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On the (un)conditionality of automatic attitude activation:

The valence proportion effect

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Abstract

Affective priming studies have shown that participants are faster to pronounce affectively polarized target words that are preceded by affectively congruent prime words than affectively polarized target words that are preceded by affectively incongruent prime words. We examined whether affective priming of naming responses depends on the valence proportion (i.e. the proportion of stimuli that are affectively polarized). In one group of participants, experimental trials were embedded in a context of filler trials that consisted of affectively polarized stimulus materials (i.e., high valence proportion condition). In a second group, the same set of experimental trials was embedded in a context of filler trials consisting of neutral stimuli (i.e., low valence proportion condition). Results showed that affective priming of naming responses was significantly stronger in the high valence proportion condition than in the low valence proportion condition. We conclude that (a) subtle aspects of the procedure can influence affective priming of naming responses, (b) finding affective priming of naming responses does not allow for the conclusion that affective processing is unconditional, and (c) affective stimulus processing depends on selective attention for affective stimulus information.

Keywords: Automatic affective processing, Affective priming, Feature-specific attention allocation, Salience, Attitudes

Throughout the history of psychology, researchers have advocated the idea that humans are equipped with a mechanism capable of automatically evaluating the affective value of all incoming stimulus information (e.g., Arnold, 1960; Bartlett, 1932; Lazarus, 1966; Wundt, 1907; Zajonc, 1980, 1984). One paradigm often used to study automatic stimulus evaluation is the affective priming paradigm (Fazio, Sanbonmatsu, Powell, & Kardes, 1986). In a typical affective priming study, participants are asked to evaluate several affectively polarized target stimuli as positive or negative as fast as possible (i.e. the evaluative categorization task). Each of these targets is preceded by an affective prime stimulus. Typically, it is observed that performance is faster and more accurate when prime and target are affectively congruent (e.g., 'HAPPY' – 'KITTEN') than when they are affectively incongruent (e.g., 'TENDER' – 'PEDOPHILE'), a phenomenon referred to as the affective priming effect (for reviews, see De Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009; Fazio, 2001; Klauer & Musch, 2003). Crucially, such an effect can occur only if the affective meaning of the prime has been processed. Therefore, the affective priming effect can be conceived of as a cognitive marker of affective stimulus processing.

Consistent with the hypothesis that stimulus evaluation occurs in an unconditional, automatic fashion, the affective priming effect has proven to be a rather robust phenomenon. For instance, affective priming effects have been obtained while participants performed an effortful secondary task (Hermans, Crombez, & Eelen, 2000; also see Klauer & Teige-Mocigemba, 2007) and when using short stimulus onset asynchronies (Hermans, De Houwer, & Eelen, 2001), subliminal prime presentations (Draine & Greenwald, 1998; Greenwald, Draine, & Abrams, 1996), and stimuli from different modalities (Hermans, Baeyens, & Eelen, 1998; Hermans, De Houwer, & Eelen, 1994; Spruyt, Hermans, De Houwer, & Eelen, 2002).

Also, whereas most affective priming studies employed the evaluative categorization task (see above), both Bargh, Chaiken, Raymond, and Hymes (1996) and Hermans, De Houwer, and Eelen (1994) obtained significant affective priming effects using a word naming task. Unlike the evaluative categorization task, the naming task does not require participants to adopt an explicit evaluative processing goal. The findings of Bargh et al. and Hermans et al. therefore suggest that affective stimulus processing does not depend on the activation of an explicit evaluative processing mindset.

Evidence concerning the reliability of the affective priming effect in the naming task is mixed however. Spruyt, Hermans, Pandelaere, De Houwer, and Eelen (2004), for example, were unsuccessful in obtaining the effect in a nearly exact replication of Bargh et al.'s (1996) Experiment 2. Likewise, Klauer and Musch (2001) failed to replicate this effect in a series of four statistically powerful experiments (see also, De Houwer, Hermans, & Eelen, 1998). In contrast, Spruyt, Hermans, De Houwer, and Eelen (2002) demonstrated that affective priming of naming responses can be readily obtained when pictures are used as primes and targets but not when words are used as primes and targets (see also Wentura & Frings, 2008).

