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Implicit relational effects in associative recognition

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We study the contribution of implicit relatedness to associative recognition in two experiments. In the first experiment, we showed an implicit improvement in recognition when the stimulus elements of each word pair shared common letters and they were unpaired at test. Moreover, when asked to study the stimuli under divided attention, recollection was affected, but not the effect of perceptual familiarity. In a second experiment, we replicated the effect of divided attention, and we showed that it did not affect the familiarity measured by a choice test at the item level. Overall, both experiments indicated that familiarity acts by unitizing the association, and not simply by establishing some sort of implicit cued recall (recollection).

Associative recognition is a task frequently used as a paradigm for studying recollective processes. In theory, given that participants have to distinguish between intact (targets) and rearranged (distracters) equally familiar word pairs by exposure, the acceptance or rejection of a test pair has to be based on the retrieval of the original association and not in any possible difference in familiarity. This view of associative recollection has been challenged recently in an attempt to explain contradictory results obtained in the electrophysiological and neuroimaging literature. In particular, the study of amnesic patients with hippocampal lesions, known to be critical in the processing of relational information (Eichenbaum & Cohen, 2001), has shown inconsistent results regarding the type of deficits found in associative versus item recognition. Some studies (e.g., Giovanello, Keane, & Verfaellie, 2006; Giovanello, Verfaellie, & Keane, 2003; Turriziani, Fadda, Caltagirone, & Carlesimo, 2004) have revealed more deficits in associative recognition than in item recognition in these

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patients, whereas others have not (Stark & Squire, 2003; Stark, Bayley, & Squire, 2002). One of the possible reasons for the discrepancy may lie in the possible, and theoretically unexpected, involvement of familiarity in associative judgments through the use of strategies leading to unitization of the presented stimuli (Quamme, Yonelinas, & Norman, 2007). If we unitize two independent items, they become interlinked in a unified structure, behaving like a new single item, and providing the basis for a holistic judgment based on the combination of both elements.

There are several studies showing that unitization leads to an increase of familiarity-based processing in recognition when subjects are explicitly trained to unify isolated stimuli (e.g. Diana, Yonelinas, & Ranganath, 2008; Staresina & Davachi, 2006; Winograd, Karchmer, & Russell, 1971). In associative recognition, the use of compound words (Giovanello et al., 2006; Quamme et al., 2007), stimuli differing in abstractness (Reder, Oates, Thornton, Quinlan, Kaufer, & Sauer, 2006), semantic relatedness (Rhodes & Donaldson, 2007), interactive imagery (Rhodes & Donaldson, 2008), and, in general, the explicit requirements to link the two stimuli through conceptual processing, have led to successful unitization.

As far as we know, very few researchers have explored the possibility of investigating the role of implicit unintentional perceptual relations in binding together the different components of an association, under conditions not contaminated by retrieval strategic factors. The purpose of the present study is to examine the role of implicit factors in promoting associative recognition. One indication of what to expect comes from the literature analyzing the effect of environmental context on recognition (in which the binding item+context that occurs during encoding can be seen as the item+item binding that occurs in the associative paradigm). Although there are experiments indicating that changes in context only affect recollection and not familiarity (Macken, 2002), others have obtained contradictory results, suggesting that they may affect familiarity implicitly (Levy, Rabinyan, & Vakil, 2008; Manier, Apetroaia, Pappas, & Hirst, 2004). However, given that the implicit memory literature has shown clearly an unitization effect at perceptual levels (e.g. Dorfman, 1999), we also expect perceptually based familiarity effects in associative recognition.

In the next experiments we have modified a technique previously operationalized by Parkin and collaborators to study yes-no recognition (Parkin, Ward, Squires, Furbear, Clark & Townshend, 2001; see also, Algarabel, Escudero, Mazón, Pitarque, Peset, & Lacruz, 2009; Algarabel, Pitarque, Tomás, & Mazón, 2010). In this paradigm participants assigned to an experimental condition study words created from a restricted set of letters of the alphabet (e.g. wall), that at the recognition test are mixed with new words (distracters) created from an alternative set of letters (e.g. pouch), that is, targets and distracters share no letters. The familiarity effect produced by this induced perceptual and phonological fluency, can be estimated comparing this condition in which the letters are used for improving recognition (reducing false alarms and/or increasing hits) in comparison with a control condition in which they do not have this perceptual information available (using target and distracter words created from the full alphabet; e.g. monday). We explicitly refer to the consequence of presenting words for study using a restricted set of letters as perceptual familiarity, without taking into account the exact source of the effect (letters, syllables, or other sub-lexical units). Previous experiments (Algarabel et al., 2010) provide correlational evidence indicating that the frequency with which specific vowels recur in each word set is determinant for obtaining the effect. In the case of Spanish, the most common vowels are the letters “a” and “o”.

