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# Advertising Appeals Effectiveness: A Systematic Literature Review

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## **ABSTRACT**

Positive, negative and coactive appeals are used in advertising. The evidence base indicates mixed results making practitioner guidance on optimal advertising appeals difficult. This study aims to identify the most effective advertising appeals and it seeks to synthesise relevant literature up to August 2019. Following the PRISMA framework a total of 31 studies were identified and analysed. Emotional appeals, theory utilisation, materials, results and quality were examined. Across multiple contexts, results from this review found that positive appeals were more often effective than coactive appeals and negative appeals. Most studies examined fear and humour appeals, reflecting a literature skew towards the two emotional appeals. The EPHPP framework was applied to assess the quality of the studies and identified that there remains opportunity for improvement in research design of advertising studies. Only one-third of studies utilised theory, signalling the need for more theory testing and application in future research. Scholars should look at increasing methodological strength by drawing more representative samples, establishing strong study designs and valid data collection methods. In the meantime, advertisers are encouraged to employ and test more positive and coactive advertising appeals.

Advertising appeals have witnessed an increase in research interest and scholarly attention in recent years. Studies investigate appeal effectiveness (e.g. Jordan et al. 2015, Lee 2018) and to a lesser extent systematic and meta-analytic studies attempting to synthesize results are evident (Hornik, Ofir and Rachamim 2016, Jenkin et al. 2014, O'Keefe and Jensen 2009). These studies however are limited in their focus (e.g. fear appeals; Esrick et al. 2019, Tannenbaum et al. 2015), context (e.g. disease detection behaviours; O'Keefe and Jensen 2009), media type, (e.g. mass media; Elder et al. 2004) and comparison of general advertising appeal types (e.g. rational vs. emotional (fear and humour) vs. metaphor appeals; Hornik, Ofir and Rachamim 2017). Taken together, a review of the literature indicates clear gaps requiring an evidence review focussed on synthesising studies seeking to examine positive versus negatively framed advertising appeal effectiveness that are context free, not media specific, includes rational as well as emotional studies of different emotional valances (positive, negative and coactive), and extends the range of emotions examined beyond fear and humour which is heavily investigated in the literature. Given that negatively framed appeals dominate behaviour change and prevention studies, a systematic literature review that explores the effectiveness of different advertising approaches is important, timely and called for (e.g. Armstrong 2010, Hornik, Ofir and Rachamim 2016, Williams, Lee and Haugtvedt 2004).

Hornik, Ofir and Rachamim (2016) based their meta analytic review on rational, emotional (i.e. fear, humour and sex) and metaphor advertising appeals, limiting their results to specific appeal types. The current study seeks to build on their study, extending investigation to other appeals (e.g. coactive) to ascertain the extent these have been used effectively to deliver behaviour change. Following Hornik, Ofir and Rachamim (2016), we argue that positive emotional advertising appeals are more effective in changing behaviour than negative and

rational advertising appeals. However, in contrast to their study, we do not follow their general classification of appeals (i.e. rational, emotional and metaphor), but rather we include a wider set of studies that look at rational, emotional, positive, negative and coactive advertising appeals in different campaign contexts (e.g. social and commercial).

## **Advertising Appeals**

An advertising appeal refers to the use of persuasion strategies to attract attention, create relevance and memorability, raise awareness and induce action (Armstrong 2010). An advertising message can appeal to one's cognition (i.e. rational appeals), emotions (i.e. emotional appeals) or both. Rational appeals rely on arguments, reason and facts to create persuasion (Dahlen, Lange and Smith 2010). In contrast, emotional appeals seek to induce certain emotions in the audience to make the message memorable and more persuasive to take action (Dahlen, Lange and Smith 2010). The emotional versus rational debate has been widely discussed with scholars exploring effectiveness in different advertising aims, contexts, business types and target audiences (see for example: Akpınar and Berger 2017, Matthes and Wonneberger 2014, Mattila 1999, Moran and Bagchi 2019). Two recent meta-analytic studies identified that consumers respond more favourably to emotional appeals than they do to rational appeals (Hornik, Ofir and Rachamim 2016, Hornik, Ofir and Rachamim 2017).

Effectiveness of different emotional appeals utilised in advertising messages has also received attention. Emotional appeals can be classified as positive, negative or coactive based on the valence of emotion employed. Each emotional valence exerts different effects on judgment and therefore affects perceptions and behaviours differently (Lerner and Keltner 2000). The literature reports mixed results for advertising effectiveness when it comes to

positive versus negative emotional appeals. For example, while fear appeals were found to generate defensive reactions (Witte and Allen 2000) and result in a boomerang effect for young adults (Lennon, Rentfro and O'Leary 2010), other studies found negative appeals to be effective in creating behaviour change when compared to positive and neutral appeals (Small and Verrochi 2009, Struckman-Johnson et al. 1994, Sun 2014, Tay 2011). Neutral appeals are discussed mainly in charity advertising (see for example Small and Verrochi 2009), where positive and negative appeals are compared to neutral (no emotion) ads.

Positive emotional appeals are explored in the literature to a lesser extent reflecting their limited use in advertising campaigns focussed on health prevention and related contexts (Dunstone et al. 2017, Tay 2005). Inducing positive emotions through advertising messages was found to yield more positive attitudes to the advertisement (Lau-Gesk and Meyers-Levy 2009), higher liking of the message (Hornik, Ofir and Rachamim 2017), and a stronger impact on behaviour than negative emotional appeals in multiple contexts such as safe driving (Plant, Irwin and Chekaluk 2017), reducing binge drinking among college students (Lee 2018), encouraging environmental friendly behaviour (Skurka et al. 2018, Wang et al. 2017), health behaviour (Jordan, Bleakley, Hennessy, Vaala, Glanz and Strasser 2015, Vaala et al. 2016), and anti cyber bullying (Alhabash et al. 2013). However, positive emotional appeals were found to be less effective for highly involved consumers (Yoon and Tinkham 2013) and for female audiences (Noble, Pomeroy and Johnson 2014) when compared to low involved and male audiences respectively.

Recently there has been an interest in the literature in the use of coactive emotional appeals that seek to induce both positive and negative emotions simultaneously (Nabi 2015, Yoon 2018). It is hypothesised that the use of a threat-relief emotional message by combining

emotions like fear and humour will result in a stronger persuasion outcome (Nabi 2015). Positive emotions have the ability to reduce the defensive reactions that negative appeals generate, making them more effective in changing behaviour (Bennett 2015, Mukherjee and Dubé 2012). Eckler and Bolls (2011) and Alhabash, McAlister, Hagerstrom, Quilliam, Rifon and Richards (2013) found coercive appeals to have a stronger impact than negative appeals but their work also indicated that coercive appeals are weaker than positive appeals. No known systematic or meta-analytic review has synthesised the effectiveness of coercive advertising appeals, signalling the need for a review study.

## **Emotions**

Emotion can be defined as the psychological reaction to an event, a memory, and specific types of media (Allen et al. 2005). Emotions are usually provoked by an internal stimulus that generates a strong short-term reaction influencing one's attitudes toward something (Scherer 2005). Wu et al. (2018) report that being exposed to an advertisement, even a very short exposure, will induce both strong and weak emotions. The type of emotions used in an advertisement will have different results for the audience. Using neural signal tools like heartrate monitors, Kaye et al. (2016) found that negative advertisements stimulate respondents while positive advertisements result in a more relaxed feeling.

## **Aims**

Taken together, the current evidence base indicates mixed results for advertising appeal effectiveness making practitioner guidance difficult. Consequently, more research is needed to extend understanding. Literature remains fragmented (Hornik, Ofir and Rachamim 2016), creating a challenge for advertisers aiming to develop effective messages in their fields given

a lack of clear guiding signals from the research community. This highlights the need for a systematic literature review to examine:

**RQ1.** Which emotional advertising appeal is more effective in creating behaviour change across different contexts?

There is no recent systematic review that looks beyond the context of advertising (e.g. health) and valance of emotions (e.g. fear appeals) to understand the effectiveness of positive versus negative and coercive advertising appeals. The aims of this systematic review study are twofold. First, to highlight the most effective advertising appeal based on empirical research findings utilising behavioural (e.g. driving speed) or behavioural proxy (e.g. intentions) measures up to August 2019. Second, this review analyses the quality of published studies in the field based on the Effective Public Health Practice Project (EPHPP) protocol to guide future research.

