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Comments on “Fearful and Sexual Pictures Not Consciously Seen Modulate the Startle Reflex in Human Beings”, by Ruiz-Padial and Vila, Online on the Biological Psychiatry web site

Christian Grillon and Brian Cornwell

NIMH

In a recent article entitled *Fearful and Sexual Pictures Not Consciously Seen Modulate the Startle Reflex in Human Beings*, Ruiz-Padial and Vila claim that the startle response can be potentiated by masked negative pictures (spiders/snakes) that are nonconsciously processed. We believe that this claim is not supported by the data and that the study is seriously flawed for two primary reasons.

First, evidence that masked stimuli were not consciously perceived came exclusively from a post-test questionnaire in which participants viewed 12 pictures (4 household objects, 4 flowers, 4 spiders), with 2 test pictures (a specific flower and a specific spider) that were previously presented masked to one group of subjects and unmasked to another group. Subjects chose which picture they had seen and, in Experiment 2, also indicated their confidence. Subjects reliably recognized the pictures when they were previously presented unmasked. In the masked condition, 6 subjects (25%) correctly identified one or both pictures. The other 75% did not recognize the pictures, which was interpreted as lack of awareness of the pictures when startle was elicited. We do not dispute the claim that the specific masked pictures were not recognized by those subjects, but we do not believe that the recognition test is relevant to the interpretation of the potentiation of startle by the masked spiders. This is too stringent a test and could significantly underestimate the number of aware subjects (Lovibond and Shanks 2002). It is quite possible that subjects perceived *a* flower and *a* spider, eliciting the appropriate affective state to modulate startle, even though they could not later identify *the* specific exemplars previously presented among 3 within-category exemplars. The recognition task, in short, far from establishes that masking prevented all *affective* qualities from reaching awareness.

Second, the startle data are extremely puzzling. In Experiment 1, there were only 2 startle data points, one per stimulus condition. This raises significant concerns to researchers who routinely use this technique. One predominant force consistently acting on startle responses is habituation, which manifests itself as a significant reduction in startle responses over time. The trial order was properly counterbalanced across participants to control for habituation. Nevertheless, it is apparent in Experiment 1 that something strange happened. The effect of stimulus type (the spider > the flower) was significant ($F(1,38)=4.19, p<.04$) across all subjects. Surprisingly, it appears to grow substantially ($F(1,19)=18.29, p<.001$, no effect sizes presented) for those subjects shown the flower first and the spider second, implying that startle responses increased substantially over time, contrary to the powerful effects of habituation. Because the other half of the data is not presented, we can only assume that there was no effect in the spider-then-flower group, violating our expectation that fear and habituation would combine to yield

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the greatest effect for the spider-then-flower group rather than flower-then-spider group. There appears to be a serious flaw in the methods, possibly due to *insufficient* startle trials, which undermines the findings of Experiment 1. Despite the effect of stimulus type irrespective of trial order, conclusions regarding the role of awareness are restricted to analyses based only on subjects receiving the flower-then-spider order. Experiment 2's results raise similar concerns given the few trials used for block 1 (1 per condition) and block 2 (2-4 per condition) and the complexity in controlling for habituation with >2 conditions.

In summary, Ruiz-Padial and Vila fail to convincingly demonstrate that fearful pictures can modulate startle responses outside conscious awareness. Not only did their recognition test fail to completely assess relevant aspects of awareness, but they also studied fear-potentiated startle with an inappropriate method.

References

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