The Effects of Unconscious Context on Social Representations: Evidence from the Subliminal Emotional Priming Paradigm

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The present study investigates the effects of emotional unconscious context on recognizing elements as being part of a social representation (SR). The subliminal priming paradigm was used where a subliminal facial expression (happy vs. angry) was presented prior to a target sentence, which was an item belonging either to central or peripheral elements of the SR of higher education studied by Lo Monaco, Lheureux and Halimi-Falkowicz (2008). Two factors were manipulated in this experiment: emotional priming (positive, negative, and no priming) crossed with the structural status of items (central vs. peripheral) in a mixed design. Two dependent measures were recorded: the yes/no responses and reaction time. Overall, the results support the idea that the structural status of the target items was preserved while in the negative emotional priming condition, as participants tended to be slower to respond "No" to central elements compared with the no priming and positive priming conditions. Moreover, our findings suggest that central elements are always recognized as such even if the unconscious context varies. Finally, this study revealed the insensitivity of central elements to unconscious context variations, a point that is not declared by the theory. Hence, our findings may contribute to the further development of central core theory by taking into consideration subtle contextual manipulation in follow-up studies.

Social Representations (SR) can be defined as spheres of beliefs, attitudes, and opinions. They are involved in the social construction of reality, and studying them allows a better understanding of common sense and, more specifically, position-taking and behaviors in a given situation. According to Moscovici (1981, p. 181), they are "a set of concepts, statements and explanations originating in daily life in the course of inter-individual communications." Thus they are "the equivalent, in our society, of the myths and belief systems in traditional societies; they might even be said to be the contemporary version of

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commonsense" (p. 181). As a consequence, SRs are dependent on the social context within which they are grasped. They are also involved in the definition of social identity for a given social group. From this perspective, studying SR is helpful in understanding intergroup conflicts and intra-group dynamics, since these are anchored in social roots.

In line with the social representation theory (SRT; Moscovici, 1961, 2008), and the central core theory (CCT; Abric, 1993, 2001; Rateau, Moliner, Guimelli & Abric, 2011), the hypothesis that the emotional unconscious context changes will differentially affect the elements of the SR function to their structural status (central vs. peripheral) can be tested. Indeed, according to CCT, central elements are defined as less sensitive to immediate context variations than peripheral ones. Thus, the objective of this study is to investigate the effects of emotional unconscious context on recognizing elements as being part of a social representation according to their central versus peripheral structural status.

Social psychologists who specialize in this area consider SR socially regulated by virtue of the social position of different groups. Moreover, SRT (Moscovici, 1981, 1984, 1988, 2008) defines SR as both a process (i.e., representing a given social object) and a product (i.e., the SR of a given social object). Since the seminal study by Moscovici (1961, 2008) on the SR of psychoanalysis in France during the 1950s, many approaches have been tried to study SR. Several categories (see Rateau, Moliner, Guimelli, & Abric, 2011, for a review) were often cited in the SR scientific literature, including the sociogenetic model (Moscovici, 2008; Jodelet, 1992), the structural model (Abric, 1993, 2001), and the sociodynamic model (see Clemence, 2001, for a review). Note that not all the objects are objects of social representations. They have to give rise to important issues, they must be polemical and arouse involvement. For examples these objects can concern "energy savings" (Souchet & Girandola, 2013), "Human Rights" (Doise, 2002), or "mental illness" (Jodelet, 1991).

The present study focuses on the structural model, otherwise known as the central core theory (CCT) of SR, which highlights the dichotomy between a very limited number of central elements versus a large number of peripheral elements (Abric, 1993, 2001; Flament, 1994; Guimelli, 1993a, 1993b, 1998; Moliner, 1995; Moloney, Hall, & Walker, 2005; Moloney & Walker, 2002; Rateau et al., 2011). In announcing the CCT, Abric (1976, 1987) stipulated that it has roots in Asch's formation of impressions theory (1946), according to which some criteria are decisive in our judgment toward a person.