## **METHOD**

This systematic literature review has followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Guidelines (Moher et al. 2009). Following PRISMA protocols this systematic literature review sought to identify studies that compared negative and positive appeals that were published in peer-reviewed journal articles as at August 2019. Due to the heterogeneity of the identified programs (e.g. reducing sugar sweetened beverages, smoking, alcohol use, donation behaviour and safe driving) in regards to study populations (e.g. college students, adolescents, adult populations and more) and outcome measures (e.g. driving speed, intentions to quit, clicks to the organ donation register and more), meta-analysis was not possible (Estrada et al. 2017, Williams et al. 2001). Seven databases were searched in August 2019, using the following terms:



emotional appeals or emotion\* based advertis\*

AND

appeal\*

AND

advertis\* or public service announcement or psa or message or communication or strategy or promot\* or campaign or experiment

In total, 2,384 records were initially identified (see Figure 1 for a flowchart of the search process adopted). Due to the magnitude and focus of each database and its alignment with the search terms, there was variance in the number of records produced from each database. The downloaded records were collated using Endnote. Firstly, all duplicate records were removed leaving a total of 1507 unique records. Secondly, unqualified records including conference and government reports, unidentifiable full text, as well as records not in English were removed. Finally, titles and abstracts of remaining records were assessed and classified into the exclusion criteria categories: studies using non advertising materials (e.g. news articles), non-emotional based advertising, non-experimental studies (e.g. content analysis and literature reviews), studies exploring only one type of appeal (i.e. negative, positive, mixed or rational), rational versus emotional appeal studies, message framing studies (e.g. gain vs. loss frame), studies lacking behaviour or intention measures of effectiveness.

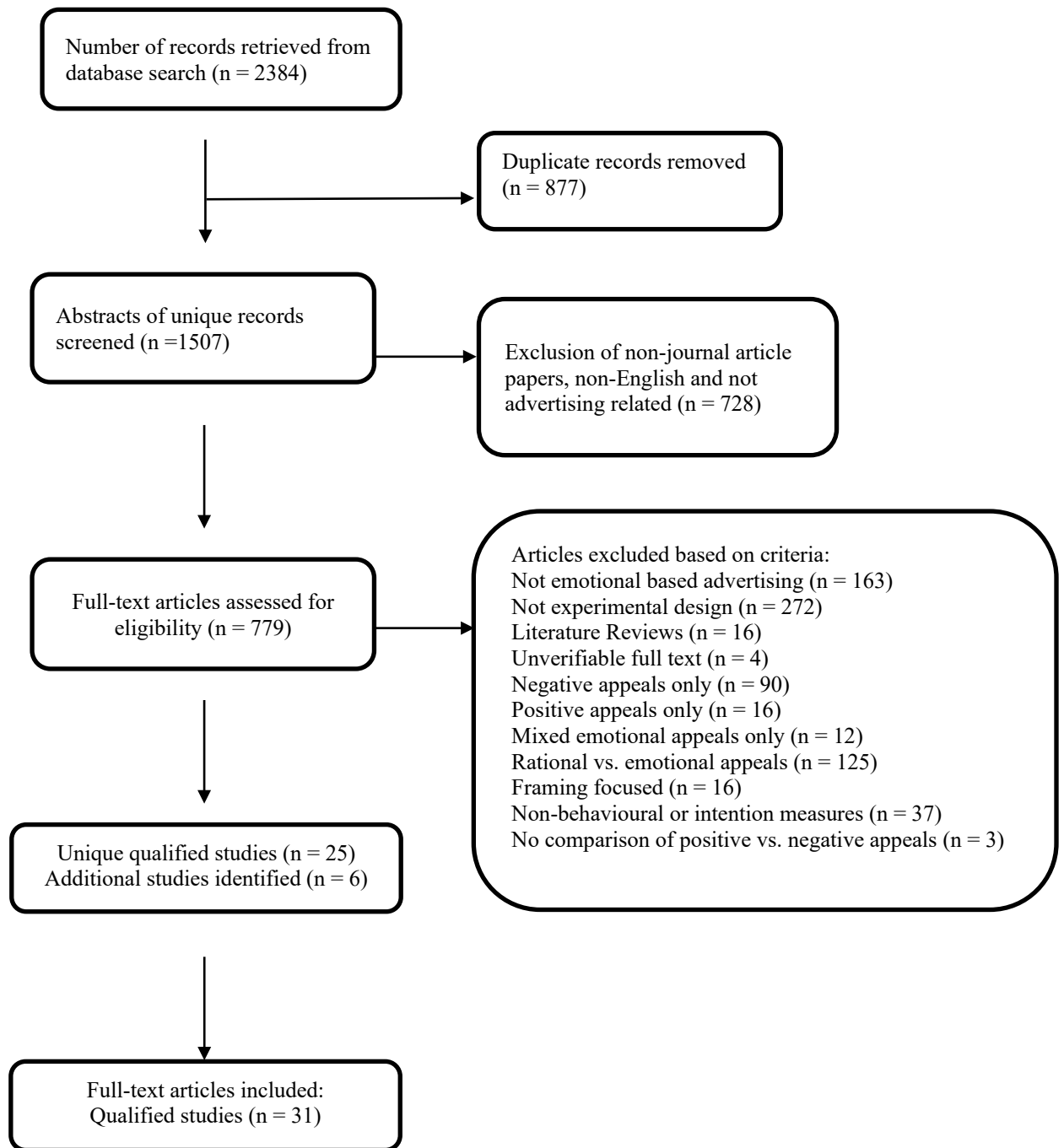


Figure 1. Systematic search diagram using PRISMA process

After application of the exclusion criteria, a total of 25 articles undertaking a direct comparative evaluation of the effectiveness of positive and negative appeals were identified. Next, backward and forward searching using authors' names, Google Scholar, and reference lists

were completed. A further 6 articles were identified. In total 31 articles were analysed. The full list of papers can be found in Appendix A.

### **Data extraction and analysis**

The included studies were analysed in terms of; 1) the employed materials 2) study characteristics and results and, 3) study quality.

#### *Employed materials and media*

Each study's stimulus was screened to determine the type of media (e.g. video, print, audio), the type of emotion (e.g. fear, guilt, happiness), the target issue (e.g. health behaviour, safe driving, environmental behaviour) and the type of appeals tested (e.g. positive, negative, coactive, rational appeals). This categorised studies based on the type of stimulus used to identify patterns and examine appeal effectiveness.

#### *Study characteristics and results*

The 31 identified studies were analysed based on their sample size, sample characteristics (e.g. age and gender), data collection methods (e.g. self-report or objective measures), data collection time points (e.g. post exposure only, pre and post exposure, or after a delayed period of time), the employed theory (if any) and mediators and moderator measures of effectiveness. Study outcome measures that were set to warrant inclusion in the review were restricted to behaviour or behavioural intention measures. Studies were excluded if an outcome evaluation was not undertaken to examine advertising effectiveness. For included studies results were categorised based on the most effective appeal, namely (a) positive, (b) negative, (c) no difference/inconclusive or (d) mixed if positive and negative appeals were found to be effective for different cohorts.