To explain these inconsistent findings, De Houwer and Randell (2004; also see De Houwer, Hermans, & Spruyt, 2001) suggested that affective priming of naming responses depends on the extent to which naming is semantically mediated. Because affective stimulus information is stored within the semantic system (e.g., Bower, 1991), one can indeed expect that affective stimulus processing is more likely to take place when an in-depth semantic analysis of the target stimuli is required. In line with this hypothesis, De Houwer and Randell obtained reliable affective priming of naming responses when participants were asked to name only those target words that did not belong to a specific semantic category (Experiment 2). In contrast, when the naming of the targets was conditional upon the color of the word rather than its semantic category, no affective priming was obtained (Experiment 1). Also

consistent with the idea that affective priming of naming responses depends on the extent of in-depth semantic processing is the observation that affective priming in the naming task is typically more robust and replicable when pictures instead of words are used as primes and targets (Spruyt et al., 2002). Pictures are known to have privileged access to the semantic system (Glaser, 1992; Glaser and Glaser, 1989). Pictorial primes will therefore activate affective stimulus information to a higher degree than do words. Moreover, because pictures first have to activate their concept nodes within the semantic system before they can be named (Glaser, 1992; Glaser and Glaser, 1989), picture naming is always semantically mediated.

Recent studies conducted by Spruyt, De Houwer, and Hermans (2009; also see Spruyt, De Houwer, Hermans, & Eelen, 2007) suggest an alternative, more fine-grained interpretation, however. Spruyt et al. put forward that automatic semantic stimulus processing is modulated by feature-specific attention allocation. More specifically, they argued that the semantic analysis of a task-irrelevant stimulus is more pronounced for those stimulus dimensions that are selectively attended to. Given the assumption that affect can be regarded as a semantic dimension (e.g., Bower, 1991; De Houwer & Hermans, 1994; Fiske & Pavelchak, 1986), the hypothesis of Spruyt et al. thus implies that automatic affective processing of task-irrelevant stimuli will depend on the extent to which affective stimulus information is selectively attended to.¹

Spruyt et al. (2009), for instance, manipulated the degree to which attention was assigned to the affective stimulus dimension by asking participants to classify the targets on the basis of their affective connotation on either 25% or 75% of all trials (Experiment 1). Consistent with the selective-attention framework, affective priming of naming responses was significantly stronger in the 75 % evaluation condition than in the 25% evaluation condition.

Based on these findings, one could argue that the affective stimulus dimension was selectively attended to in prior studies that did produce affective priming of naming responses

(e.g., Bargh et al., 1996; Hermans et al., 1994). Consider, for example, the findings of De Houwer and Randell (2004). A closer look at their procedures reveals that it may have been an efficient strategy for participants to selectively assign attention to affective stimulus information. In both studies, all to-be-named words had a clear affective connotation (e.g., 'TERRIFIC') whereas all to-be-ignored targets were affectively neutral. In other words, stimulus valence was informative about whether a naming response was required or not. This subtle procedural feature may have encouraged participants to adopt a strategic evaluative processing goal (but see Pecchinenda, Ganteaume, & Banse, 2006).

Feature-specific attention allocation may also have been responsible for the findings obtained with the picture – picture naming task (Spruyt et al, 2002; Wentura & Frings, 2008). Spruyt et al. showed that pictures are more effective as primes and more susceptible to priming as targets. In their studies, however, there might have been a confound between stimulus modality and the degree to which participants were encouraged to assign attention to the affective stimulus dimension. Because the emotional tone of pictures used in affective priming studies is typically more extreme than the emotional tone of words, pictures may be more effective in inducing selective attention for the affective stimulus dimension than words (Spruyt et al., 2009).

