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Beyond fear appeals: Exploring nostalgia-evoked mental simulation as a persuasive strategy for smoking cessation

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Abstract

This study introduces nostalgia-evoked mental simulation as a compelling strategy for smoking cessation, offering a novel alternative to traditional fear-based approaches. Mental simulation, a cognitive technique enabling individuals to visualize future outcomes, enhances motivation and goal-directed behaviour. When combined with nostalgia—emotionally significant memories from the past—this approach fosters deeper emotional engagement and cognitive reflection, increasing its persuasive potential. Despite its promise, limited research has applied nostalgia-driven mental simulation in health interventions. This qualitative study addresses this gap by examining how such interventions influence smokers' attitudes and intentions to quit. Conducted across three government hospitals in Peninsular Malaysia, the study involved smokers enrolled in the Quit Smoking Clinic Program. Participants were assigned to one of four groups: three received nostalgia-evoking audio messages—focused on past imagery, physiological challenges, or positive emotions—while a control group received conventional health warnings. Narrative analysis of participants' reflections revealed that nostalgia-evoked mental simulation promoted self-awareness and emotional resonance, which in turn increased motivation to quit smoking. Respondents who emotionally connected with the nostalgic content reported greater awareness of smoking-related health risks and stronger intentions to reduce or cease smoking. However, the intervention's effectiveness varied based on factors like emotional sensitivity and smoking history, highlighting the importance of personalized approaches. The findings underscore the psychological benefits of combining cognitive simulation with emotionally resonant messaging and suggest that such integration may enhance the effectiveness of cessation programs. This study contributes to the development of tailored, emotionally grounded public health interventions and calls for further exploration of long-term and culturally specific outcomes.

Keywords: Nostalgia-Evoked Message; Mental Simulation; Smokers' Attitude; Behavioural

1. Introduction

Mental simulation is an established cognitive mechanism that enables individuals to visualize and mentally rehearse future scenarios, fostering motivation, self-efficacy, and behavioural commitment. As a behaviour change technique, mental simulation facilitates goal-directed thinking by allowing individuals to anticipate the consequences of their actions and develop strategies to achieve a desired outcome [3]. Within the realm of health interventions, this approach has demonstrated efficacy in promoting physical activity, dietary improvements, and addiction recovery, including smoking cessation [8]. When combined with nostalgia-evoked messaging, mental simulation may serve as an even more compelling persuasive tool. Nostalgia—a sentimental reflection on personally significant past experiences—has been shown to reinforce self-continuity, enhance motivation, and strengthen goal-directed behaviours [12]. In the context of smoking cessation, nostalgia-driven interventions may elicit emotional connections to healthier past experiences, personal identity, and significant life events, thereby increasing the personal relevance of cessation efforts. Despite its potential, the integration of mental simulation and nostalgia-based messaging in smoking cessation interventions remains underexplored. Tobacco use remains a persistent global public health challenge, contributing significantly to