Abric (1993, 2001) proposed that the central system is characterized by two essential functions: a meaning generative function and a meaning organizational function (Abric, 1993, 2001; Guimelli, 1993; Rateau et al.,

2011). It generates the meaning for the SR as a whole, and it determines relationships between the elements composing the representational field. The peripheral system is the "bumper" of the central system as metaphorically described by Flament (1987, p. 146). It provides the central beliefs of the SR with concreteness, regulation, and protection. Hence, the components of the peripheral system allow the adaptive capacity of SRs by protecting the central system from external threats that could jeopardize its stability and coherence. Peripheral elements allow for SRs to be individualized without causing them any structural modification and consequently to meet the adaptive needs of people on a daily basis (see Abric, 1993, 2001; Rateau et al., 2011, for a review).

Several characteristics may differentiate central from peripheral elements. As proposed by Abric (1993), elements composing the central core are linked to collective memory and are rooted in the history of the group, while peripheral elements allow taking into account individual experiences and past histories. Another fundamental characteristic of the central elements refers to their consensual aspect that is responsible for the homogeneity of the group. In contrast, peripheral elements are not consensual; they express the heterogeneity of the group. Furthermore, when central elements are stable, coherent, and rigid, peripheral elements are flexible and accept contradictions. Moreover, elements composing the core of the representation refer to the common view of an object constructed by a social group and it is responsible for the social differentiation between social groups. Indeed, these kinds of elements are linked to group social identity. As an example, in the framework of the "black sheep effect" paradigm (see Marques, Yzerbyt & Leyens, 1988; Pinto, Marques, Levine & Abrams, 2010), Zouhri and Rateau (in press) have shown that when an in-group member called into question a central element, it led to more criticism compared to calling a peripheral element into question.

Finally, and more relevant to our study, is the difference in terms of sensitivity to context changes. Indeed, unlike peripheral elements, central elements, according to Abric (1993), are not very sensitive to the immediate context.

The SR Structure-effect

We suggest calling the observed difference between experimental results associated with central relative to peripheral elements the *SR structure-effect*. An earlier demonstration of this effect can be traced back to a psychophysical study conducted by Flament in 1995. He manipulated the context of the activated SR of higher education using Parducci's range-frequency model (Parducci, 1965). The idea was to vary the ratio of central to peripheral beliefs from *less* to *highly* through

equally represented central beliefs about higher education. The results showed that central beliefs were less affected than peripheral beliefs by context effects. Subsequent studies replicated this SR structure-effect under many experimental conditions. This effect was found in the foot-in-the-door (FITD) paradigm by Eyssartier, Joule, and Guimelli (2007), in the double-foot-in-the door (DFITD) paradigm (Souchet & Girandola, 2013), and even in the field of study of binding communication by Zbinden, Souchet, Girandola, and Bourg (2011). The authors of these works showed that participants placed in the central condition, compared with participants who realized a first committing act based on the peripheral system, were more willing to realize an act and were more favorable toward this act. This effect was also observed in studies examining attitude changes. Indeed, Tafani and Souchet (2002) used the counter-attitudinal essay paradigm (Janis & King, 1954) and showed that behavior-challenging peripheral elements induced a rationalization process, leading to minor changes in the way of thinking about the object. On the other hand, when the behavior challenged central elements, the rationalization process induced a structural change in the SR.

However, one may ask the following question: Is it possible to find an SR structure-effect following unconscious context changes? We can argue from a theoretical perspective that central elements within a SR are characterized by stability and are highly resistant to context changes (Abric, 1993, 2001; Flament, 1995; Lo Monaco et al., 2008; Rateau et al., 2011; Wagner, Valencia & Elejabarriera, 1996), such as emotional and affective changes. Hence, our study aimed to provide at least two major contributions. First, we tackled the question of the contextual manipulation of emotion and, more precisely, unconscious emotional manipulation of an affective external source of information, such as facial expression in relation to the study of the structure of an SR. More precisely, in the present study we manipulated the context at two levels: an *explicit level*, which is related to the way the instruction was presented to participants by highlighting the relevance of the presented items to their academic career; this is likely to activate specific issues in relation to the participants' identity as individuals. We also used an *implicit level,* through the introduction of subliminal emotional primes prior to the target presentation.