Evidence obtained with the affective Simon task (De Houwer & Eelen, 1998) points even further in this direction (Duscherer, Holender, & Molenaar, 2008). In this affective variant of the spatial Simon task (Simon, 1990; Simon & Rudell, 1967), participants are presented with words that vary independently on both the affective stimulus dimension and a nonaffective stimulus dimension (e.g., grammatical category). Crucially, participants are asked to categorize the words on the basis of the nonaffective stimulus dimension while using response labels that are affectively polarized (e.g., 'good'-'bad'). The irrelevant affective value of the stimulus words can thus either be congruent or incongruent with those of the

response labels. Although the affective connotation of the words itself is irrelevant for the task at hand, one commonly observes slower and less accurate responses when the word and the response are affectively incongruent than when they are congruent. Duscherer et al. (2008) manipulated the proportion of affective Simon trials on which affectively polarized stimuli were presented and found the affective Simon effect in the response latency data to come about only if the proportion of trials consisting of affectively polarized stimulus materials was high.

This finding is important because it suggests that selective attention for affective stimulus information can be manipulated not only in a blatant manner via instructions and task demands (as in the studies of Spruyt et al., 2007, 2009) but also in a procedurally more subtle manner, that is, by varying the proportion of affective stimuli. To substantiate this idea, however, several issues need to be dealt with first.

First of all, it should be emphasized that the findings of Duscherer et al.'s were not conclusive. Although the valence proportion had an impact on the affective Simon effect in the reaction time data, a similar data pattern did not emerge in the error data. In fact, the error data revealed an affective Simon effect irrespective of the proportion of affectively polarized stimuli. One procedural detail that might account for this data pattern concerns the response labels used. While Duscherer et al. took great care in manipulating the proportion of affective stimuli, the applied response labels were affectively polarized throughout the entire experiment (“positive” or “negative”). That is, irrespective of whether the proportion of trials consisting of affectively polarized stimulus materials was high or low, participants still had to execute an affectively labeled response on all trials. As pointed out by Spruyt, Everaert, De Houwer, Moors, and Hermans (2008), the use of affectively polarized response labels can prompt one to selectively attend the affective stimulus dimension. It is therefore important

that the valence proportion is manipulated in such a way that the proportion of affectively polarized responses is also low.

Second, even if the data of Duscherer et al. would have been conclusive, it still remains to be seen to what extent their findings generalize to other experimental tasks. It is possible, for instance, that the valence proportion moderates the affective Simon effect not because it influences automatic affective processing per se but because it influences the processes that mediate between automatic affective processing and the affective Simon effect, such as response competition (see Gawronski, Deutsch, LeBel, & Peters, 2008; Moors, Spruyt, & De Houwer, 2009; Spruyt, Gast, & Moors, in press). To rule out such an interpretation, studies using other experimental tasks are vital.

In the present experiment we examined whether the valence proportion of affective stimuli modulates affective priming of naming responses too. More specifically, we embedded critical naming trials in a large set of filler trials that either consisted of neutral stimuli (low valence proportion) or affective stimuli (high valence proportion). The affective priming effect was expected to be significantly stronger in the high valence proportion condition than in the low valence proportion condition. This experiment is important for several reasons. First of all, it is generally assumed that affective priming in the naming task is driven by processes other than those underlying the affective Simon effect (e.g., De Houwer, 2006; Gawronski et al., 2008; Moors et al., in press). Evidence that the valence proportion also influences priming effects in the naming task would therefore provide important additional support for the hypothesis that the proportion of affective stimuli influences the probability of affective stimulus processing rather than processes specific to the affective Simon effect. Second, in a naming task, the proportion of affectively polarized responses is equal to the proportion of affectively polarized stimuli presented. The naming

task is therefore better suited to study the impact of the valence proportion on automatic affective stimulus processing.

