial modeling.

The emotional factor was registered by the interviewer after the questions the interviewee to describe their degree of emotion or emotional problem at the different stages of the interview. Quantification of the emotional factor through the EI consisted of the attempt to convert the subjectivity of the executive's emotions during his reasoning at a BDP for values described on a simple, clear, quantitative and objective scale. The executive was restricted to some type of emotion: anger, boredom, euphoria, fear, among others. The registered value was an "algebraic sum" of all kinds, involving qualitative and quantitative aspects, that is, covering the types and intensity of emotions.

Otherwise, you can admit that the emotional factor describes a behavioral range that may vary from one state to another, from balance or relax up to tension or problem, involving a single emotion or several emotions such as nervousness, irritability, faced with a problem that needs to be solved. Thus, results from all existing emotions and that have been noticed by the interviewer during the question-problems-decisions.

The highest the intensity of the executives' emotion (s) during the planned steps at the methodology was, the highest degree will be granted him on the El. The lower the intensity is, the lower will be the grade that should be given on the El. Thus, the emotional factor was the sum of the emotional types and intensities facing the problemsquestions created on the methodology and assessed at the El with a single value from zero to ten.

It was considered that the emotional factor as zero would correspond to then minimum tension of the executive, showing a state of calm and/or balance, without significant problem. However, the value "zero" does not mean that the executive has no emotion at all.

On the other hand, the emotional factor equal to ten, or the maximum value measured on the EI, is the most excited state of tension or the highest degree of emotion (s) than the executive really is.

## 7. INTERVIEW AND INTERVIEWEE GROUPS

Cognitive tests have been applied in four groups of interviewee, whose main goals and characteristics are shown in Table 4.

	PREVIOUS	PEOPLE	COGNITIVE	
INTERVIEWEE GROUP	ATTRIBUTES	INTERVIEWED	TESTS	INTERVIEW GOALS
	OF THE		APPLIED	
	EXECUTIVES			
1. PRECURSOR	Temperamental, stressed, balanced, calm	20	Stroop and Raven	Previous evaluation about the methodology to be used
2. METHODOLOGY IMPROVEMENT	Unknown	35	Stroop and Raven	Improvement of the methodology to be used
3. THEORY CORROBORATOR	Unknown	130	84 – only Stroop 46 – Stroop and Raven	Checking about the influence of the emotional factor over the executive that would cause a negative interfere on the BDP
4. THEORY CONFIRMATION	Unknown	30	Stroop and Raven	Confirmation of the existence of the emotional factor over the executive that would cause a positive interfere on the BDP

The Stroop Test was the first cognitive test applied to executives. The second one would be Raven.

## 8. USAGE OF THE STROOP TEST

## 8.1 – Introduction step to the Stroop Test

Each executive received the following standardized information: "This is a test to measure your attention under psychological pressure of a race against time. It is a way to evaluate your capacity for cognitive control." When the executive didn't understand the initial explanation, it was added: "It is a test to see your ability to control your mind when making assertive decisions." Each interviewee was informed that he needed, as soon as possible, to answer questions that involved certain cognitive procedures. Then, after the details of possible doubts, the interviewee was ready to start the test. At the beginning of each interview, the researcher asked the interviewee: "Can we evaluate now your level of emotion on the EI?" The purpose was to check whether it has caused some tension or mental disturbance (emotion) due to the elapse of time and a possible cognitive difficulty. After answering the first question, the researcher wrote it in the graphic record, which corresponded to the  $E_1$  variable (1st reference value of emotion).

## 8.2 - First step of the Stroop Test

After this step, the interviewee was aware that he would be evaluated by cognitive test that was about to start. The interviewer took the first sheet of the STROOP Test and showed only the first line that worked as an example of how the test should be conducted.

The executive was informed that he could not use his finger to facilitate the reading, mark the line on the paper, comment, stop and / or laugh at himself in order not to waste time. The executive can't also wear special glasses to better focus on the "things" or any element or dispersive action and use only his own voice and vision resources in a natural way<sup>10</sup>.

Let the executive understand the procedures or rules of this part of the test to take his decisions. The preliminary time of adjustment and understanding took a few minutes (maximum of three minutes). He was asked to read the first example-line and try to be quick.

After everything is clear, the interviewer took off the sheet that covered the other lines with the names of colors written in black and white and asked for the executive to read everything immediately, including all rows and columns. The interviewer was monitoring and checking the procedures for reading and recognition of names of colors written in black and white and ordered at random rows and columns, asking the maximum speed of the executive, because time would be considered<sup>11</sup>.

The interviewee was informed that the same rules are still applied. Then, a one-line example of another sheet was showed, where the new task would be saying the names of colors as quick as possible (also from left to right until the end; total of 10 lines without including the example-line). This sheet had rectangles with different colors (blue, pink and green) also ordered at random. In this step, it was emphasized that "time is important"<sup>12</sup>. Besides that, the executive was asked if he could answer an example-line, checking his understanding. In case of doubt, the researcher is allowed to help the executive.

