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Self-Concept Schemata Organization to Cope With Social Stressors: A Chronometric Assessment

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Abstract

A sample of 583 individuals of different ages and from different social and cultural backgrounds took part in a semantic priming study to explore their self-concept and self-esteem mental organization and structure in the human lexicon. Findings yielded by separating the sample into four groups showed that age and cultural background affect how humans organize self-esteem content and structure. Specifically, word recognition of physical attributes related to self-esteem provides support for the idea of a fractured mental representation of the self to cope with demands of ideal body stereotypes. It is suggested that meaning formation related to physical self is different from that based on abstract self-concept and self-esteem. This conceptual organization seems to help individuals to cope with ideal body stereotype demands and to avoid possible psychological disorders related to self-esteem affecting the so-called schematic individuals.

Keywords: Self-schemata; Self-concept; Self-esteem; Cross-cultural differences; Semantic nets; Semantic priming.

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1. Introduction

The idea that self-concept plays an influential role in individual's wellbeing, and is a constructive factor enabling positive outcomes, has been well documented (Chui and Wong, 2016; Rodrigues *et al.*, 2015; Smith and Crocetti, 2017). In general terms, self-concept refers to the domain-specific judgment of the self (Donnellan and Robins, 2009). Theoretical academic views of this mental capacity have changed from considering self-concept as a unitary single-dimensional representation of personal traits towards adopting a multidimensional hierarchical view (Shavelson *et al.*, 1976), where a global self-concept is structured around specific dimensions (Bong and Skaalvik, 2003), each considering a domain (e.g., 18 dimensions regarding academic performance Marsh and Yeung (1997) related to physical appearance (Marsh, 2002; Vispoel, 2000). Here, a great variety of instruments have been developed to measure self-concept dimensions and their sub-components (Keith and Bracken, 1996).

A relevant correlate constraining self-concept development is self-esteem (DeMarree and Bobrowski, 2017). This psychological dimension implies a general explicit and implicit attitude towards oneself (Johnson, 2016) as well as self-worth judgment. Taken together, self-esteem and self-concept represent a complex set of psychological dimensions (self–complexity) organized by content and structure to provide a person with functional adaptability to her/his social context and her/himself (Campbell *et al.*, 2003). Here, self-concept and self-esteem contents relate to beliefs and attitudes people have about themselves, whereas structure refers to how diverse contents are interrelated to empower people with stability and adaptability. For instance, it has been argued that using similar traits regarding the self in different situations (Locke, 2006). Produces a positive sense of personal continuity.

However, self-descriptive consistency across situations can be maladaptive, since a person might be inflexible to situational demands (English and Chen, 2011; Locke, 2006). Thus, the cross-context consistency hypothesis presents conflicting views of the adaptiveness of features of self-structure. In this respect, it has been proposed that, for a person to cope with different contexts and situations, she/he might develop different selves (Pilarska, 2015). However, the way a person holds contextualized self-views (self-concept variability) to organize one´s self-experience and maintain a sense of self and identity remains as a subject of heated debate (Pilarska and Suchańska, 2014a;2014b).

In this paper, it is argued that, by considering a cognitive view of emergent self-organization properties of our brain, it is possible to frame a self-concept mixed view. That is, it is hypothesized that meaning formation due to