Finally, the present study is important because it sheds new light on the conditions under which affective priming of naming responses can be obtained.

Method

Participants

Due to the small to medium effect sizes generally associated with affective priming of naming responses, we performed a power analysis using a power coefficient of 0.80 and an effect size ($d = 0.35$) obtained in a study with similar stimulus materials and procedure (Spruyt & Hermans, 2008). This analysis revealed an optimal sample size of 67 for each between-subjects condition, resulting in an optimal total sample size of 134. We therefore recruited 106 undergraduates at Ghent University (mean age = 19 years; 31 men, 75 women), with an implied power estimate of about 0.74 to detect a priming effect in each between-subjects condition. All participants took part of the study in exchange for course credit or a payment of € 8.

Materials

We used 60 prime pictures (30 positive and 30 negative) and 40 target words (20 positive nouns and 20 negative nouns) as experimental stimuli. These stimuli were used to create the experimental trials and were equal in both the low valence proportion and the high valence proportion condition. The prime pictures were selected on the basis of normative data collected by Spruyt et al. (2002). On a scale ranging from very negative (-5) to very positive (5), the mean affective ratings of the positive ($M = 2.23$, $SE = 0.10$) and negative prime pictures ($M = -2.87$, $SE = 0.20$) were significantly different, $t(58) = 22.61$, $p < .001$. The target words were taken from a list of Dutch words that were rated on a 7-point scale ranging from 0 (very negative) to 7 (very positive) (Hermans & De Houwer, 1994). The mean

affective rating for the positive targets ($M = 6.16$, $SE = 0.08$) was significantly higher than that for the negative targets ($M = 1.49$, $SE = 0.05$) and significantly different, $t(38) = 47.11$, $p < .001$.

The primes for the filler trials were taken from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 1999) and consisted of 20 neutral pictures ($M = 5.21$, $SE = 0.11$), 10 positive pictures ($M = 7.72$, $SE = 0.13$), and 10 negative pictures ($M = 2.73$, $SE = 0.09$). The mean affective rating of the neutral primes differed significantly from that of the positive, $t(28) = 13.79$, $p < .001$, and the negative primes, $t(28) = 14.67$, $p < .001$. Obviously, the mean affective ratings of the positive and negative primes were significantly different as well, $t(18) = 30.93$, $p < .001$.

The filler targets were taken from the word norms collected by Hermans and De Houwer (1994). These were 30 neutral nouns ($M = 4.10$, $SE = .03$), 15 positive nouns ($M = 6.1$, $SE = 0.09$), and 15 negative nouns ($M = 1.56$, $SE = 0.05$). The mean affective ratings of the neutral nouns differed significantly from both the positive and negative nouns, $t(43) = 24.26$, $p < .001$, and $t(43) = 44.13$, $p < .001$, respectively. The difference in mean affective ratings of the positive and negative targets was also reliable, $t(28) = 44.42$, $p < .001$. The filler trials in the low valence proportion condition were constructed using the neutral primes and targets. The affectively polarized stimuli were used to construct the filler trials in the high valence proportion condition.

All pictures were sized to a width of 512 pixels and a height of 384 pixels. Target words were presented in a white, Arial font with a height of 28 pixels. All stimuli were presented against the black background of a 19-inch computer monitor with a refresh rate of 100 Hz and a screen resolution of 1024×768 . The experiment was run using Affect 4.0 (Spruyt, Clarysse, Vansteenwegen, Baeyens, & Hermans, 2009). The responses were registered with an external voice key that was connected to the parallel port of the computer.

Procedure

Participants were randomly assigned either to the low valence proportion condition ($n = 54$) or the high valence proportion condition ($n = 52$). They were seated in front of the computer screen in a dimly-lit room. Instructions appeared on screen and were clarified by the experimenter when necessary. Participants were instructed to pronounce the target words as fast and as accurately as possible. They were informed that the prime pictures were irrelevant for the task. Participants in both conditions received the same set of experimental trials. In the low valence proportion condition experimental trials were embedded in a context of neutral filler trials. In the high valence proportion condition experimental trials were embedded in a context of affective filler trials.