Second, as recognized by many authors, SRT (Rateau et al., 2011) is a very flexible framework and suited to extension. Therefore, taking into consideration the unconsciously perceived context changes is a big step forward in SR theoretical development. From a methodological perspective, the original introduction of the subliminal priming (unconscious) within the standard SR paradigm will provide a solid

cross-validation of available techniques and allow a more fine-grained behavioral analysis of participants' responses when facing social objects.

As shown above, one important feature of the central core theory consists in differentiating central from peripheral elements with respect to their sensitivity to context immediacy. The initial development of the theory did not address the issue of the ambiguity that an "immediate context" may generate. Nevertheless, many criteria have been used in the social psychology literature to manipulate social contexts as an independent variable.

Regarding the distinction between conscious vs. unconscious context, there is no research to our knowledge that tackles this issue either from a theoretical or from a methodological perspective using paradigms involving reaction time (RT) measures.

The subliminal masked priming paradigm has become a very powerful technique in the investigation of bottom-up processes involved in many psychological tasks (Bargh & Pietromonaco, 1982; Dixon, 1971, 1981; Forster & Davis, 1984; Marcel, 1983). It has many methodological advantages, such as being non-invasive, and it allows an accurate control of the stimulus duration made possible by masking technique. Thus, the subliminal stimulus is typically referred to as the prime stimulus and is below the threshold of visual awareness. Subjects remain unaware of the prime presentation or the activation of concepts associated with this prime. The subliminal priming manipulation has been found to influence participants' evaluations in various tasks, such as rating of persons, making good-bad judgments of neutral stimuli (e.g., Bargh & Pietromonaco, 1982; Gibbons, 2009; Greenwald, Klinger, & Liu, 1989), judging the affect of faces showing an ambiguous expression of surprise, rating pictures of landscape paintings and portrait photographs (e.g., Channouf, 2000; Li, Zinbarg, Boehm, & Paller, 2008; Murphy & Zajonc, 1993), and evaluating faces with respect to hiring for a job position (Skandrani-Marzouki & Marzouki, 2010).

It is important to state that our study involves a data-driven approach. Indeed, the initial theoretical claim of the CCT did not provide specific assumptions about the conscious versus the unconscious nature of the context. Consequently, this study aimed to examine the influence of the unconscious context on the way participants organize their social representations.

METHOD

Participants

Fifty-two French undergraduate students at Aix-Marseille University volunteered to participate in our study. Eighteen participants (9 males), with a mean age of about 22 years, were each randomly assigned to one

of the three priming conditions. All students reported having normal or corrected-to-normal vision.

Stimuli and design

We used a computerized version of the *Context Independence Test* (CIT), which is a technique developed by Lo Monaco et al. (2008) and was revealed to be very efficient in providing a systematic diagnosis of the SR structure. The CIT stems from the idea (Abric, 1993, 2001) and the previous results (Flament, 1995) that central elements are more resistant than peripheral elements to context variations

Target stimuli. Twenty items in relation to academic career SR studied by Lo Monaco et al. (2008) to validate the CIT technique served as target stimuli. These items about the SR of higher education contain 4 central items (1. *Require hard work*; 2. *Require investment*; 3. *Allow the acquisition of knowledge*; and 4. *Allow to prepare one's own career*) and 16 peripheral items (5. *Imply to pass exams*; 6. *Allow the acquisition of diplomas*; 7. *Provide access to a high level of instruction*; 8. *They are long-lasting*; 9. *Take place at the university*; 10. *Allow us to make friends*; 11. *They are difficult*; 12. *Allow outings*; 13. *Allow rising on the social ladder*; 14. *Require sacrifices*; 15. *Require attendance*; 16. *They are stressful*; 17. *Lead to a filtering out*; 18. *Require ambitions*; 19. *Require to go to class*; and 20. *They are fun*).