## 8.3 – Second step of the Stroop Test

At this stage of the test, the executive needed to quickly say the name of the color after the visual recognition and proceed without using his finger or a marker line, among others, and use vision and voice<sup>13</sup>.

It is recommended at this stage: "for the test to be more efficient, don't stop, don't comment, don't laugh, because the time runs fast." The interviewee was informed that he could correct his mistakes. In this case, the researcher wrote the errors that had been corrected, that is, all correct and / or wrong options made by the executive for each question without showing it<sup>14</sup>.

<sup>&</sup>lt;sup>10</sup> Color-blind people, with problems on the visual field, auditory field and/or voice are not part of this methodology.

<sup>&</sup>lt;sup>11</sup> Stress agent or element inducted on purpose.

<sup>&</sup>lt;sup>12</sup> One more reinforcement for the stress element.

<sup>&</sup>lt;sup>13</sup> This reinforcement of rules has always been used when the executive didn't obey or accomplish the rules appropriately.

<sup>&</sup>lt;sup>14</sup> If the interviewee wants to know how many errors he made, he should be told that it was not the right time for him to know that.

The example-line that represents only the colors in that stage of the test was: "BLUE-PINK-GREEN-PINK-BLUE-GREEN-PINK-BLUE-GREEN-PINK." There were 10 colors hatched by line on the paper to be quickly and correctly said, not considering the example-line, which had also 10 examples of colors. In total, there were 10 lines with 10 colors, resulting in 100 answers for each person. Before starting the test, the interviewer used to say: "When you're ready, just let me know".

These statements and questions occurred during the first cognitive test (STROOP test - composed by four sheets) in order to create stressful situations, which represented or simulated the reality during this BDP conducted by the executive.

## 8.4 - Third step of the Stroop Test

The procedure has been adopted as a standard for the next stage involving the use of a third sheet, showing the first example line. However, this step involved the reading of the color, that is, the executive should read the word of the color, but not what was written. Example: GREEN BLUE PINK. Correct answer: blue pink green.

In the previous stage - the second sheet - the executive should have a quick answer to recognize and name the color painted on paper in the form of a rectangle in each one of the 10 (ten) colors. At this stage, the same thing happened in terms of speed, but it was restricted to reading the color painted and not the one written on the paper.

The new procedure resulted in an interference over the executive and induced a degree of disruption or difficulty. The brain half-skillful interviewed for the previous rules could influence the responses of the third paper. This issue can, further, be a factor or an element in a stressful psychological level of the executive<sup>15</sup>.

During the application, the executive was asked, as in the previous sheets although each one present a different "situation-problem", showing the color of the ink that was used to write the word, "line by line".

## 8.5 – Fourth step of the Stroop Test

After answering the 3rd sheet, they went on to the last sheet that crossed two processes: the one of reading and the names of colors. The executive was informed that this step was more complex. Then, the task was explained, stating that: "it is necessary to say the name of the color of the ink unless the word is inside a rectangle; then, you read the written word." This task resulted in a contribution of difficulty on the use of the flexibility and cognitive inhibition.

For example: GREEN BLUE PINK GREEN BLUE

The correct answer is: blue pink green blue and blue.

## 8.6 - Measurement of the emotional factor after the Stroop test

At the end of the interviewee's responses, the researcher filled in the board of correction, asking the executive to evaluate his emotional factor, value of emotion (s) ( $E_2$ ), without telling him that the test was over. It is a sheet containing the records of the two previous measurements in order to check the possible variations of his emotion<sup>16</sup>.

## 9. USAGE OF THE RAVEN TEST

<sup>&</sup>lt;sup>15</sup> The idea of adding stressing factors was to check and quantify interviewed people's emotions during the necessary decisions by the test created at the E.I.

<sup>&</sup>lt;sup>16</sup> Also taking into account the three emotional components according to Picture 4.3.

The RAVEN cognitive test RAVEN (MATRIZES PROGRESSIVAS ESCALA AVANÇADA, 2003; SPREEN e STRAUSS, 1998) (*Advanced Progressive Matrices – APM*) is composed by thirty-six pages and it was conducted after the test and ending of the third STROOP test measuring the emotional factor in E.I..

This test was presented to the executive showing that he should choose only one answer (the decision) from the 8 (eight) options, faster and more accurate in 30 (thirty) minutes for the 36 (thirty-six) papers with issues that required logical reasoning. The executive was told every five minutes about the time that has already gone. When the executive had doubts during the test, they were answered objectively, offering the minimum amount of information the fastest way as possible.

At the end of the Raven test, before a final and longer informal conversation<sup>17</sup>, an evaluation was made about the Final Emotion ( $E_F$  or  $E_3$ ) using the graph from Picture 6. To complement the information obtained about the existence of the emotional factor in BDP, the interviewer talked in a direct, spontaneous and open way about the methodology that has been used.

## **10. RESULTS FROM THE SERIES OF INTERVIEWS**

The series of interviews showed a lot of information. Some of them are shown below.