For each participant, 40 experimental trials were created by randomly combining the experimental primes and targets with the restriction that each trial type (positive-positive, positive-negative, negative-positive, negative-negative) occurred equally often. Because there were more prime pictures than experimental trials, a subset of 40 pictures was randomly drawn for each participant. There was no stimulus repetition for the experimental trials.

Participants were presented with 120 additional filler trials. In the high valence proportion condition, these filler trials were composed of affective primes and targets that were randomly combined with the restriction that each trial type (positive-positive, positive-negative, negative-positive, negative-negative) occurred equally often. The filler trials in the low valence proportion condition consisted of neutral primes and targets that were combined in a purely random fashion. Because of the large number of filler trials, stimulus repetition was allowed for all filler trial types. The exact number of stimulus repetitions on the filler trials was not controlled for.

The experiment started with 12 practice trials, followed by 160 randomly intermixed experimental and filler trials. The practice trials were randomly selected from the complete set of filler trials.

Each trial started with a 500-ms presentation of a fixation cross in the center of the screen, followed by a 500-ms blank screen. The prime picture was presented for 200 ms and the target appeared after a stimulus onset asynchrony (SOA) of 250 ms. The target word was then presented until a response was detected or 2000 ms elapsed. Once the experimenter had coded the response, the next trial was initiated after an intertrial interval (ITI) that varied randomly between 500 ms and 1500 ms.

Results

Only the data of the experimental trials were analyzed. Because the error rates associated with the experimental trials were very low (0.12 %), we limited our analyses to the response latencies. Data from experimental trials on which an incorrect response was given (0.12 %) or trials on which the voice key was triggered incorrectly (4.08 %) were excluded from the analysis. The impact of outlying values was reduced by excluding all response latencies (0.40 %) that deviated more than 2.5 standard deviations from a participant's mean latency in a particular condition (see Ratcliff, 1993). The remaining data were submitted to a 2 (valence proportion: low vs. high) x 2 (prime valence: positive vs. negative) x 2 (target valence: positive vs. negative) repeated measures ANOVA. Mean response latencies are provided in Table 1.

The main effects of prime valence, $F(1, 104) = 12.46, p < .001, MSE = 346, f = 0.35$, and target valence, $F(1, 104) = 132.17, p < .001, MSE = 603, f = 1.13$, were both significant but did not interact, $F(1,104) < 1$. Targets preceded by positive primes were responded to more quickly than targets preceded by negative primes (mean difference of 6 ms; $SD = 19$ ms) and positive targets were responded to faster than negative targets (mean difference of 27

ms; $SD = 24$ ms). Importantly, the crucial three-way interaction between valence proportion, prime valence, and target valence was significant, $F(1, 104) = 5.72, p < .05, MSE = 316$, and had a reasonable effect size, $f = 0.23$. To further investigate the nature of this three-way interaction, two separate 2 (prime valence: positive vs. negative) \times 2 (target valence: positive vs. negative) repeated measures ANOVAs were conducted, one for each valence proportion condition. The interaction between prime valence and target valence was significant in the high valence proportion condition, $F(1, 51) = 4.21, p < .05, MSE = 335$. There was a 5 ms ($f = 0.29$) difference between affectively congruent and incongruent trials (for our effect size estimation procedure, see Rosenthal & Rosnow, 1991). In the low valence proportion condition, the interaction between prime valence and target valence did not reach significance, $F(1,53) < 1.7, p = .19, MSE = 297, f = 0.18$.