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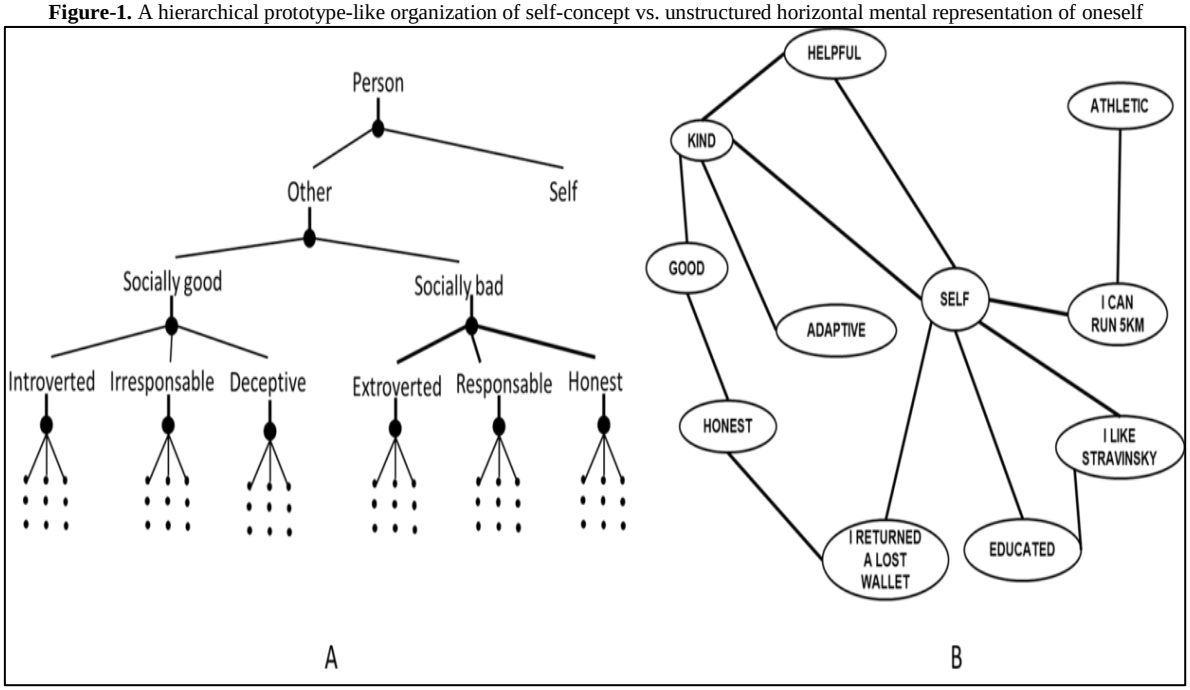
emergent self-schemata allows individuals to hold consistent and fragmented self-concept that is manifested in different contexts. To achieve this purpose, the following theoretical account of concept mental representation of self-concept is put under scrutiny.

1.1. Concept Mental Representations of the Self

Self-schemata mental representations, as introduced by Markus (1977), provide generalizations about oneself based on previous experiences. Extensive academic research has been conducted to explore information processing patterns regarding personality traits (Siem, 1998), physical attributes (Jung and Lennon., 2003). sex roles (Hill, 2007), etc. The findings yielded indicate that information congruent with the self-schemas will be processed in a deeper and faster way (facilitating encoding and recall), whereas inconsistency avoids interpretation and processing.

Within a self-schemata view, semantic self-knowledge can be explained in terms of general structural principles resembling connectivity of semantic networks. For instance, Figure 1.A shows the self-concept as a concept within a semantic network that has a hierarchical structure. Here, the self is allocated at a highest superordinate level which is assumed to be formed in early life stages (containing personal attributes, like being thin or fat, tall or short, etc.) promoting self-awareness that we are different from others. In turn, mental representation of others let us compare ourselves to different categories of possible selves, having in mind identity formation at later stages of our live.

Figure-1. A hierarchical prototype-like organization of self-concept vs. unstructured horizontal mental representation of oneself



This prototype-like mental representation is one of possible models to represent knowledge about oneself (self-schemata). For example, Kihlstrom and Cantor (1984) suggested that, rather than assuming a hierarchical prototype of the self, inheriting a specific set of attributes to the lowest ordinal instances of a tree, an exemplar mental representation view of self-concept can be assumed, where the self is an instance within a hierarchical structure of persons (Cantor and Michel, 1979). The problem with such hierarchical structures is that they fail to predict experimental outcomes derived from their theoretical assumptions. For example, cognitive semantic priming studies have shown that it is easier to recognize a sparrow as a bird than to identify it as a sparrow, but it is easier to recognize a chicken than to perceive it as a bird (Rogers and McClelland, 2004). An alternative way to represent self-knowledge in a concept network is illustrated by an unstructured semantic net in Figure 1.B. Here, semantic distance among concepts serves to construct meanings of possible selves.

