Semantic charged stimulus to be utilised on the Emotional STROOP in eating disorders early detection
Results from a Portuguese sample, by 14-25 age group*

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Summary: Since the report from Cattell (1886) about the Colour and Word reading task, and the further formulation of the interference task (Stroop, 1935) the interest on this field has really been improved. The versatility, speed of administration and simplicity are the most characteristics pointed to the Stroop test on several investigations with patients with eating disorders (Ben-Tovim *et al.*, 1989; Green & McKenna, 1993; Mogg, Kentish & Bradley, 1993; Walker *et al.*, 1992). At the same time, emotional and cognitive abnormalities on internal and environmental information processing are typical characteristics on eating disorders (nervous anorexia and bulimia) (Nisbert, 1968; Fairburn, 1985, 1987; Fairburn e Garner, 1988), clearly involved on the Stroop task.

In this article we present the results from the first study realized with European Portuguese[1] language, with PSITCA Test – Screening Protocol on Eating Disorders Behaviour / *Protocolo de Screening para identificar transtornos do comportamento alimentar* (Cabaco *et al.*, in press). We present the results of the first phase of the research project, bilaterally financed by the Luso-Spanish Actions, directed by Professors M. J. Loureiro, from Beira Interior University - Portugal, and A. S. Cabaco, from Pontifícia de Salamanca University – Spain.

Key Words: Stroop Task, Eating disorders, Cognitive and Emotional Abnormalities.

Since the report from Cattell (1886) about the Colour and Word reading task, and the further formulation of the interference task (Stroop, 1935) the interest on this field has really been improved. Some authors have even categorised the importance that the test has achieved has a rare phenomenon (Esgalhado, 2002).

Emotional and cognitive abnormalities on internal and environmental information processing are typical characteristics on eating disorders (nervous anorexia and bulimia) (Nisbert, 1968; Fairburn, 1985, 1987; Fairburn e Garner, 1988)

Authors like Jensen & Rohwer (1966) and others (Dyer, 1973) states that the emotional Stroop effect is a simple method to evaluate the anxiety intensity of bulimic and anorexic patients, regarding to factors like body morphology and food.

This procedure rely on the belief that naming the colour of words with emotional contents take some advantages over other techniques developed to measure emotional alterations related with emotional disturbs, phobias, and others (*Cf.* Loureiro MJ, Cabaco AS, Castro JA & Esgalhado MG, 2002).

A lot of research has been developed in order to demonstrate the potential utilization of the Stroop phenomenon as a screening test (Ben-Tovin & Walker, 1991; Rogers & Green, 1993; Mogg, Kentish & Bradley, 1993; Vitousek & Hollon, 1990; Cooper & Fairnburn, 1987, 1989; Cooper *et al.*, 1987; Walker *et al.*, 1992; Armas, 1997) sustaining the considerable amount of published articles over the last decades on psychiatric patients with diversified ethiology (namely phobia) and severity (Watts, McKenna, Sharrock, & Trezire, 1986).

The study on attention mechanisms of selective processes and its implications on information cognitive processes are one of the most interest areas on contemporary Cognitive Psychology (Loureiro *et al.*, 2002). The Stroop task is utilised on the clear majority of research projects, considering the basic and the applied field (Arana, Cabaco and Sanfeliu, 1997). According to Mc Leod (1991) only in the last half a century more than 400 hundred articles using by some way the Stroop task were published. Basically, the Stroop task presents a measure of the subjects' ability to classify information from the environment and selectively react to it. By this way, the Stroop interference cartoon presented to the subject represents a measure of the subjects' ability to classify the information from the environment and selectively react to it. Once the attention predisposition is a central aspect on emotional behaviour this could explain the major importance that this task has achieved on the applied field, mainly clinical, as for a predictive diagnostic point of view, as for more diversified fields, like depressions, phobias, schizophrenia or psychosis (Cabaco, 1998; Cabaco & Armas, 2000). The phenomenon of attention predisposition are not only a sub-product of a emotional disturbance but is also important for the occurrence of it. All this factors taken together contributes to a dynamic process that elicits small increases on emotional states, leading to low emotional disturbances. The frighten stimulus became more relevant, leading to a posterior increase on emotional disturbance (Loureiro *et al.*, 2002). Data from several studies suggests that subjects that suffer from a given type of pathology are usually slower in a word colour-naming task, if this word has some relation with its clinical condition, on Stroop emotional version (Willians *et al.*, 1997; In Loureiro *et al.*, 2002).