Note that, in the high valence proportion condition, both the main effect of prime valence and the main effect of target valence also reached significance. More specifically, positive target trials were responded to faster than negative target trials, $F(1,51) = 73.81, p < .001, MSE = 508, f = 0.44$, and positive prime trials were responded to faster than negative prime trials, $F(1,51) = 9.99, p < .01, MSE = 304, f = 1.20$. As a result, it is difficult to interpret affective priming effects for specific subsets of trials. For example, a comparison of positive and negative target trials within each level of prime valence would lead to an overestimation of the affective priming effect on positive prime trials and an underestimation on negative prime trials. Similarly, a comparison of positive and negative prime trials within each level of target valence would lead to an overestimation of the affective priming effect on positive target trials and an underestimation on negative target trials. In line with this reasoning, the difference between congruent and incongruent primes was statistically reliable on positive target trials $F(1,51) = 15.54, p < .001, MSE = 276, f = 0.55$. but not on negative target trials ($F < 1$, see Table 1). Likewise, a comparison between congruent and incongruent targets

revealed a highly significant affective priming effect for positive prime trials, $F(1,51) = 64.50, p < .001, MSE = 414, f = 1.12$, and even a significant contrast effect for negative prime trials, $F(1,51) = 28.40, p < .001, MSE = 429, f = 0.75$. It must be clear however that these contrasts are deflated/inflated by main effects of prime valence and target valence. For these reasons, we are reluctant to calculate affective priming effects for one category of prime valence or target valence (also, see Dijksterhuis & Aarts, 2003).

Discussion

According to the selective-attention framework of semantic priming put forward by Spruyt et al. (2009), the semantic analysis of task-irrelevant stimuli depends on the extent to which specific (semantic) stimulus dimensions are selectively attended to. In line with this framework, previous studies have shown that affective stimulus processing depends strongly on the extent to which attention is assigned to the affective stimulus dimension (e.g., Spruyt et al., 2007, 2009). In each of these studies, however, feature-specific attention allocation was manipulated in a salient manner via explicit instructions and task requirements. The merits and scope of the selective-attention framework put forward by Spruyt et al. (2009) would be severely limited if only such manipulations would have effect on automatic semantic stimulus processing. In the present study we examined whether affective priming in the naming tasks depends on the number of trials that consisted of affectively polarized stimulus materials (i.e., the valence proportion). In line with our expectations, we observed that the affective priming effect in the naming task was modulated by the valence proportion. As indicated by the significant three-way interaction between prime, target, and condition, affective priming was more pronounced in the high valence proportion condition than in the low valence proportion condition. This data pattern shows that procedurally subtle manipulations of feature-specific attention allocation can have a clear impact on automatic affective stimulus processing, and on automatic semantic stimulus processing in general.

Our findings shed new light on the mixed findings that have been obtained earlier with the naming task. In contrast to the many failures to observe affective priming of naming responses (e.g., Klauer & Musch, 2001; Spruyt et al., 2004), Spruyt et al. (2002) did observe robust effects when pictures instead of words were used as primes and targets. According to the selective-attention hypothesis, this effect results from the fact that the pictures used in affective priming research are typically very graphic and more extreme in their affective meaning than words. Pictures might therefore be more successful in inducing selective attention for affective stimulus information as do words. Our results support this hypothesis by showing that a subtle, non-instructional element of the procedure such as the valence proportion can influence affective priming effects. Of course, some published studies did show affective priming of naming responses despite the fact that neither pictures were used nor special measures were taken to draw attention to the valence of the stimuli (Bargh et al., 1996; Hermans et al., 1994). We can only speculate about the precise procedural factors that were responsible for these findings. Irrespectively, our results do show that subtle, non-instructional aspects of the procedure (such as the precise set of stimuli that is used) can influence the magnitude of the affective priming effect.