### *Quality Assessment*

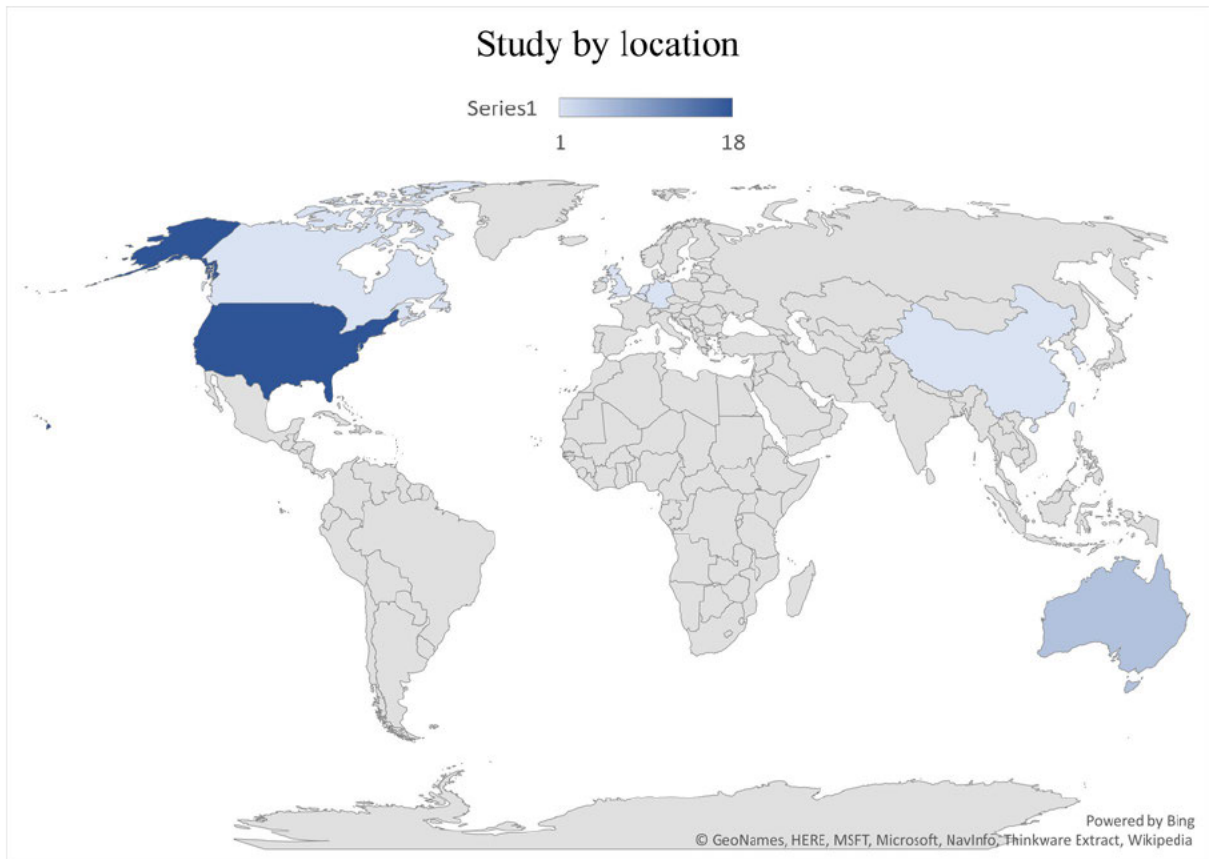
The quality of the included studies was assessed using the EPHPP quality assessment tool for quantitative studies (Effective Public Health Practice Project 2019). The EPHPP tool is suitable for evaluating multiple study designs (Deeks et al. 2003) and has been used to assess the quality of advertising studies in previous reviews (Becker and Midoun 2016). The assessment tool is valid (Jackson et al. 2005, Thomas et al. 2004) and suitable for use in systematic reviews examining effectiveness (Deeks, Dinnes, D'Amico, Sowden, Sakarovitch, Song, Petticrew and Altman 2003). Each study was rated using six EPHPP criteria [1] selection bias – how representative the sample is of the target population; [2] study design – the likelihood of bias due to the allocation process in the study; [3] confounders –the extent to which groups were balanced at baseline with respect to confounding variables; [4] blinding – whether participants were aware of the study objectives and researchers participating in the study were aware of each group participation status; [5] data collection – whether study measures were valid and reliable; and [6] withdrawals and drop outs – the percentage of participants remaining in the study at the final data collection period in all groups (Thomas, Ciliska, Dobbins and Micucci 2004). Each individual aspect is rated as weak, moderate or strong and an overall rating is applied to each study (Thomas, Ciliska, Dobbins and Micucci 2004). All studies assessed through the EPHPP tool were rated by two researchers and inter-reliability scores exceeded the 80% threshold. Discrepancies were discussed and resolved with all three authors.

## **RESULTS**

### **Description of included studies**

In total 31 studies qualified for inclusion. More than half of studies were from the United States (n=18; e.g. Alhabash, McAlister, Hagerstrom, Quilliam, Rifon and Richards 2013, Bleakley et

al. 2015), followed by Australia (n=5; e.g. Kaye, Lewis, Algie and White 2016, Noble, Pomeroy and Johnson 2014), the rest (n=8) were from Canada (Tay 2011), United Kingdom (Eckler and Bolls 2011), Germany (Jäger and Eisend 2013), Belgium (Faseur and Geuens 2010), Netherlands (Hendriks, Putte and Bruijn 2014), China (Wang, Bao, Wang and Wu 2017), Taiwan (Wu, Sundiman, Kao and Chen 2018), and South Korea (Sun 2015) (see figure 2 for study locations). Most studies addressed social issues (n= 28) such as safe driving (Jäger and Eisend 2013, Kaye, Lewis, Algie and White 2016, Lewis, Watson and White 2008, Plant, Irwin and Chekaluk 2017, Previte, Russell-Bennett and Parkinson 2015, Taute, McQuitty and Sautter 2011, Tay 2011), charity donations (Cao and Jia 2017, Faseur and Geuens 2010, Kemp, Kennett-Hensel and Kees 2013, Small and Verrochi 2009, Zemack-Rugar and Klucarova-Travani 2018), health (Bleakley, Jordan, Hennessy, Glanz, Strasser and Vaala 2015, Hendriks, van den Putte and de Bruijn 2014, Jordan, Bleakley, Hennessy, Vaala, Glanz and Strasser 2015, Lee 2018, Lee and Ferguson 2002, Passyn and Sujun 2006, Struckman-Johnson, Struckman-Johnson, Gilliland and Ausman 1994, Thainiyom and Elder 2017, Vaala, Bleakley, Hennessy and Jordan 2016), the environment (Noble, Pomeroy and Johnson 2014, Skurka, Niederdeppe, Romero-Canyas and Acup 2018, Wang, Bao, Wang and Wu 2017, Yoon and Tinkham 2013), organ donation (Rodrigue et al. 2014, Sun 2015), and cyberbullying (Alhabash, McAlister, Hagerstrom, Quilliam, Rifon and Richards 2013). Three studies were undertaken in commercial settings with authors examining toothbrush, influenza vaccine, alcohol, cars and insurance advertisements (Brooker 1981, Eckler and Bolls 2011, Wu, Sundiman, Kao and Chen 2018) (see figure 3).

