

Is positivity a cue or a response option? Warm glow vs evaluative matching in the familiarity for attractive and not-so-attractive faces[☆]

O. Corneille^{a,*}, B. Monin^b, G. Pleyers^a

^a *Catholic University of Louvain, Louvain-la-Neuve, Belgium*

^b *Department of Psychology, Stanford University, USA*

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Abstract

Monin (2003) showed that the attractiveness of a face increases its perceived familiarity regardless of prior exposure, and suggested that this beautiful-is-familiar effect was due to the misattribution to familiarity of the positive affect (or “warm glow”) elicited by attractive faces. This research tests the alternative interpretation that an evaluative match between a positive stimulus (an attractive face) and a positive response (“familiar”) accounts for this effect in the absence of any misattribution. In a face recognition task, participants were led to signal their sense of familiarity with previously seen and unseen faces by selecting either a pleasant (affectively congruent) or unpleasant (affectively incongruent) image. Consistent with the warm glow heuristic, higher false alarm rates were obtained for more attractive distracters, and this effect survived (and was, if anything, stronger) when an affectively incongruent response format was used. These findings are discussed in the context of current face memory and perceptual fluency models. © 2004 Elsevier Inc. All rights reserved.

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It has long been noted that recognition entails an attributional process. According to this memory-attribution framework (e.g., Jacoby & Dallas, 1981; Jacoby & Kelley, 1987; Johnston, Dark, & Jacoby, 1985; Whittlesea & Williams, 2000, 2001), recognition is often a decision-making process in which people have to decide whether a stimulus feels familiar in the absence of objective criteria for discriminating true and false recognition. Importantly, Jacoby and Dallas (1981) noted that a *fluency heuristic* may guide familiarity decisions under conditions of uncertainty: Stimuli that are processed more

fluently may evoke more of a sense of familiarity and be judged accordingly.

Recently, Monin (2003) examined an intriguing consequence of this general principle in the context of face memory. The author suggested that attractive faces (and positive stimuli in general) elicit positive affect (dubbed “warm glow” in tribute to Titchener, 1910), which may be mistaken for familiarity. In something akin to a mirror image of the mere exposure effect (Zajonc, 1968), instead of familiar stimuli seeming more pleasant, pleasant stimuli would seem more familiar. Monin (2003; see also Monin & Oppenheimer, 2004) presented the results of five studies supporting this view. In three studies, the more attractive faces appeared to participants, the more familiar they seemed, even when their inherent prototypicality was controlled for. In one study, a similar effect was obtained for positively valenced words. In a final study, the heuristic nature of the

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* Corresponding author. National Fund for Scientific Research, Brussels, Belgium.

E-mail address: olivier.corneille@psp.ucl.ac.be (O. Corneille).

phenomenon was supported by the fact that the beautiful-is-familiar effect was strongest under poor encoding and retrieval conditions. Converging evidence was obtained by Baudoin, Gilibert, Sansone, and Tiberghien (2000) who reported stronger feeling of familiarity toward smiling faces under some conditions, and by Garcia-Marques, Mackie, Claypool, and Garcia-Marques (2004; see also Garcia-Marques & Mackie, 2000) who showed for example that preceding words with positive primes increases their likelihood of being called “old” by participants.

Whereas an increasing amount of data suggests that stimulus familiarity increases with stimulus positivity, the possibility remains that this relationship was obtained in large part because of a halo effect (see in particular the “Beautiful-is-Good” effect, by Dion, Berscheid, & Walster, 1972) and, more generally, because of an evaluative matching effect. According to the latter interpretation, participants may have been more prone to associate positively valenced stimuli (i.e., attractive faces, positive words) with positive responses (e.g., “familiar,” “known”) than with negative responses (e.g., “unfamiliar,” “unknown”). Conversely, participants may have been more prone to associate negatively valenced stimuli (i.e., unattractive faces, negative words) with negative responses (e.g., “unfamiliar,” “unknown”) than positive responses (e.g., “familiar,” “known”). This evaluative matching hypothesis would suggest that the positive association obtained between face attractiveness and face familiarity may be considered as a special case of people’s readiness to generate decisions that are congruent in valence (see Musch & Klauer, 2003, for numerous illustrations of this principle), which would have little to do with perceptual fluency or metacognitive processes.

Admittedly, past research has provided evidence for a warm glow effect in studies where participants were asked to rely on “old” vs “new” judgments instead of judgments of familiarity and unfamiliarity (e.g., Garcia-Marques et al., 2004; Monin, 2003). If one assumes that “old” is a negatively valenced response option and that “new” is a positively valenced response option, then the argument could be made that past work has provided cases of affective-incongruity in the response format. The argument is not clear-cut though, as one may reasonably argue that there are cases where “old” is good (e.g., old friends) and “new” is bad (e.g., new shoes). In any case, because past studies have not experimentally manipulated congruent vs incongruent response options, the question remains largely open and empirical.