Prime stimuli. These stimuli were already piloted and used in the study by Marzouki-Skandrani and Marzouki (2010). Prime stimuli consisted of pictures of 10 faces expressing either happiness or anger. The emotional expression of prime faces was evaluated by five raters with an excellent inter-judge agreement (Kendall's coefficient of concordance $W = 0.89$, see Siegel & Castellan, 1988). Two factors were manipulated in this experiment: Emotional Priming (positive, negative, and no priming) as a between-subject factor, and Structural status of items (central vs. peripheral) as a within-subject factor in a mixed design. The whole set of 20 items is presented randomly per priming condition. Two dependent measures were recorded: the yes/no responses and the reaction time (RT).

Procedure

Participants were seated in front of a computer screen at a viewing distance of 50 cm. Stimuli were displayed on a monitor with a resolution of 1280 x 800 pixels and a 60 Hz refresh rate. The experiment was conducted using SuperLab® software (Version 1.03). Each participant was presented with 20 random items of the source SR and (s)he was asked to decide whether the item was congruent or not with his/her own representation of the academic career. Each trial began with a central

fixation for 300 msec and was immediately followed by a forward mask for 20 msec. The latter was then replaced with a face prime for 50 msec that was immediately covered with a backward mask (identical to the forward mask) for a duration of 20 msec. Finally, one item among the 20 listed above was displayed until the subject responded. Participants performed a 2-AFC (two-alternative forced-choice) task as follows: They were asked to read the instructions carefully and to press the (green) button of the keyboard if the target was associated, according to the participant, with the response "*Always refers, in all cases, to your own idea about higher education,*" and to press the (red) button if the target was associated with the response "*Does not refer, in all cases, to your own idea about higher education*". Prior to the task, each participant became familiarized with three practice trials. The experimental session lasted about 15 minutes.

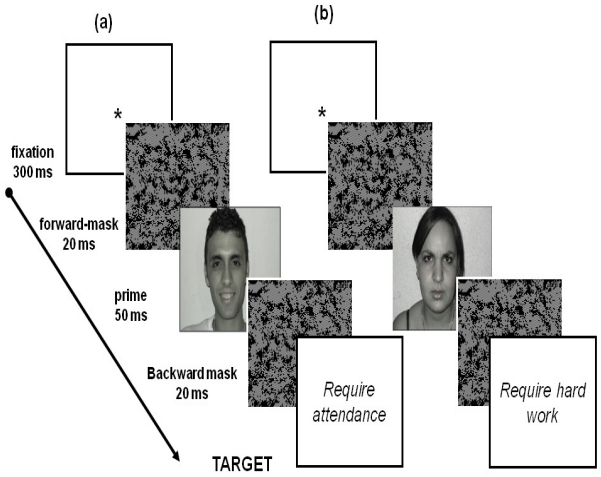

FIGURE 1 Example Trials of the Priming Experiment with Positive Prime (a) or Negative Prime (b).

RESULTS

Post-experimental self verbal report was used as a measure of prime visibility (e.g., Geissler, 1990; Merikle, 1992). According to their answers, all participants were completely unaware of the presence of

faces as primes although 9.6% reported that they had detected brief flashes prior to the target presentation.

Participants' concordance rate. We presented in Figure 2 the percent of "yes" and "no" responses as a function of priming conditions and items structural status. Notice that the agreement rate towards central items is around 18% on average and is stable in all priming conditions, whereas the rejection rate is very low and not significantly different from 0%. In the presence of peripheral items as targets, participants' concordance rates vary as a function of priming conditions. Indeed, the results indicate a significantly higher agreement rate in both positive (65.8%) and no priming (62.8%) conditions compared to negative priming condition (45.5% vs. 62.8 %, χ^2 (1) = 20.9, $p < .0001$ and 45.5 % vs. 65.8 %, χ^2 (1) = 29.1, $p < .0001$).

