Enhancing Health Marketing Communication for Breast Cancer Screening: Insights from Eye-Tracking and Facial Expression Experiments

Abstract

This working research investigates how marketing communication using promotional messages influences consumers' attention and emotional responses, with the ultimate goal of improving breast cancer screening outcomes. This empirical study reports on an experiment designed to explore women's reactions to breast cancer screening advertisements by integrating innovative measurement tools such as eye-tracking and facial expression recognition software. The primary objective is to examine how specific elements of screening advertisements capture visual attention and evoke corresponding emotional responses, providing actionable insights for tailoring digital health marketing communications to increase screening uptake. By exploring the potential of these technologies, this research seeks to transform traditional marketing practices within the context of health promotion, enhancing well-being related health marketing campaigns.

Keywords: *Eye-tracking, Facial Expression Recognition, Breast Cancer Screening*

Track: Marketing Communication (including digital) and Branding

1. Introduction

Promoting health has started using ways to get the public involved in preventive screening programs more effectively, than before according to Petrocchi et al.'s study in 2020 which shows that personalized promotion messages using regulatory fit theory and humour can encourage people to follow breast cancer screening recommendations based on evidence positively impacting participation rates by evoking emotions and reducing negative reactions, towards health messages. Moreover, Lee et al. (2017) demonstrated how incorporating solutions can illustrate technology's potential as an influential tool in encouraging specific groups to engage actively in screening activities and fostering a connection, between consumer involvement and screening practices.

Cutting edge advancements, in technology chances to delve into the cognitive and emotional processes that drive reactions to health-related ads effectively Tracking eye movements has played a crucial role in measuring where people look and identifying which parts of a message capture their attention (Kim et al., 2022). For example, specific areas on faces that convey emotions greatly influence how those emotions are perceived suggests that the visual components of a message play a role, in eliciting the emotional reactions. In addition, to that Bozkurt and colleagues (2024) delve into the realm of facial emotion recognition which brings about a sense of real-life relevance by utilizing tracking of emotional expressions. These strategies help explain how individuals visually perceive and emotionally respond to messages thus improving the accuracy of the models that connect these responses to behaviours like participation in breast cancer screening.

By employing measurement tools and theoretically driven and empirically validated marketing methods, the focus of this research is the health promotion improvement. Eye-tracking and facial expression recognition technology in design enables one to examine consumers' immediate and unaware reactions to advertising messages. Such tools are applied to identify components of a message. Whether text-based graphics or audiovisual material that commands attention and triggers response, in effective persuasion (Kim et al., 2022). With the help of sophisticated measurement tools with messaging strategies such a coming together of technology, with targeted communication strategies promises to improve the effectiveness of health awareness campaigns by keeping up with an adaptive digital market environment.

2.Promotion Messages

Promotion messages are a key component of health communication strategies targeting breast cancer screening. A diverse body of research has investigated their capacity to influence consumer attention, emotional responses, and screening outcomes. Few studies have explored how interventions, ranging from electronic messaging to culturally relevant communications, can improve screening uptake. Evidence suggests that both the framing and perceived personal relevance of messages play critical roles in this process (Li & Li, 2021).

Several investigations have highlighted the importance of message design and delivery medium. For instance, Conroy et al. (2022) demonstrated that electronic messaging integrated within electronic medical records is not only feasible but can also predict and potentially enhance breast cancer screening behaviours. Such technologies may enable researchers to fine-tune the content of promotional messages and their delivery, ensuring that visual and auditory cues are optimized to capture attention and elicit desired emotional reactions.

3.Attention and Emotional Responses

Combining facial expression analysis and eye-tracking software offers a powerful method for studying attention and emotional responses to persuasive messages, as in the instance of health communication campaigns encouraging breast cancer screening. Such technologies enable researchers to measure visual attention and affective responses in real time, which means that it is possible to identify what elements of a message attract attention and elicit emotional responses that can ultimately influence behavior (Wang et al., 2024).

Eye-tracking produces quantifiable data about gaze direction, fixation durations, and saccadic movements that are key measures to discover the ways in which consumers visually attend to promotional material. For instance, Shepherd and Rippon (2022) contend that an examination of how individuals look at different parts of a face—even when partially occluded by masks—can tell us about the mechanisms involved in emotion recognition and empathic concern that drive it.

