

The Role of Dispositional Factors in Moderating Message Framing Effects

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Author Note

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### **Abstract**

**Objective:** Health messages can be framed in terms of the benefits of adopting a recommendation (gain-frame) or the costs of not adopting a recommendation (loss-frame). In recent years research has demonstrated that the relative persuasiveness of gain- and loss-frames can depend upon a variety of dispositional factors. This paper aims to synthesize this growing literature to develop our understanding of the moderators of framing.

**Methods:** A systematic review of published literature on gain- and loss-framing was therefore conducted. Articles were retrieved that tested the interaction between framing and moderators representing individual differences in how people are pre-disposed to think, feel and behave. The significance and direction of framing main effects and interactions were noted and effect size data extracted where available.

**Results:** A total of 47 articles were retrieved published between January 1990 and September 2011 that reported on 50 unique experiments testing 23 different moderators. Significant interactions with typically small to medium simple main effect sizes were found in 37 of the 50 studies. Consistent interactions were found for factors such as ambivalence, approach-avoidance motivation, regulatory focus, need for cognition, and self-efficacy beliefs. Less consistent effects were found for perceived riskiness of activity, issue involvement and perceived susceptibility/ severity.

**Conclusions:** The relative effectiveness of gain- or loss-framed messages can depend upon the disposition of the message recipient. Tailoring the frame to the individual therefore has the potential to maximize message persuasiveness.

*Keywords:* framing effects; goal framing; dispositional factors; systematic review

### The Role of Dispositional Factors in Moderating Message Framing Effects

Some persuasive health appeals focus on the benefits and desirable consequences of adopting a recommended behavior, whereas others emphasize the costs and unwanted consequences of not adopting the recommendation. In other words persuasive messages can be presented in two frames: *gain-frames* that focus on the advantages of engaging in the behavior, or *loss-frames* that focus on the disadvantages of not engaging in the behavior.

For the past 20 years or so a great deal of research has investigated the persuasive impact of these two types of message frames. For example, in one of the earliest studies Meyerowitz and Chaiken (1987) found that a loss-frame was more persuasive than a gain-frame at encouraging women to attend their mammography appointment. However, as the body of research grew, it soon became apparent that loss-frames were not always more persuasive than gain-frames. For example, gain-frames were more persuasive in promoting the benefits of using sunscreen (Rothman, Salovey, Antone, Keough, & Martin, 1993).

Attention therefore turned to identifying variables that might moderate framing effects and one factor to emerge was the perceived riskiness or function of the health behaviour (Rothman & Salovey, 1997). Rothman and Salovey proposed that people will be more responsive to a loss-framed message when the outcome of the decision to engage in a health behaviour involves some degree of uncertainty or risk, whereas they will be more responsive to a gain-framed message when the outcome is relatively certain or safe. This explanation was inspired by the framing postulate of Prospect Theory: People generally prefer risky options when losses are emphasized but prefer non-risky or safe options when gains are emphasized (Tversky & Kahneman, 1981). Consistent with this perspective Rothman and Salovey also argued that loss-framed appeals would be more effective in promoting illness detection behaviours (i.e., some risk of an unpleasant outcome), whereas gain-framed appeals

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would be more effective in promoting prevention behaviours (i.e., little risk of an unpleasant outcome).

The distinction between prevention and detection behaviors has proven to be a relatively useful heuristic for understanding the impact of message framing, and the pattern of findings across studies is fairly consistent (Rothman, Bartels, Wlaschin, & Salovey, 2006; Rothman & Updegraff, 2011; Rothman, Wlaschin, Bartels, Latimer, & Salovey, 2008). However, recent meta-analyses of the framing literature have demonstrated that, although the persuasive advantages of loss- or gain-frames in detection or prevention contexts may be statistically significant, the effect sizes are very small and heterogeneous (O'Keefe & Jensen, 2006, 2007, 2009, 2010).

However, as noted by Myers (2010) and Latimer, Salovey, and Rothman (2007), these meta-analyses may underestimate the utility of gain- and loss-framed appeals because they did not sufficiently account for the heterogeneity found between studies. A number of factors might be important moderators. For example, a recent meta-analysis by Gallagher and Updegraff (in press) has shown that effect sizes are larger when measures of behaviour rather than attitudes or intentions have been used to assess the persuasive impact of framed messages. How the *individual* thinks and feels about the behaviour may also be important, and it has been argued that the effectiveness of framed appeals depends upon the *fit* between how a message is framed and the person or situation (Rothman et al., 2006; Rothman & Updegraff, 2011; Rothman et al., 2008).