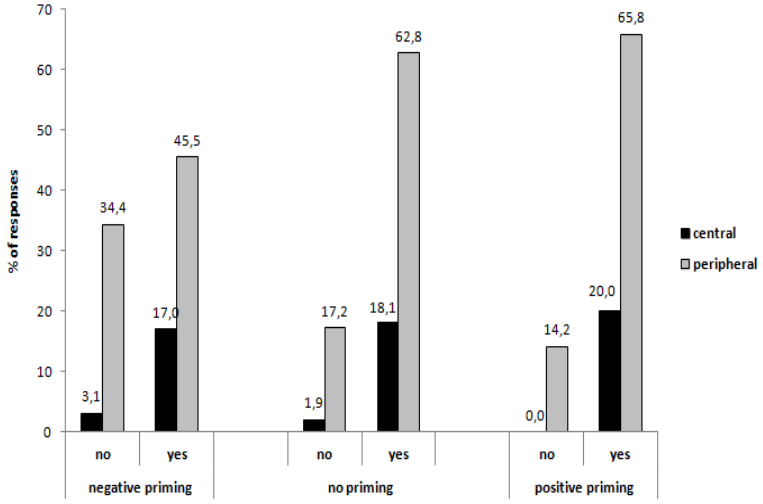

FIGURE 2 Concordance Rate Means Associated as a Function of Affective Valence & the Structural Status of Targets

Reaction time analysis. The reaction times were log transformed to reduce the effect of outliers as recommended by Ratcliff (1983).

Yes responses. We conducted a mixed ANOVA on RT data, including only trials where participants gave "yes" as a response, with emotional priming as a between-subject factor, the structural status as a within-subject factor and log RT as the dependent variable. The results are shown in Figure 3. The ANOVA revealed a highly significant main effect of Priming, $F(2, 49) = 72.5$, $MSE = 0.02$, $p < .0001$, $\eta_p^2 = .75$ and Structural status, $F(1, 49) = 9.5$, $MSE = 0.17$, $p < .005$, $\eta_p^2 = .16$. The

interaction between these two factors was not significant, $F(2, 49) = 1.3$, $MSE = 0.02$, $p > .1$, $\eta_p^2 = .05$. Post-hoc tests (Fisher's LSD) revealed a significant difference between central and peripheral items only in the no priming condition ($p < .01$).

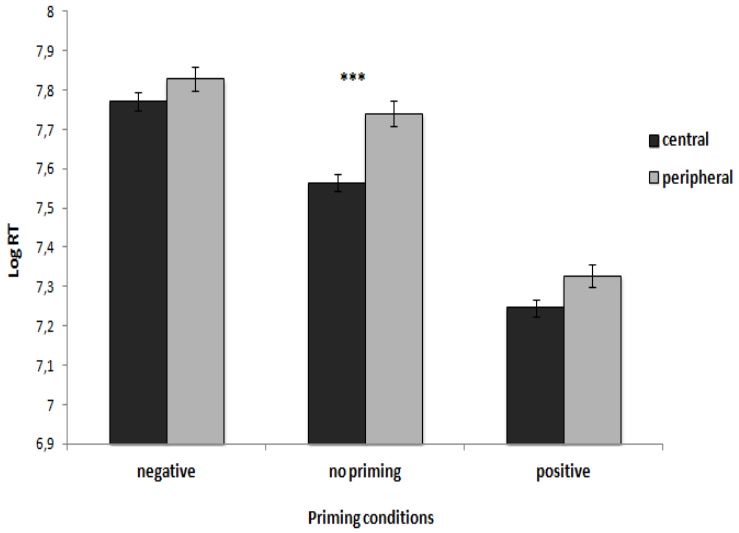

FIGURE 3 RT Means (+/- standard-errors) Associated with "Yes" Responses as a Function of Affective Valence & the Structural Status of Targets

No responses. The same mixed ANOVA was also performed on RT data including only trials associated with participants' "no" responses. The results showed highly significant main effects for priming, $F(2, 49) = 7.3$, $MSE = 4.5$, $p < .005$, $\eta_p^2 = .75$, and structural status, $F(1, 49) = 200$, $MSE = 4.4$, $p < .005$, $\eta_p^2 = .75$. The interaction was also significant, $F(2, 49) = 7.5$, $MSE = 4.4$, $p < .005$, $\eta_p^2 = .75$. Post-hoc comparisons (Fisher's LSD) revealed significant differences between central and peripheral items in all priming conditions, all $p_s < .0005$, (see Figure 4).