Similarly, Bozkurt et al. (2024) demonstrate the potential of eye tracking in capturing dynamic visual attention to affective stimuli, pointing to its application in environments where subtle visual cues are critical in the conveyance of affect. Automatic recording of facial expressions provides not only objective data on consumers' direct emotional responses but also aids in the discrimination between various affective states that may influence decision processes. In health promotion, the use of these technologies is very promising. By understanding the dynamics of visual attention and emotional reactivity, researchers can identify which components of

promotional messages for breast cancer screening are most engaging and compelling. Future research would do well to further elucidate the causal pathways between measured attention (e.g., specific patterns of gaze) and emotional responses (e.g., facial expression change) to enhance intervention efficacy in health communication.

4.Breast Cancer Screening

Health marketing communication aimed at improving breast cancer screening outcomes has increasingly focused on using tailored messages and digital strategies to address both cognitive and emotional barriers associated with screening participation. Tailoring messages for specific target groups is essential for optimizing impact. Research indicates that the framing of messages can meaningfully influence an individual's perceived risk and subsequent screening behaviours. Loss-framed messages are particularly effective among individuals with a higher perceived vulnerability to breast cancer (Gallagher et al., 2011). Complementary studies have shown that message relevance, especially when integrated with culturally appropriate content, plays a pivotal role in engaging diverse populations (Li & Li, 2021).

Narrative and community-based interventions have also proven useful in overcoming structural and emotional barriers to screening. Tailored communication strategies that integrate survivor stories and culturally specific narratives foster trust and promote positive health behaviours among underserved populations (McQueen et al., 2011).

5.Methodology

This ongoing neuro-marketing research aims to examine the persuasive effectiveness of breast cancer screening advertisements using advanced biometric tools. A sample size of 30 participants has been selected, including women aged above 40 with good vision and understanding of the information provided. Exclusion criteria include males, participants under 40, individuals with severe vision problems, known neurological or psychiatric conditions, and those who have engaged in similar neuro-marketing studies within the last six months. Participants will be briefed on the Tobii Nano eye tracker and Noldus FEA software, which will capture metrics such as fixation points, duration of focus, and gaze patterns. High-resolution video recordings of participants' faces will be made for facial expression analysis via Noldus FEA software, following the General Data Protection Regulation (GDPR - Regulation (EU) 2016/679).

The experiment will employ a within-subjects design whereby participants will be exposed to a series of breast cancer screening advertisements while their eye movements and facial expressions will be continuously monitored. Eye-tracking technology will record metrics such as gaze duration, fixation count, and areas of interest (AOIs) on key advertisement elements. Advanced facial expression recognition software will decode emotional responses by analysing micro expressions corresponding to affective states such as surprise, happiness, and concern.

6.Results

Firstly, the study looks into determining the elements of ads that catch women's attention the most. Secondly the aim is to measure the reactions triggered by these ads through recognizing expressions and observing where people look in real time. Finally the research plans to find a connection, between these signals and how effective the ads are, at convincing the target audience to go for breast cancer screening. The goals outlined will be based on the foundation of neuromarketing. It underscores the significance of comprehending reactions, from consumers to anticipate their behaviours as discussed by Rvaheva in 2024. Visual elements, in ads can catch peoples' attention. Make them feel more positive emphasizing the need to consider emotions and attention when measuring the effectiveness of health communication strategies.

7.Implications

The impact of this study, on health promotion and marketing communication is expected to be substantial as it seeks to confirm the effectiveness of using eye tracking and facial expression recognition in evaluating consumer reactions in healthcare settings. By linking biometric measures to behavioural outcomes, the study aims to support targeted interventions that can reduce barriers to breast cancer screening, potentially leading to earlier detection and improved prognoses.

8.Conclusion

The ongoing study leverages cutting-edge technological innovations such as eye-tracking and facial expression recognition software to gather data and understand consumer behavior. The

findings may suggest that the use of specific visual elements in advertising can effectively trigger emotional responses, enhancing well-being-related health marketing campaigns.

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