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Does Mood Affect Self-Concept? Analysis through a Natural Semantic Networks Based Approach

Research Article

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Abstract

Currently, one of the most developed areas of research concerns the elucidation of the relationship between affect and cognition. The main objective of this experimental study is to examine the effects of mood on self-concept, or more precisely, on the elaboration or conceptualization of the self-concept in-the-moment. A useful technique that has recently started to be used in research concerning self-concept was used: The Natural Semantic Networks Technique. The data was analyzed using a graphics tracing technique, which allows an accurate visualization of the network elements (i.e. self-concept defining words) and of the centrality that the elements have in that network. The results support the hypothesis that mood affects in-the-moment judgments of self-concept.

Keywords: Mood Induction; Self-Concept; Semantic Networks.

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Introduction

Self-concept (i.e. the definition of oneself) can be described as the beliefs, hypotheses and assumptions that people have about themselves. It provides structure, coherence and meaning to personal existence [14, 15]. Self-concept refers to an individual representation of all that is known about the self and includes aspects such as names, likes, dislikes, beliefs and descriptions of physical appearance [15, 10]. On the basis of this definition, Pajares and Schunck (2005) as well as Heatherton and Wyland (2002) indicate that self-concept arises from the beliefs that a person holds as true about their own experience. Self-definition is, in essence, what an individual thinks they are.

Current information processing perspectives [9, 21] indicate that self-concept consists of an enormous repertoire of relevant information about oneself (commonly known as autobiographic memory) that includes episodic as well as semantic knowledge. One basic unit recognized by the information-processing model is the working self-concept which is produced from all knowledge relevant to the current situation.

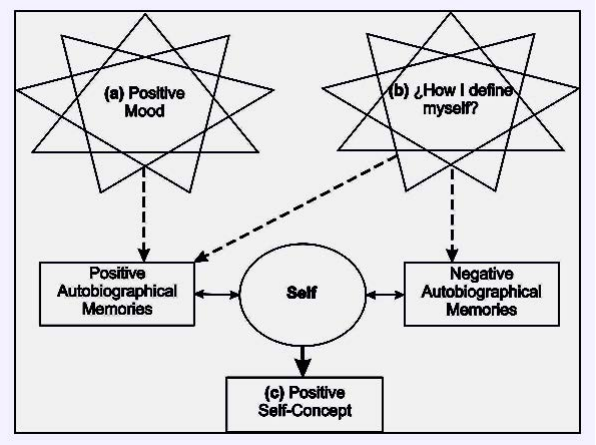
The working self-concept as well as the complete repertoire are organized in a series of categories, commonly known as self aspects. Self aspect categories are ideographic and, as previously mentioned, reflect individual roles (e.g. student, athlete), specific situations (e.g. with friends, with teachers), emotional states, personal traits, interpersonal relationships, among others. Furthermore, the repertoire of information about oneself is composed of contents with both a positive as well as negative value. According to the information processing model [21], the frequency of activation of the categories of self in any given moment will determine the way in which a person defines themselves, be it in a more positive or negative manner. Bower's Associative Network Model [4] proposes that mood can cause a change in the activation of mnesic categories which in turn influence cognitive judgements. For this reason, it is possible that a change in mood is accompanied by a change in the definition that the person gives themselves.

In the Associative Network Model, it is proposed that concepts, events and emotions can be represented as nodes within a network [4, 5]. A particular emotion (e.g. annoyance) is described as a node interconnected with other nodes that represent, for example, phenomenological and physiological characteristics, linguistic labeling, as well as events and memories related to that emotion. The activation of any node within the network leads to the activation of all interconnected nodes. When an emotion is activated, that emotional node propagates the activation to the rest of the nodes with which it is connected. The activation will be spread to physiological and autonomous reaction nodes characteristic of each emotion; to facial and postural expression nodes, to action tendency nodes and also to nodes representing episodic memories associated previously to the activated emotion. This propagation of activation as well as the activation of specific memories

would explain the effect of mood state on self-concept. Thus, when an object which has both positive and negative associations is evaluated, the resultant evaluation will depend on the amount of activation that the positive and negative nodes accumulate in that moment. This process is called summation of activation. An example, Figure 1, shows hypothetically the resulting self-evaluation (i.e. self-concept) when the person is in a predominantly positive mood.