A browse of the literature and reference to some recent narrative reviews highlights the fact that there is already a sizeable body of research that has investigated the role of a range of recipient characteristics in moderating framing effects (Myers, 2010; Rothman et al., 2006; Rothman & Updegraff, 2011; Rothman et al., 2008). Dispositional factors that have been investigated include, amongst others: individual differences in consideration of future

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consequences, issue involvement, need for cognition, approach-avoidance motivation, and regulatory focus. However, none of these narrative reviews have presented a comprehensive analysis and synthesis of these effects. A more precise refinement of when and for whom gain- and loss-framed appeals will be most effective is therefore needed. The aim of this paper is to address this gap in the literature by reporting the findings of a systematic review of framing research that has tested the moderating effects of individual differences in recipients' dispositions and prior beliefs. This systematic review therefore represents an approach to give an account of message framing effects from the perspective of the message recipient.

### **Method**

The methods used in this review were informed by guidance provided by the UK Centre for Reviews and Dissemination (Centre for Reviews and Dissemination, 2008).

### **Inclusion and Exclusion Criteria**

Studies were included in the systematic review if they compared the effects of gain-framed and loss-framed messages on persuading people to change their attitudes, intentions or behaviors towards health-related behaviors. This included papers that targeted illness detection behaviors (e.g., mammography screening, HIV testing) or disease prevention behaviors (e.g., using sunscreen, stopping smoking) that could have consequences for either the message recipient's own health or the health of an individual over whom they had decision making responsibility (e.g., the decision to vaccinate their child against an infectious disease). Studies were excluded if participants were asked to make a recommendation about how somebody else should make a health-related decision (e.g., Levin, Gaeth, Schreiber, & Lauriola, 2002), or decisions that would not have any health implications for the recipient (e.g., Reinhart, Marshall, Feeley, & Tutzauer, 2007).

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Papers were only included if they adopted an experimental methodology comparing the effectiveness of gain- and loss-framed messages using either a within-participants design (repeated measures) or between-participants design (independent groups), and tested the interaction between their framing manipulation and one or more recipient characteristics using appropriate statistical tests. To qualify for inclusion the recipient characteristic needed to represent a specific and clearly defined individual difference in how people may be pre-disposed to think, feel or behave. This includes not only individual differences in stable and enduring dispositional characteristics such as personality types, values, motivations, and thinking styles but also individual differences that may be less stable over time or across situations, such as people's pre-existing beliefs and attitudes towards the issue.<sup>1</sup>

However, it is important to note that the aim of this review was to explore the contribution of *pre-existing* individual differences. The review therefore excluded studies that used experimental manipulations to try to change recipients' beliefs or construals such as their perceptions of the riskiness of the behaviour (e.g., Maheswaran & Meyerslevy, 1990; Matwin, 2008), whether the goal of the advocated behaviour was viewed from a promotion-related or prevention-related perspective (e.g., Aaker & Lee, 2001; Spiegel, Grant-Pillow, & Higgins, 2004), whether the desired behaviour was framed in terms of ought or ideal self-guides (e.g., Evans & Petty, 2003), or their self-efficacy beliefs (e.g., van 't Riet, Ruiter, Smerecnik, & de Vries, 2010).

### **Identification of Papers**

The literature was searched for research published in any language that were available in publicly accessible domains and had been subject to some level of scientific peer review. This included peer-reviewed journal articles, book chapters, published Conference Proceedings, or Doctoral Theses. Unpublished manuscripts that may not have been subjected to peer review and are not available in the public domain were not included.

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The article search and selection process is outlined in Figure 1. The starting point was to identify papers that had been reported in previous systematic and narrative reviews of message framing effects (Edwards, Elwyn, Covey, Matthews, & Pill, 2001; Kyriakaki, 2007; Latimer, Brawley, & Bassett, 2010; Myers, 2010; O'Keefe & Jensen, 2006, 2007, 2009, 2010; Rothman et al., 2006; Rothman & Updegraff, 2011; Rothman et al., 2008; Yi, 2004). Papers citing these reviews were also retrieved. This was followed by a keyword search for papers published between January 1 2005 and September 20 2011 in the SSCI, CPCI-SSH, MEDLINE, PsycINFO, PsycARTICLES, and CINAHL databases. The search was restricted to papers published since 2005 because the previous systematic reviews, which included literature searches up until August 2008, would have captured any studies published prior to this.

The titles and abstracts were scanned by two independent reviewers for possible inclusion in the review. This yielded a short-list of 194 papers. The full text copies of these papers were obtained and scrutinised against the inclusion and exclusion criteria. Forty-seven papers met the criteria.<sup>2</sup>

### **Data Extraction**

A data extraction template was designed and refined in light of a pilot test of data extraction between two independent coders (for a copy see Online Supplement A). The independent coding of six papers produced a percentage agreement of 100% for all codes that have been used in the data analysis reported in this paper.

The template extracted data on whether the gain- vs. loss-framing main effects (FRAME) and/or recipient characteristic interactions (MODERATOR x FRAME) were statistically significant. If the necessary data were reported in the paper, or subsequently provided on request from the authors, effect sizes ( $r$ ) were also computed. Positive values

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were used to indicate a gain-frame advantage ( $G > L$ ) and negative values were used to indicate a loss-frame advantage ( $L > G$ ).