Some investigations on the psychopathology field have demonstrated that the selective emotional attention to relevant stimulus, could affect the subject's performance on certain tasks, in which the information processing could be disruptive (Loureiro *et al.*, 2002). The utilization of frightening stimulus (social and physical) related with the particular pathology have shown that those who suffer from the same pathology, spend more time in reacting to that stimulus, comparing to normal subjects.

The versatility, speed of administration and simplicity are the most characteristics pointed to the Stroop test on several investigations with patients with eating disorders (Ben-Tovim *et al.*, 1989; Green & McKenna, 1993; Mogg, Kentish & Bradley, 1993; Walker *et al.*, 1992). Other cognitive tasks could be clearly biased by factors like self-report (that could lead to a distortion of responses), intentional denial, and so fort. Stroop task, *on contraire*, are not to be directly influenced by this factors, once this task only could be directly influenced if the subject deliberately slow down the performance (Ben-Tovim, Walker & Douros, 1993;

Green, Elliman & Rogers, 1996; Vitousek & Hollon, 1990).

The emotional Stroop task could be, by these means, of major importance in detailed psychopathological studies in order to discriminate clinical disturbs like anorexia and bulimia (Cooper, Anastasiades & Fairburn, 1992; Channon, Hemsley & De Silva, 1988), in the calculation of several pathologies effects, or even in the effects of some treatments of the same pathology (Ben-Tovim & Walker, 1991; Cooper & Fairburn, 1992) (See also Cabaco & Armas to a review).

Objectives

The main goal of this article stands on the research of eating disorders from a cognitive point of view, on the sequence of prior published research (Loureiro *et al.*, 2002). From a practical point of view we had in mind the importance on the development of instruments, based on the emotional Stroop effect, to be utilized by Portuguese clinicians and researchers.

According to Loureiro *et al.* (2002) the direct translation of word stimulus from other languages, having Portuguese language has the reference, could constitute itself has a strong methodological bias. In this article we present the results from the first study realized with European Portuguese4 language, with PSITCA Test – Screening Protocol on Eating Disorders Behaviour / *Protocolo de Screening para identificar transtornos do comportamento alimentar* (Cabaco *et al.*, in press).

In this article we present the results of the first phase of the research project, bilaterally financed by the Luso-Spanish Actions, directed by Professors M. J. Loureiro, from Beira Interior University -

Portugal, and A. S. Cabaco, from Pontifícia de Salamanca University – Spain.

Methods

Sample
The research was developed in two clearly distinct phases.

In the first phase (study 1) we have utilized what we have named a "Rational Criteria": a set of words (10) related with semantic categories of "food" and "body" were selected. A set of words related with semantic neutral ("casa" / "house", "sofá" / "sofa", etc.) and emotional ("suicídio" / "suicide", "morte" / "death", etc.) categories (20) were also selected.

The selection process has been realized with basis on previous studies from the Spanish team on former research in Spanish and Portuguese (from Brazil) language, taking in consideration the contextual differences.

In the second phase (Study 2) we have utilized what we have named "Formal Criteria":

"Use Frequency", "Familiarity", "Understanding Level" and "Imagering Evocation Degree".

These "subjective indices" were evaluated in a Likert Scale ranging from "0" (nothing) to "5" (totally), and were scored by 375 Portuguese subjects of the present study, representing a sample ranging from the ages of 14 to 25 (See also Loureiro *et al*., 2002).

Procedures

Parting from the original Spanish Test, presented in Spanish language (with researches in Spain, Argentine and Chile), Portuguese language (Brazil) and British

language (EEUU) we have selected a set of stimulus words, considering the specific characteristics of words semantic contents, possible double meanings and utilization frequency (representation) on the respective age group traditionally believed to be more vulnerable to these type of pathology.

Results

The available data are related to the subjective indices ("Use Frequency", "Familiarity", "Understanding Level" and "Imagering Evocation Degree"). The average, the standard error and the respective *n* for each category are presented.