There are many studies concerning the effects of mood on self-concept judgment. This research tends to evaluate the effects of mood on self-concept structure [6]; self-concept clarity [14]; the evaluative component of self-concept [2]; and the content of self-concept [17-20]. In relation to the latter, it was observed that in

Figure 1. Mood priming effect for a hypothetical associative memory structure. In this case, the positive autobiographic memories are activated by the positive mood (a) and by the "how I define myself" stimulus (b). Therefore, the likelihood of a positive self-definition increases (c). Negative autobiographic memories only receive activation from stimulus (b) and not from in-the-moment mood (a). For this reason, the likelihood that the person defines themselves negatively decreases.



the case of the participants that had been induced to a sad mood, the negative content of self-concept increased, while in the case of those induced to a happy mood the positive content of self-concept increased. However, this congruent effect with mood was only observed in peripheral self-concept components and not in central components [20].

Sedikides (1995) found evidence concerning the way in which mood does or does not influence previously formed conceptions about oneself, but this does not inform knowledge regarding the possible effects of mood on an in-the-moment elaboration or conceptualization of the self. This effect has not yet been verified, because the influence of mood on self-concept has only been tested using arbitrary descriptions chosen by researchers, or by descriptions previously made by the participants [19].

In a previous non-experimental study, Flores Kanter, Medrano and Manoiloff (2014) were able to detect that those that manifested a predominantly negative mood gave in that moment a more negative definition about themselves, compared to those who manifested a predominantly positive mood and who defined themselves in-the-moment more positively. However, when a non-experimental design is used, it is not possible to draw inference regarding any causal relation between mood and in-the-moment self-concept. The following research aims to examine, using an experimental design, the effects of mood on the in-the-moment elaboration of self-concept using a Natural Semantic Networks Technique (NSNT) will be applied.

NSNT is based on the principles of the Natural Semantic Networks Model [23, 16], which proposes that concepts have no meaning if they are taken into account in isolation. The meaning appears when they are seen in relation to other concepts with which they are connected. Therefore, concepts are represented as nodes in a network, and the more properties two concepts have in common the greater the connections between two nodes. The "natural" study of semantic networks indicates that there must be some internal organization of the information in the long term memory where words and concepts construct relationships, which give the object its meaning. The other main principle refers to semantic distance, which states that not all object-defining concepts are equally important to its definition. In a given semantic network, some concepts will be more central than others. In this research, the NSNT will be used to investigate how participants define themselves (i.e. self-concept), and to observe if in-the-moment self-concept varies according to mood.

Methodology

Participants

Sixty-four university students participated in the experiment. They were selected through accidental nonprobability sampling [1]. 20.3% were male and 79.7% were female. The age range was from 17 to 50 years (mean = 21.75; standard deviation = 5.72).

Instruments

In order to verify the effectiveness of the mood induction, the Positive and Negative Affect Schedule (PANAS) was used. This instrument was adapted to the local population by Medrano et al. (2015) [12]. This instrument is based on an orthogonal model that suggests the existence of two factors that are relatively independent of each other: positive affects and negative affects [24]. In the local adaptation, the existence of two factors that explain as a whole a 36% of the instrument variability were observed. Acceptable internal consistency was found (a = .84 for NA; a = .75 for PA).

The evaluation of self-concept was made using the Natural Semantic Networks Technique. In the following section, the tech-

nique is explained in more detail, as are the analyses and indicators used in it.

Procedure

In the present study, a within-subject experimental design was used, with random groups and one independent variable [13]. The sample was divided in two groups in which participants were randomly assigned: the Positive Induction Group (PIG) and the Negative Induction Group (NIG). Previous to the mood induction, the participants were accurately informed about the aims of the investigation, about their voluntary participation, and about the anonymity of their answers.

Following this, the mood induction was carried out. This induction was made through a combination of music with thoughts or ideations [7]. Following the recommendations of Eich et al. (2007), the participants were exposed to a selection of pleasant music to induce a positive mood. Four pieces of classical music were chosen: Four seasons: Spring I Allegro and Spring III Alegro, by Vivaldi; The Nutcracker: Trepak and Waltz of the Flowers, by Tchaikovsky; and Serenade #9: Finale, by Mozart. To induce a negative mood, participants were exposed to a selection of unpleasant music. For this, three pieces of classical music were selected by the authors: Four seasons: Autumn, Vivaldi's adagio; Adagio in G Minor, by Albinoni; and Violin Concerto: Adagio di Molto, by Sibelius. The MCI [7] consisted in asking the participants to focus on images or ideations that make them feel happy or sad while listening to the music. The duration of the induction was in line with previous investigations [7] and was approximately 20 minutes for both conditions (i.e. PIG and NIG).