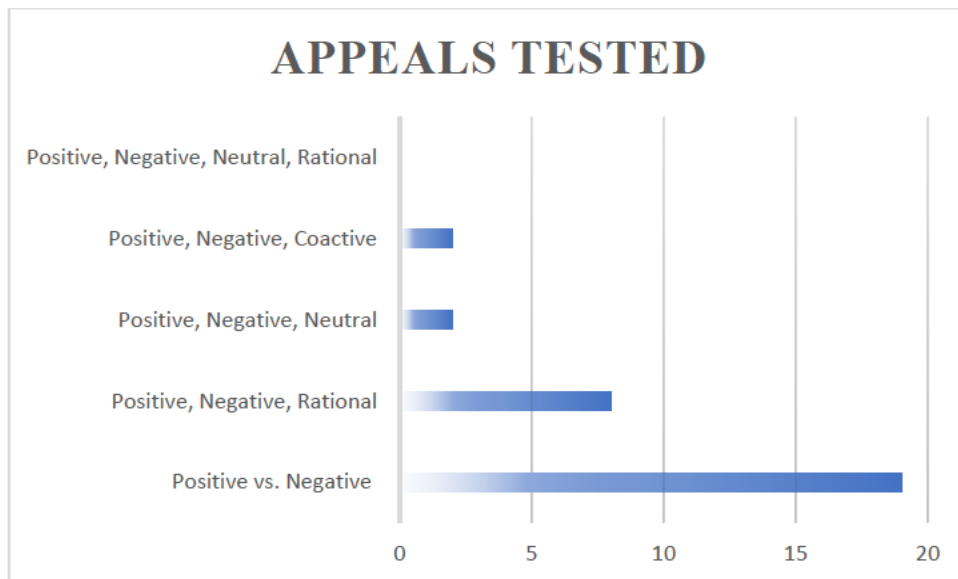


*Figure 2 Location of included studies*



*Figure 3 Studies by targeted issue*

Most studies looked at positive versus negative advertising appeals (n=19; e.g. Kaye, Lewis, Algie and White 2016, Kemp, Kennett-Hensel and Kees 2013), only two studies included positive, negative and coactive appeals (Alhabash, McAlister, Hagerstrom, Quilliam, Rifon and Richards 2013, Eckler and Bolls 2011), while the rest incorporated a rational (n=8; e.g. Skurka, Niederdeppe, Romero-Canyas and Acup 2018, Sun 2015) or neutral appeal (n=2; Small and Verrochi 2009, Zemack-Rugar and Klucarova-Travani 2018; see figure 4) in their tests. In terms of emotions, fear versus humour was most frequently examined with 12 (38%) studies comparing the two emotions (e.g. Tay 2011, Vaala, Bleakley, Hennessy and Jordan 2016). Of all tested emotional appeals, fear was the most studied appeal (48%) followed by humour (45%). Positive emotions such as pride (Kemp, Kennett-Hensel and Kees 2013, Noble, Pomeroy and Johnson 2014, Wang, Bao, Wang and Wu 2017), hope (Rodrigue, Fleishman, Vishnevsky, Fitzpatrick and Boger 2014, Thainiyom and Elder 2017), love (Previte, Russell-Bennett and Parkinson 2015) and a range of negative emotions such as disgust (Hendriks, van den Putte and de Bruijn 2014), anger (Rodrigue, Fleishman, Vishnevsky, Fitzpatrick and Boger 2014), shame (Previte, Russell-Bennett and Parkinson 2015), regret (Taute, McQuitty and Sautter 2011) and guilt (Noble, Pomeroy and Johnson 2014) were also considered. Seven studies did not specify which positive and negative emotions were tested (Alhabash, McAlister, Hagerstrom, Quilliam, Rifon and Richards 2013, Eckler and Bolls 2011, Faseur and Geuens 2010, Kaye, Lewis, Algie and White 2016, Plant, Irwin and Chekaluk 2017, Sun 2015, Wu, Sundiman, Kao and Chen 2018).



*Figure 4 Studies by the tested appeals*

Only three studies utilised objective data collection tools. Objective outcome data included GPS speed trackers (Kaye, Lewis, Algie and White 2016), driving stimulators (Plant, Irwin and Chekaluk 2017) and donation amounts (Small and Verrochi 2009). The rest of the studies relied on self-reported measures (n=28; e.g. Jäger and Eisend 2013, Skurka, Niederdeppe, Romero-Canyas and Acup 2018, Wu, Sundiman, Kao and Chen 2018). The majority of studies (n=24) collected data post exposure only (e.g. Sun 2015, Taute, McQuitty and Sautter 2011). Four studies included a post exposure and a follow up data collection time point after a delayed period of time (Hendriks, Putte and Bruijn 2014, Lewis, Watson and White 2008, Passyn and Sujana 2006, Plant, Irwin and Chekaluk 2017). Two studies collected data pre and post exposure (Previte, Russell-Bennett and Parkinson 2015, Rodrigue, Fleishman, Vishnevsky, Fitzpatrick and Boger 2014) and only one study collected data at pre, post, and follow up time points (Kaye, Lewis, Algie and White 2016).

Only 35% of studies were guided by theories. Theories that were reported included the Elaboration Likelihood Model (Lewis, Watson and White 2008), Extended Parallel Process



Model (Tay 2011), Theory of Planned Behaviour (Hendriks, Putte and Bruijn 2014), Affect as Information Theory (Taute, McQuitty and Sautter 2011) and other theories (see appendix A).

### **Study Outcomes**

The aim of this systematic review was to highlight effective advertising appeals. This is based on the ability of the appeal to influence behaviour or behavioural intentions significantly ( $p < 0.05$ ) in the desired direction (e.g. reduce drink driving). The results of the 31 included studies indicate that positive advertising appeals are slightly more effective than negative and coercive advertising appeals. It is important to note there is evidence of effectiveness for all appeal types and each context and target audience differ in appeal effectiveness requiring pre-testing and examination prior appeal consideration. Thirty-five percent ( $n=11$ ) of studies reported positive appeals to be more effective (Alhabash, McAlister, Hagerstrom, Quilliam, Rifon and Richards 2013, Brooker 1981, Eckler and Bolls 2011, Lee 2018, Plant, Irwin and Chekaluk 2017, Previte, Russell-Bennett and Parkinson 2015, Rodrigue, Fleishman, Vishnevsky, Fitzpatrick and Boger 2014, Sun 2015, Wang, Bao, Wang and Wu 2017, Wu, Sundiman, Kao and Chen 2018, Zemack-Rugar and Klucarova-Travani 2018) while 26% ( $n=8$ ) reported negative appeals to have a stronger persuasion effect than positive appeals (Bleakley, Jordan, Hennessy, Glanz, Strasser and Vaala 2015, Hendriks, Putte and Bruijn 2014, Kaye, Lewis, Algie and White 2016, Noble, Pomering and Johnson 2014, Small and Verrochi 2009, Struckman-Johnson, Struckman-Johnson, Gilliland and Ausman 1994, Tay 2011). Nineteen percent of studies ( $n=6$ ) showed mixed results. Where mixed results were reported the mixed outcomes occurred as a result of range of factors including gender (Kemp, Kennett-Hensel and Kees 2013, Thainiyom and Elder 2017), connection to others (Faseur and Geuens 2010), prior attitudes (Jäger and Eisend 2013), time of assessment after exposure (Lewis, Watson and White 2008), issue involvement (Yoon and Tinkham 2013) and psychological involvement (Cao and

Jia 2017). Five studies (16%) did not find any significant differences in effectiveness between positive and negative appeals (Passyn and Sujun 2006, Skurka, Niederdeppe, Romero-Canyas and Acup 2018, Thainiyom and Elder 2017). Finally, only one study reported inconclusive results due to unrepresentative sample (Lee and Ferguson 2002). Figure 5 showcase results of the included studies.