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preventable diseases such as lung cancer and coronary heart disease. The World Health Organization [15] reports that tobacco-related illnesses account for over 8 million deaths annually, including approximately 1.2 million fatalities due to second-hand smoke exposure. Despite numerous public health initiatives aimed at curbing tobacco consumption, smoking prevalence remains high, particularly in Malaysia, where tobacco use has been deeply embedded in cultural and social norms. Aggressive marketing strategies by the tobacco industry have contributed to the normalization of smoking, influencing individuals across various age groups and perpetuating smoking as a socially accepted lifestyle choice. The National Health Morbidity Survey [11] underscores the severity of smoking prevalence in Malaysia, reporting that smoking is responsible for 27,200 deaths annually, with approximately 4.8 million individuals aged 15 and above actively smoking. Men are disproportionately affected, being over 30 times more likely than women to be current smokers. In response to this alarming trend, Malaysia introduced the National Strategic Plan on Tobacco Control (NSPTC) 2015-2020, targeting a reduction in smoking prevalence to 15% by 2025 and ultimately envisioning a tobacco-free generation by 2045 in alignment with the WHO's Noncommunicable Diseases Global Target. Recognizing the urgency of the situation, the World Heart Federation (WHF) has endorsed Malaysia's Generational End Game (GEG) policy, which aims to prevent nicotine addiction among future generations by prohibiting the sale of tobacco products to individuals born after a specified year. This initiative, supported by the Southeast Asia Tobacco Control Alliance (SEATCA), is expected to yield long-term benefits in public health, social well-being, and economic stability [13]. However, while policy-driven approaches play a crucial role, effective smoking cessation interventions must also address individual-level motivation and behavioural change mechanisms. Conventional smoking cessation campaigns have primarily relied on emotional appeals—such as fear, guilt, disgust, and anger—to encourage behaviour modification [16]. Fear-based messaging has been extensively utilized in public health initiatives targeting high-risk behaviours, including smoking, unsafe sexual practices, binge drinking, and substance abuse [2 ,14, 16] However, evidence suggests that such approaches often fail to induce sustained behaviour change, particularly among individuals who are already aware of the associated health risks [9]. Moreover, fear appeals may elicit psychological reactance, leading to defensive responses that reduce message effectiveness [9]. Given these limitations, alternative communication strategies are needed to enhance personal engagement, cognitive reflection, and motivation for behaviour change. Nostalgia-based messaging, when integrated with mental simulation techniques, offers a novel approach to enhancing cognitive and emotional processing in smoking cessation interventions. Rather than evoking negative emotions, nostalgia reconnects individuals with meaningful past experiences, reinforcing a sense of identity, self-efficacy, and personal agency in quitting smoking.

Mental imagery plays a central role in this process, enabling individuals to mentally rehearse positive smoking cessation scenarios, thereby increasing motivation, confidence, and readiness for behavioural change. Guided imagery interventions have shown promise in enhancing smoking cessation outcomes, as they allow individuals to visualize themselves as non-smokers, experiencing improved health, emotional well-being, and freedom from addiction [4]. Mental simulation, as a cognitive tool, can be categorized into two primary processes:

Outcome Simulation – Individuals imagine the positive results of quitting smoking, such as better respiratory health, increased physical endurance, and financial savings. This process strengthens goal commitment by reinforcing anticipated benefits [8].

Process Simulation – Individuals mentally rehearse the steps required to overcome smoking triggers, develop coping strategies, and maintain their commitment to cessation. Process simulation fosters problem-solving skills and preparedness, essential for sustained behaviour change [3].

By integrating mental simulation with nostalgia-evoked messaging, smoking cessation interventions can increase emotional engagement, reinforce self-identity, and enhance motivation for long-term behaviour change. However, research in this area remains limited, particularly in understanding individual differences in response to nostalgia-based interventions. Factors such as personal smoking history, emotional sensitivity, and past experiences may influence how individuals interpret and engage with nostalgic messaging in the context of smoking cessation. This study seeks to bridge this gap by exploring the role of nostalgia-driven mental simulation in influencing smokers' attitudes and behavioural intentions. By examining respondents' self-reflections and cognitive-emotional responses to nostalgia-based interventions, this research aims to provide evidence-based insights for developing tailored smoking cessation programs that enhance personal engagement, motivation, and sustained behaviour change.

2. Materials and method

A qualitative research design was employed to examine the effects of mental simulation and nostalgia-evoked messaging on smoking cessation attitudes. This study constituted the second phase of a broader experimental investigation. The intervention utilized a mental simulation technique to manipulate message exposure, with

