



## Changing people's attitudes and beliefs toward driving through floodwaters: Evaluation of a video infographic



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### ABSTRACT

Despite awareness of campaigns such as 'Turn Around, Don't Drown' and the Australian state of Queensland's 'If It's Flooded, Forget It', people continue to drive through floodwaters, causing loss of life, risk to rescuers, and damage to vehicles. The aim of this study was to develop a video infographic that highlights the dangers of driving through floodwaters and provide safety tips to reduce the risk, and to evaluate its effectiveness in changing the beliefs and intentions of Australian adults toward this risky driving behaviour. This study adopted an online three-wave non-controlled pretest–posttest design. Australian licensed drivers ( $N = 201$ , male = 41, female = 160;  $M_{age} = 34.10$ ) self-reported their demographic and psychological variables (intention, attitude, subjective norm, barrier self-efficacy, risk perception, anticipated regret, perceived susceptibility, and perceived severity) at baseline (T1), immediately post-intervention (T2), and at a one-month follow-up (T3). Messages in the video infographic were developed based on psychological theory and empirical evidence, using data on causal factors derived from coronial records and the findings of behavioural research. Results indicated that men had significantly higher intentions and attitudes and significantly lower barrier self-efficacy, risk perception, anticipated regret, perceived susceptibility, and perceived severity with respect to driving through floodwater than women. Statistically significant time  $\times$  gender interaction effects were also found; attitude and subjective norm were significantly lower between T1 and T2 for both men and women but scores between T2 and T3 remained significantly lower for women only. In addition, perceived susceptibility and perceived severity scores were significantly higher in women across T1 and T2, with the difference maintained at T3. In contrast, there were no differences in scores across the three-time points for men. The implications of these findings for road safety and drowning prevention messages targeting drivers during floods are discussed.

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## 1. Introduction

Globally, drowning accounts for 7% of all injury-related deaths making it the third leading cause of unintentional death worldwide (World Health Organization, 2014). In Australia, on average over 280 people die each year as a result of unintentional drowning (Royal Life Saving Society - Australia, 2016), with non-fatal drowning thought to be at least 20–50 times the rate of fatal drowning (Onyekwelu, 2008). Men continue to be at a higher risk of drowning, with double the overall mortality rate of women globally (World Health Organization, 2014). Of the 280 unintentional drowning fatalities in Australia in the 2016/17 financial year, 83% were men (Royal Life Saving Society - Australia, 2016). The economic impact of drowning is substantial; the total annual cost of drowning injury in Australia is about AUD110 million with similar rates per capita reported in other developed countries (World Health Organization, 2014). To highlight the seriousness of this issue, reports suggest that drowning represents a similar burden today as diarrhoeal disease and measles in the 1970s and 1980s (World Health Organization, 2014).

There is a strong association between individuals' behaviour during floods and risk of drowning. One of the more prominent behavioural risk factors related to flood drowning fatalities is intentionally driving through floodwater, with reports indicating that around 53% of flood-related deaths were the result of this risky behaviour, and male and female fatality rates for this particular drowning-related behaviour are approximately 60% and 40%, respectively (AWSC, 2016; Peden, Franklin, Leggat, & Aitken, 2017; World Health Organization, 2014). Thousands more are rescued every year on the roads, many underestimating the depth and velocity of the water, believing their vehicles to be large enough to drive through or perceiving pressure from passengers and/or a need to go to work or get home (Hamilton, Peden, Keech, & Hagger, 2016; Hamilton, Peden, Pearson, & Hagger, 2016). These facts make driving behaviour and drowning a serious public health issue, and it is recommended by the World Health Organization (World Health Organization, 2014) in their first-ever global report on drowning, that prevention is vital to combat drowning rates. The Australian Water Safety Council (AWSC, 2016) has established the goal of achieving a 50% reduction in drowning deaths by the year 2020. Consistent with this goal, the Australian Water Safety Strategy 2016–2020 has targeted reducing the impact of disaster and extreme weather on drowning deaths – with driving through floodwaters identified as a priority area. Key objectives in achieving these aims are to implement strategies that raise community awareness of water safety, and promote better education and skills to prevent drowning from these activities.

Mass media campaigns have aimed to address the problem of flood-related drownings, such as 'Turn Around Don't Drown' (NOAA, 2011) and 'If it's flooded, forget it' (Queensland Floods Commission of Inquiry, 2016) – government initiatives specifically targeting driving through floodwaters. Although these campaigns have been aimed at reducing the number of unintentional drowning deaths, very little research to date has evaluated the success of these campaigns on people's attitudes, motives, and, critically, actual drowning rates. In fact, in Australia, fatal and non-fatal incidents continue to occur regularly (AWSC, 2016; Henley & Kreisfield, 2008; Peden, Franklin, & Leggat, 2016; Royal Life Saving Society - Australia, 2016), with an average of 13 river flood-related fatalities each year (Peden et al., 2017). This suggests current water-safety messages are not effective, or insufficient, in encouraging people's safe behaviours in floods and has resulted in a national call for research into behaviours around floodwater (AWSC, 2016).

Although mechanisms exist which can help to understand why individuals may decide to engage in safety compromising behaviours around water (Drobot, Benight, & Gruntfest, 2007; Gissing, Haynes, Coates, & Keys, 2016; Hamilton & Schmidt, 2013, 2014; Hamilton, White, Wihardjo, & Hyde, 2016; Pearson & Hamilton, 2014; Taylor, Archer, Bird, & Paton, 2016), the empirical literature to guide health and safety messages is lacking. Mass media campaigns can produce positive changes or prevent negative changes in health-related behaviours across large populations (Wakefield, Loken, & Hornik, 2010). Theory-based campaigns are also more effective in promoting health-protective behaviour compared to atheoretical campaigns (Noar, 2006; Webb, Joseph, Yardley, & Michie, 2010).

Further, evaluation of advertising countermeasures is easier and more cost effective with theoretically devised approaches given the clearly measurable constructs (French et al., 2012; Prestwich, Webb, & Conner, 2015; Stead, Tagg, MacKintosh, & Eadie, 2005). However, although theory-based campaigns has been suggested as one of the more critical conditions for the success of most public health media campaigns, it is often overlooked (Nathanail & Adamos, 2013; Randolph & Viswanath, 2004). Given psychological factors are likely to be critical in individuals' decisions to drive through floodwater (Hamilton, Price, Keech, Peden, & Hagger, 2017; Pearson & Hamilton, 2014), it is important that behavioural interventions grounded in sound psychological theory are adopted to modify people's risky behaviours around water.

### 1.1. The current study

Drawing on our previous research (Hamilton, Peden, Keech et al., 2016; Hamilton, Peden, Pearson et al., 2016; Pearson & Hamilton, 2014), we identified key theory-based constructs (beliefs, attitudes, self-efficacy, risk perceptions, and regret) and mapped these on to relevant behaviour change methods (see Kok et al., 2016), to develop an empirical- and theory-based video infographic designed to highlight the dangers of driving through floodwaters and provide safety tips to reduce the risk. The aim of this study was to determine whether the infographic would have a direct impact on the beliefs and intentions of men and women toward driving through floodwater. Although drowning rates as a result of driving through floodwater are higher for men (approx. 60%), rates of drowning deaths as a result of this risky driving behaviour are still high among women

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