In the first experiment we investigate the effect of implicit relatedness in associative recognition by manipulating the perceptual and phonological overlap between both members of each stimulus pair. More specifically participants made two sequential study-test associative recognition tasks. In each study task, the words of each pair are written using the same letter set (e.g. words with the vowel “a” and no vowel “o” or vice versa) although the study lists are made of half A-A pairs and half O-O pairs (e.g. wall-yarn, pouch-kiosk, respectively). In each recognition test, target pairs are always the same as studied (half A-A and half O-O pairs), but we manipulate within-subjects the status of the distracter pairs in the two recognition tasks. Whereas in one of these tasks, the distracter pairs are of the type A-A and O-O (being A and O, studied words from list A and O, respectively, but rearranged), in the other recognition task the distracters pairs are of the type A-O and O-A (being A and O, studied words from list A and O, respectively). From here on we will call these two test conditions as *No Change* and *Change* conditions, respectively. If the presence of common letters contributes to unitize both words, there should be a difference in performance between both conditions either in hits, or false alarms or in both due to the increase dissimilarity between intact and rearranged word pairs.

Besides investigating the familiarity effect produced via perceptual unitization, we also investigate the effects of dividing attention during encoding. In the divided attention condition, participants also studied A-A and O-O word pairs while at the same time they made odd/even judgments of an aurally presented number. The literature indicates that dividing attention produces a strong deficit on recollection and a smaller or no effect on familiarity (Yonelinas, 2002). Dividing attention also produces a greater use of familiarity as a compensatory mechanism in older people (Castel & Craik, 2003). In consequence, if familiarity is involved we expect that divided attention will affect recollection without affecting perceptual familiarity.

In sum, we predict that familiarity differences between intact pairs (targets) and rearranged pairs (distracters) will increase if the implicit relation established at study is necessarily broken at test in the case of the rearranged pairs. To further clarify the implicit or explicit nature of the effect, we also introduced a divided attention condition for studying its consequences on the familiarity effect. If this unitization is of familiarity origin and then automatic, it should not be affected (or be less affected) by dividing attention. The second experiment provides evidence of the development of familiarity at the item level by means of a forced choice test after the associative recognition phase. A divided attention condition also provides information about the nature of the different mechanisms involved in associative recognition.

EXPERIMENT 1

METHOD

Participants. Thirty two psychology students (average age=22.01, six of which were male) from the University of Valencia (Spain) volunteered to participate in the study to fulfill a course requirement. Sixteen students were randomly assigned to one of the two study conditions described in the procedure. Four additional participants were excluded from the statistical analysis when they reported that they had noticed the perceptual manipulation introduced, as described below.

Design. We manipulated two *study conditions* (between subjects, Control vs. Divided Attention) and two *test conditions* (within subjects, Change vs. No Change).

Stimuli. We created two lists (list A & list O) of 96 Spanish words of between 3 and 9 letters long selected from an initial database of 14,000 words (Alameda & Cuetos, 1995). The list A included 96 nouns formed entirely from the following letters of the Spanish alphabet: a, e, u, b, d, g, j, n, r, z. The list O included 96 nouns formed entirely from the following letters of the Spanish alphabet: o, i, c, f, h, l, m, p, s, t, v. These two sets were created through an iterative process by which we attempted to obtain two balanced sets of stimuli, particularly with regard to vowels. These lists A & O were equated in mean frequency per two million (Alameda & Cuetos, 1995) 62.83 (sd=188.57) and 63.93 (sd=201.30), respectively, and length, 5.09 (sd=1.34) and 5.12 (sd=1.34), respectively. Finally, the words of these two lists we randomized and paired within list, giving place to two lists of 48 A-A and O-O unrelated pairs. From these two lists, we formed randomly four blocks of 20 pairs: ten A-A pairs (e.g. wall-yarn) and ten O-O pairs (e.g. pouch-kiosk). These four blocks were also equated in frequency and length, and were used to generate four test lists: two lists with intact pairs (or targets, being in each list half A-A pairs and half O-O pairs), one list with rearranged (within list) pairs formed by repairing the study pairs and producing new A-A or O-O distracter pairs (*No Change* condition), and the other list with rearranged (between lists) pairs formed by rearranging the studied pairs and producing new A-O and O-A distracter pairs (*Change* condition).