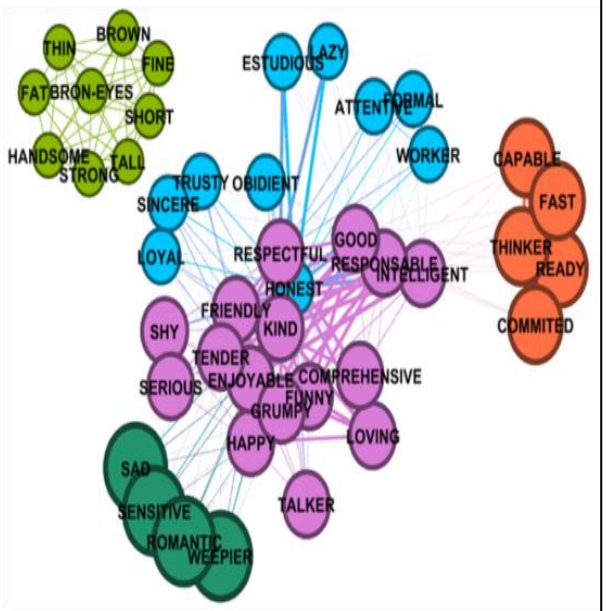
Even when both semantic net models conform with the concept mental representation principles (such as meaning formation due to the spreading effects of activating meaningfully connected concepts) there are no suitable candidates to represent the self-concept. Notice first that an unstructured semantic network does not permit research analysis of content vs. structure underlying self-concept/self-esteem. On the other hand, contents of a net are very idiosyncratic or theoretically based in that they are not supported by empirical data.

In regard of these limitations, Castro *et al.* (2016). Presented an alternative cognitive view of mental representation of self-concept. These authors used a natural semantic network technique (Morales and Santos, 2015), to obtain from youngsters semantically related conceptual definitions of relevant target self-knowledge concepts. Figure 2.A shows only five of the ten groups containing the highest-ranked definers of self-concept targets identified as a part of their study. Concept definers framed by a grey box are used to define several target concepts providing net connectivity (denoted as common definers). Figure 2.B shows the resulting semantic net graph representation of self-concept contents organized for a specific net structure known as “scale-free small-world graph” (Steyvers and Tenembaum, 2005).

Figure-2. (A) Conceptual definitions of relevant self-concept selves, and (B) a visual concept network representation (self-concept structure) of concept definers (self-knowledge content) obtained from youngsters

SOCIALIZING		INTELLECTUAL		PHYSICALLY	
DEFINER	RANKING	DEFINER	RANKING	DEFINER	RANKING
Friendly	46	Intelligent	47	Tall	55
Kind	25	Good student	18	Thin	40
Talker	24	Responsible	18	Brown	33
Happy	24	Capable	18	Short	30
Funny	23	Good	17	Handsome	28
Shy	22	Lazy	17	Brown eyes	23
Honest	21	Ready	15	Fat	20
Plenty	21	Thinker	11	Good	15
Respectful	18	Applied	9	Strong	14
Serious	14	Fast	8	Ugly	14

AS A FAMILY MEMBER		AS A PERSON	
DEFINER	RANKING	DEFINER	RANKING
Happy	36	Honest	50
Responsible	30	Responsible	49
Plenty	21	Happy	34
Tender	20	Friendly	32
Honest	16	Grumpy	27
Grumpy	14	Intelligent	27
Respectful	12	Kind	21
Good	11	Respectful	17
Funny	11	Good	16
Loving	10	Comprehensive	15



