



The Impact of Choice on the Affective Startle Modulation: Evidence for Decreased Defensive Response

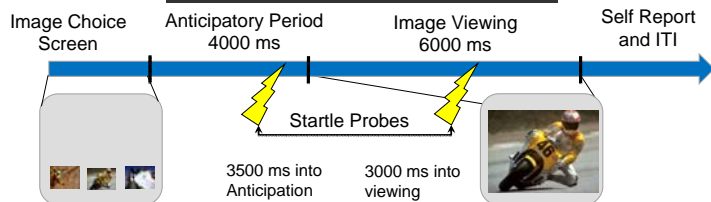
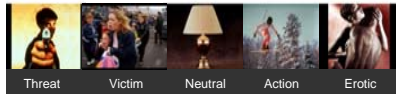
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Introduction

- Research on the affective startle modulation (ASM) has almost entirely utilized a 'passive' viewing paradigm, in which emotion-eliciting stimuli are randomly chosen for participants.¹⁻⁵ This is the case for ASM designs with & without an anticipatory period.
- Lacking choice or agency over an affective experience is directly in contrast to daily life where much of emotion experience involves some active choice over options. Since the affective startle modulation has been crucial to both basic and applied research we investigated how choosing an emotional stimulus might influence motivational activation. We hypothesized that the lack of choice may be one reason a linear pattern is not observed during anticipatory periods of ASM studies.³⁻⁴
- The current study introduced a 'choice' condition – defined as the ability to choose between potential stimuli – and included an anticipatory period in an effort to differentiate between active and passive states of anticipation and viewing.
- Our primary hypothesis was that in contrast to previous research, choice would create a linear pattern of startle modulation in anticipation of (chosen) images – i.e., motivational activation would occur in anticipation of chosen images and not in those with no-choice.

Methods

- 84 undergraduate students (68 female, mean age 25.35, SD 8.99) were randomly assigned to either a Choice (N=44) or (N=40) No-choice condition.
- All participants viewed three content-matched thumbnail sized images, followed by a 3500ms anticipatory period, and then a 6000ms full screen version of one of the 3 images. Choice condition participants selected one of the three and were subsequently shown that image. No-choice condition participants had one of the three images randomly chosen for them. Image contents were chosen based on previous research.^{1,5}
- EMG measurements of blink magnitudes were recorded for reactions elicited by 50ms 105 dB startle probes during either anticipation or viewing.
- Startle measurement and scoring was in line with current guidelines.⁶



Results

- Self-report findings indicated a main effect of arousal ($F(5,415)=118.82, p < .001$) and valence ($F(5,415) = 344.49, p < .001$) as expected. Analyses of main effects of Choice vs No-choice found no differences for arousal ($F(1,82) = .318, n.s.$), and an effect for valence ($F(1,82) = 7.40; p < .01$). See Figure 1.
- As expected there was a significant (linear) effect of startle magnitude during picture viewing ($F(4,44) = 3.60 p < .01$), $F(4,40) = 4.54, p < .01$) and an unexpected significant linear effect during anticipation for *both* groups ($F(4,44) = 5.38 p < .001$), $F(4,40) = 2.48, p < .05$). See Figure 2.
- In addition, there was an unexpected significant omnibus attenuation of startle magnitude in Choice condition compared to No-choice ($F(1,82) = 7.85, p < .01$).

Figure 1. Mean Self Report of Arousal and Valence by Choice. Both groups reported a main effect of arousal and valence as expected. There was no main effect of group for arousal, but a main effect of group for valence (The Choice group reported higher valence for threat and neutral images compared to No-choice condition).

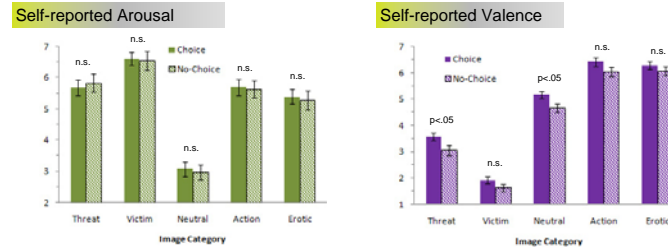
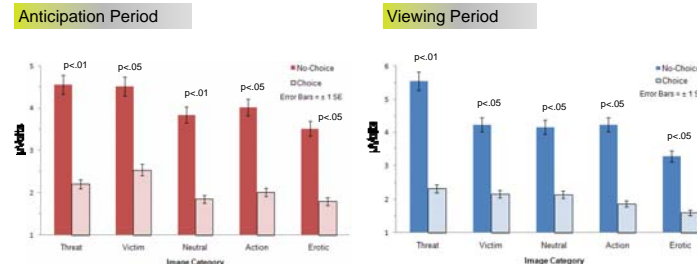


Figure 2. Mean Startle Magnitudes Separated by Choice & No-Choice Conditions During Anticipation and Image Viewing Periods. 1) Main effect of content (Threat>Erotic) for both anticipation and viewing periods. 2) Main effect of group (No-choice>Choice) at every comparison point.



Discussion

- In contrast to previous research and our primary hypothesis, a linear pattern of the startle response was found in anticipation for *both* choice and no choice, indicating that the thumbnails likely activated approach-avoidance.
- Thus, the period of 'anticipation' presented here likely includes a post-viewing component.
- The overall effect of choice was unexpectedly seen in the attenuation of the startle response at every time point and with every content.
- The minimal self-report differences underscore that the effect of the dampened startle response was likely due to the effect of choice and not on the images themselves.
- One interpretation of these findings is that having choice, agency, or control over an affective experience may decrease vigilance.
- These findings may be especially important to psychopathology research where control or vigilance is a central factor – such as in anxiety or depressive disorders.
- Future research will need to confirm these results either using a within-subjects design, or making sure the two groups are viewing identical images.

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