Additional features were extracted to enable us to put these results into context: the characteristics of the sample recruited (i.e., sample size, mean age, percent females), the type of behavior, and how the persuasive effects were measured (i.e., attitudes, intentions, or behaviours). The methodological quality of the papers was also assessed using a list of criteria adapted from previous systematic reviews conducted by Edwards et al. (2001) and van den Berg, Schoones, and Vliet Vlieland (2007). The criteria used are outlined in Online Supplement B.

### Results

Two of the 47 papers reported data from more than one study (Broemer, 2002; Shen, 2005) resulting in 50 experiments published between 1989 (Lalor & Hailey, 1989) and 2011 (Hull, 2011). Some studies tested more than one FRAME main effect or MODERATOR  $\times$  FRAME interaction and the proportions of those tests found to be statistically significant are shown in Table 1.

#### TABLE 1 ABOUT HERE

As shown in Table 1, 16 of the 81 tests (19.8%) of the FRAME main effect were significant with quite similar proportions for each type of outcome measure (i.e., behavior 17.6%, attitude 22.7%, intention 18.9%, attitude/intention composite 20.0%). The mean quality scores of the studies that found these significant effects were not significantly different from those showing non-significant effects ( $M_{sig} = 7.45$ ,  $M_{ns} = 7.82$ ,  $t(48) = 0.940$ ,  $p = .35$ ), although their power to detect smaller effect sizes was close to significance ( $M_{sig} = 0.182$ ,  $M_{ns} = 0.228$ ,  $t(48) = 1.91$ ,  $p = .063$ ). It should be noted of course that these findings



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may not be representative of the framing effects literature as a whole because this review has only evaluated the sub-sample of framing studies to test moderator effects.

The effects of 23 different moderators were tested in 50 experiments. As shown in Table 1, a total of 100 interaction tests were conducted of which 47 (47.0%) were statistically significant. In contrast to the FRAME main effects, the type of outcome tested appeared make some difference to the incidence of significant interactions: 13 of the 20 studies (65.0%) measuring behavioral outcomes found significant interactions, compared to 11 out of 25 (44.0%) measuring attitudes, and 19 out of 49 (38.8%) measuring intentions. However, no differences were found between the quality scores and smallest effect sizes that the significant and non-significant studies were powered to detect (quality scores -  $M_{sig} = 7.76$ ,  $M_{ns} = 7.69$ ,  $t(48) = 0.174$ ,  $p = .86$ ; smallest effect size -  $M_{sig} = 0.217$ ,  $M_{ns} = 0.219$ ,  $t(48) = 0.088$ ,  $p = .93$ ).

Table 2 presents the results for each moderator. Similar moderators are grouped together where connections could be made between their proposed mechanisms and predicted effects. Details are provided about the types of outcomes tested, the population group from which the sample was obtained, mean age and percentage of females in that sample, the sample size, an estimate of the smallest effect size that the study was powered to detect, and quality score.

TABLE 2 ABOUT HERE

### **Perceived Riskiness of Activity**

Three moderators are considered in this section: *perceived riskiness of activity*, *descriptive norms*, and *subjective norms*. *Descriptive norms* (i.e., perceptions of how other people are actually behaving) and *subjective norms* (i.e., perceived social pressure to engage or not in a behavior) are considered in this grouping because, as argued by Cho and Boster (2008), if participants perceive that a behavior is the peer norm they are more likely to

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consider their own non-adherence to that behavior as risky because it entails standing out from their peers.

One of the studies that tested *descriptive norms* (Cho & Boster, 2008) and three that tested *perceived riskiness of activity* (Apanovitch, McCarthy, & Salovey, 2003; Hull, 2011; Toll et al., 2008) found that gain-framed messages were more persuasive when the activity was perceived as low risk. However, only Cho and Boster (2008) found that loss-framed messages were more persuasive when the activity was perceived as high risk (i.e., high perceived descriptive norm). The remaining six experiments either found no significant interaction (Abhyankar, 2008; Ferguson & Gallagher, 2007; Gallagher, Updegraff, Rothman, & Sims, 2011a; Stuart & Blanton, 2003) or an interaction that did not match the predicted effects (Collins, 2006; Williams, Clarke, & Borland, 2001). Collins (2006) and Williams et al. (2001) found a loss-frame advantage when the activity was perceived as low risk and/or a gain-frame advantage when the activity was perceived as high risk.

### **Confidence in Positive Outcome**

The moderators considered in this section are connected by the confidence that they provide recipients with for a positive outcome if they adopt the recommended behaviour. It includes *response efficacy* (perception that the recommended action can avert the threat), *self-efficacy* (confidence in ability to perform the recommended behavior), *perceived behavioral control* (perceived ease of performing the behaviour), and *dispositional optimism* (generalized positive outcome expectancies, Scheier & Carver, 1987).