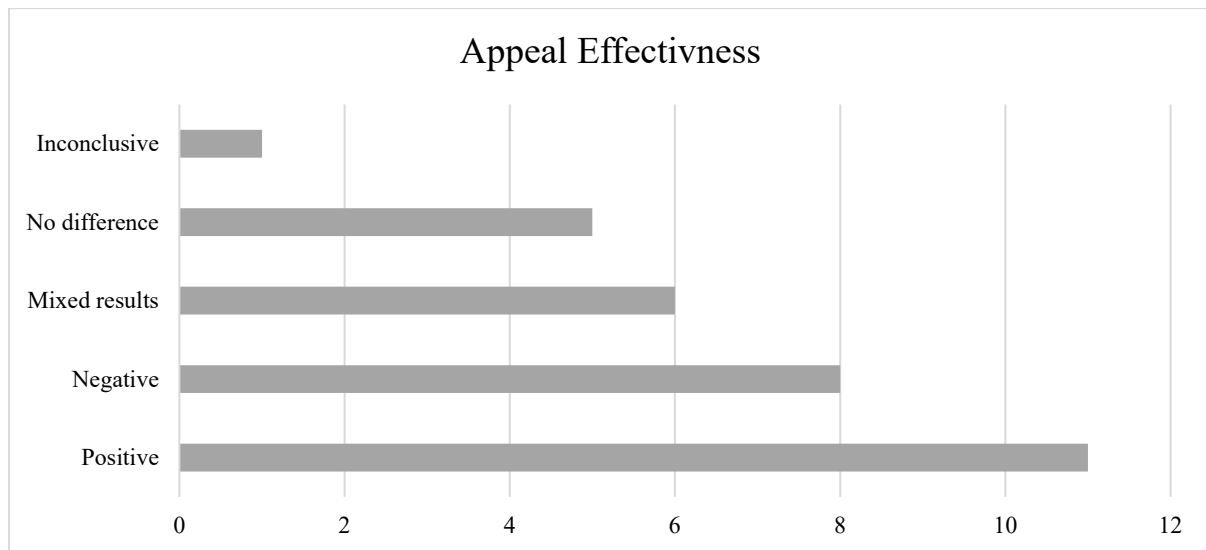


Figure 5 Results supporting different appeals effectiveness or reporting mixed, indifferent or inconclusive results.

### Quality assessment

A quality assessment of the identified papers was conducted using the EPHPP tool (see Appendix B). Of the 31 included studies, 26 were assessed as weak in the global rating, five were assessed as moderate and none were assessed as strong. Selection bias was likely in many studies due to the use of student samples or bias to a geographical area. Only one study was somewhat likely to have a representative sample (Skurka, Niederdeppe, Romero-Canyas and Acup 2018). Five studies included a control group and randomly allocated participants into experimental groups (e.g. positive and negative stimuli) therefore these were assessed as strong in terms of study design (Bleakley, Jordan, Hennessy, Glanz, Strasser and Vaala 2015, Jordan, Bleakley, Hennessy, Vaala, Glanz and Strasser 2015, Skurka, Niederdeppe, Romero-Canyas

and Acup 2018, Struckman-Johnson, Struckman-Johnson, Gilliland and Ausman 1994, Vaala, Bleakley, Hennessy and Jordan 2016). Six were assessed as moderate (Hendriks, Putte and Bruijn 2014, Kaye, Lewis, Algie and White 2016, Lewis, Watson and White 2008, Plant, Irwin and Chekaluk 2017, Previte, Russell-Bennett and Parkinson 2015, Sun 2015) while the rest (n=20) were weak due to their cross sectional nature (e.g. Alhabash, McAlister, Hagerstrom, Quilliam, Rifon and Richards 2013, Jäger and Eisend 2013).

In terms of confounders, about one-third of studies (n = 10, 32%) reported either no baseline differences between groups or controlled for at least 80% of relevant confounders resulting in a strong rating. The rest of the studies (n=21) did not report potential confounders or account for confounds during analysis and were therefore assessed as weak (e.g. Alhabash, McAlister, Hagerstrom, Quilliam, Rifon and Richards 2013, Bleakley, Jordan, Hennessy, Glanz, Strasser and Vaala 2015, Lee 2018). Only 2 studies (10%) clearly reported that both the assessors and participants were not blinded in the experiment resulting in a weak rating (Plant, Irwin and Chekaluk 2017, Rodrigue, Fleishman, Vishnevsky, Fitzpatrick and Boger 2014). The rest of the studies (n=29, 87%) were rated as moderate as it was not clear if the participants and assessors were blinded or not. In terms of data collection methods, over half of the included studies (n=19, 61%) did not provide evidence of the validity of the reported measures and were therefore assessed as weak.

Two studies were assessed as moderate in their data collection method as they reported on validity but not reliability of the measures (Jordan, Bleakley, Hennessy, Vaala, Glanz and Strasser 2015, Plant, Irwin and Chekaluk 2017) while the rest (n=10, 32%) were rated strong for providing evidence of the validity and reliability of the reported outcomes measures (e.g. Kaye, Lewis, Algie and White 2016, Kemp, Kennett-Hensel and Kees 2013, Noble, Pomeroy

and Johnson 2014, Sun 2015). For the retention rate of participants, only two programs were assessed as strong with more than 80% completing the experiment (Kaye, Lewis, Algie and White 2016, Plant, Irwin and Chekaluk 2017). The rest were rated as moderate due to the lack of retention rate reporting (e.g. Jäger and Eisend 2013), low completion rate (e.g. Jordan, Bleakley, Hennessy, Vaala, Glanz and Strasser 2015, Rodrigue, Fleishman, Vishnevsky, Fitzpatrick and Boger 2014) or due to the post exposure nature of studies where retention rate is not applicable (e.g. Faseur and Geuens 2010).

## **DISCUSSION**

The aims of this study were twofold. This study aimed to identify which appeal type (positive, negative and/or coercive) was most likely to change social and commercial behaviour and to assess the quality of studies reported in peer review literature. This is the first known systematic review that is not limited to an emotion, appeal type, context or media. Our findings extend understanding in three key ways. First, this paper extends understanding of appeal effectiveness with consideration of the effectiveness of coercive appeals. Second it examines the extent of theory and emotion use in the included studies. Third, it assesses study quality identifying how researchers can enhance the evidence base by improving study quality.

### **Positive, negative or coercive?**

Consistent with the literature (Hornik, Ofir and Rachamim 2016, Jenkin, Madhvani, Signal and Bowers 2014) our findings confirm a slight persuasive advantage of positive advertising appeals over negative appeals. Positive appeals are able to increase consumers' perceived response efficacy more than negative appeals (Zemack-Rugar and Klucarova-Travani 2018); help consumers realise the rewards of the promoted behaviour (e.g. moderate alcohol consumption; Previte, Russell-Bennett and Parkinson 2015); induce positive attitudes - more

than negative and coercive appeals - and therefore affect behavioural intentions positively (Eckler and Bolls 2011, Wang, Bao, Wang and Wu 2017). According to studies synthesised in the present review positive appeals yield higher acceptance of the advertising message (Alhabash, McAlister, Hagerstrom, Quilliam, Rifon and Richards 2013) by creating a positive climate in which messages may be received (Brooker 1981), reducing reactance (e.g. skipping, ignoring, backlash or resisting; Wu, Sundiman, Kao and Chen 2018), and increasing message liking (Lee 2018). Further outcomes accruing from positive appeals include illustration of positive benefits of the promoted behaviour by inducing empathy and reducing guilt (Rodrigue, Fleishman, Vishnevsky, Fitzpatrick and Boger 2014).

Negative appeals dominate social change practice and while evidence for effectiveness exists there appears to be less support in comparison to positive and coercive appeals based on this study's findings. Mixed results were also evident in other studies. For example, Kemp, Kennett-Hensel and Kees (2013) argued that positive appeals are more persuasive with a male audience than a female audience, while Jäger and Eisend (2013) found participants with less favourable prior attitudes produce higher change in intentions to drink drive when exposed to positive emotional appeals.