Table 1 shows data about the Neutral Words. Use frequency of such words are clearly elevated, compared with what could be expected to be considered as the average (2,50). In this sample, the average utilization of Neutral Words is clearly elevated with the exception of "bandeira" / "flag" (2,17) and "pedra" / "stone" (2,23). Concerning on emotional content words

"Use Frequency" (Table 2), the average is lower, as could be expected, once their utilization could be more expectable in emotional charged life events. Only two variables (words) presents average incidence superior to that that could be considered as normal (2,50): "medo" / "fear" (2,60) and "triste" / "sad" (2,89) (probably these words are the most colloquial one and by these means, also the most utilized words by "normal subjects").

Regarding to the "Use Frequency" on eating disorder (Table 3), the results shows a clear similarity with the neutral words utilization. Only to variables (words) shows an average use lower than the expected (2,50): "obesidade" / "obesity" (1,69) and "gordura" / "fat" (2,37). In fact, this similarity was already expected from the beginning, once, despite its relation with the eating disorder, these words are highly colloquial, and, by this way, they constitute the usual lexical repertoire of normal subjects (they are related with daily food habits).

Table 1. Neutral words

	Frequência de uso Use Frequency			Familiaridade Familiarity			Compreensão Understanding			Imagem Imagering		
	N	Mean	S.E.	N	Mean	S.E.	N	Mean	S.E.	N	Mean	S.E.
Casa House	375	4,45	O,79	375	4,74	0,64	375	4.61	0,71	375	4,60	0,72
Sofá Sofa	375	4,02	1,15	375	4,25	1,13	375	4,26	1,15	375	4,38	1,07
Calor Heat	375	3,75	1,00	375	3,87	1,18	375	4,00	1,24	375	3,66	1,49
Armário Closet	375	3,88	1,25	375	4,08	1,23	375	4,03	1,30	375	4,08	1,29
Jardim Garden	375	3,15	1,51	375	3,84	1,51	375	3,91	1,39	375	4,13	1,37
Gato Cat	375	2,69	1,98	375	3,17	1,94	375	3,63	1,73	375	3,80	1,73
Tapete Carpet	375	3,39	1,54	375	3,52	1,58	375	3,67	1,60	375	3,76	1,56
Bandeira Flag	375	2,17	1,75	375	2,91	1,91	375	3,70	1,68	375	3,80	1,62
Cortina Curtin	375	2,68	1,64	375	3,13	1,69	375	3,42	1,68	375	3,55	1,64
Pedra Stone	375	2,23	1,83	375	2,51	1,98	375	3,06	1,91	375	3,17	1,88

The analysis of table 1 shows that, regarding to "Familiarity", The Neutral words are clearly elevated, compared with what could be expected to be considered as the average (2,50). In this sample, and just related to Neutral Words, none of them shows an average lower than 2,50.

Regarding to the "Understanding" on Activation Words of Emotional Content (Table 2), only one variable "suicídio" / "suicide" presents an average incidence (2,30) lower than the Expected Mean (2,50). This could be related with the fact that, probably, this word is not much used in the daily life repertoire, although is not a complete estrange word. At the same time, this word is related with a subject that could be accepted to be avoided by the common citizen, namely by adolescents. In fact, the analysis of table 2 shows that this word presents the lower level of "Familiarity" (1,40) among the other words of the test.

Finally, regarding to "Understanding" on "Activation Words on Food Content" (Table 3), the same pattern is observed, being the variable "Obesidade" / "Obesity" the only with an average lower, 2,06, than what could be expected (2,50).