Our findings are also important for the discussion concerning the automaticity of affective stimulus processing. Given that the naming task does not require one to adopt an (explicit) evaluative processing mindset, it has been argued that finding affective priming of naming responses provides strong evidence for the hypothesis that automatic affective stimulus evaluation can take place in an unconditional fashion. The present data clearly show, however, that finding an affective priming effect in the naming task is still insufficient to warrant such a conclusion. Even so, it should be emphasized that our findings are not necessarily inconsistent with the generic idea that affective stimulus processing can proceed in an automatic fashion. In accordance with a decompositional view of automaticity (Moors &

De Houwer, 2006, see also Footnote 1), we merely contest the alleged unconditionality of automatic affective stimulus processing, not the idea that affective stimulus information can be processed in an automatic fashion under certain conditions per se.

Finally, we would like to point out that the present reasoning is valid only if one assumes that the magnitude of the affective priming effect is directly related to the extent of affective stimulus processing. In contrast, one might argue that the effect of feature-specific attention allocation on affective priming is situated at the level of the processes that translate affective processing into affective priming effects rather than at the level of affective processing itself (e.g., Gawronski, et al., 2008; Moors et al., 2010; Spruyt, Gast, & Moors, in press). More reliable claims could be made when different measures of affective stimulus processing provide similar outcomes despite the fact that different underlying mechanisms are at play. The fact that our results converge with those obtained by Duscherer et al. (2008) with the affective Simon task therefore suggests that the effect of feature-specific attention allocation is not paradigm-specific. Nevertheless, studies that confirm the impact of feature-specific attention allocation on other indices of automatic affective stimulus processing are needed to firmly substantiate our claims. Recently, our lab undertook such efforts (Everaert, Spruyt, & De Houwer, 2010) using the emotional Stroop paradigm (Pratto & John, 1991). Mirroring Spruyt et al. (2009), we presented participants with trials that were traditional emotional Stroop trials or trials that were aimed at inducing attention allocation to a specific stimulus feature. As expected, the emotional Stroop effect was stronger when participants selectively attended the affective stimulus dimension.

In summary, the present experiment demonstrated a clear impact of valence proportion on affective priming of naming responses. Affective priming was stronger when the proportion of affective stimuli was high compared to when this proportion was low. We attributed this result to differences in feature-specific attention allocation evoked by different

proportions of affective information. These findings underline the fact that the observation of affective priming effects in the naming task is insufficient to conclude that affective processing is unconditional.

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Preparation of this paper was supported by Grant BOF/GOA2006/001 and Methusalem Grant BOF09/01M00209 of Ghent University. Adriaan Spruyt is a Postdoctoral Fellow of the Flemish Research Foundation (FWO - Vlaanderen).

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Footnotes

¹ Following the guidelines of Moors and De Houwer (2006), we adhere to a feature-based, decompositional approach to the definition and diagnosis of automaticity. According to this viewpoint, different automaticity features can be conceptually and logically separated and should therefore be studied independently from each other. It thus makes little sense to classify a process as nonautomatic simply because it is found to depend on a particular (set of) precondition(s). Accordingly, the hypothesis that affective priming of naming responses depends on feature-specific attention allocation does not imply that affective processing is a nonautomatic processes.

Table 1
Mean Response Latencies for each Trial Type and Affective Priming Effects (in ms) as a Function of Condition (SDs between brackets).

Valence Proportion	Trial type				Congruency		APE
	(+,+)	(+,-)	(-,+)	(-,-)	Congruent	Incongruent	
Low	475 (49)	500 (57)	477 (52)	508 (56)	492 (50)	489 (51)	-3 (17)
High	464 (48)	496 (59)	477 (46)	499 (54)	482 (49)	487 (51)	5* (18)

Note. APE = affective priming effect; (+,+) = positive prime, positive target; (+,-) = positive prime, negative target; (-,+) = negative prime, positive target; (-,-) = negative prime, negative target.

* $p < .05$, two-tailed.

Appendix

 Stimuli in the experimental list

Positive prime pictures: balloons; a rose; a teddy bear; a butterfly; a smiling woman; a waterfall; a sunset; a kitten; a bride; a present; a father with baby; a naked couple hugging; a nude female swimmer; a tropical coast; two smiling people making the peace sign; a couple; newlyweds; a dolphin; a squirrel; a baby; a candle; an air balloon; a Christmas tree; smiling man; white clouds; a rainbow; a pretty woman; a smiling baby; a strawberry; an orange.