Castro and colleagues noticed from their study that self-concept contents provided by 120 teenagers were structured to cope with social identity demands. For instance, note that concept definers of targets "HOW DO I SEE MYSELF AS A PERSON" and "HOW DO I SEE MY SELF PHYSICALLY" are neither interconnected nor are they connected to any other group of definers pertaining to self-concept. This is graphically represented in Figure 2.B (physical attributes vs. rest of the net connectivity). These authors thus concluded that semantic net structure of self-concept contents is implemented to signify differently physical and abstract self-concept/self-esteem because this way of meaning formation about oneself empowers individuals to cope with demands imposed by social situations. For instance, if a person does not conform to a desirable physical stereotype (being tall, handsome, etc.) this will not affect the abstract way this person conceives herself/himself, since isolation of an abstract self is disconnected from a physical conception (in terms of meaning). This is not the case for schematic individuals, for whom body image is relevant to the self-concept and might thus lead to emotional disorders due to constant social stressors to conform to an appearance stereotype (Jung and Lennon., 2003; Jung and Lee, 2006).

Furthermore, the authors reported that semantic priming studies (with a lexical decision task), in which self-concept/self-esteem word-pairs were compared to recognition of associative and semantic nonrelated word-pairs, showed that abstract and physical self-concept/self-esteem word pairs were recognized as significantly different.

These results provided support for a fragmented representation of self-concept. This fragmentation might vary depending on personal style to cope or conform with social stereotypes. Thus, in this study, it is hypothesized that the less a sample of individuals is exposed to media stereotypes the less fragmented self-concept contents are obtained. To explore this academic interest, the following cognitive experiments were conducted.

2. Method

A cognitive science study of mental representation was conducted to explore the way conceptual information regarding the self is organized and structured to cope with valuation of identity toward ideal physical attributes. For this purpose, a quasi-experimental semantic priming study was implemented based on a 4 (Group type: low exposure to physical body idiosyncrasy, Mexican teenagers from a cosmopolitan city, Mexican young adults from a cosmopolitan city, Spanish young adults) x 5 (Semantic relation: associative, self-concept, physical self-esteem, abstract self-esteem, nonrelated words) factorial design.

2.1. Sample

A total of 538 individuals were considered in this study. Participants were divided into four groups depending on their exposure to social demands to conform with ideal body stereotypes as follows:

2.1.1. Low Exposure

This sample consisted of 96 individuals (8 males, 88 females) whose age ranged between 18 and 24 years. The inclusion criterion considered that they belonged to a small country city (north of Mexico: Linares) with strong self-identity, specific historical background and low exposure or demand to conform to an ideal body stereotype.

2.1.2. High Exposure

This category consisted of three additional samples:

- A sample of city teenagers

Here, 75 high school students (66 females, 9 males) were selected, since they reside in a main cosmopolitan city in the north of Mexico, close to the USA ideals of body stereotypes. Their age ranged between 13 and 16 years old.

- A sample of young adults

Participants (bachelor students) in this sample (120 females, 64 males) were recruited from the same city where teenagers resided. They are assumed to be more exposed (due to age) to social stereotypes and to be able to cope better with these social and cultural factors (mature individuals). Their age ranged between 19 and 25 years old.

- A sample from another cultural context

A sample of 183 bachelor students from the University of Salamanca, Spain (105 females, 78 males) was included to contrast individuals from similar cultural inheritance but different demands to conform with body image stereotypes (Toro *et al.*, 2006).

2.2. Instrument

A computerized semantic prime was implemented. Here, a computer software called Inquisit milliseconds V.4 was used for fast random presentation of stimuli. An experimental trial consisted of a centration point stimulus of 500 ms followed by a prime and a target. The SOA was set to 250 ms with an ISI of 50 ms. The cognitive task was a lexical decision task.

Semantic-related word pairs used in the priming study were selected as follows. First 15 associative and semantic unrelated word pairs were chosen from a standard norm word dictionary (Postman and Keppel, 2014). Here, word controls of size, frequency and imaginability for category were considered as an inclusion criterion. Self-concept and self-esteem word pairs were selected based on the extant research in this field (Castro *et al.*, 2016). Table 1 shows these stimuli. The stimulus set consisted of 90 word pairs, since non-word targets were included to compare with the lexical decision task over the target word (well written or not well written). A non-word was created by adding a letter to a well-written target word.