DISCUSSION

The present study investigated the effect of emotional unconscious context on the expression of an SR. A subliminal priming procedure was used where a subliminal facial expression (happy vs. anger) was presented prior to an item belonging either to central or peripheral elements of the SR of higher education.

The results of concordance rate data are clear-cut. Emotional priming has no impact on participants' decisions about central items, whereas peripheral items were highly sensitive to emotional priming. These results are quite consistent with Abric's theoretical claim (Abric, 1993, 2001; see also Rateau et al., 2011) and the previous empirical findings about the SR-structure effect (Flament, 1995; Lo Monaco et al., 2008).

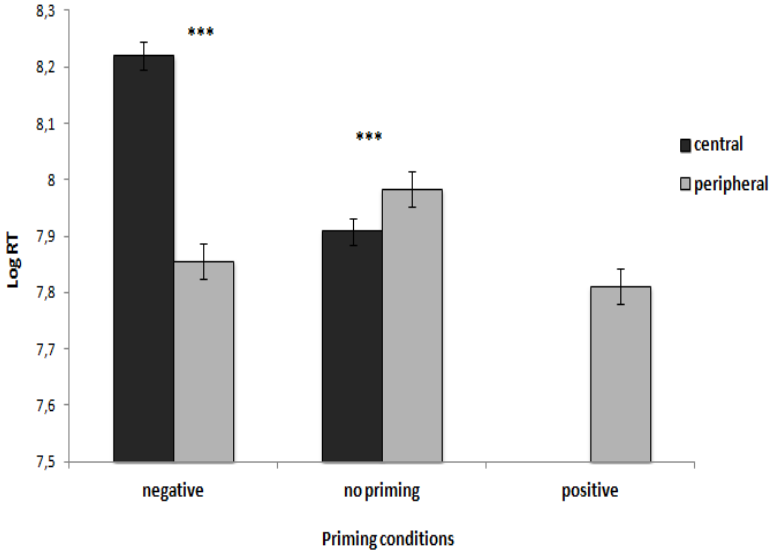

FIGURE 4 RT Means (+/- standard-errors) Associated with "No" Responses as a Function of Affective Valence & the Structural Status of Targets

Indeed, considering the percentages of responses, we observe that the manipulation of the context does not cause any changes concerning the central elements. Conversely, the peripheral elements are very sensitive to the context variations (i.e., priming conditions) as predicted by the CCT. Additionally, these results enabled us to answer our main question about the insensitivity of the central core to context variations in conscious vs. unconscious contexts.

From a theoretical point of view, unlike peripheral elements, central elements are defined as insensitive to the immediate context. With respect to the RT results, one may expect that central elements yield faster responses than peripheral ones in the "no priming" condition for both "yes" and "no" responses. Central elements are evaluated faster than the peripheral elements given the role they played in recognizing the

object of representation (Rateau et al., 2011). This is consistent with their status of "evidence provider." Indeed, central elements are critical to the way we represent social because they generate and organize the meaning of the SR. Moreover, they are characterized by a high level of connectedness with the rest of the SR (Guimelli, 1993), they have a high symbolic power insomuch as their contradiction may challenge the meaning of the SR as a whole (Rateau et al., 2011); and they are trans-situational as they are involved in various situations (Abric, 2001; Flament, 1995; Lo Monaco et al., 2008; Wagner, et al., 1996). Because of these aspects, this difference in RTs could be interpreted in terms of high accessibility of the central elements relative to the peripheral ones.

With reference to the "positive" and "negative" priming conditions, one may expect variations only with the case of "no" responses in the "negative priming" condition. Here once again, the results are consistent with the CCT assumptions as much as it refers to the importance of the role of the central elements in a SR. Additionally, although our paradigm does not imply an emotional induction, the negative emotion could promote a higher level of alertness for participants because of its relevance to our survival (e.g., Hansen & Hansen, 1994; Marzouki, 2012). Unlike peripheral elements, central elements involved higher stakes in the situation and led participants to be slower to answer in the "negative priming" condition.