Negative prime pictures: barb wire; an inflamed breast; an angry man; gun pointed at the camera; a bloody dead calf; a knife held against a female neck; a gun pointed at a woman; a man running with an injured child in his arms; trash; a car crash; a crying African child; a starved woman; maggots; an explosion; a gasmask; an injured man; a white shark; a spider; a dog with exposed teeth; a dead dog in a slaughterhouse; an injection; a floating corpse; injured lips; a wounded man; a crying man; a snake; a gun; skulls; a baby with a tumor; a house on fire.

Positive target words: LIEFDE (love); VRIEND (friend); VAKANTIE (vacation); VREDE (peace); TROUW (loyal); ROMANTIEK (romance); MUZIEK (Music); THUIS (home); HUMOR (comedy); LEVEN (life); WARMTE (warmth); FEEST (party); DROOM (dream); GEZONDHEID (health); APPLAUS (applause); TROTS (pride); SCHOONHEID (beauty); LACH (smile); ZOMER (summer); KNUFFEL (hug).

Negative target words: MOORD (murder); VERKRACHTING (rape); INCEST (incest); STANK (stench); AIDS (aids); MARTELING (torture); TUMOR (tumor); HAAT (hate); ONGELUK (accident); ALCOHOLISME (alcoholism); PEDOFIEL (pedophile); SLACHTING (slaughter); COMA (coma); HEL (hell); INFECTIE (infection); WERKLOOSHEID (unemployment); SADIST (sadist); BRAAKSEL (vomit); TIRAN (tyrant); VERSTIKKING (suffocation).

 Stimuli in the valent context list

Positive prime pictures (IAPS numbers): 1440; 1463; 1604; 1750; 1920; 2070; 2311; 2550; 5831; 7430.

Negative prime pictures (IAPS numbers): 2276; 2750; 3300; 9000; 9001; 9041; 9220; 9280; 9290; 9561.

Positive target words: KUS (kiss); OMHELZING (embrace); ZON (sun); BLOEMEN (flowers); LENTE (spring); GESCHENK (gift); VERRASSING (surprise); CADEAU (present); BRUID (bride); BLOESEM (blossom); VLINDER (butterfly); WENS (wish); HEMEL (heaven); BOEKET (bouquet); MELODIE (melody).

Negative target words: OORLOG (war); EXECUTIE (execution); BOMMEN (bombs); KANKER (cancer); GEZWEL (swelling); MISDAAD (crime); GEWEREN (rifles); KOGEL (bullets); DRUGS (drugs); ZIEKTE (disease); GANGSTER (gangster); GIJZELAAR (hostage); BEDREIGING (threat); VIRUS (virus); LIJK (corpse).

 Stimuli in the neutral context list

Neutral prime pictures (IAPS numbers): 2214; 2280; 2575; 5395; 5455; 5535; 6150; 7095; 7096; 7130; 7186; 7190; 7207; 7211; 7495; 7550; 7560; 7620; 7820; 7830.

Neutral target words: DOOS (box); PAPIER (paper); DISCO (disco); BORD (plate); TAS (cup); STOEP (pavement); STREEP (line); VIERKANT (square); ACCENT (accent); BOOG (bow); GIST (yeast); TROMPET (trumpet); VERGELIJK (agreement); LIJN (line); POOL (pole); PARADE (parade); SCHAAR (scissors); TAND (tooth); AGENTSCHAP (agency);

TRAPEZIUM (trapezium); KAPPER (hairdresser); TAPIJT (carpet); MAGAZINE (magazine); KRANT (newspaper); HOED (hat); STOEL (chair); BALPEN (ball pen); MAND (basket); TAFEL (table); CIRKEL (circle).