2.3. Procedure

Participation in the study was voluntary and written consent was obtained from all participants. No economic reward or academic grading point was offered. Each participant was seated in front of a computer and, after a brief instruction, they proceeded to a practice trial session. If they reported to be ready, then they proceeded with the study. They took around twenty minutes to complete all tasks.

Table-1. Semantic priming word pairs related to self-concept and self-esteem.

Self-Esteem		Self-Concept	
Prime	**Target**	**Prime**	**Honest**
Loving	Handsome	Affectionate	Lazy
Romantic	Jelous	Inteligent	Good
Weeper	Romantic	Friendly	Loyal
Sensible	Skilled	Respectful	Kind
Sad	Quiet	Worker	Trusty
Happy	Easy	Sharing	Happy
Smart	Ugly*	Comprehensive	Grumpy
Thinker	Strong*	Studious	Attentive
Capable	Handsome*	Obedient	Creative
Serious	Short*	Solidary	Playful
Shy	Brown*	Extrovert	Sincere
Funny	Thin*	Tolerant	Bad
Talker	Tall*	Sentimental	Punctual

3. Results

All participants in this study achieved at least 95% of correct answers through the different experimental conditions. Errors were eliminated from analysis. Thus, a mixed ANOVA was carried out on data distributed in a 4 (Group type: teens from Mexico, young adults from Mexico, young adults from Spain, low exposure to external influence) x 5 (Semantic relation: associative, abstract self-esteem, physical self-esteem, self-concept, nonrelated) experimental factor design.

Table-2. Main effects obtained from ANOVA.

Effect	Ss	Df	MS	F	P	Partial eta-squared
Semantic Relation (SR)	115E6	3	382E5	93.3	0.000*	0.027091
Type of group (TG)	375E4	4	937E3	14.87	0.000*	0.345425
SR*TG	226E4	12	1249E3	2.99	0.000*	0.016529

As can be observed from Table 1, a significant main effect was obtained for the type of group factor. Figure 3 visually illustrates group participants´ word recognition latencies underlying this principal effect. This graph clearly reveals self-concept word recognition differences between Spanish and Mexican individuals, as well as between individuals with low influence of external media and main city residents. A more specific visualization of study participants' performance through experimental conditions is presented in Figure 4. However, to focus on mental representation organization due to external social influence, Figure 5 shows an interaction graph presenting only group differences to recognize physical and abstract attributes of self-concept/self-esteem. Furthermore, post hoc comparisons were carried out to provide a more comprehensive discussion of the results displayed in plot figures. Thus, let us first put under scrutiny between-group differences in self-concept word recognition by using post hoc comparisons presented in Table 2.

Table-3. Differences in individual group abilities to recognize physical and abstract self-esteem

Contrasts	SS	Df	MS	F	P
Mexican adults vs. Spain	2583787	1	2583787	11.04821	0.000*
Mexican adults vs. Teens	2271794	1	2271794	10.04821	0.001*
Mexican adults vs. Low exposure	20042729	1	20042729	88.64954	0.000*
Spain vs Teen	79569	1	79568.6	0.3519	0.5532
Spain vs. Low exposure	33690595	1	3360595	149.0144	0.000*
error	120731790	534	226089		

It can be observed from Table 2 that, in regard to Figure 5, a comparison between Mexican and Spanish teens suggests similar recognition of self-concept words. Even though if a planned comparison is carried out, contrasting recognition latencies to physical self-esteem words, then a significant marginal difference between both groups exists. By considering this difference, then all groups showed significant differences to recognize physical attributes as part of self-esteem (see Table 3).