Overall, the results support the idea that the structural status of the target items was preserved while in the negative emotional priming condition, as participants tended to be slowest in giving the "no" answer for the central elements compared with the no priming and positive priming conditions where participants showed the fastest RTs. Regarding the difference between central and peripheral elements for the "no" responses in the "negative priming" condition, it is important to point out that our argument does not explain the result in terms of a representational change. Moreover, one can notice from a theoretical point of view that the results concerning the percentages of responses are in line with the insensitivity to variations of immediate context (see Abric, 1993, 2001; Flament, 1995; Lo Monaco et al., 2008). Indeed, in the case of central elements one can expect stable results, which is not the case for peripheral elements.

Our findings suggest that central elements are always recognized as such even if the unconscious context varies. Concerning specifically the RTs, in the "no priming" conditions for both the "yes" and "no" responses, participants were faster for the central elements than for the peripheral elements. In terms of percentages of responses, there is no difference between the "priming" and the "no priming" conditions. The result is clear-cut: central elements are insensitive to variations of

unconscious context. From a theoretical point of view, this result is not surprising, but it is original. To our knowledge, none of the research conducted in the framework of the CCT has shown such a result. In addition, one may observe a different pattern of results with the peripheral elements. Such results showing more variations are quite consistent with the CCT which posits that peripheral elements are, on the one hand, more sensitive to immediate context, and on the other hand, more subject to individual variations. In line with this explanation, since the central elements are shared by the group and define the common view of the social object, and since the peripheral elements support the individual variations, one may expect more variations for the latter than the former.

These results are quite stimulating to the development of the CCT, because the connection between this theory and this kind of measure, while it seems to be encouraging, has not been investigated. In fact, more relevant to the discussion of the results of this study is the empirical paper of Wagner et al. (1996) that boldly discussed the theoretical and methodological aspects of the CCT. The said paper went practically unnoticed in the field of research on the CCT for two decades despite the authors' criticism of the methods used by a massive body of research on the CCT that highly under-diagnosed context-invariance for central elements. Wagner et al. (1996) argued that context-invariance is a *sine qua non* feature of central elements, although no appropriate method based on this property was suggested to diagnose context-invariance properly. Even if the research of Flament (1995) was realized in the same period, these limits have been taken into account in the work of Lo Monaco et al. (2008) in the framework of a method able to diagnose the dichotomy between central and peripheral elements relative to their insensitivity to context.

One limitation of the present study is that it is based on the previous diagnosis conducted by Lo Monaco et al. (2008). Nevertheless, there is an important difference between their study and ours. Indeed, in the classic paper-pencil test, which occurred in the previous study, the participants had all the items listed at the same time, so they could take the time to compare items. In the computerized task, however, which we used, it is very difficult to make such a comparison, especially in the presence of 20 items exceeding by far the human memory span capacity. Nonetheless, given the stable character of a social representation (Rateau et al., 2011) and the absence of a significant event associated with the object, and in the end the clarity of the results recorded in the present study, one can be confident about the reliability of the conclusions.

Finally, this study highlights the insensitivity of central elements to unconscious context variations, which was not explicitly stated by the

theory. In conclusion, our findings may contribute to widening the scope of CCT theory by showing its extension to unconscious contexts. Thus, follow-up studies using various paradigms and tasks will sharpen our understanding of the underlying mechanisms of these unconscious effects on social representations.

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Footnotes

[1] Many criteria have been extensively used in the social psychology literature to manipulate social contexts as an independent variable. We can list, for example, the following distinctions: *private* (remote from others' evaluation) versus *public* (being exposed); being exposed to a majority vs. minority); *immediate* (context-specific) versus *permanent* (context-general); *implicit* (indirect manipulation) versus *explicit* (direct manipulation).

[2] 54 participants took part in the study using a between-subjects design. The sample in each experimental condition was balanced, so there were 18 participants in each experimental condition. Two outliers were removed from the sample before analyzing the data.

[3] Note the highly unbalanced proportions typically reported between central versus peripheral items as a key feature of the structural approach to studying SRs.