respondents assigned to one of four conditions: three treatment groups exposed to nostalgia-based messaging (past imagery, physiological reactance, and positive emotions) and a control group receiving conventional health messages. Respondents' cognitive and emotional responses to the intervention were subsequently assessed. The study was conducted during the operational hours of the Quit Smoking Clinic Program at three government hospitals in Peninsular Malaysia. Each respondent was allocated 30 minutes in a controlled environment to complete the intervention. Prior to the simulation, a baseline assessment was conducted, measuring respondents' behavioural attitudes toward smoking cessation. Participants were randomly assigned to one of four experimental groups: Past Imagery Group – Exposed to messages evoking nostalgic memories of a smoke-free past, Physiological Reactance Group – Received messages emphasizing the struggle of nicotine dependence and the challenges of quitting, Positive Emotions Group – Presented with messages emphasizing hope, renewal, and the benefits of a smoke-free future. Lastly, Control Group – Received standard health-focused messages devoid of nostalgia-related content. Before participating, respondents reviewed the inclusion and exclusion criteria outlined in the consent form. Ethical considerations were upheld by ensuring that all participants met the stipulated criteria and provided informed consent. To ensure randomized allocation, each respondent selected a random number (1-4), which determined their assignment to one of the four groups. During the intervention, participants listened to a 10-minute pre-recorded audio message aligned with their assigned condition. The audio messages were designed to elicit cognitive and emotional engagement, particularly through mental simulation and nostalgia-driven content. Following the intervention, a post-assessment was conducted after a 10–15-minute interval to evaluate participants' self-reflections and responses to the messages.

The stimuli for the intervention consisted of four distinct pre-recorded message scripts, each corresponding to one of the experimental conditions:

- *Past Imagery Messages*: Adapted from Hussain and Lapinski's [5] research on public service announcements (PSAs), these messages incorporated nostalgic imagery to evoke memories of life before smoking initiation.
- *Physiological Reactance Messages*: Developed based on smoking cessation guidelines from the Ministry of Health Malaysia and the World Health Organization (WHO), these messages emphasized the challenges of nicotine withdrawal and the struggle of overcoming addiction.
- *Positive Emotion Messages*: Designed to promote empowerment, self-efficacy, and optimism, emphasizing the personal and social benefits of quitting smoking.
- *Control Group Messages*: Derived from standard Information, Education, and Communication (IEC) materials, these messages contained factual, health-based smoking cessation information without nostalgia or simulation elements.

The selection of message content was based on existing evidence-based frameworks for smoking cessation interventions. While the past imagery script was adapted from validated Public Service Announcement (PSA) research, the other scripts were developed based on widely recognized smoking cessation materials. Although these materials have not been extensively tested using mental simulation techniques, previous studies suggest that positive message framing can effectively evoke emotions and influence behaviour change. The study targeted adult smokers enrolled in the Quit Smoking Clinic Program at three major government hospitals in Peninsular Malaysia, namely Hospital Putrajaya, Hospital Tuanku Ampuan Rahimah, and Hospital Tuanku Jaafar. Participants were required to be 18 years or older, aligning with the predominant demographic of smokers, as indicated by the National Health Morbidity Survey 2015. This study aimed to examine variations in nostalgia susceptibility, cognitive engagement, and motivational shifts, contributing to a deeper understanding of how mental simulation and nostalgia-driven messaging influence smoking cessation attitudes.

2.1. Data analysis

A narrative analysis approach was employed to examine and interpret the qualitative data collected from respondents following their participation in mental simulation exercises involving nostalgia-evoked messaging. The primary objective of this analysis was to gain deeper insight into respondents' personal accounts, reflections, and emotional experiences related to their smoking behaviours and their reactions to the intervention messages. By utilizing narrative analysis, the study moved beyond surface-level responses to explore how individuals constructed meaning around their smoking habits, health-related attitudes, and the role of nostalgic memories in shaping cognitive and emotional processes associated with smoking cessation.

The narrative analysis in this study followed a structured approach, consisting of several key stages [10]:

- Data Familiarization – The researcher conducted an in-depth review of respondents' written reflections, carefully reading and re-reading the content to develop a comprehensive understanding. This phase facilitated

the identification of recurring patterns, emotional responses, and significant life events linked to smoking behaviours and nostalgia-evoked mental simulations.