Table-4. Contrasting group recognition differences of physical attributes

Contrasts	SS	Df	MS	F	P
Mexican adults vs. Spain	1422303	1	1422303	11.42816	0.000*
Mexican adults vs. Teens	2765932	1	2765932	10.04821	0.001*
Mexican adults vs. Low exposure	1422303	1	1422303	88.64954	0.000*
Spain vs Teen	568032.9	1	568032.9	3.8188	0.0512
Spain vs. Low exposure	11686772	1	11686772	78.5685	0.000*
error	79430511	534	148746		

How these results relate to the link between semantic net structure and self-concept contents? First, the low exposure group tested as the slowest participants with no processing time differences to recognize between physical and abstract self-esteem concepts (Figure 5, top). This finding would support the idea of a unified mental representation due to their own strong cultural identity and low exposure to media or social image stereotypes. In contrast, city teens showed differential fast processing time of image body attributes (hyper priming) as compared to abstract attributes (Figure 5, bottom). This last result should support a semantic structure where physical attribute concepts are disconnected from a general schema of a self-concept schema to cope appropriately with social stereotype demands, such as not being affected by not fitting well into a stereotype. Here, meaning formation about oneself is unique and is delimited by physical constraints.

The cross-cultural difference between Mexican and Spanish young adults is particularly interesting, as they have similar cultural inheritance, but different demands on body stereotypes. Thus, Spanish youth seemed to be more sensitive to recognizing physical body attributes (related to Eurocentric definitions of ideal beauty).

Generally speaking, the analysis results revealed no recognition differences between self-concept and abstract self-esteem, indicating that the main differences are due to recognition differences between physical and abstract self.

Figure-3. Group differences in self-concept word recognition

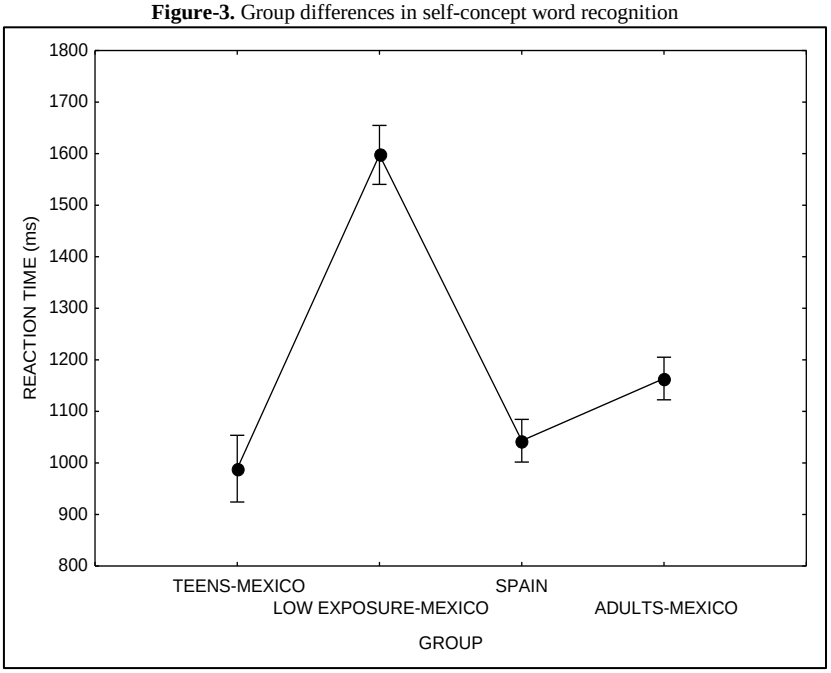


Figure-4. Interaction graph of groups´ semantic word-related recognition latencies