Procedure. Participants completed two sequential study-test associative recognition tasks under computer control in groups of up to 12 individuals. At each study phase, 44 (4 fillers) word pairs (font size 18, in black on a white background) were presented for study for 2,500 ms each in the center of the screen preceded by a fixation cross for 500 ms. Half of the studied pairs were of the A-A type and the other half of the O-O type. "Study conditions" was a between subjects independent variable with two levels: Participants in the *Control* condition studied words of the A-A and O-O type whereas participants in the *Divided Attention* condition studied the same word pairs hearing simultaneously a random digit (1 to 10) through their earphones, and having in each trial to categorize it as odd or even pressing the keys for the letters “i” and “p” of the keyboard.

"Test conditions" was a within subjects independent variable with two levels. In one recognition test, subjects had to distinguish 20 intact (targets) pairs (10 of the A-A type and 10 of O-O type) from the 20 rearranged (distracters) pairs of the same type (10 of the A-A type and 10 of the O-O type; *No Change* condition). In the other recognition test, subjects had to recognize 40 pairs of words, half being intact (targets) and half being rearranged from the different set condition (10 rearranged pairs of the A-O type and 10 rearranged pairs of the O-A type; *Change* condition). Recognition tests were counterbalanced across subjects. In both recognition tests participants had unlimited time to decide if pairs were intact or rearranged using the keys "d" and "k" (counterbalanced across subjects). After the last test, participants received a questionnaire asking them about the strategies that they have utilized for responding. As indicated previously, the four participants that mentioned anything related with the letter composition of the words were excluded from the experiment.

RESULTS AND DISCUSSION

Table 1 presents average of hits, false alarm rates, and discrimination indexes (d') by conditions. With regard to discrimination (d'), the mixed analysis of variance of 2 (study conditions: between subjects) by 2 (test conditions: within subjects) showed significant main effects of both the study conditions, F (1,30)=8.34, $p<0.01$, $\eta^2_p=0.22$, and the test conditions, F (1,30)=7.01, $p<0.05$, $\eta^2_p=0.19$, indicating a better performance in the Control condition than in the Divided Attention condition, and a better performance in the Change condition than in the No Change condition (see table 1). The interaction of both variables was not significant, F (1,30)<1, $\eta^2_p=0.02$.

Table 1: Proportion of hits, false alarms and d' (standard errors in brackets) for experiment 1 as a function of study and test conditions.

	Test Condition					
	Change			No Change		
Study Condition	Hits	FA	d'	Hits	FA	d'
Control	0.63 (0.05)	0.18 (0.03)	1.44 (0.20)	0.63 (0.05)	0.30 (0.04)	0.96 (0.21)
Divided Attention	0.58 (0.04)	0.34 (0.03)	0.68 (0.19)	0.57 (0.04)	0.43 (0.04)	0.39 (0.21)

The 2x2 mixed analysis of variance on hits indicated no significant effects of either the main effects of study and test conditions, F (1,30)=1.24, ns, $\eta^2_p=0.04$, F (1,30)<1, $\eta^2_p=0.00$, respectively, nor their interaction, F (1,30)<1, $\eta^2_p=0.00$.

Finally, the 2x2 analysis of variance on false alarm rates showed significant main effects of both the study conditions, $F(1,30)=9.63$, $p<0.01$, $\eta^2_p=0.24$, and test conditions, $F(1,30)=14.93$, $p=0.001$, $\eta^2_p=0.33$, indicating that there were more false alarms in the Divided Attention condition than in the Control condition, and more in the No Change condition than in the Change condition (see table 1). The interaction of both variables was not significant, $F(1,30)<1$, $\eta^2_p=0.01$.