The effectiveness of coercive appeals compared to single appeals was examined by two of the 31 included studies. Their findings suggest coercive appeals are less effective than positive appeals and more effective than negative appeals (Alhabash, McAlister, Hagerstrom, Quilliam, Rifon and Richards 2013, Eckler and Bolls 2011). Positive appeals require less cognitive processing, generate a general sense of pleasantness, are more likable and facilitate positive attitudes towards the advertisement making the advertised behaviour more appealing and taking action more tempting. On the contrary, the more negative an ad is, the less likable it is,

and the less likely viewers are to take action (i.e. share on social media). Therefore, coactive emotional appeals come in the middle, they are more effective than negative appeals but less effective than positive appeals (Alhabash, McAlister, Hagerstrom, Quilliam, Rifon and Richards 2013). Interestingly, the two studies including coactive appeals in their experiments focused on viral sharing behaviour. Taking the target behaviour in consideration, their results can be interpreted more specifically. Previous studies found both emotional valence and arousal to affect content sharing and virality of advertisements (Berger 2011, Berger and Milkman 2012). More specifically, content that are emotionally arousing (either positive or negative) are more likely to be shared with others than those less arousing. Furthermore, ads that are more positive in nature are more likely to be shared than negative ads (Berger and Milkman 2012). Moreover, the use of positive emotions along with negative emotions helps reduce the defensive responses of the audience resulting in a higher persuasion effect (Mukherjee and Dubé 2012). Hence, the studies included in this systematic review found coactive appeals to be more effective than negative appeals. When testing behaviour beyond sharing and virality, Yousef, Dietrich and Rundle-Thiele (2021) found positive appeals and coactive appeals to have similar effect on behaviour. Target audience plays a role in different appeals effectiveness, including coactive appeals. Studying advertising effect on young adults road safety perceptions and behaviour intentions, Yousef, Dietrich and Torrisi (2021) found coactive appeals to be more effective than single emotional appeals. The limited and mixed evidence for coactive appeals effectiveness is mainly due to the limited studies including such appeals in their experiments. More evidence is needed to determine coactive appeals effectiveness in other contexts and behaviours.

### **Applying theories and moving beyond fear and humour appeals**

Over the years, advertising researchers have been under pressure to deliver relevant and practical findings that practitioners can follow and utilise (Pitt et al. 2005). It is argued that advertising research has formulated theories with “a high level of generality” which makes them difficult to apply in practice (Cornelissen and Lock 2002). As a corollary, and due to the empirical nature of the included studies, these issues may have led to the limited application of theoretical frameworks. Pitt, Berthon, Caruana and Berthon (2005) found only a minority of papers published in an 11 year period made explicit use of theories. Our findings confirm their research with more than half of the included studies lacking a theoretical base. Examples exist indicating how and where theory has been applied by researchers in intervention design, recruitment, implementation and evaluation (see Willmott et al. 2019). For example, Wadsworth and Hallam (2010) applied social cognitive theory to an e-communication intervention identifying which theoretical constructs led to a physical activity increase. Theory did not only inform their study but was tested, refined and built on by the authors. This type of theory application can enhance study outcomes, better inform future research and systematically identify which theories are effective and for which audiences (Willmott, Pang, Rundle-Thiele and Badejo 2019).

Similarly, limited studies explored emotions beyond the heavily investigated emotions of fear and humour. Little is known about how other emotions effectiveness such as anger, disgust, guilt, love, joy and pride appeals deliver (or not) behavioural change. This reinforces past studies which have identified the limited use of emotions in advertising messages (Dunstone, Brennan, Slater, Dixon, Durkin, Pettigrew and Wakefield 2017, Tay 2005), not because other emotions are less effective but because there is limited evidence of effectiveness. When studies explore more emotions, new evidence emerges enabling practitioners to innovate and capture the attention of their audience. For example, Previte, Russell-Bennett and Parkinson (2015)

found a persuasive advantage for love and happiness (two emotions that are rarely examined in the advertising literature) over fear and shame appeals in moderate drinking advertising message, highlighting the potential of other emotions to yield desired results.

### **Enhancing study rigour to deliver a stronger evidence base for advertising effectiveness**

Study quality assessment frameworks provide tools to assess the quality of research. The stronger the study, the more the policy, practitioner and research community can rely on the study findings. This study applied the EPHPP quality assessment tool (Effective Public Health Practice Project 2019) to assess study quality. Of particular concern is that no one study overall was rated as strong in the current review. In general, the methodological quality of the included studies was low. In the absence of strong evidence any conclusions drawn in the present evidence review and earlier meta-analytic and systematic literature reviews should be interpreted with caution until stronger study designs emerge. Within the present review notable, methodological problems included selection biases, weak study designs and invalid data collection methods.

A common issue with sampling is the use of student samples and samples from a specific region for convenience, resulting in selection bias. While calls for adoption of probability sampling procedures in the academic literature have been made (Plant, Reza and Irwin 2011, Sarstedt et al. 2018), limited adoption of non-probability sampling is evident. In the absence of replication across samples or regions this reduces the generality of these studies making them bound to their sample and regional characteristics. Furthermore, the use of cross-sectional study designs contributed to the overall weak rating for most studies in this review. Including only a post-test immediately after exposure to the tested advertisements can lead to different result compared to testing over a delayed period of time (Lewis, Watson and White 2008) making



the results incomplete and the findings less comprehensive. Researchers are encouraged to include more than one time point for data collection to measure behaviour change over time. Finally, the validity and reliability of data collection methods used in the included studies are mostly weak. This is a reflection of the limited use of theories, with more studies bringing in their own measures without testing their validity or reliability before conducting their evaluations. Future research should focus on increasing the validity of their studies by utilising previously validated measures from the literature (David and Rundle-Thiele 2018). This makes the study easier to replicate and its findings more reliable. Taken together, future research should aim to address these issues and improve the methodological quality of advertising evaluation studies to enhance empirical evidence.

### **Limitations**

This study is restricted by several important limitations, which should be considered when interpreting the findings. Firstly, the study is limited by the search parameters utilized and the study quality frameworks applied. For example, the review only includes studies that empirically test advertising appeal effectiveness (positive, negative, coactive), using behavioural measures (e.g. purchase intentions) that have been published in peer reviewed English literature. Hence studies that rely on other measures (e.g. attitudes) or evaluate other message tactics (e.g. framing) and non-English and non-peer reviewed studies, were excluded. Grey literature may contribute important information and future studies may benefit from examining these sources. The study focused mainly on emotional appeals, hence rational appeals were not included. Future reviews should compare rational and emotional appeals for more comprehensive findings. Second, due to the heterogeneity in the tested appeals, study populations and reporting of results a meta-analysis was not possible, and a qualitative description of study outcomes was provided. Few studies included effect sizes and odds ratios,

limiting our ability to compare effectiveness for the different advertising appeals. Thirdly, results of the current review are collected from different contexts and behaviours and generalisation of findings cannot be extended beyond this review. Moreover, pre-tests should be carried out before adopting any advertising appeal for any specific context, behaviour and target audience. Finally, based on the quality assessment of the included studies there is a clear absence of strong rigour experiments, hence any conclusions drawn in the present review should be interpreted with caution.

### **Future research**

Future research should examine appeals effectiveness by utilising and applying advertising theories, investigating emotions beyond fear and humour in advertising appeals, increase the strength of their studies by following EPHPP guidelines, or other study quality frameworks, to design rigorous experiments and ensure that valid replicable analysis is reported. More effort should be made to draw representative samples, ensuring valid data collection methods and designing strong experiments that test effectiveness pre, post and after a delayed period of time following exposure. Furthermore, more studies should include coactive appeals in their evaluations to confirm their effectiveness compared to single appeal use as only a limited number of studies explored this type of appeal.

Future systematic literature reviews should build on this study by including other advertising tactics such as non-emotional appeals and gain and loss framing which can provide a wider picture of advertising effectiveness. Moving forward, consensus on advertising effectiveness outcome measures should be generated by the advertising research community. By agreeing on standard outcome measures, as occurs in tobacco control research, the research community could then advance understanding further via meta-analyses. Any effort that can reduce data

transformation practices will serve to ensure synthesis studies can advance knowledge through delivery of the highest quality research that can inform policy and advertising practices.

## **CONCLUSION**

This systematic review examined advertising appeals effectiveness based on the literature up to August 2019. Our findings support previous meta analytic reviews in confirming positive appeals effectiveness over negative appeals. We extend on their findings however by including coercive advertising appeals. Across different contexts and behaviours, this review found positive appeals to be effective more often than negative appeals and coercive appeals. When all three appeals are studied, evidence suggest coercive appeals are more effective than negative appeals and less effective than positive appeals. Specifically, this review highlighted the scarce of theory use in advertising research signalling the need for more attention to embed theory into advertising design and evaluation. Moreover, a major concern raised by this review is the quality of the published papers. A greater focus should be made by authors to utilise valid data collection methods, representative samples and strong study designs. This research has contributed to a better understanding of advertising appeal effectiveness and may be of interest to policy makers, advertising professionals and designers and researchers who are interested in maximising return on investment.