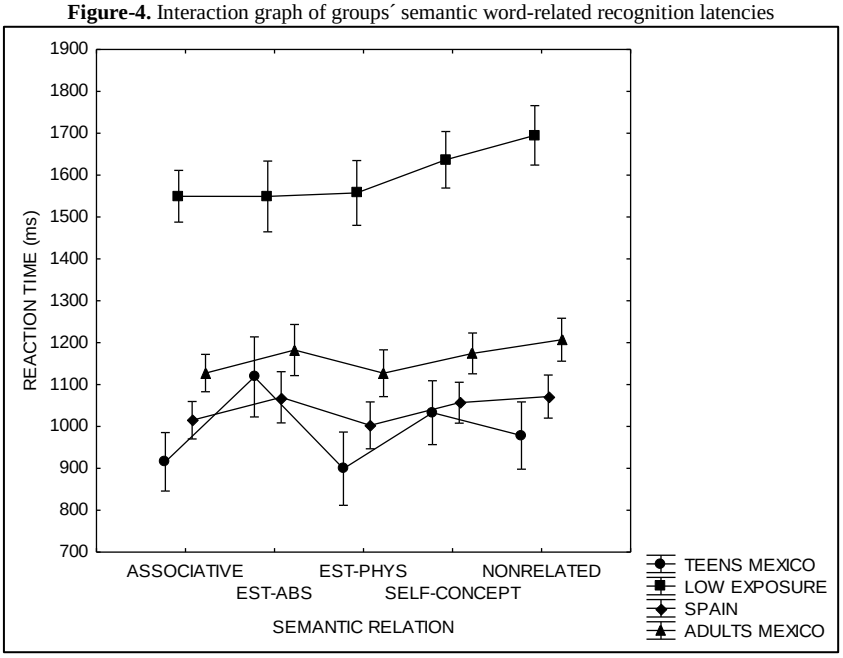
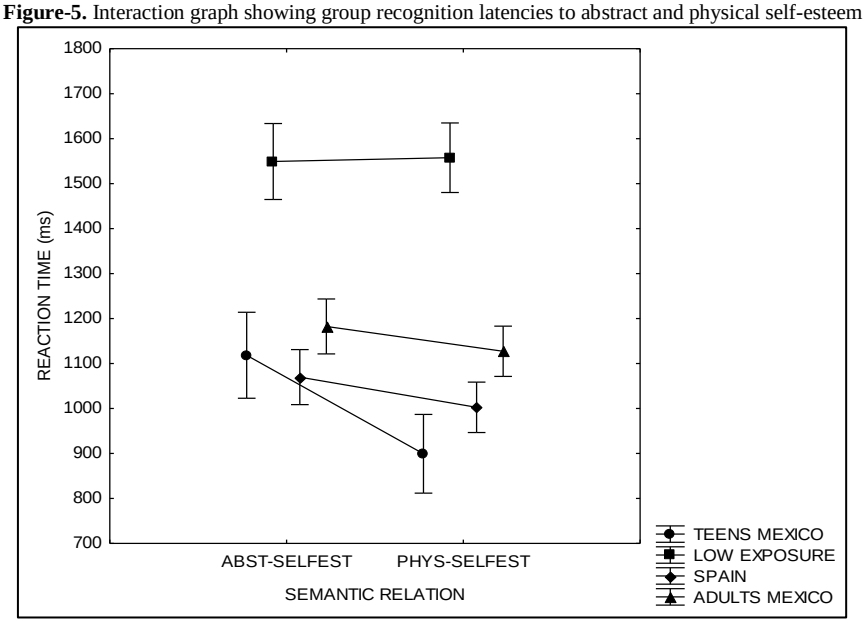


Figure-5. Interaction graph showing group recognition latencies to abstract and physical self-esteem



4. Discussion

The self is egoprotective, egocentric, disproportionably positive and prone to self enhancement bias (Overwalle, 2007). This seems to be the case for the youngsters´ self-concept mental representation shown in Figure 1, indicating that a positive self-schema having two possible self-esteem views (physical vs. abstract) empowers them with two ways of meaning formation (Cyranowsky, 2000). For subjective wellbeing and as a coping strategy to social responsiveness (Pilarska and Suchańska, 2014a;2014b; Pilarska, 2015).