In the present research, we thus sought to provide a more compelling experimental test for the independent contribution of a warm glow heuristic in the production of a beautiful-is-familiar effect in face memory. This test was conducted by manipulating the affective congruency

of the response format at the recognition stage. As in Monin (2003, Experiment 2), our task involved discriminating between target and distracter faces that varied in attractiveness. For each face presentation, participants in the *affectively congruent* condition had to select a positively valenced picture (a butterfly) when they thought the face had been presented to them before, and to select a negatively valenced picture (a rat) otherwise. Instructions were reversed in the *affectively incongruent* condition. This time, participants had to select a negatively valenced picture (a rat) when they thought the face had been presented to them before, and to select a positively valenced picture (a butterfly) otherwise.

This manipulation of the response format allowed us to provide a straightforward test for the independent contribution of the warm glow heuristic over and above evaluative matching. Assuming that evaluative matching underlies the impact of face attractiveness on familiarity, this effect should disappear when participants are forced to communicate a familiarity response via a negative format. Specifically, the evaluative matching hypothesis would predict that attractive faces would lead to more familiarity responses when familiarity is communicated via a positive response (i.e., in the affectively congruent condition, where the picture of a butterfly signals familiarity), but no effect (or even a reversal of effect) when familiarity is signaled via a negative response (i.e., in the affectively incongruent condition, where the picture of a rat signals familiarity). The warm glow heuristic, however, would predict that the beautiful-is-familiar effect should still be observed in an affectively incongruent response format.

Interestingly, whereas the evaluative matching hypothesis predicts that attractiveness should relate positively to familiarity in the affectively congruent but not in the affectively incongruent condition, the opposite prediction may, if anything, be derived from the affect-as-information framework (see also Bless & Forgas, 2000). This is because participants may feel relatively more confused about the true source of their positive feelings toward an attractive face in affectively congruent conditions (e.g., “Do I feel good about that attractive face because of the face *or* because of the lovely picture of the butterfly I am about to select to signal familiarity with that face?”) than in affectively incongruent conditions (e.g., “I feel positive about this attractive face *despite* the picture of the rat I am about to select to signal familiarity with this face; so, I must feel quite positive about this face”). Interestingly too, the present analysis seems also consistent with Whittlesea and Williams’ (2000, 2001) expectation-discrepancy hypothesis according to which familiarity depends on how fluent a stimulus is expected to be, which in turn depends on the context: Keeping constant the ‘objective’ fluency of a stimulus, the less fluent this stimulus is expected to be, the more the stimulus will evoke a sense of

familiarity (for a related argument, see also Winkielman, Schwarz, Fazendeiro, & Reber, 2003).

In sum, the present study aimed at providing a test for the independent contribution of the warm glow heuristic in the beautiful-is-familiar effect. If the effect were merely due to participants' readiness to communicate affectively congruent decisions, then attractiveness should relate positively to familiarity in the affectively congruent condition but not in the affectively incongruent condition. In contrast, the warm glow hypothesis would predict the beautiful-is-familiar effect to survive incongruence in the response format. Finally, the memory-attribution framework may even predict the beautiful-is-familiar effect to be weaker in the affectively congruent condition, which makes participants relatively more uncertain regarding the true source of their feelings toward a face. Our main hypothesis for this study, however, was that the beautiful-is-familiar effect would survive evaluative incongruence in the response format, therefore providing original support for the independent contribution of a warm glow (i.e., beautiful-is-familiar) heuristic in this effect.

Method

Participants

Sixty-three undergraduate students at the Catholic University of Louvain (21 males, 42 females) took part in the main part of the experiment in the context of a course requirement. Another 48 students rated the pictures prior to the experiment on a voluntary basis. The experimental sessions were run in a computer room and involved six to eight participants at a time.

Materials

We first pretested an entirely new set of pictures for the present study. This decision was aimed at generalizing the findings reported by Monin (2003) to new materials. Additional efforts were also made to standardize the pictures compared with the original study by Monin (2003) in which the backgrounds and presentation formats varied across pictures, possibly leading to confounds between face and picture effects. We downloaded portraits of 80 young adults (half males, half females) from a casting database website [<http://www.interfaces.nl/>]. These pictures were black and white with a neutral grayish background. They were cropped to a same size and they all appeared in a head and shoulder format with frontal views of the faces and three-quarter views of the shoulders. Adobe-Photoshop was used to equalize the pictures regarding the shoulders orientation, with the right shoulder always appearing on the foreground.