After the induction, the PANAS scale was completed in order to verify the mood changes. Afterwards, people were asked about their self-concept using NSNT. The technique consisted in asking subjects to define a stimulus or reactive with at least five single words. Those words could be nouns, adjectives, verbs or pronouns; but grammatical particles (articles or prepositions) were not allowed [23, 16]. The stimulus or reactive presented to the participants, and the one they should define, was the following: "How I define myself". The reactive was chosen based on the aims of the present work and the results of previous studies [8].

The data analysis was carried out in two parts. Independent group t tests were used to verify whether the groups presented with differences in predominant mood. The data was analyzed with IBM SPSS 20.0 Software.

The semantic network analysis consisted of (1) the calculation of the centrality indicators (i.e. weighted degree centrality); and in (2) the layout of the network in a visual diagram. The centrality indicators show the importance that a node has in a certain network [3]. The weighted degree centrality, the centrality indicator used in this work, is calculated based on (a) the number of links or connections a certain node has with other nodes (i.e. degree) plus (b) the co-occurrence between two given nodes (i.e. weight). This centrality indicator was calculated in order to observe which concepts were the most central or important in self-definition, in each of the experimental groups. In addition to the above, based on previous studies [23], the 15 defining words with the highest centrality values as were considered the most representative words of the self-concept in each group. For the drawing of the semantic network in a graph, the Force Atlas 2 algorithm was applied [11]. This algorithm uses a force-directed drawing in that it simulates a physical system: the nodes repel each other (as occurs in magnets) while the edges attract the nodes which are connected (as occurs in springs or elastic). In addition to the above, the force-directed graph drawing is characterized by locating nodes according to the relation they have with other nodes within the network, and not in relation to the contingent characteristics that a node has. Finally, a modularity algorithm was calculated. This algorithm allows detection of subgroups (i.e. clusters) of words which defined the self which had strong interconnection with each other. For the mentioned analysis (i.e. centrality indicators; graph tracing; and modularity algorithm) Gephi 0.8 software was used.

Lastly, the z test for proportions and independent samples was also used to compare the values of weighted centrality obtained by each group [3] in relation to the words with positive and negative connotation.

Results

First, the results obtained in relation to the induced mood will be mentioned. As can be observed in Table 1, the groups present a significant difference with respect to the positive and negative affects. The PIG reached higher levels of positive affect (Mean = 27.60; Standard Deviation = 7.38) compared to the NIG (Mean = 20.35; Standard Deviation = 6.52). The effect size for this difference was 1.06 which indicates a large effect [22]. In the same way, the NIG reached higher levels of negative affects (mean = 19.88; standard deviation = 6.52) compared to the PIG (Mean = 13.90; standard deviation = 4.38). The effect size for this difference was 1.08 which also indicates a large effect [22].

The next aim of the analysis was to compare the experimental groups with respect to the judgement of self-concept. For this, centrality values, as well as the correspondent valence of the words were analyzed.

Below, in Tables 2 and 3, and Figures 2 and 3, the fifteen most defining words and with greatest levels of centrality, and the figure showing the corresponding semantic networks are shown.

When considering the fifteen words with highest value of centrality, group differences can be found which are congruent with the induced mood. The results show that, while in the PIG the

Table 1. Positive and Negative affects according to the mood induction.

	Group					
	PIG (N=30)		NIG (N=34)			
Affect Level	M	SD	M	SD	gl	t
Positive Affect	27.6	7.38	20.35	6.52	62	4.17**
Negative Affect	13.9	4.38	19.88	6.52	62	-4.24**

Note. **$p < .001$ (bilateral significance).

Table 2. The fifteen self-defining words with highest centrality values. PIG (N=30).

Self-Defining Words	Centrality Value	Valence
Happy*	106	Positive
Proud*	69	Positive
Enthusiastic*	67	Positive
Serene*	57	Positive
Sociable*	55	Positive
Susceptible	52	Negative
Anxious	50	Negative
Funny	48	Positive
Charming	46	Positive
Honest	45	Positive
Kind	42	Positive
Responsible	40	Positive
Irritable	39	Negative
Solidary	39	Positive
Intelligent	38	Positive

Note. * = The five self-defining words with highest centrality values.

Table 3. The fifteen self-defining words with highest centrality value. NIG (N=34).