Three studies found that loss-frames were most persuasive in people with high self-efficacy beliefs who were confident in their ability to perform the recommended behavior (van 't Riet, Ruiters, Werrij, & De Vries, 2008; van 't Riet, Ruiters, Werrij, & De Vries, 2010a; Williams et al., 2001). However, the remaining four experiments failed to produce significant

interactions (Abhyankar, 2008; Ferguson & Gallagher, 2007; Lauver & Rubin, 1990; Sanchez, 2006).

### **Relative Weighting or Salience of Negative (vs. Positive) Outcomes**

The moderators considered in this section are concerned with characteristics proposed to influence the salience or weighting that message recipients give to negative information rather than positive information (Broemer, 2002; Maheswaran & Meyerslevy, 1990). It includes recipients' *ambivalence* towards the activity and a group of moderators proposed to affect people's motivation to process information systematically: *issue involvement*, *perceived susceptibility/severity*, *body consciousness*, *attitude towards the activity*, *intention strength*, and *stage of readiness*.

As shown in Table 2, the three studies conducted by Broemer (2002) found that loss-framed messages were more persuasive at encouraging recipients who were high in ambivalence to exercise regularly, eat a low fat diet, and use condoms, whereas gain-framed messages were more persuasive for recipients low in ambivalence.

Five further experiments showed that loss-framed messages were more persuasive in those recipients most likely to process a message systematically (Gallagher et al., 2011a; Jung & Villegas, 2011; Kiene, Barta, Zelenski, & Cothran, 2005; O'Connor, Ferguson, & O'Connor, 2005; Quick & Bates, 2010). For example, both Gallagher et al. (2011a) and Quick and Bates (2010) found the loss-frame advantage increased as perceived risks of getting breast cancer or excess drinking increased. However, there were still 12 studies in this grouping either producing non-significant interactions (Abhyankar, 2008; Brug, Ruiters, & Van Assema, 2003; Covey, Kundi, & McConnell, 2009; Greenlee, 1997; Hsiao, 2002; Lalor & Hailey, 1989; Lee & Aaker, 2004; Moorman & van den Putte, 2008; van 't Riet, Ruiters, Werrij, & de Vries, 2010b) or significant interactions with inconsistent patterns (Hevey et al., 2010; Hsiao, 2002; Millar & Millar, 2000). Gain-frame advantages were found in recipients

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who had a high perceived chance of being involved or injured in a traffic accident (Millar & Millar, 2000), placed a high importance on their appearance (Hevey et al., 2010), and were in the preparation stage of readiness to exercise (Hsiao, 2002).

### **Thinking Styles**

As well as individual differences in issue involvement that may vary situationally from one type of behavior to another, this review includes a group of eight studies that tested the moderating effects of stable thinking styles that may affect the degree to which people process the message in-depth: *need for cognition* (the extent to which people engage in and enjoy effortful cognitive activities - Cacioppo, Petty, & Kao, 1984), *depth of processing* (people's ability and motivation to process information in-depth - Wolski & Nabi, 2000, cited in Umphrey, 2003), *monitoring style* (the degree to which people attend to and scan for threatening cues - Miller, 1987), and *vigilance/ cognitive avoidance* (people's motivation to search for/ avert attention from threat-relevant cues - Krohne et al., 2000).

Four studies in this section showed that high need for cognition or in-depth processing produced a loss-frame advantage (Rothman, Martino, Bedell, Detweiler, & Salovey, 1999; Sanchez, 2006; Spaderna, 2004; Umphrey, 2003), and three studies showed that low need for cognition or shallow processing produced a gain-frame advantage (Spaderna, 2004; Steward, Schneider, Pizarro, & Salovey, 2003; Umphrey, 2003). The study conducted by Gallagher and Updegraff (2011b) found that the interaction between need for cognition and framing was dependent on the type of outcome that a message promoting exercise focussed on. Amongst people with high need for cognition gain-framed messages were more persuasive if the outcomes were intrinsic (i.e., satisfaction/ enjoyment) but loss-framed messages were more persuasive if the outcomes were extrinsic (i.e., appearance/ health).

### **Motivational Orientations and Values**

The studies in this final section tested how recipients' motivational systems interact with framing effects. This includes dispositional motivations that are manifestations of approach or avoidance tendencies, such as Gray's (1990) behavioral activation system-BAS (responsiveness to reward or incentive cues) or behavioral inhibition system-BIS (responsiveness to punishment or threat) and Higgins' (1998) promotion focus (motivated by advancement and accomplishment) or prevention focus (motivated by security needs).