Now imagine that, for some reason, a participant from the low exposure group should move to a main cosmopolitan city like the one in which the young adults from this study live. As can be seen from Figure 5, this person belongs to a group that seems to be schematic, that is, holds a single self-esteem view, but is now suddenly required to fit into a society with different physical appearance requirements. The message obtained from other group semantic priming results is that, to be inserted in social contexts with high exposure to social appearance, self-knowledge in the lexicon should be rearranged with different physical self-views (different meaning formation of the physical view). Could a low-exposure person organize mental representation of self-concept/self-esteem in terms of content and structure to develop multiple self-views (Kihlstrom and Cantor, 1984), to cope with such a social change? Extant research suggests that, in contrast to aschematic individuals (those that do not have to conform to the requirements of an appearance self-schema), a schematic individual is highly prone to stress herself/himself due to not complying with social demands on physical appearance (Jung and Lee, 2006). This is relevant, since it has been documented that not living up to one's ideal self leads to decreased self-esteem (Barnett *et al.*, 2017), and possible vulnerability to emotional disorders, such as depression and anxiety (Hilbert *et al.*, 2018; Longworth *et al.*, 2016).

Thus, being aschematic or co-schematic is a possible adaptation strategy. However, the current study findings support the co-schematic solution underlined by a fractured mental representation of the self (fragmentation hypothesis) for the low-exposure individual to be adapted in a cosmopolitan city in order to avoid vulnerability to emotional disorders. However, the problem of being consistent (consistency hypothesis) is a relevant fact for self-concept preservation.

Here, it is argued that, by adopting a specific view on how self-knowledge is stored in the lexicon, this consistency vs. fragmentation hypothesis might disappear. Consider first that there are at least three dominant views pertaining to human lexicon—the multiple lexicons view (implying different system stores for different lexical information, like sensorimotor information, emotion or spatial information), the single lexicon view (where all lexical levels are integrated), and the no-lexicon view (Sousa and Gabriel, 2015).

This researcher subscribes to the no lexicon view, where self-knowledge emerges as a self-concept/self-esteem schema to signify the self. That is, there is no self-schema stored in our memory, but it dynamically emerges as required by social and mental factors (Rumelhart *et al.*, 1986). Thus, the low-exposure individual should not, in principle, have a cognitive processing impediment to self-knowledge organization to consistently signify herself/himself through different cultural backgrounds. However, notice that self-knowledge content can be indeed an obstacle for functional emergent self-organized schemata. For instance, if egoprotective nature of self-schema is disrupted by storing and activating negative conceptualization of oneself, vulnerability to emotional disorders is possible, since self-esteem constitutes a protective factor against the development of depressive symptoms (Dumont and Provost, 1999).

Now let us focus on this last point by considering the obtained conceptual definitions of concept targets (Figure 2, left). Here, a weight association between two concepts (W_{ij}) can be computed by the following derivative of the Bayesian formula:

$$W_{ij} = -\ln [p(X=0 \,\&\, Y=1)\, p(X=1 \,\&\, Y=0)]\, [p(X=1 \,\&\, Y=1)\, p(X=0 \,\&\, Y=0)]^{1}$$

where X and Y represent the pair of concepts to be associated. In determining the association values among concepts in a natural semantic network, the joint probability value $p(X = 1 \,\&\, Y = 0)$ can be obtained by computing how many times the definer X of a pair of concepts appeared in a group of definers in which Y did not appear, and the same for the other probability values. Then, a constrained satisfaction neural net can be implemented to simulate emergent schemata behavior (López and Theios, 1996); (Morales and Santos, 2015; Rumelhart *et al.*, 1986).

If the self-concept definer HONEST is activated in such a net, the net activation produces the unique activation of GRUMPY (a negative trait). This is not the case if two positive traits (HONEST, FRIENDLY) are activated.

Right now, is not a matter of discussion why honesty can activate the "grumpy" concept. What is relevant is the potentiality of having negative mental representations from the same self-knowledge. This would not occur by having a fractured mental self-concept representation (fragmentation hypothesis) since different self-views will protect one kind of schemata behavior from a possible negative impact of an independent schemata behavior (physical appearance schema). More research is needed in this empirical research direction.

5. Conclusions

This paper aimed to explore how mental concept organization of the self seems to cope with social stereotype demands. It can be concluded that sometimes self-organized concept schemata regarding the self might lead to non-adaptive meaning formations of self- concept and self-esteem that can be detected by the appointed mental representation techniques.

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