Forty-eight students at the Catholic University of Louvain agreed to provide initial ratings on a voluntary basis. They were asked to rate the attractiveness of the 80 portraits, displayed in one of two random orders on eight sheets of paper (10 on each page) with a Likert scale underneath each of them. Participants were asked to report on the scales how attractive they considered each picture to be (from 1 = Not very attractive to 9 = Very attractive). We insisted that the ratings should be relative and that the whole range of the scales should be used. These ratings allowed us to come up with two sets of 40 pictures (half males, half females) that were equalized on mean attractiveness (set 1: $M = 4.98$, $SD = 1.30$; set 2: $M = 4.98$, $SD = 1.36$), $t(78) = .01$, ns. Faces from set 1 and set 2 were used half of the time as targets and half of the time as distracters in the study.

Procedure

As the participants entered the computer room, they were greeted by the experimenter and seated in front of a computer. They were told that the study would be run on the computers, and that the instructions would be delivered on the computer screens, so that they could pace themselves through the task. The first task consisted in the incidental learning of 40 target faces and required participants to categorize as fast as possible these faces as either 'male' or 'female.' When done with this categorization task, participants were asked to complete a questionnaire that was lying upside down on the right of their keyboard. The content of this questionnaire was unrelated to the purpose of the study. The questionnaire involved no visual materials and served as a filler task. Its completion took approximately 10 min. Once the questionnaire was completed, participants were asked to wait quietly until they received more instructions, which were communicated on the computer screen once all participants in the session had completed the questionnaire.

At this point, participants received the instructions for the unexpected recognition task. They were told that they would be presented with 80 pictures, which they would have to identify as familiar or unfamiliar. They were told that they would have to consider a face as familiar if they thought this face had been presented to them earlier in the experiment (i.e., in the gender categorization task) and to categorize it as unfamiliar if they thought otherwise. As in Monin (2003), we instructed participants that half of the faces had been presented in the gender categorization task, and we encouraged participants to rely on their sense of familiarity with a face if unsure about their recognition.

Participants were further instructed that they would have to communicate their responses by selecting the picture of a rat or the picture of a butterfly that would appear on the top of the screen. In the Affectively congruent condition, participants were asked to select the

picture of a butterfly to signal a familiarity response and to select the picture of a rat to signal an unfamiliarity response. These instructions were reversed in the Affectively incongruent condition. The picture of the rat and that of the butterfly were selected from the International Affective Picture System (Lang, Greenwald, Bradley, & Hamm, 1993), and were equated on valence intensity (i.e., the rat was as negative as the butterfly was positive) and emotional intensity.

On each identification trial, participants were either presented with a target face or a distracter face that appeared for 2 s on the center of the screen. Then, the pictures of the rat and of the butterfly appeared at the top of the screen. For both the target and distracter presentations, the rat and the butterfly appeared half of the time on the left and half of the time on the right of the screen. Participants had to communicate their answer by hitting the V key (on an Azerty keyboard) to select the picture on the left of the screen and the N key to select the picture on the right of the. Once a response was entered, the three pictures (i.e., the face, the rat, and the butterfly) were removed from the screen and a blank screen appeared for 1 s, directly followed by a new trial.

Participants were reminded of the instructions (i.e., which picture should be selected to signal familiarity or unfamiliarity, and how to select the left or right picture) at the bottom of each identification screen. This reminder, in conjunction with the manipulation of the response format as a between-participants factor, made it hardly likely that participants would get confused in the instructions and key uses. The only variation concerned the location of the rat and butterfly pictures that had to be selected either at the left or the right of the screen. The presentation order of the pictures was randomized across participants. Participants were thanked for their participation at the end of the session, and they were fully debriefed in the context of a collective session.

Results

Analysis by picture. We started by collapsing across subjects within conditions, using picture as the unit of