As shown in Table 2, six experiments found that framed messages congruent with the recipients' motivations were more persuasive: gain-frames were more persuasive when the recipient was predominantly approach oriented (i.e., high BAS/ promotion focused) and/or loss-frames were more persuasive when the recipient was predominantly avoidance oriented (i.e., high BIS/ prevention focused) (Gerend & Shepherd, 2007; Latimer et al., 2008; Mann, Sherman, & Updegraff, 2004; Sherman, Mann, & Updegraff, 2006; Updegraff, Sherman, Luyster, & Mann, 2007; Yi & Baumgartner, 2009). However, the other four studies failed to produce significant interactions (Kostygina, 2008; Myers, 2011; Shen, 2005, Expts 1 and 2).

Three somewhat different types of values or motivations were tested in the other studies included in this section.

Quick and Bates (2010) failed to support their prediction derived from psychological reactance theory (Brehm, 1966), that loss-framed messages which posed a greater threat to a recipient's freedom would be less persuasive in recipients with high *trait reactance* who are proposed to value their independence (Hong & Faedda, 1996). The interaction between *trait reactance* and framing was not significant.

The second of these studies, conducted by O'Connor, Warttig, Conner, and Lawton (2009), tested the moderating effects of the personality trait *consideration of future consequences* (Strathman, Gleicher, Boninger, & Edwards, 1994). Recipients who tend to

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sacrifice immediate benefits to achieve a desirable future outcome (high CFC) were more persuaded by a loss-framed message, whereas recipients who prefer options where gains are immediate (low CFC) were more persuaded by a gain-framed message.

Finally, applying self-discrepancy theory (Higgins, Tykocinski, & Vookles, 1990), Tykocinski, Higgins, and Chaiken (1994) found support for their prediction that gain-framed messages would be more persuasive in recipients who possessed an actual:ought discrepancy (i.e., a discrepancy between an individual's beliefs about the attributes that one actually possesses and their representation of either their own or someone else's beliefs about their duties and responsibilities), and loss-framed messages would be more persuasive in recipients who possessed an actual:ideal discrepancy (i.e., a discrepancy between an individual's beliefs about the attributes that one actually possesses and their representation of either their own or someone else's hopes or aspirations for them).

### **Discussion**

The findings of this systematic review illustrate how failure to consider the moderating influence of individual differences may mask the direction and underestimate the strength of gain- and loss-framed appeals. Significant interactions were found in nearly half the papers with individual differences in ambivalence, approach-avoidance motivations, regulatory focus, self-efficacy beliefs, and need for cognition/ depth of processing producing the most consistent patterns. Less consistent patterns were produced for perceived riskiness of activity, issue involvement, and perceived susceptibility/ severity.

Although difficult to interpret the mixed results are a valuable product of this review. By highlighting mixed results this review challenges commonly held views in the literature that may be driven by the repeated citation of one of two studies. An example of this is the paper by Apanovitch et al. (2003) that has been regularly cited as evidence that loss-framed

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appeals are more persuasive amongst people who perceive the behavior as risky. This systematic review challenges this perspective by identifying two studies that have found the opposite pattern of results (Collins, 2006; Williams et al., 2001). Moreover, by pooling together mixed results in a single place, this review provides a means of weighting the evidence for and against different theoretical explanations.

This includes the very different theoretical perspectives proposed by Maheswaran and Meyerslevy (1990) and Rothman, Martino, Bedell, Detweiler, and Salovey (1999) for how depth of processing affects message framing. More specifically, Maheswaran and Meyerslevy argued that recipients who were motivated to process information in a detailed and integrated manner (systematic processing) rather than a superficial manner (heuristic processing) were more likely to be persuaded by a loss-framed message because negative information is weighted more heavily when forming an attitude through scrutiny of information. In contrast gain-framed messages should be more persuasive when recipients process a message superficially because they are more likely to rely on peripheral cues like the positive tone of the message to guide their response. On the other hand Rothman and his colleagues proposed that the framing effects predicted from the prevention-detection distinction should be stronger in people who pay more careful attention to the message: The advantages of loss-frames in encouraging detection behaviors and gain-frames in encouraging prevention behaviors should be biggest when people are motivated or have the ability to process the message thoroughly. Whilst this review has identified evidence that supports both perspectives, it should be noted that the weight of evidence from the issue involvement and thinking style moderators has come out more often in favor of Maheswaran and Meyerslevy's (1990) perspective.

The mixed results also highlight the importance of replicating findings. This includes the findings for *consideration of future consequences* (O'Connor et al., 2009) and *self-*

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*discrepancies* (Tykocinski et al., 1994), both of which are based on single studies. Until they are replicated results such as these should be regarded as provisional.

More reliable conclusions can however be drawn from moderators such as approach-avoidance motivations, regulatory focus, and self-efficacy beliefs that, as noted previously, have produced consistent effects on multiple occasions. As noted by Rothman and Updegraff (2011) attention to the message is a potentially important mediator of framing effects.

