

Critical Appraisal for “Neural correlates of fear appeal in advertising: An fMRI analysis”

The sample size is chosen cleverly since they've more than what's required to achieve 80% statistical power. The use of a 2x2 factorial design is good, but on top of it adding a within-person variable using a parametric design that would indicate the strength of the fear advertisement (if it's extremely fearful or not) could've helped us to better know the level of fear in print ads since they've indicated that in general, low fear is not complied with, extreme fear also results in minimal persuasion, and a moderate fear is required to motivate people towards a state. It is indicated that during stimulus presentation participants watch passively but that can be more powerful with an event design (with a non-predictive or mixed presentation of fear and non-fear stimuli) rather than the one they've designed, blocked with alternative fear and non-fear, if the emphasis is on complying with the surprise hypothesis since in block design the fact that “next event is a fear” is predictable and mind will prepare for it and hence there will be fewer activations when the fear stimulus would be presented. Duration for stimuli of 1.5s and rest for 0.25s is better than a typical block design of 16-20s of stimulus presentation since more time can invoke memory recalls and attention in vision related areas for related mental imagery to the stimulus, e.g. a person after seeing the first image starts imaging the rest of the story related to it, hence a faster stimuli representation would prevent that. This is also facilitated by their use of 10 years old printed ads, hence there is the least chance that these ads were pre-known. A magnetic field of 3T is ideal as is used in most fMRI setups. Although voxel sizes of 2x2x2mm and 3x3x5mm can also be used but since there is a trade-off between temporal and spatial resolutions, the former one would compromise with temporal resolution or accuracy of BOLD signals, the latter one would compromise with spatial resolution and may even yield unnecessary artifacts, also the latter one is non-isotropic, while isotropic ones are less prone to subsample a voxel from between along any axis, hence the use of 3x3x3 by the authors which is isotropic and doesn't compromise too much with the temporal resolution is optimal. The use of FWHM for functional images increase the Signal-to-Noise ratio (SNR), yielding better predictability for the BOLD. A whole-brain image approach instead of the Region of Interest approach is better since the latter one requires a lot of prior knowledge about the brain regions involved in the particular stimulus-response, and since this is novel research on finding neural activations of fear appeal in print ads, we can't expect to have known most of the effective ROIs'. Most of their activations that they found conformed with their hypothesis, a lot of other works have also indicated activations in these regions in response to incidents related to fear, such as threat anticipation, norm violation, etc. Activation of the anterior cingulate cortex (responsible for decision making) indicates that fear may cause a belief or disbelief in something.

Their research also indicates that fear may induce the hippocampus for storing long-term memory. This is naturally evident, as we remember events of fear with more detail than normal activities. The research didn't test for subliminal stimuli(a stimulus sufficiently small as to be able to perceive unconsciously only), as well as didn't presented stimulus with interacting objects, and this limits the generalizability of their work to a real situation when fear print adds could occur in any form. Since fear is an emotion, and gradually decreases with time(not time-invariant), non-linear models might be better than General Linear Models. It may be noted that all of their hypothesis is based on forwarding inference like a typical fMRI experiment, i.e., they only convey that fear print adds activates certain regions. The authors didn't give strong evidence on reverse inference, i.e., given those brain regions are active, we know what kind of print adds for fear is acting as stimulus currently, although they did talk about various related works on how different kind of fear-related activities invoked related regions that they found, in future they may come up with a robust proposed plan to incorporate this. This is turn would increase the statistical power.

References

Amaro E Jr, Barker GJ. Study design in fMRI: basic principles. *Brain Cogn.* 2006 Apr;60(3):220-32. doi: 10.1016/j.bandc.2005.11.009. Epub 2006 Jan 19. PMID: 16427175.

Mohamed M. Mostafa (2020) Neural correlates of fear appeal in advertising: An fMRI analysis, *Journal of Marketing Communications*, 26:1, 40-64, DOI: [10.1080/13527266.2018.1497680](https://doi.org/10.1080/13527266.2018.1497680)