This first experiment showed very clear differences in d', in favor of the condition in which participants discriminated between unpaired stimuli not sharing letter set (Change condition) versus those comparing unpaired words sharing letter set (No Change condition). However, and interestingly, this advantage was due to the lowering of false alarms and not at the expense of increasing hits. This fact reinforces the belief that participants were not explicitly aware of the experimental manipulation. Otherwise, they would have used it in their advantage for increasing performance through hits. However, one might be skeptical about the origin of the differences found. Could they be caused by recollection instead of familiarity?. In the paper by Manier et al (2004), mentioned in the introduction, participants evaluated a series of semantically categorized stimuli that were contingently associated with several screen locations. In contrast to the present results, they observed simultaneously a decrease in hits and false alarms in the critical condition that involved a mismatched location and semantic category. Their data show that studied items of a category tested in the same position were remembered better than those studied in different positions and, in turn, non-studied items of a category tested in the same position were higher than their counterparts in different positions. The fact that the divided attention group, despite a general decrement in performance, maintained the same hits pattern as the other group suggests that the experimental manipulation affects familiarity (Yonelinas, 2002), although this consequence may be the result of the type of processing required for encoding. Therefore, Experiment 2 will examine whether such manipulation is affecting familiarity using a slightly different study task and a new recognition test (a two forced-choice task to test familiarity at the item level).

EXPERIMENT 2

The first aim of Experiment 2 was to replicate the results of Experiment 1, using a different study task that prevents better participants of being aware of the experimental manipulations (as e.g. might have happened in the *change* condition of Experiment 1 if a participant had responded "new" based on being aware that any type pair A-O or O-A could not have actually been studied, thereby reducing the false alarm rate). Thereby, whereas that in Experiment 1 each participant studied half pairs type A-A and half pairs type O-O, in Experiment 2 half of the participants studied only pairs type A-A and half of the participants studied only O-O pairs, being all participants tested in two recognition tasks in which both target and distracters pairs were either of A-A type (for participants that studied A-A pairs) or O-O pairs type (for participants that studied O-O pairs), as in the *No Change* condition of Experiment 1. Since all words were from the same letter set, perceptual dissimilarity had no role in the associative response, in order to avoid aware responses. The second aim of Experiment 2 is to assess familiarity also at the item level by means of a forced-choice test, using a modification of the procedure used by Parkin et al. (2001, exp. 2). In this task participants had to discriminate between two words, studied or new (being half of the pairs A-O type, and half O-A type), and were led to believe by instructions that in every pair, one of the words had been studied, although in half of the pairs this was not really true because participants had actually to discriminate between two "new" words, one of which was created from the same set of letters as the studied words and the other one being from the set of letters of non studied words. In this condition the choice of the words belonging to the studied list would allows us to assess the familiarity effect produced solely by perceptual manipulation, because participants tend to implicitly choose those words based only on perceptual repetition of certain letters.

METHOD

Participants. Forty-five psychology students (average age=22.67, seven of which were male) from the University of Valencia (Spain) volunteered to participate in the study and earned extra credit towards their degree. They were randomly assigned to one the two between subjects study conditions (20 participants were assigned to Control condition and 22 to the Divided Attention condition). Three additional participants were excluded from the statistical analysis because they were aware somehow of the perceptual manipulation.

Design. We manipulated between subjects the variable *study conditions* (Control vs. Divided Attention presentation).

Stimuli. The same set as in Experiment 1.

Procedure. Participants were first exposed to two study-test associative recognition tasks followed by a forced choice test. In each study task participants studied 34 (4 fillers) word pairs (font size 18, in black on a white background) displayed in the center of the computer screen for 2,500 msec, preceded by a fixation cross for 500 ms. Half of the participants studied pairs of words type A-A and half studied O-O pairs in both study tasks. At each recognition test subjects received 10 intact (target) pairs and 10 rearranged (distracter) pairs (type A-A, for participants that studied A-A pairs or type O-O, for participants that studied O-O pairs), and they had to decide which one was intact and which one was rearranged by pressing the keys for letter “d” or “k” of the computer keyboard (counterbalanced across subjects). Participants assigned to the Divided Attention condition heard through an earphone, at the same time as they studied the pairs, a random number (1 to 10) which had to be categorized as even or odd by pressing the keys for “i” or “p”, as in Experiment 1.