Self-Defining Words	Value of Centrality	Valence
Insecure*	70	Negative
Responsible*	65	Positive
Susceptible*	59	Negative
Happy*	58	Positive
Sociable*	54	Positive
Strong	51	Positive
Persistent	50	Positive
Anxious	43	Negative
Respectful	42	Positive
Enterprising	42	Positive
Emotive	38	Neutral
Decided	36	Positive
Active	35	Positive
Funny	33	Positive
Timorous	33	Negative

Note. * = The five self-defining words with highest centrality values.

centrality value reached by the positives words corresponds to 82% of the total value of centrality; in the NIG, the centrality value reached by the positive words amounts to 71% of the total centrality value. This difference of 11% is statistically significant ($z = 5.05$; $p < .001$). In the PIG, the centrality value reached by the negative connotation words corresponds to 18% of the total centrality value; in the NIG, the centrality value reached by the negative connotation words corresponds to 29% of the total centrality value. This difference is also statistically significant ($z = 5.05$; $p < .001$).

Finally, the modularity algorithm was used to detect clusters of self-defining words in each group. The results are displayed in Figure 4 and 5

Discussion

The results confirm the hypothesis of congruence between mood and in-the-moment judgements of self-concept. This can be observed in tables 2 and 3 as well as in Figures 2 and 3. In the PIG the self-defining words with positive connotation reached greater values of centrality when compared with words of the same valency in the NIG. In contrast, in the NIG, the negative self-defining words obtained greater centrality values in comparison with negatives words in the PIG. This was congruent with the induced mood state reached a difference of 11%. In addition to this, whilst in the PIG the five self-defining words with greatest centrality value were all of a positive nature, in the NIG, two were of a negative nature (the centrality of these two words amounted to 42% of the total centrality within the five words with greatest centrality). In short, the results show that the centrality value

Figure 2. Semantic network with the fifteen words with highest centrality value from the PIG (N=30). The size of the nodes and the labels are proportional to the centrality value. The edge thickness is proportional to the weight of the relation between two nodes. The nodes with positive value are represented in blue, and the nodes with negative value are represented in red.

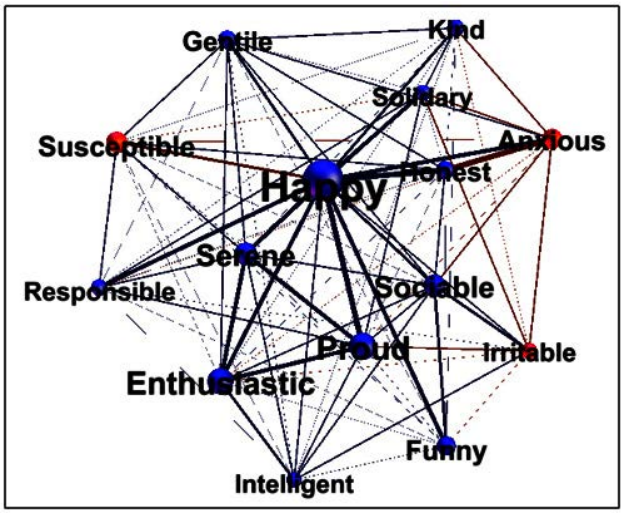


Figure 3. Semantic network with the fifteen words with highest centrality value from the NIG (N=34). The size of the nodes and the labels are proportional to its centrality value. The edge thickness is proportional to the weight of the relation between two nodes. The nodes with positive value are represented in blue; the nodes with negative value are represented in red; and the node with neutral valence (neither positive nor negative) is in green.

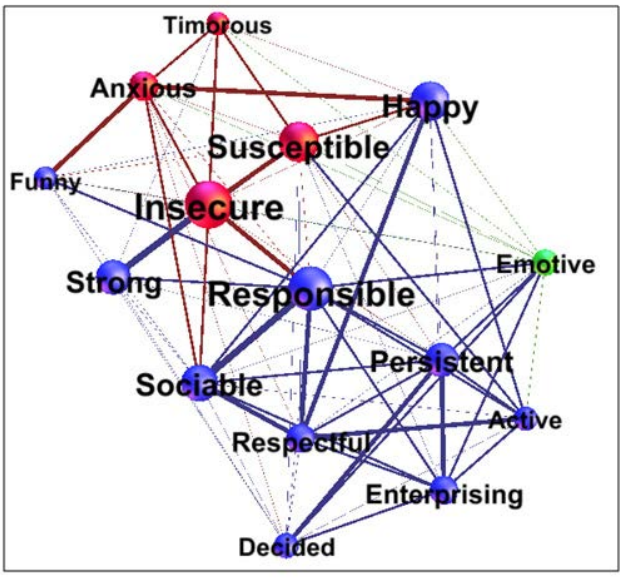


Figure 4. Semantic network with the fifteen words of highest centrality value for the PIG (N=30). The nodes of Cluster 1 are represented in purple; and the nodes of Cluster 2 are presented in light blue.