Messages must first capture attention for persuasion to occur. This review provides evidence to suggest that the extent to which either gain- or loss-framed messages attract attention can depend upon the motivational sensitivity of the recipient. For example, loss-framed messages are more consistent with the motivations of recipients who are responsive to punishment cues or security goals (i.e., BIS/ prevention focus), whereas gain-framed messages are more consistent with the motivations of recipients who are responsive to reward cues or achievement goals (i.e., BAS/ promotion focus).

Of course attention to the message may not provide a complete account for why these congruent combinations are the most persuasive. As Rothman and Updegraff (2011) have noted people's responsiveness to congruently framed messages might also be promoted through a person's subjective experience whilst processing the message. If a message "feels right" by fitting the recipient's motivational orientation, this transfers to the persuasion context because it adds importance or value to the issue (Cesario, Grant, & Higgins, 2004).

Recipients' reactions to other types of subjective experience produced by gain- or loss-framed messages are also potentially influential. The review has highlighted for example how recipients' self-efficacy beliefs moderate their response to the threat or fear evoked by loss-framed messages. Drawing upon research on fear appeals and Witte's (1992) Extended Parallel Process Model, it has been suggested that recipients with high self-efficacy beliefs are more receptive to a threatening loss-framed message because they feel capable of averting



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the threat by adopting the recommended action (van 't Riet et al., 2010a; van 't Riet et al., 2008). On the other hand when people have low self-efficacy beliefs and lack confidence, the persuasiveness of loss-frame messages is reduced because the greater sense of threat may lead to defensive processing.

This systematic review has identified the most consistent and inconsistent dispositions and beliefs that determine how people respond to framed messages. The limitations of this body of research are also more evident. This includes not only highlighting those moderators for which there are inconsistencies to resolve, but also identifying the moderators for which the data are limited to under-powered or single experiments, particular types of behavior, or outcome measures. For example, the types of behavior studied for some moderators may be quite restricted (e.g., three of the six studies shown in Table 2 that found significant results for approach-avoidance motivations were tested on dental flossing behavior), and/or rely on measuring people's attitudes or intentions rather than their actual behavior (e.g., the highest proportion of significant interactions were found in the studies measuring behavior which lends support to Gallagher and Updegraff's (in press) assertion that attitudes or intentions may not capture the true benefits of framing).

As well as considering the limitations in the body of research identified it is necessary to note the limitations of this systematic review itself. Although the search strategy was broad there is the possibility that the initial screening of titles and abstracts may have missed a small number of papers with relevant data. An additional limitation was our inability to compute effect sizes from many of the papers. Although some authors provided us with the necessary additional data on request the majority did not respond, particularly if the research had been conducted several years ago. It was therefore not possible to conduct any quantitative meta-analyses on the effect size data which would have provided a more solid foundation for any conclusions drawn. Effect sizes have however been reported when they

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were available along with information about sample sizes, statistical power, and study quality.

Even acknowledging these limitations this systematic review provides a valuable reference source and reinforces recent arguments made by Myers (2010), Latimer et al. (2010) and Rothman et al. (2008) that framing effects can be better understood by considering how people think and feel about the behavior. More specifically the recipient's disposition and prior beliefs were shown to shape how they respond to framed information in the majority of studies in which moderator effects were tested. However, the effects were by no means universal for any of the moderators. As noted previously, the directions of the interactions were either inconsistent or there were non-significant results. Although methodological differences between studies might go some way to explain some of these differences (e.g., lack of power, type of outcome measure used), future research needs to address the extent to which the effects are robust in different contexts and identify the factors that themselves shape the influence of recipient characteristics.

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### Footnotes

<sup>1</sup> Papers were also retrieved that had analyzed the moderating effects of various demographic characteristics such as age and gender but the analysis of this data is not reported in this paper. A reference list of the retrieved papers is available on request from the author.

<sup>2</sup> One of the reviewers of a previous version of this paper drew our attention to a meta-analysis conducted by Gallagher and Updegraff (in press) which was published online on 13 October 2011 (i.e., after the date of the literature search). This meta-analysis examined the effects of using different outcomes to assess the persuasive impact of framed messages (i.e., attitudes, intentions or behavior). The references in this paper were also checked and all relevant papers had already been included in this review.



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Table 1

*Frequency and percentage of statistically significant FRAME main effects and MODERATOR × FRAME interactions*

	All types	Type of Outcome Measure			
		Attitude/ Intention Composite Score	Attitude	Intention	Behavior
<b>FRAME main effects</b>					
$k_{Sig} / k_{Total}$ (%Sig)	16 / 81 (19.8%)	1 / 5 (20.0%)	5 / 22 (22.7%)	7 / 37 (18.9%)	3 / 17 (17.6%)
<b>MODERATOR × FRAME interactions</b>					
$k_{Sig} / k_{Total}$ (%Sig)	47 / 100 (47.0%)	4 / 6 (66.7%)	11 / 25 (44.0%)	19 / 49 (38.8%)	13 / 20 (65.0%)

