



Research Paper

From awareness to behaviour: Testing a hierarchy of effects model on the Australian Make Healthy Normal campaign using mediation analysis

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ABSTRACT

The Make Healthy Normal mass media campaign was a three-year campaign launched in 2015 in New South Wales (NSW), Australia to address community norms around overweight and obesity. It was underpinned by a hierarchy of effects model; a commonly used framework in campaigns but one that has rarely been tested. The campaign evaluation included a cohort study of NSW adults, surveyed three times over 12 months ($n = 939$ at Wave 3). This study tested the campaign's hierarchy of effects model, which theorized that participants would move from *recognition* to *behaviour change* via *understanding*, *knowledge*, *attitude*, *social norms*, *self-efficacy*, and *intention*, using these data. We used the moderation and mediation of effects method proposed by Baron and Kenny, adjusting for age and sex, to test for progression through the hierarchy of effects for two outcomes: physical activity and fast food consumption. We found a clear progression through the theorized model, from *recognition* through to *behaviour change*, via the intermediate variables for both outcomes. We also found several effects not predicted by the theorized model, with consistently strong associations between *understanding* and *attitude*, *understanding* and *self-efficacy*, *attitude* and *self-efficacy*, and *self-efficacy* and *behaviour change* in both outcome models. Our study provides support for the hierarchy of effects as a conceptual model in campaign planning and evaluation of social marketing campaigns. To our knowledge, this is the first study to compare the hierarchy between two behavioural outcomes and the consistency observed between the models adds to the potential usefulness of the hierarchy of effects.

1. Introduction

The Make Healthy Normal (MHN)¹ mass media campaign was launched in June 2015 as part of the strategy to address overweight and obesity in the state of New South Wales (NSW), Australia (Centre for Epidemiology and Evidence, 2016). The campaign ran for three years, using television as the primary media, supported by other channels, including billboards and social media. It was the major communication element of NSW's cross-government approach to obesity prevention, the Healthy Eating and Active Living Strategy (Centre for Population Health, 2013). It challenged the normalisation of being overweight and encouraged adults to adopt healthier lifestyle behaviours, including increasing physical activity and reducing consumption of energy dense, nutrient poor foods. In phase one (2015–2017), the target audience was all NSW adults. Evaluation of phase one found that it was effective at

increasing knowledge of physical activity recommendations and the health effects of overweight and obesity but had no effect on behaviour (Kite et al., 2018a).

Best practice principles for mass media campaigns suggest that the use of theories or frameworks is important in improving the likelihood of a successful mass media campaign (Grunseit et al., 2016; Noar, 2006; World Health Organization, 2000). Accordingly, MHN's logic model incorporated the hierarchy of effects model (HOEM), shown in Fig. 1, as a central component. However, a recent review of overweight and obesity campaigns found that while many campaigns ostensibly used theories or frameworks in their design and/or evaluation, no campaign reported explicitly testing the underpinning theory or framework (Kite et al., 2018b). Without formal testing, there is no way of knowing whether theories or frameworks are accurate reflections of the constructs they describe, which in turn makes it more difficult to refine and

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¹ Abbreviations: HOEM – Hierarchy of effects model; MHN – Make Healthy Normal campaign.

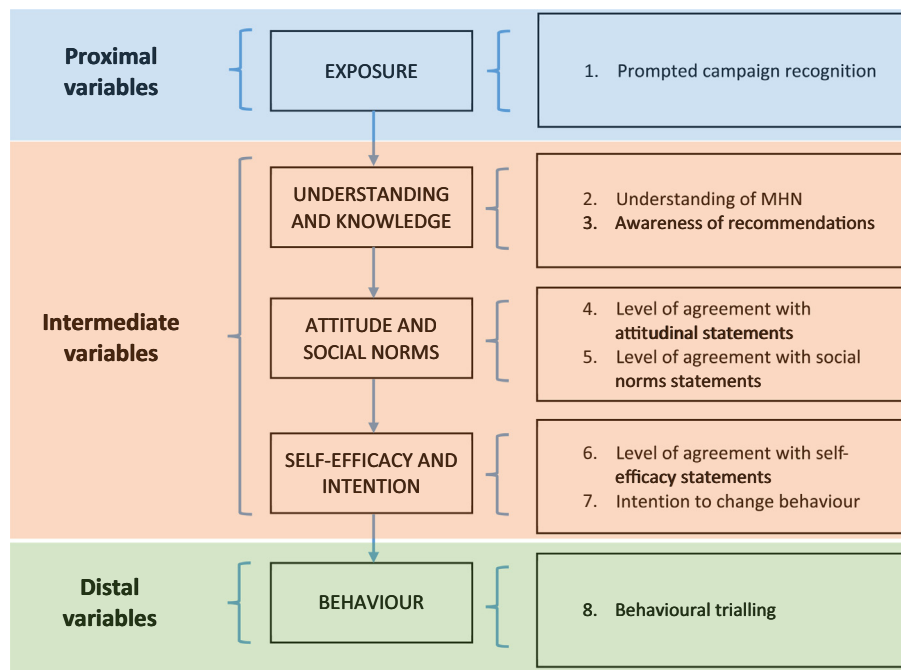


Fig. 1. Make Healthy Normal theorized hierarchy of effects model (with evaluation measures, right hand side).

improve the usefulness of public health campaigns.