The final two alternative forced-choice test was carried out on 20 A-O and 20 O-A pairs, randomly presented, under the belief that one of the words of each pair was studied and the other was new. In half of the pairs, one of the two words was effectively studied and not tested in the associative recognition phase (from here on *Choice Old*). The purpose of this condition was, in part, to reduce the possibility that subjects would intentionally appreciate that some of the words presented in this phase were not studied. However in the remaining half of the pairs none of the two words was actually studied, but one of them belonged to the same letter set as those words presented in the study phase (from here on *Choice New*). In this latter case the choice of these words would allows us to assess the familiarity effect produced solely by the perceptual manipulations. Given this mixture of both types of pairs, participants were not likely to realize that there were some trials in which none of the words were studied. The participant had to select the "studied" word using the “d” or “k” keys of the keyboard to indicate the left or right word of each pair, respectively.

Finally, all participants received a questionnaire in which they had to respond regarding the strategies they used to associate and recognize the pairs. Three participants that indicated that the letters had played a role in their responses were excluded from the statistical analysis.

RESULTS AND DISCUSSION

Table 2 presents average of hits, false alarm rates and discriminability indexes (d') by conditions.

Table 2: Proportion of hits, false alarms and d' (standard errors in brackets) for experiment 2 and proportions of hits on *Old* and *New* words in the forced-choice task as a function of study conditions.

Study Condition	Hits	FA	d'	Choice Old	Choice New
Control	0.77 (0.02)	0.22 (0.03)	1.71 (0.18)	0.84 (0.02)	0.63 (0.02)
Divided Attention	0.60 (0.03)	0.35 (0.03)	0.70 (0.11)	0.78 (0.02)	0.63 (0.02)

As expected, divided attention decreased discriminability, d', $t(40)=4.62$, $p<0.01$, SEM=.22 (one-tailed test). This effect was produced by decreasing hits, $t(40)=4.40$, $p<0.01$, SEM=.04, and increasing false alarms, $t(40)=2.89$, $p<0.01$, which indicated that recollection is strongly affected by dividing attention at encoding. These results replicate those of Experiment 1 in terms of preventing more closely the possibility of participants being aware of the repetition of certain letters.

With regard to the choice test on studied words (*Old*), divided attention decreased item recognition, $t(40)=2.25$, $p<.05$, SEM=.04, whereas the difference in the choice test on *new* words did not, $t(40)<1$, $p>.20$, SEM=.03. In any case, the choice proportions were all significantly different from 0.50, $t(19)=14.92$, $p<0.01$, $t(19)=5.35$, $p<0.01$ for studied and new words within the control group, and $t(21)=11.12$, $p<0.01$, and $t(21)=5.53$, $p<0.01$, within the divided attention group. Considering a difference in the order of .10 between the two groups and a variability of 0.12 estimated from past data obtained under identical circumstances, we had a power of 0.85 to detect the difference that could be considered optimal (Cohen, 1988). The results of the *Choice New* condition clearly indicate that participants tend to choose the unstudied words belonging to the studied list by the implicit perceptual familiarity caused by repetition of certain letters.

GENERAL DISCUSSION

In two experiments we studied the contribution of perceptual implicit relations to associative recognition and its effect on single item familiarity. The results of the first experiment indicated that perceptual information produced an improvement in performance obtained when the two test words were systematically dissimilar and did not share letter sets. The experiment also shows that divided attention produced significant decrease in performance, but it did not alter the unitization effect produced by linking words from the same letter set. The second experiment replicated the effect of divided attention on associative recognition and item choice, but did not affect the "familiarity effect" on new words in the choice test, providing further evidence that perceptual manipulation produces an increasing "familiarity" in the associative recognition phase. In conclusion, the present experiments support the idea that any manipulation leading to the unitization of the pair of stimuli in associative recognition contributes to an increase in the influence of familiarity. The more possibilities of linking the pair of stimuli, the greater the influence of familiarity, and this is also apparent even when the participants are amnesic patients (Giovanello et al., 2006). Previously, Yonelinas, Kroll, Dobbins, & Soltani (1999) had already shown that familiarity can have a big influence on associative judgments in situations where the stimuli are not arbitrarily paired. Furthermore, the present research shows that this is an "implicit" familiarity effect because participants are completely unaware of the factor they are using to unitize word pairs. As in the study of context effects on recognition (see Levy et al., 2008), awareness is not completely necessary (see the opposite conclusion in Macken, 2002).