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Table 2

*Significance and direction of MODERATOR xFRAME interactions*

MODERATOR	OUTCOMES TESTED <sup>a</sup> POPULATION GROUP (mean age, %F)	N (smallest effect size <i>r</i> ) <sup>b</sup> QUALITY SCORE <sup>c</sup>	MODERATOR x FRAME Interaction	G>L PREDICTION <sup>d</sup>	L>G PREDICTION <sup>d</sup>
<b>PERCEIVED RISKINESS OF ACTIVITY</b>					
<i>Perceived riskiness of activity</i>					
Apanovitch 2003	HIV testing (B) General population (32.0yrs, 100%)	425 (.14), 8.0	Sig (.392)	<i>low risk activity</i> G>L (+.131)	<i>high risk activity</i> L=G (-.074)
Collins 2006	Abstinence from sex (I) Undergraduates (19.2yrs, 49%)	183 (.21), 10.0	Sig in males only (.360)	L>G (-.261)	G>L (+.242)
Ferguson 2007	Flu vaccine (I) Undergraduates (20.1yrs, 51%)	200 (.20), 10.0	Ns	L=G	L=G
Gallagher 2011a	Mammography (B) Clinic attendees (51yrs, 100%)	355 (.15), 7.5	Ns (.033 - .206, p=.078)	L>G (-.102)	L>G (-.317)
Hull 2011	HIV testing (I) General population (22yrs, 100%)	1052 <sup>e</sup> (.10), 11.5	Sig	G>L (+.120)	L=G (-.066)
Toll 2008	Smoking abstinence (B) Clinical trial participants (42.7yrs, 51.9%)	249 (.18), 9.5	Sig in females only	G>L (+.148)	L=G
Williams 2001	Breast self-examination (I, B) General population (45.7yrs, 100%)	539 <sup>e</sup> (.12), 8.0	Sig (B only)	L>G (-.154)	L=G (-.033 - +.029)
<i>Subjective norms</i>					
Abhyankar 2008	MMR vaccine (I) General population (35.2yrs, 100%)	140 (.23), 9.0	Ns (.30)	<i>low subjective norm</i> L>G	<i>high subjective norm</i> L>G
<i>Descriptive norms</i>					
Cho 2008	Reduce alcohol, tobacco, and marijuana use (A, I) School students (12.7yrs, 56%)	246 (.18), 9.0	Sig (≥.114)	<i>low descriptive norm</i> G≥L (+.010 - +.155)	<i>high descriptive norm</i> L>G (-.210 - -.374)
Stuart 2003	Condom use (I) Undergraduates (n/a, 65%)	123 (.25), 7.5	Ns	L>G	L>G

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MODERATOR	OUTCOMES TESTED POPULATION GROUP (mean age, %F)	N (smallest effect size <i>r</i> ) QUALITY SCORE	MODERATOR x FRAME Interaction	G>L PREDICTION	L>G PREDICTION
<b>CONFIDENCE IN A POSITIVE OUTCOME</b>					
<i>Response efficacy</i>					
Abhyankar 2008	MMR vaccine (I) General population (35.2yrs, 100%)	140 (.23), 9.0	Ns (.10)	<i>low response efficacy</i> L>G	<i>high response efficacy</i> L>G
Ferguson 2007	Flu vaccine (I) Undergraduates (20.1yrs, 51%)	200 (.20), 10.0	Ns (.063)	L=G	L=G
<i>Self-efficacy</i>					
Sanchez 2006	Test/inoculate fictional virus (I) Undergraduates (n/a, 91.4%)	579 (.11), 7.5	Ns	<i>low self-efficacy</i> L>G	<i>high self-efficacy</i> L>G
Van 't Riet 2008	Smoking cessation (I) General population (42.7yrs, 45.2%)	499 <sup>e</sup> (.14), 10.0	Sig	L=G (.00)	L>G (.061)
Van 't Riet 2010a	Skin self-exam (I) Undergraduates (20.7yrs, 91.2%)	124 (.24), 9.5	Sig (.261)	G>L (+.134)	L>G (-.251)
Williams 2001	Breast self-examination (I, B) General population (45.7yrs, 100%)	539 <sup>e</sup> (.12), 8.0	Sig	L=G (-.030 - +.039)	L>G (-.258)
<i>Perceived behavioral control</i>					
Abhyankar 2008	MMR vaccine (I) General population (35.2yrs, 100%)	140 (.23), 9.0	Ns (.34)	<i>High PBC</i> L>G	<i>Low PBC</i> L>G
<i>Dispositional optimism</i>					
Lauver 1990	Colposcopy test (B) Women with abnormal Pap smears (24yrs, 100%)	94 (.28), 9.5	Ns	<i>pessimism</i> L=G	<i>optimism</i> L=G
<b>RELATIVE WEIGHTING OR SALIENCE OF NEGATIVE (vs. POSITIVE) INFORMATION</b>					
<i>Ambivalence towards activity</i>					
Broemer 2002 (Expt 1)	Exercise/ low fat diet (AI). Undergraduates (24.4yrs, 0%)	80 (.30), 8.5	Sig (.248)	<i>low ambivalence</i> G>L (+.165)	<i>high ambivalence</i> L>G (-.326)
Broemer 2002 (Expt 2)	Healthy behaviors (AI) Undergraduates (25.2yrs, 40%)	120 (.25), 8.5	Sig (.200)	G>L (+.104)	L>G (-.214)