- Identification of Narratives – Rather than extracting isolated themes or keywords, the analysis focused on recognizing complete personal accounts shared by respondents. These narratives frequently centred on family memories, health-related experiences, personal struggles with smoking, and transformative realizations triggered by nostalgic messages.
- Interpretation of Meaning – The narratives were further examined to uncover underlying emotions, motivations, and cognitive shifts expressed by respondents. Particular attention was given to how individuals framed their past smoking experiences, positioned themselves within their stories (e.g., as agents of change or individuals struggling with addiction), and how their reflections influenced their current attitudes toward smoking cessation.
- Integration with Behavioural Insights – The qualitative findings were analysed alongside behavioural indicators to assess how mental simulation and nostalgia-evoked messaging influenced respondents' thought processes. Even in cases where physiological measures such as narrative reflections often revealed significant cognitive and emotional struggles, indicating a gradual shift in smoking-related perceptions and intentions.
- Construction of the Overall Narrative – Finally, the individual narratives were synthesized to develop a broader understanding of how nostalgia-driven mental simulation influenced smoking cessation attitudes and behaviours. This process underscored the emotional and reflective dimensions of quitting smoking, highlighting how nostalgia-evoked messaging facilitated cognitive engagement, self-reflection, and motivation for behavioural change. The findings complemented the quantitative data, offering a more nuanced perspective on the role of nostalgia and mental simulation in promoting smoking cessation.

3. Results and discussion

The qualitative analysis examined the role of mental simulation and nostalgia-evoked messaging in influencing respondents' cognitive and emotional engagement with smoking cessation. By employing narrative analysis, this study provided a holistic understanding of how individuals processed, internalized, and responded to nostalgic stimuli in relation to their smoking behaviours. Unlike traditional thematic coding approaches, which emphasize isolated themes, narrative analysis allowed for an in-depth exploration of the coherence, structure, and emotional depth of participants' reflections, revealing key psychological mechanisms underlying behavioural change.

The analysis revealed that nostalgia-evoked mental simulation enhanced motivation for smoking cessation, particularly by fostering self-reflection and emotional engagement. Most respondents expressed a heightened awareness of their smoking habits and demonstrated an increased willingness to reduce or quit smoking. The findings indicate that mental simulation, when integrated with nostalgia-driven messaging, can serve as a catalyst for self-examination, reinforcing personal health goals and strengthening the intention to quit. Furthermore, many respondents linked their motivation to quit smoking with emotionally significant memories, including experiences related to family, past health conditions, and meaningful life events. These findings align with existing research on mental simulation, which suggests that high-quality mental simulations enhance self-efficacy, goal-setting, and behavioural perseverance [3, 7,]. Respondents who engaged more deeply with nostalgia-based scenarios were more likely to articulate a clear commitment to behaviour change, reinforcing the notion that nostalgia serves as a psychological mechanism that facilitates gradual shifts in cognition and behaviour.

3.1. Emotional and Social Influences

The role of social factors in behaviour modification also emerged as a significant theme. Several respondents noted that family and peer influences played a critical role in reinforcing their attitudes toward smoking cessation. These findings suggest that nostalgia-evoked messages may be particularly effective when they emphasize social connections and shared past experiences, as such content may resonate more deeply with individuals seeking emotional and social support during their quitting process. However, the study also identified individual differences in response to nostalgia-evoked messaging. While most participants reacted positively, one respondent indicated that the messages lacked personal relevance, highlighting the importance of message framing and individual susceptibility to nostalgia. This suggests that tailoring nostalgia-based interventions to align with an individual's personal experiences may enhance effectiveness.

3.2. Supporting Respondents' Perspectives

The following participant reflections illustrate how mental simulation and nostalgia-driven messaging influenced smoking cessation attitudes:

"Make me think about my health, I am active but usually short of breath. I need stamina. It's hard, but I need to cut down my cigarettes and hang out with friends who smoke." (ID30)

"Helped me to quit smoking by reducing my cigarette intake, but I need further guidance from this clinic." (ID1)

Conversely, one participant expressed a limited connection to the message content, emphasizing the need for personalized approaches:

"I feel that the message was not particularly helpful for me; however, I am still able to gradually reduce my smoking by avoiding excessive stress and drawing inspiration from how my parents successfully quit smoking." (ID22)

3.3. Implications for Behaviour Change Interventions

Mental simulation enables individuals to mentally rehearse future scenarios, reinforcing self-efficacy and commitment to smoking cessation. When combined with nostalgia, which evokes meaningful past experiences, this approach strengthens personal motivation by reconnecting individuals with previous identities, values, and social influences that may have discouraged smoking. These findings align with research suggesting that high-quality mental simulations enhance goal-directed behaviours, perseverance, and cognitive restructuring [3, 7,]. To enhance the effectiveness of smoking cessation interventions, tailored nostalgia-evoked mental simulation exercises should be integrated into existing behaviour change frameworks by incorporating personalized storytelling interventions that guide individuals to visualize their smoke-free future while drawing on nostalgic reflections of past health, social connections, or personal achievements, as well as utilizing multimedia-based interventions, such as audio-guided mental simulation exercises or video-based nostalgic narratives, to create immersive and emotionally engaging experiences.

Additionally, individual differences in nostalgia susceptibility and emotional responsiveness should be considered in intervention design. While some individuals may respond strongly to nostalgia-driven messaging, others may require more structured cognitive scaffolding to translate nostalgic reflections into meaningful action. Future research should explore how factors such as age, cultural background, and emotional processing styles influence the effectiveness of nostalgia-based interventions, ensuring that such strategies are inclusive and adaptable to diverse populations. By integrating mental simulation and nostalgia-evoked messaging into smoking cessation programs, public health practitioners can develop more engaging, psychologically grounded interventions that foster long-term motivation and behavioural commitment. These findings contribute to the growing evidence supporting emotionally resonant, cognitively immersive health communication strategies as an alternative to traditional persuasive messaging in behaviour change interventions.

3.4. Mental Simulation as a Mechanism for Attitude and Behaviour Change

The findings align with existing research that suggests mental simulation functions as a potent cognitive tool for influencing health behaviours [3]. By allowing individuals to mentally rehearse a smoke-free future, mental simulation fosters self-efficacy, motivation, and goal-directed action. In this study, respondents who engaged in nostalgia-evoked mental imagery demonstrated greater emotional involvement and self-reflection, both of which are critical in shaping behavioural intentions. The narratives suggest that many respondents envisioned themselves as non-smokers, reinforcing the cognitive restructuring necessary for perceiving cessation as an achievable goal. Additionally, the findings confirm that nostalgia serves as an emotional bridge between past experiences and present behaviours, reinforcing the belief that quitting smoking can restore a sense of well-being and align with a more positive self-concept. This aligns with prior research suggesting that nostalgia strengthens self-continuity and enhances motivation for goal-directed behaviour [12]. Through the recollection of meaningful past experiences, respondents were able to reframe their current smoking habits in relation to their personal identity, health aspirations, and social influences.

3.5. Cognitive and Emotional Responses to Mental Simulation and Nostalgia

A key contribution of this study is the rich qualitative narratives that illustrate the emotional and cognitive dimensions of nostalgia-evoked mental simulation. The analysis identified three primary mechanisms through which mental simulation influenced smoking cessation attitudes: self-reflection and personal realization, emotional resonance and motivational shifts, and variability in individual responses.

3.6. Self-Reflection and Personal Realization

Nostalgia-evoked messages often prompted introspection among respondents, leading to greater awareness of the long-term health risks of smoking and an increased sense of personal responsibility for quitting. Many participants reflected

on their physical well-being and lifestyle choices, recognizing the negative impact of smoking on their health. One respondent expressed:

"This made me think about my health. I am active but usually short of breath. I need stamina. It's hard, but I need to cut down my cigarettes and hang out with friends who don't smoke." (ID30)

This response highlights how mental simulation facilitates cognitive restructuring, allowing individuals to reframe their smoking behaviours in the context of their long-term health goals and overall well-being. By visualizing a healthier, smoke-free future, respondents were able to shift their perception of cessation from a challenge to an attainable goal.