In the past there have been discussions about the possible existence of priming for new associations in conditions that do not explicitly require deliberate retrieval of the memory episode. To investigate this problem, Graf & Schacter (1985) developed a procedure in which participants studied unrelated word pairs under elaborative encoding conditions, followed by a stem completion task in which each stem was accompanied by a context word. In the test it was shown that the rate of completion of the stems was greater for studied than new contexts. This effect has been shown to not require necessarily elaborative encoding conditions (Dew, Bayen & Giovanello, 2007) but it is promoted by unitization manipulations (Musen & O'Neill 1997). Nevertheless, past research casted doubts about the automatic or controlled origin of the implicit association effect (Kinoshita, 1999). In particular, the observation that dividing attention at test reduces the fluent generation of multiple stem completion candidates in the original task designed by Graf & Schacter (1985), led to believe that the implicit creation of new association has an explicit contamination. The associative recognition task that we have introduced in this paper bear some similarity to that of Graf & Schacter's and fulfills similar requirement for the study of implicit associations inasmuch as the implicit perceptual association remains unnoticed by the subjects. We can here assume with more certainty that participants did not notice the perceptual relation between pair of words by objective and subjective reasons. Objectively, as both experiments show, divided attention at study produced a strong decline in performance in the explicit dependent variable with no discernible effect on the implicit effect. On the other hand, we indirectly requested information about the way in which participants had solved the task and none of them noticed anything related to the pattern of perceptual regularities between word pairs. In conclusion, the present experiments reinforce the idea that participants are susceptible to implicit relations among stimuli in an explicit paradigm in which they are allocating processing resources to a different stimulus dimension.

Theoretically, the present data can easily be explained from the unitization view (Diana et al., 2008) that establishes that when the two elements of an association are unitized, in this case by a perceptual implicit relation, then familiarity develops and contribute to associative recognition. The domain dichotomy view, on the other hand (Mayes, Montaldi, & Migo, 2007) establishes that the experimental setting we are using here promotes the development of familiarity through the pairing of stimuli in the same domain (word-word). According to this view, when within-domain stimuli are used, the perirhinal cortex is in charge of using inter-stimulus similarity to bind together the distinct components. But, when people face between-domain stimuli (word-pictures, for example), it is the hippocampus which links "distinct" memories for later "recall-to-accept" and/or "recall-to-reject" of each test stimulus. However, given that in the current experiments, we can clearly isolate the effect of stimulus similarity through the measurement of perceptual overlap of each pair of stimuli, we argue that the demonstration of a "normal" familiarity effect in the dissimilar-similar testing condition of the first experiment contradicts this view.

A final point concerns the issue of whether our experiments are really showing the consequences of the involvement of familiarity in associative recognition, rather than the involvement of some sort of implicit recollection. When familiarity is operationally defined at the subjective level, researchers check the fact that participants are not able to place the remembered item in any past context. That is, we remember a "face" but we are unable to provide any evidence about what, where, and when. The reasons for the improvement in associative recognition by the perceptual manipulation implemented here are operationally identical. Therefore, we believe this is a definitive reason to think that familiarity is involved in associative recognition by unitizing the elements in association.

Since some investigations have shown that elderly people and patients with cognitive deficits show a significant impairment in recollection but they successfully rely on perceptual familiarity to improve recognition (see e.g. Anderson et al., 2008; Westerberg et al., 2006; but see also Wolk, Signoff & DeKosky, 2008), our future research will have to analyze whether this well preserved familiarity capacity can be used as a compensatory mechanism for such recollection deficits, using both within-domain stimuli (type word-word, picture-picture) and between-domain stimuli (type word-pictures), because stimulus form change seems to affect differentially familiarity (see e.g. O'Connor & Ally, 2010). In this regard we have recently replicated the findings here reported, with the same procedures, using pictures as materials (Pitarque & Sáez, 2012).

RESUMEN

Efectos relacionales implícitos en reconocimiento asociativo. En dos experimentos analizamos la contribución de relaciones implícitas entre palabras sobre el reconocimiento asociativo. En el experimento 1 mostramos una mejora implícita en el reconocimiento cuando las palabras de cada par de estudio compartían letras comunes y eran desemparejadas en el test. Además en la condición de estudio bajo atención dividida la recolección se veía afectada, pero no así el efecto de la familiaridad perceptual. En el experimento 2 replicamos estos resultados bajo atención dividida y mostramos que esta condición no afectaba tampoco a la familiaridad medida a nivel de item individual en una tarea de elección forzosa. Globalmente considerados nuestros resultados muestran que el efecto de familiaridad perceptual hallado es debido a una unificación perceptual de la asociación y no simplemente a un tipo de recuerdo guiado recolectivo.

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