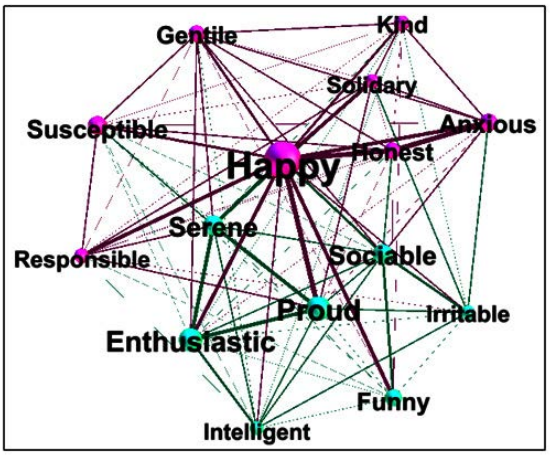
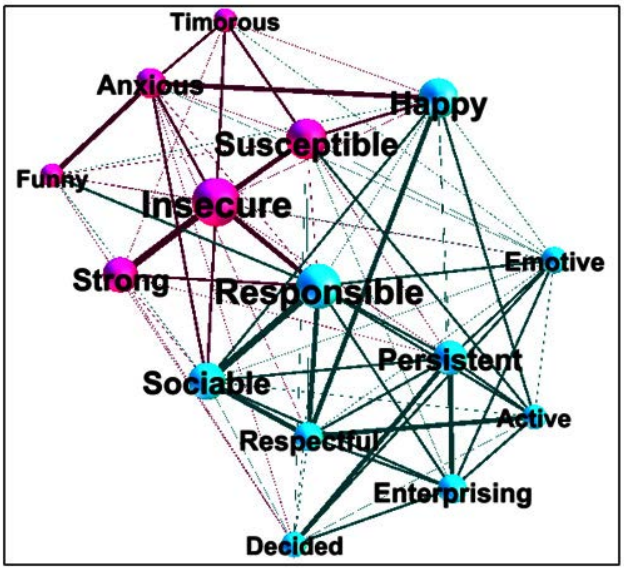


Figure 5. Semantic network with the fifteen words of highest centrality value for the NIG (N=34). The nodes of Cluster 1 are represented in purple; and the nodes of Cluster 2 are presented in light blue.



of the self-defining words with negative or positive value vary in congruence with the mood induced.

The effect of mood on in-the-moment self-concept can also be observed in Figures 4 and 5. These images represent the two clusters of self-defining words detected using the modularity algorithm in each induction group. Whereas in the PIG the two clusters are composed of words with a predominantly positive connotation, in the NIG they are predominately negative. This suggests that in the PIG, positive words are more likely to be co-activated. In the NIG the co-activation of words that have negative connotation becomes more probable, at least in one of the clusters.

These results are coherent with the information processing model [5, 21] proposed in order to define the relation between affect and cognition (i.e. associative network model) as well as to define self-concept as context-dependent. As it was explained, mood can often serve as a context for the elaboration of self-definition, which implies that a change of mood can be accompanied by change in the activation of the different categories (i.e. definers) of self-concept. Bower and Forgas (2001) define this process as summation of activation, and explain that the mood-congruent processing occurs because the affective state that a person experiences determines the availability of a series of themes, perceptual categories, as well as ways to interpret reality, that are congruent with the affective state. In line with this model, the groups in this study did not present great differences regarding the amount of positive or negative definers in their corresponding semantic networks. The percentage of negative words in the PIG was around 20, whist it was 26 in the NIG. The proportion of positive words was 80% in the PIG and 74% in the NIG. However, such differences in the proportions are not statistically significant when the Fisher's exact test is applied; for this reason, it can be considered that the proportions of positive and negative words in both groups are the same. This would then indicate that the resulting self-concept in each of the induction groups is not determined by the amount of defining words of different value, rather, self-concept varied in relation to the degree of activation of the self-defining concepts in the different groups. This activation is hypothesized to have been determined by the induced affective state.

To conclude, this research enables greater clarity than previous studies regarding the subject [8] of the influence that mood states can have on in-the-moment elaboration of judgments that are central to people's lives, as is the judgement of self-concept.

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