The HOEM has been recommended for use in public health campaigns since the 1980s (McGuire, 1984), having developed in the 1960s as part of advertising and marketing theory. It posits that proximal variables (e.g. awareness) are causally linked to distal outcomes (e.g. behaviour change) through a series of intermediate measures (e.g. social norms, attitudes, intentions) (Cavill & Bauman, 2004), although the sequence of effects can vary (Barry & Howard, 1990). HOEM also holds that the probability of achieving each outcome decreases as the process moves through the hierarchy, meaning that the proportion of a population that engages in the desired behaviour change would be small.

Within the broader advertising and marketing literature, the HOEM has been tested in the context of sport sponsorship (Alexandris & Tsiotsou, 2012) and digital advertising (Bruner & Kumar, 2000; Yoo et al., 2004; Schlee & Schlee III, 2006), with mixed results. Indeed, Weilbacher (Weilbacher, 2001) has argued that HOEM should be abandoned as an advertising framework because it suffers from several conceptual weaknesses. He believes there has been an uncritical acceptance of HOEM because measurements of HOEM constructs, such as brand awareness, are possible, even though the model itself has not been validated. On the other hand, Barry (Barry, 2002) has argued that the model remains important and that the problem is not, as Weilbacher (Weilbacher, 2001) implies, that the model has not been validated but rather that it is inherently difficult to test. Barry concludes that it is essential to test the model, including investigating different temporal sequences.

Within public health, there is some support for HOEM, although some of the evidence relies on cross-sectional measures (Russell-Bennett et al., 2016). One study using repeat cross-sectional survey data to explore the effects of a radio soap opera on adoption of family planning methods found that the HOEM was useful in predicting the effects of the program in moving people through the stages of change toward adoption (Vaughan & Rogers, 2000). HOEM has also been used as a conceptual framework for understanding the relationship between exposure to junk food marketing and diet and weight without being formally tested (Kelly et al., 2015). Only two studies have examined HOEM using longitudinal data, both investigating physical activity mass media campaigns (Bauman et al., 2008; Craig et al., 2010). Bauman et al. (Bauman et al., 2008) found some support for a hierarchy

of effects in the United States-based *VERB* campaign, with awareness and understanding of the campaign's messages (proximal variables) predicting behaviour change (distal outcome) in adolescents, the target audience for *VERB*. However, adolescent attitudes and expectations (both intermediate variables) were not mediators of behaviour change, which would ordinarily be expected based on classical understandings of the HOEM. In their examination of HOEM in an adult population using data from Canada's *ParticipACTION* campaign, Craig et al. (Craig et al., 2010) similarly found support for the model. In this case, however, the results did show that awareness predicted intermediate variables that in turn predicted behaviour change. Collectively, the results of these studies suggest that the HOEM may work differently depending on demographic or other characteristics. Longitudinal studies such as those described above allow investigation of the sequence of HOEM and the limited number of such studies restricts our understanding of how campaigns work.

Hornik (Hornik, 2002) has argued that exposure to messages may affect behaviour by changing social norms – unwritten rules or codes of conduct that govern the way people behave in certain contexts (Chung & Rimal, 2016). Accordingly, social norms are part of several established theories of behaviour change commonly used to inform campaign design and evaluation, including Social Cognitive Theory (Bandura, 1989), Social Learning Theory (Bandura, 1977), and the Theory of Planned Behaviour (Ajzen, 1991). In addition, there have been calls for mass media campaigns to adopt broader social goals, rather than only focusing on the individual (Wakefield et al., 2010; Abroms & Maibach, 2008) and there is clear evidence that social norms have a measurable impact on obesity (Christakis & Fowler, 2007; Shoham et al., 2015). MHN is one of only a handful of campaigns to expressly challenge social norms around diet, physical activity, and weight (Kite et al., 2018b). However, the inclusion of social norms as a step in a campaign's HOEM, has not, to our knowledge, been previously reported.

Explicitly testing a theory or framework is essential if we are to maximise its usefulness through revision or rejection (Rothman, 2004; Nutbeam et al., 2010). To this end, this study aimed to test the Make Healthy Normal HOEM. Specifically, we sought to determine whether (1) the HOEM that underpins the evaluation of MHN is a useful and valid predictive tool; and (2) the cascade of effects in the HOEM varies

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