### **Caption list**

*Figure 6. Systematic search diagram using PRISMA process*

*Figure 7. Location of included studies*

*Figure 8. Studies by targeted issue*

*Figure 9. Studies by the tested appeals*

*Figure 10. Results supporting different appeals effectiveness or reporting mixed, indifferent or inconclusive results*

*Appendix A. 31 studies included in the analysis.*

*Appendix B. EPHPP Scores*

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## Appendices

Appendix A. 31 studies included in the analysis.

Author	Context	Theory	Quality	Outcome (most effective appeal)	Primary outcome measures	Results
(Alhabash, McAlister, Hagerstrom, Quilliam, Rifon and Richards 2013)	Social - Cyberbullying	None stated	Weak	Positive	<ul style="list-style-type: none"> <li>• Attitude toward the status update (ASU)</li> <li>• Anti-cyberbullying attitudes (ACB)</li> <li>• Viral behavioural intentions (VBI)</li> </ul>	Emotional tone had a significant main effect on all variables, where positive messages had the most favourable attitudes and highest intentions to share the ad, followed by coercive and negative messages ( $p < 0.001$ ).
(Bleakley, Jordan, Hennessy, Glanz, Strasser and Vaala 2015)	Health – sugar consumption	None stated	Weak	Negative	<ul style="list-style-type: none"> <li>• Intentions to cut back on sugary drinks</li> </ul>	Adolescents' intention to cut back on sugary drinks was highest in the fear condition, followed by humour, nurturance, and the control group. Only the fear appeal group showed significantly different intentions from the control group ( $p < 0.05$ ).

(Faseur and Geuens 2010)	Charity donation	None stated	Weak	Mixed results	<ul style="list-style-type: none"> <li>• Attitudes towards the ad</li> <li>• Perceived effectiveness</li> <li>• Intention to donate</li> </ul>	Results were different depending on connectedness to the cause. When participants felt connected to the cause, positive appeal was more effective than negative appeal ( $p < 0.05$ ). When participants felt less connected to the cause, negative appeals were found more effective ( $p < 0.05$ ).
Hendriks, van den Putte and de Bruijn (2014)	Alcohol consumption	Theory of Planned Behaviour	Weak	Negative	<ul style="list-style-type: none"> <li>• Conversational valence</li> <li>• Binge drinking attitudes, norms, perceived control, intentions and behaviours</li> </ul>	An increase in the emotion fear was significantly related to a more negative conversational valence about alcohol ( $p < 0.05$ ). The emotions disgust and humour were not related to conversational valence (NS).
(Jäger and Eisend 2013)	Road safety	None stated	Weak	Mixed results	Safe driving behaviour intentions	For reducing drink driving, participants with less favourable prior attitudes tend to show higher behavioural intentions when confronted with the humorous appeal than when confronted with the fear appeal ( $p < 0.1$ ). While participants with favourable prior attitudes show opposite results favouring fear appeals ( $p < 0.05$ ). Similar results were

						found for the anti-speeding context (p<0.05).
(Jordan, Bleakley, Hennessy, Vaala, Glanz and Strasser 2015)	Health – sugar consumption	None stated	Moderate	No difference	Parent’s intention to cut back on their children’s sugar sweetened beverage (SSB) intake	None of the emotional appeals, when compared with the control group, were directly related to parents’ intention to cut back on their child’s SSB consumption (NS), and none of the coefficients were significantly different from one another. Humour was significantly associated with decreased feelings of empowerment and hope (p<0.05). Appeals generating feelings of empowerment and hope was significantly associated with increased intention to cut back on child’s sugar sweetened beverages (p<.05).
(Kaye, Lewis, Algie and White 2016)	Road safety	None stated	Moderate	Negative	<ul style="list-style-type: none"> <li>• Self-reported speeding behaviour</li> <li>• Actual speeding behaviour</li> </ul>	In the negative appeal condition, participant showed a significant reduction in speeding in both self report and objective data collections (p <0.05)
(Kemp, Kennett-Hensel and Kees 2013)	Charity donation	Attachment Theory	Weak	Mixed results	Donation intention	Women expressed higher intentions to give in the sympathy condition than the pride condition (p<0.05), while men revealed opposite results,

						donating more when exposed to pride over sympathy ads ( $p < 0.05$ )
(Lee 2018)	Alcohol consumption	None stated	Weak	Positive	Intentions to change drinking behaviour	College binge drinkers who were in the humour condition reported higher levels of intention to change their drinking habits, than those in the fear condition.
(Lee and Ferguson 2002)	Health - smoking	None stated	Weak	Inconclusive	Intentions to quit smoking	There was a significant interaction between the effects of the conditions and the participants' rebelliousness, ( $p < .05$ ), on the participants' intention to quit smoking. However, authors considered results to be inconclusive due to small number of participants who currently smoke.
(Lewis, Watson and White 2008)	Road safety	Extended Parallel Process Model and Elaboration Likelihood Model	Weak	Mixed results	<ul style="list-style-type: none"> <li>• Intentions to drink drive</li> <li>• Drink driving behaviour</li> </ul>	Immediately post exposure to the ads, the negative appeals reduced intentions to drink drive for both males and females ( $p < 0.05$ ). After follow-up, the positive appeal condition was associated with significantly less drink driving than the negative appeal condition.



(Noble, Pomeroy and Johnson 2014)	Environmental	None stated	weak	Negative	Pro-environmental behavioural intentions	Results show a significant difference between guilt and positive self-image appeals ( $p = 0.049$ ). Of these two appeals, the guilt appeal was the more effective appeal in influencing intentions ( $M_{-ve} = 3.35$ ; $M_{+ve} = 3.03$ ).
(Plant, Irwin and Chekaluk 2017)	Road safety	None stated	Weak	Positive	<ul style="list-style-type: none"> <li>• Intentions to reduce speeding behaviour</li> <li>• Speeding behaviour</li> </ul>	Appeal type had a significant effect on intentions to reduce speeding ( $p < 0.05$ ). Participants' average travelling speeds were relatively reduced after viewing the positive anti-speeding advertisement when compared to the control advertisement ( $p < 0.05$ ). At follow up, a main effect for advertisement appeal was no longer found (NS).
(Rodrigue, Fleishman, Vishnevsky, Fitzpatrick and Boger 2014)	Organ donation	None stated	Weak	Positive	Organ donation decision making	About half of all participants ranked the positive appeal message as the most effective in motivating them to think more seriously about registering as an organ donor. Those reporting higher total positive emotions were more likely to click through to the organ donation website ( $p < 0.05$ ).
(Skurka, Niederdeppe,	Environmental	None stated	Weak	No difference	<ul style="list-style-type: none"> <li>• Climate change activism intention</li> </ul>	No significant differences were recorded between the fear and