analysis. Each data point corresponded to the average attractiveness rating for that picture and the proportion who called that picture “old” in one of the four conditions created by crossing old–new status and congruence. This yielded 320 data points ($80 \times 2 \times 2$), which we used to perform a linear regression analysis to predict the probability that a face was called ‘old’ with attractiveness (standardized), old–new status (+1/–1), congruence (+1/–1), and the four corresponding interaction terms. Table 1 presents the results of this analysis, which explained 49% of the variance, $F(7, 312) = 43.3$, $p < .001$. Old–new status was the only main effect to be significant ($b = .15$, $p < .001$), and reflects the predictable fact that people are more likely to call an actual old face ‘old’ than a new face. This was qualified, however, by an interaction with congruence ($b = .02$, $p < .05$), reflecting the fact that, all other things being equal, old and new faces were better differentiated in the congruent condition (57% vs 23%) than in the incongruent condition (51% vs 25%). Attractiveness had no direct impact on the proportion of participant calling a face “old” ($b = .01$, ns), but it did interact with old–new status ($b = -.02$, $p < .05$). This reflects the fact that collapsing across conditions, the link between attractiveness and calling a face “old” was higher for new faces ($r = .19$, $p < .05$) than it was for old faces ($r = -.03$, ns). Table 2 presents these correlations. No other coefficient was significant. In particular, the coefficient capturing the three-way interaction was not different from zero, $t(312) = .01$, ns, and the R^2 stays at .49 when that predictor is dropped.

Analysis by participant. The analysis by picture is straightforward but does not control for the fact that each picture yields four data points. In a second pass, we re-analyzed the data by computing for each participant a logistic regression equation predicting whether,

Table 2
Correlations between average attractiveness and proportion of participants calling the face ‘old,’ by condition

| | Congruence | Incongruence | Overall |
|--------------------|------------|--------------|---------|
| Old (hits) | -.09 | .03 | -.03 |
| New (false alarms) | .14 | .23* | .19* |

* r s are significant at $p < .05$.

Table 1
Regression equation predicting the proportion of participants who called a face ‘old’

| | b | SE | β | $t(312)$ | Sig. |
|-----------------------|-------|------|---------|----------|------------|
| Constant | 0.39 | 0.01 | | 43.7 | $p < .001$ |
| Old–new (O) | 0.15 | 0.01 | 0.69 | 17.0 | $p < .001$ |
| Attractiveness (A) | 0.01 | 0.01 | 0.06 | 1.4 | ns |
| Congruence (C) | 0.01 | 0.01 | 0.04 | 1.0 | ns |
| $A \times O$ | –0.02 | 0.01 | –0.08 | –2.0 | $p < .05$ |
| $A \times C$ | –0.01 | 0.01 | –0.04 | –1.1 | ns |
| $O \times C$ | 0.02 | 0.01 | 0.10 | 2.5 | $p < .05$ |
| $A \times O \times C$ | 0.00 | 0.01 | 0.00 | 0.0 | ns |

$R^2 = .49$, adjusted $R^2 = .48$.

Table 3
Mean logistic regression coefficients predicting the likelihood that a participant call a picture 'old'

| | <i>n</i> | Old–new | | Attractiveness | | Interaction | | Constant | |
|--------------|----------|----------|-----------|----------------|-----------|-------------|-----------|----------|-----------|
| | | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> |
| Congruence | 33 | 1.44** | (2.26) | .02 | (.27) | –.11** | (.22) | –1.17* | (2.64) |
| Incongruence | 30 | .65** | (.37) | .15* | (.29) | –.13* | (.30) | –.61** | (.51) |
| Overall | 63 | 1.1** | (1.69) | .08* | (.29) | –.12** | (.26) | –.91** | (1.95) |

* $p < .05$; ** $p < .01$; means without stars are not significantly different from zero.

for that participant, a picture would be called 'old' based on its old–new status $[-1/+1]$, its standardized attractiveness, and an interaction term composed of the product of the two previous predictors. Analyses by participant could then be conducted on these coefficients (Monin, 2003, Study 5). Table 3 shows that on average the coefficient for attractiveness is significantly greater than zero, although, if anything, it seems marginally higher in incongruence (average $b = .15$, $p < .05$) than in congruence (average $b = .02$, ns), $t(61) = 1.8$, $p < .08$. As one would expect, the coefficient for old–new is also significantly different from zero (whether the face is actually old or new impacts its likelihood of being called "old"), and this is now true in both conditions, although it is marginally higher in the congruence condition (average $b = 1.44$, $p < .01$) than in the incongruence condition (average $b = .65$, $p < .01$), $t(61) = 1.9$, $p < .07$. The average interaction term did not differ by condition, being significant and negative in the congruence (average $b = -.11$, $p < .01$) as well as the incongruence condition (average $b = -.13$, $p < .05$), $t(61) < 1$, ns. Given our dummy coding, this negative interaction term indicates that attractiveness increased familiarity more toward novel than previously-seen faces.