15



Picture 7. - Errors in RAVEN



Picture 9 – Cumulative Emotion Indicator





Picture 8 – Labialized



Picture 10 - Emotion Indicator 1 or Starter



Picture 12 - Emotion Indicator 3 or Final

Picture 11 – Emotion Indicator 2

Picture 12 – Emotion Indicator 3 or Final

The first graph showed a result in which all the executives got mistakes above of 10% at the Raven test. The second one showed the emotional labialized of the executive, i.e., its total emotional variation throughout the interview. All of the graphs indicated that the emotional factor of the executive was presented during the steps of the interview. The quantified emotion on the E.I. had an interference over the BDP – represented by the cognitive tests and sceneries of the created methodology.

## 11 - POSITIVE ASPECTS AND ADVANTAGES ABOUT THE CHOSEN METHODOLOGY

The methodology provided evidence related to the participation with the emotional factor in the executive's BDP: multicultural aspects. That means that the executive, according to his multicultural aspects, looked for a way to explain and / or justify the emotional factor in his decisions. Such issues can be also used for future researches.

Regarding the "conventional" and different methodology, specifically, according to the stimulus given: positive for group 4 - theory confirmation- and negative for the group 3 - theory corroborator -, the results are varied, as already expected: lower percentage of errors for group 3 and higher percentage of errors for group 4, showing that stimuli that influence the emotional factor on the executive's decisions can lead to better or worse performance and results according to the type of stimulus.

All of the executives presented high levels of emotion and noticed emotional labiality. Everything was recorded and quantified at different times on the El created, on purpose, by the methodology.

None of the executives gave themselves the zero value on the EI during the interviews. All of the interviewees, more than 200 (two hundred), have expressed and / or admitted the existence of an emotional factor that influenced on their decisions.

Without the executives knowing that they had finished the use of the methodology, some emotional were observed and registered, influencing their decisions for both the cognitive tests involving short-term tasks (STROOP test) and for those activities with a long-term test (RAVEN). Some of these behavioral manifestations were:

### 1. Verbal expression

"Bad words" showing anger and frustration to get everything right and finish fast.

### 2. Vocalization and Frequency of Words

Oscillation of the tone of voice showing uncertainty and lack of logical knowledge. Garrulity showing insecurity and apprehension of making mistakes.

### 2. Eye Movement

Fixed and tired eyes due to the extreme concentration on the problems.

### 3. Facial Movements and Sounds

Tics and facial expressions, showing high tension and different emotions.

## 4. Body Movement (Legs and Arms)

Repetitive shaking of legs, showing anxiety and high concentration.

## 5. Physiological Response and transpiration

Transpiration in cold places, showing that the executive was tense and uneasy. Request to leave the environment to go to the bathroom.

## 12. BRIEF QUANTITATIVE ANALYSIS ABOUT THE SIZE OF THE SAMPLE AND THE ACQUIRED RESULTS

The total number of interviewees in front of an *infinite number* of executives exceeded 200 (two hundred). In terms of qualified, meaningful or statistical sampling, it was not necessary - within these people - to evaluate more than two hundred people, that is, a greater number of executives.

With 200 people, the statistical - or absolute - error of the sample collected in relation to real people<sup>18</sup>, and, consequently, the error for all of the calculations in this article didn't exceed 7% (up) to 7% (down), using a maximum range ( $\frac{1}{2} \times \frac{1}{2}$ ). By increasing the sample to 1,000 executives, all of the calculations would fall to 3% (ranging from +3% to -3%). To 10,000, it would fall to 0.98%, and 1 million would fall to 0.098%.

Thus, a larger sampling would not significantly improve the results of calculations. The values found in the statistical error of +7% and - 7% for the calculations are significant and enough to achieve this article's goal.

### 12.1 - Inference

The emotional factor always present on the BDP wouldn't be different with a larger number of executives.

### **13. CONCLUSION**

Through theoretical support of many authors who intertwined, in general, about the fact of the existence of the emotional factor together with the cognitive process, more convergent information related to it on scientific basis, also pointing out the problems of articles that ignore, reduce or even eliminate the emotional factor in the decision-making process, it is possible to see that it's necessary to show a different perspective to the BDP.

The creation of an experimental methodology applied in groups of interviewees, the qualitative and quantitative analysis that had been performed, the advantages and results it had, besides the creation of an EI, were able to identify and determine the influence of emotion involving the executive in his decisions no matter their culture, education and origin is. It was confirmed and proved that the emotional factor is always present at the BDP.



## 13.1 – Basic Graphic Suggestion

Picture 13 - Emotional factor at the BDP

The graph above shows the basis of the proposal, i.e., the minimum suit or the most approximated, from the company reality where it's incorporated, or rescued, the emotion together with the cognitive or rational process of the executive, in a positive or negative way, on the BDP and getting, respectively, better or worse results.

<sup>&</sup>lt;sup>18</sup> Error = sampling proportion minus the unknown proportion.

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