3.7. Emotional Resonance and Motivational Shifts

The study findings indicate that nostalgia-evoked mental simulation is deeply intertwined with emotional engagement, which plays a critical role in fostering motivation for behaviour change. Respondents who recalled emotionally significant past experiences frequently associated them with feelings of loss, regret, or longing, reinforcing their desire to quit smoking. One participant shared how personal loss influenced their motivation:

"Hearing the message made me remember my father, who was a smoker and passed away from lung disease. I don't want my kids to go through the same thing." (ID12)

This finding is consistent with previous research suggesting that emotionally charged memories serve as motivational catalysts, encouraging individuals to reassess their smoking behaviours considering their past experiences and future aspirations [1]. Nostalgia's ability to evoke strong emotional connections enhances the personal relevance of smoking cessation, reinforcing it as a meaningful and necessary change.

3.8. Variability in Individual Responses

While most respondents responded positively to nostalgia-evoked mental simulation, a subset of participants reported difficulty in emotionally connecting with the messages. Some struggled to visualize themselves as non-smokers, suggesting that individual differences in nostalgia susceptibility, emotional sensitivity, and smoking history may influence how effectively the intervention resonates. One participant expressed:

"I understand the message, but I don't think it applies to me. I've been smoking for too long." (ID5)

This response suggests that nostalgia-based interventions may not be universally effective, and message framing should be tailored to accommodate individual differences in smoking history and emotional receptivity. Future research should explore personalized approaches that enhance engagement for individuals who may require stronger cognitive scaffolding to visualize a smoke-free future.

4. Conclusion

This study provides compelling evidence that mental simulation, particularly when paired with nostalgia-evoked message, serves as a powerful cognitive and emotional mechanism for promoting smoking cessation. By enabling individuals to mentally rehearse a smoke-free future while drawing upon emotionally significant past experiences, this approach fosters self-reflection, emotional engagement, and increased motivation to quit smoking. The qualitative findings suggest that nostalgia-driven mental simulation enhances cognitive restructuring, reinforcing the belief that quitting smoking is both achievable and aligned with personal identity and long-term well-being. The findings further demonstrate that emotional resonance plays a critical role in behaviour change, as respondents who connected with nostalgic messages often expressed a heightened awareness of smoking-related health risks and a stronger intention to quit. However, the study also highlights variability in individual responses, with some participants struggling to emotionally connect with the messages, suggesting that personalized approaches may be necessary to maximize the effectiveness of nostalgia-based interventions. As smoking cessation is a gradual, multi-stage process, integrating mental simulation with nostalgia-evoked messaging into smoking cessation programs may provide a more engaging, psychologically grounded alternative to conventional fear-based or rational health communication strategies. Future research should further explore how individual differences in nostalgia receptivity, smoking history, and emotional processing influence the effectiveness of these interventions. Additionally, investigating longitudinal effects and real-world applications, such as digital health interventions or community-based programs, could provide valuable insights into the sustained impact of nostalgia-driven mental simulation on smoking cessation outcomes. By refining personalized, evidence-based smoking cessation strategies, public health practitioners can leverage the cognitive and

emotional power of nostalgia and mental simulation to enhance the effectiveness of smoking cessation interventions, ultimately supporting individuals in making lasting behavioural changes.

Compliance with ethical standards

Disclosure of conflict of interest

We declare no conflict of interest.

Statement of ethical approval

Ethical approval for this study was sought from the Medical Review & Ethics Committee (MREC) and also Universiti Putra Malaysia Ethics Comittee . Prior to the participation, all respondents were provided with a comprehensive explanation of the study's objectives, including any potential risks and benefits.

Statement of informed consent

Informed consent was obtained from participants through a designated consent question embedded in the survey. Participation was entirely voluntary, and individuals has retain the right to withdraw from the study at any point without penalty. An information sheet and formal consent form was provided to each potential participant during the recruitment process. Additionally, verbal consent was obtained when participants are contacted via telephone to ensure their understanding and willingness to participate.

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