Table 2. Activation words on emotional conten

	Frequência de uso Use Frequency			Familiaridade Familiarity			Compreensão Understanding			Imagem Imagering		
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.
Medo Fear	375	2,60	1,36	376	2,70	1,65	376	3,30	1,57	376	2,60	1,68
Desastre Disaster	375	1,99	1,46	376	2,20	1,68	376	3,00	1,76	376	2,70	1,84
Terror Terror	375	1,93	1,52	376	2,10	1,74	375	2,90	1,82	376	2,50	1,80
Fracasso Fiasco	375	2,22	1,39	376	2,40	1,58	376	3,00	1,69	376	2,40	1,70
Vítima Victim	375	1,87	1,48	376	2,10	1,71	376	2,80	1,81	376	2,60	1,81
Acidente Accident	375	1,84	1,56	376	2,10	1,79	376	2,90	1,85	376	2,70	1,93
Perigo Danger	374	2,49	1,52	375	1,70	1,61	376	2,90	1,88	376	2,60	1,93
TristeSad	375	2,89	1,44	376	3,00	1,58	376	3,50	1,65	376	3,00	1,78
Ameaça Treat	374	1,68	1,53	375	1,90	1,77	375	2,70	1,92	375	2,20	1,79
Suicídio Suicide	375	0,91	1,44	376	1,40	1,88	376	2,30	2,15	376	1,90	1,99

The analysis of table 1 shows that, regarding to "Understanding", The Neutral words are clearly elevated, compared with what could be expected to be considered as the average (2,50). In this sample, and just related to Neutral Words, none of them shows an average lower than 2,50.

Regarding to the "Familiarity" on Activation Words of Emotional Content (Table 2), the majority of the variables presents results lower than 2,50 ("Desastre" / "Disaster", "Terror" / "Terror", "Fracasso" / "Fiasco", "Vítima" / "Victim", "Acidente" / "Accident", "Perigo" / "Danger", "Ameaça" / "Treat", "Suicídio" / "Suicide"), which could mean that in this sample, the subjects are not really used to the utilization of such words, in terms of its daily repertoire, when compared with the rest of the test words.

Finally, regarding to "Familiarity" on "Activation Words on Food Content" (Table 3), the same pattern is observed, and none of the variables shows an average lower than 2,50.

Table 3. Activation words on Food conten

	Frequência de uso Use Frequency			Familiaridade Familiarity			Compreensão Understanding			Imagem Imagering		
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.
Açúcar Sugar	375	3,63	1,13	375	3,77	1,28	375	3,81	1,44	375	3,90	1,35
Barriga Stomach	375	3,33	1,58	375	3,67	1,59	375	3,64	1,56	375	3,56	1,60
Bolo Cake	375	3,80	1,25	375	4,05	1,14	375	4,13	1,23	375	4,32	1,15
Enorme Big	375	2,86	1,50	375	3,05	1,62	375	3,37	1,60	375	3,33	1,55
Fiambre Ham	375	3,48	1,34	375	3,78	1,38	375	3,79	1,47	375	3,79	1,48
Gordura Fat	375	2,37	1,56	373	2,64	1,72	374	3,05	1,77	374	3,82	1,87
Obesidade Obesity	374	1,69	1,61	374	2,06	1,82	375	2,86	1,88	375	2,61	1,93
Peso Heavy	375	2,90	1,48	375	3,02	1,60	375	3,45	1,61	375	3,08	1,62
Calorias Calorie	375	2,62	1,62	375	2,86	1,68	375	3,26	1,63	375	2,65	1,76
Gelado Ice cream	375	3,98	1,20	375	4,18	1,20	375	4,30	1,18	375	4,43	1,08

The analysis of table 1 shows that, regarding to "Imagering", The Neutral words are clearly elevated compared with what could be expected to be considered as the average (2,50). In this sample, and just related to Neutral Words, none of them shows an average lower than 2,50.

Regarding to the "Imagering" on Activation Words of Emotional Content (Table 2) only three variables, "Fracasso" / "Fiasco" (2,40), "Ameaça" / "Treat" (2,20) and "Suicídio" / "Suicide" (1,90), presents results lower than what could be the Expected Average (2,50).

Finally, regarding to "Imagering" on "Activation Words on Food Content" (Table 3), the same pattern is observed, and none of the variables shows an average lower than 2,50.

Conclusions

We believe that the present data could be of major importance for Clinical and Health Psychologists, General Practitioners and other professionals in their professional praxis, on the research line that has been developed, namely from a diagnostic point of view (Loureiro *et al.*, 2002). Once this data were collected in normal subjects (free of any known or diagnosed pathology) they could be postulated as reference data, in order to help the interpretation of results of subjects with scoring deviations, that could be suffering any type of general emotional disturbances related with daily food habits. We propose a further analysis, comparing normal subjects to "pathological subjects" (subjects suffering from food behaviour pathology or feed habits related disorders).

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