Romero-Canyas and Acup 2018)					<ul style="list-style-type: none"> <li>Individual climate change mitigation behaviour intention</li> </ul>	humour appeals on activism intention (NS) or mitigation behavioural intention (NS).
(Small and Verrochi 2009)	Charity donation	Emotional Contagion	Weak	Negative	Donation amount	Donations were significantly higher in sadness appeal compared to happiness and neutral appeals ( $p < .05$ )
(Struckman-Johnson, Struckman-Johnson, Gilliland and Ausman 1994)	Health - Sexual health	None stated	Weak	Negative	<ul style="list-style-type: none"> <li>Intentions to use condoms</li> <li>Condoms collected after experiment</li> </ul>	Significant effect of appeal type on intentions to use condoms was recorded ( $p < .05$ ). Intentions to use condoms were significantly higher in fear condition compared to humour, erotic and factual appeals. No significant effect of appeal was found for number of condoms taken after experiment.
(Sun 2015)	Organ donation	None stated	Moderate	Positive	Organ donation intention	The subjects who received the ad with a positive message had a higher intention than the other group ( $p < 0.05$ ).
(Taute, McQuitty and Sautter 2011)	Road safety	Affect Information Theory as	Weak	No difference	Intentions to drink drive	For both the positive and the negative PSAs, the structural coefficients between empathy and attitude towards the ad are positive. The standardized path coefficients between attitude towards the ad and behavioural

						intentions are, respectively, .54 and .60 for the positive and negative PSAs both showing significant effects ( $p < 0.05$ ).
(Tay 2011)	Road safety	Extended Parallel Process Model, Elaboration Likelihood Model and Health Belief Model	Weak	Negative	Intentions to wear seatbelt.	The mean score for the two adaptive intentions items were higher for the fear-based video than the humour-based video and these differences were statistically significant ( $p < 0.05$ ).
(Thainiyom and Elder 2017)	Social	None stated	Weak	No difference	Intention to discriminate against people living with HIV/AIDS	No significant differences among experimental groups was found for intention to discriminate for both dependent variables: social distancing, and policy support (NS).
(Vaala, Bleakley, Hennessy and Jordan 2016)	Health – sugar consumption	weight-based identity threat theory	Moderate	No difference	Intentions to reduce sugar-sweetened beverage (SSB) consumption	None of the emotional responses were significantly related to intentions in the full parent sample. Mediation was found with argument strength and empowerment and hopeful emotions increasing intention to reduce SSB

						consumption, regardless of whether participants had been stigmatized (NS).
(Wang, Bao, Wang and Wu 2017)	Environmental	None stated	Weak	Positive	Green product purchase intentions	The promotional effect of pride appeal on purchase intention is better than that of guilt appeal ( $p < 0.05$ ). Similarly, the admiring green appeal is significantly more effective than the disdainful green appeal in improving consumers' purchase intention ( $p < 0.05$ ).
(Wu, Sundiman, Kao and Chen 2018)	Commercial	None stated	Weak	Positive	Click attitude and click intentions	Positive appeal ad was strongly and significantly related to click attitude ( $p < .05$ ) and click intentions ( $p < .05$ ). Negative appeals showed weaker effect.
(Yoon and Tinkham 2013)	Commercial	None stated	Weak	Mixed results	Purchase intention	When threat intensity was high, the non-humour ad had significantly higher purchase intention than the humour ad ( $p < .05$ )
(Passyn and Sujan 2006)	Health – sun protection	Protection Motivation Theory	Weak	Negative	Sun protection behaviour compliance	Negative emotions (regret and challenge) positively affected behaviours, but this effect diminished with time ( $p < .05$ ). Ten days later, there was a marginally significant

						difference ( $p < .10$ ). Eighteen days later, the difference disappeared (NS).
(Brooker 1981)	Commercial	Hierarchy of effects	Weak	Positive	Buying and using product	Mild humour seems to be a more effective device than mild fear in developing favourable responses to the products in the study ( $p < 0.05$ ).
(Eckler and Bolls 2011)	Viral sharing	Limited Capacity Model of Motivated Mediated Message Processing	Weak	Positive	intention to forward the viral video ad	The results revealed a significant main effect of emotional tone on intent to forward the ad ( $p < 0.05$ ). Participants indicated the strongest intent to forward viral video ads with pleasant emotional tone, followed by ads with coercive emotional tone, and then ads with unpleasant emotional tone.
(Previte, Russell-Bennett and Parkinson 2015)	Alcohol consumption	Theory of Planned Behaviour and Emotions Theory	Moderate	Positive	Intentions to drink moderately	Positive emotions more strongly influenced respondents' evaluation of outcomes from drinking moderately, rather than negative-evoking avoidance appeals ( $P < 0.01$ ).
(Cao and Jia 2017)	Charity donation	None stated	Weak	Mixed results	Donation intention	Psychological involvement negatively moderated the impact of advertising appeal on perceived response efficacy ( $p < .05$ ) and that perceived response efficacy was positively associated with donation intentions ( $p < .001$ ).  The sad versus happy appeal increased the donation intentions of

						less involved participants. For highly involved participants, however, the reverse was true.
(Zemack-Rugar and Klucarova-Travani 2018)	Charity donation	None stated	Weak	Positive	Donation intention	In the promotion focused advertising messages, the happiness appeal increased charity evaluations ( $p < .05$ ) and donation intentions ( $p < .05$ ) relative to the sadness appeal.

#### Appendix B. EPHPP Scores

Study	A. Selection bias (Q1)	A. Selection bias (Q2)	A. SCORE	B. Study design	B. SCORE	C. Confounders (Q1)	C. Confounders (Q2)	C. SCORE	D. Blinding (Q1)	D. Blinding (Q2)	D. SCORE	E. Data collection methods (Q1)	E. Data collection methods (Q2)	E. SCORE	F. Withdrawals and drop-outs (Q1)	F. Withdrawals and drop-outs (Q2)	F. SCORE	Global rating
1	3	5	*	7	*	3	4	*	1	3	**	2	1	*	4	5	**	*
2	2	3	*	2	***	3	3	*	1	3	**	2	1	*	4	5	**	*
3	3	5	*	7	*	3	4	*	3	2	**	2	1	*	4	5	**	*
4	3	5	*	3	**	2	/	***	3	3	**	2	1	*	3	4	**	*
5	3	5	*	7	*	3	4	*	3	3	**	2	1	*	3	4	**	*
6	2	3	*	2	***	2	/	***	3	3	**	1	2	**	1	3	**	**
7	3	5	*	5	**	2	/	***	3	3	**	1	1	***	1	1	***	**
8	3	5	*	7	*	3	4	*	3	3	**	1	1	***	4	5	**	*
9	3	5	*	7	*	3	4	*	3	3	**	2	1	*	4	5	**	*
10	4	5	*	7	*	3	4	*	3	3	**	2	1	*	4	5	**	*

11	3	5	*	3	**	3	4	*	3	1	**	2	1	*	1	3	**	*
12	4	5	*	7	*	3	4	*	3	3	**	1	1	***	4	5	**	*
13	3	5	*	3	**	1	1	***	1	1	*	1	2	**	1	1	***	*
14	4	4	*	7	*	2	/	***	1	1	*	2	2	*	1	2	**	*
15	2	5	**	2	***	3	4	*	3	2	**	2	1	*	4	5	**	*
16	3	5	*	7	*	3	4	*	3	3	**	2	2	*	4	5	**	*
17	3	5	*	2	***	3	4	*	3	3	**	2	2	*	2	4	**	*
18	3	5	*	5	**	2	/	***	3	3	**	1	1	***	2	4	**	**
19	4	2	*	7	*	3	4	*	3	3	**	1	1	***	4	5	**	*
20	3	5	*	7	*	3	4	*	3	3	**	2	2	*	4	5	**	*
21	4	5	*	7	*	2	/	***	3	3	**	2	1	*	4	5	**	*
22	1	3	*	2	***	1	1	***	1	3	**	1	1	***	4	5	**	**
23	4	5	*	7	*	3	4	*	3	3	**	2	1	*	4	5	**	*
24	4	5	*	7	*	3	4	*	1	3	**	1	1	***	4	5	**	*
25	4	5	*	7	*	1	1	***	3	3	**	2	1	*	4	5	**	*
26	3	5	*	7	*	3	4	*	3	3	**	2	1	*	2	4	**	*
27	3	5	*	7	*	1	4	*	3	2	**	3	3	*	4	5	**	*
28	3	5	*	7	*	3	4	*	3	3	**	2	1	*	4	5	**	*
29	3	3	*	3	**	2	/	***	3	3	**	1	1	***	2	4	**	**
30	3	5	*	7	*	3	4	*	3	3	**	1	1	***	4	5	**	*
31	3	5	*	7	*	3	4	*	3	3	**	1	1	***	4	5	**	*