General discussion

The main goal of the present note was to provide a stronger demonstration for the independent contribution of the warm glow heuristic in the beautiful-is-familiar effect. The findings support the reality of this contribution. First, we replicated the beautiful-is-familiar effect: Overall, attractive faces were more likely to be identified as familiar by participants. Second, this effect subsisted even when the response format was incongruent with the predicted response, making it harder to argue that the original effect was an artifact of evaluative matching between stimuli and response format. Third, and consistent with both the affect-as-information and expectation-discrepancy hypothesis, our data suggest that the effect may actually be even stronger in the incongruent format. This pattern of results supports the view that warm glow effects operate above and beyond mere evaluative matching.

Does the beautiful-is-familiar effect only occur with new faces?

In the current study, the beautiful-is-familiar effect was obtained mostly with new, distracter faces (false alarms), whereas attractiveness did not seem to increase recognition of old, target faces (hits). In the analysis by picture, we observed a significant interaction between old–new status and attractiveness, reflecting that there was a positive correlation between false alarm rate and attractiveness ($r = .19$ overall, $p < .05$), whether it was not significant for hit rate ($r = -.03$ overall, ns). This surfaced also as a consistently significant coefficient for the interaction term in the logistic regression analysis (average $b = -.11$ and $-.13$, both $p < .05$). This finding seems consistent with the general notion that heuristics are most likely to be relied upon when no memory trace exists for the face to be judged and participants' judgment is therefore necessarily inferential (see also Kleider & Goldinger, 2004). It also seems consistent with the idea that attractive faces, because they are less distinctive (e.g., Langlois & Roggman, 1990; Langlois, Roggman, & Musselman, 1994; Rhodes & Tremewan, 1996; Rhodes, Jeffery, Watson, Clifford, & Nakayama, 2003) may suffer from poorer encoding and recognition (e.g., Light, Kayra-Stuart, & Hollander, 1979; Mueller, Heesacker, & Ross, 1984; Vokey & Read, 1992). In other words, attractive faces, because they are less distinctive, may be more poorly encoded, and this may decrease recognition (familiarity decisions) for previously-seen attractive faces relative to previously-seen unattractive ones.

Whether a beautiful-is-familiar effect is obtained on target faces should thus mostly depend on the quality of encoding of these faces and of the strength of the memory trace for these faces. Monin (2003, Study 5) showed that attractiveness increased both hit and false alarm rates when encoding was shallow (e.g., no warning, long delay), but that it only increased false alarms when respondents could rely on their memory to recognize the old stimuli (e.g., warning, no delay). The current procedure was modeled after Monin (2003, Study 2), where attractiveness increased both hits and false alarms. It is thus unclear why no effect was obtained for hits in the present study, and suggests that encoding for the targets in the present study was better than it was in Monin's study. One possibility is that the pictures

were larger, better standardized in their format and presentation, and were of higher quality—digitized pictures on a computer screen vs photocopies of yearbook pictures in the original study. Another (additive) possibility is that the shorter distraction task (approximately 10 min vs 25 min in Monin, 2003) reduced the decay of the memory traces for target faces in the current study. At any rate, the pattern of data lines up nicely with the data in Monin's Study 5 when recollection was made easy, even though in the current study half the participants were using an incongruent response format.

The detrimental impact of an affectively incongruent response format

Another insight from the present study relates to the detrimental impact of the affectively incongruent response format on the accuracy for face memory. This was reflected in the interaction between congruence and old–new when predicting the proportion of participants who called a face 'old' (see Table 1), and in the marginal difference in average logistic regression coefficients for old–new status between congruence and incongruence (whereas the interaction term with attractiveness is basically identical—see Table 3). There are two possible accounts for the latter finding. The first account would suggest that participants were more likely to hit a wrong key in the affectively incongruent than in the affectively congruent condition. This key misuse account seems hardly likely as participants had to refer to a single and same instruction throughout the 80 trials, and were reminded of that unique instruction on each of these 80 trials. Another, possibly more interesting account of the results would suggest that accuracy in face memory decreases under conditions of affective incongruence. Incongruence in the response format would potentially decrease both correct identifications and correct rejections. Follow-up studies are needed to address the strength and generalizability of this incongruence effect on memory. A control condition would also be needed to examine whether accuracy in face memory decreases when affective congruence is weakened and/or if it is improved when affective congruence is enhanced in the response format. Both effects may have substantial implications in the context of eyewitness testimonies.

Conclusion

The present study provides additional support for the connection between the affective reaction to a social stimulus (I like this face) and an inference about the state of the world (I have seen this face before). At the same time, this study raises an issue that investigators will often have to deal with in this context, that of

evaluative matching. Fortunately, our results enable to rule it out as an alternative interpretation in the case of the beautiful-is-familiar effect. We propose that the simple procedure presented here (i.e., the introduction of incongruence) could be used by many researchers to rule out this possibility.

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