DISPOSITIONAL MODERATORS OF FRAMING

MODERATOR	OUTCOMES TESTED POPULATION GROUP (mean age, %F)	N (smallest effect size <i>r</i> ) QUALITY SCORE	MODERATOR x FRAME Interaction	G>L PREDICTION	L>G PREDICTION
<i>Ambivalence towards activity cont...</i>					
Broemer 2002 (Expt 3)	Condom use (AI) High school students (17.6yrs, 47.5%)	80 (.30), 8.5	Sig (.354)	<i>low ambivalence</i> G>L (+.139)	<i>high ambivalence</i> L>G (-.361)
<i>Issue involvement</i>					
Brug 2003 (Expt 1)	Healthy eating (A, I) Students (52yrs, 75%)	148 (.22), 9.5	Ns	<i>low issue involvement</i> L=G	<i>high issue involvement</i> L=G
Greenlee 1997 (Expt 1)	Safer sex (AI) Undergraduates (n/a, 58%)	120 (.24), 8.0	Sig (.230)	G>L ( <i>medium issue involvement</i> L>G)	G>L
Kiene 2005	Condom use messages (A) Undergraduates (21yrs, 60%)	225 (.18), 9.0	Sig relationship consequences only	L=G	L>G (-.228)
Jung 2011	Smoking (A) Undergraduates (n/a, 51.1%)	188 (.20), 10.0	Sig (.305)	G>L	L≥G
Pan 2005	Healthy eating (A, I) Undergraduates (19.7yrs, 63.4%)	232 (.18), 9.0	Ns (≤.045)	L=G	L=G
<i>Perceived susceptibility/ severity</i>					
Covey 2009	Chlamydia testing (AI) Undergraduates (20.6yrs, 55%)	200 (.20), 9.0	Ns (.032)	<i>low perceived threat</i> L>G	<i>high perceived threat</i> L>G
Lalor 1989	Breast self-examination (A,I,B) Undergraduates (n/a, 100%)	47 (.39), 6.0	Ns (<.110)	L=G	L=G
Gallagher 2011a	Mammography (B) Clinic attenders (51yrs, 100%)	355 (.15), 7.5	Sig (.201)	L=G (-.077)	L>G (-.201 - -.329)
Hsiao 2002	Exercise behavior or testing (A, I) Undergraduates (19.2yrs, 56%)	192 (.20), 8.5	Ns	L=G	L=G
Lee 2004 (Exot 2)	Sunscreen use for prevention or promotion (A) General population (20.5yrs, 52%)	163 (.21), 7.5	Ns	L=G promotion, L>G prevention	L=G promotion, L>G prevention
Millar 2000	Safe driving (I) General population (24yrs, 53%)	278 (.17), 7.5	Sig (.13)	L=G (-.055)	G>L (+.158)

DISPOSITIONAL MODERATORS OF FRAMING

MODERATOR	OUTCOMES TESTED POPULATION GROUP (mean age, %F)	N (smallest effect size <i>r</i> ) QUALITY SCORE	MODERATOR x FRAME Interaction	G>L PREDICTION	L>G PREDICTION
<i>Perceived susceptibility/ severity cont...</i>					
Quick 2010	Alcohol consumption (A, I) Undergraduates (19.5yrs, 63.3%)	395 (.14), 10.01	Sig (.141)	<i>low perceived threat</i> L=G	<i>high perceived threat</i> L>G
<i>Body consciousness</i>					
Hevey 2010	Sunscreen/ sunbed use (I) General population (20.4yrs, 58.5%)	390 (.14), 7.5	Sig (suntan use only) (.173)	<i>low body consciousness</i> L>G	<i>high body consciousness</i> G>L
<i>Attitude towards activity</i>					
Abhyankar 2008	MMR vaccine (I) General population (35.2yrs, 100%)	140 (.23), 9.0	Ns (.10)	<i>negative attitude</i> L>G	<i>positive attitude</i> L>G
O'Connor 2005 (Expt 2)	Male contraceptive use (I) Undergraduates (20.4yrs, 0%) <sup>f</sup>	152 (.22), 7.5	Sig	L=G	L>G (-.187)
<i>Intention strength</i>					
Moorman 2008	Smoking cessation (A, I) Undergraduates/ postgraduates (21.7yrs, 63%)	151 (.22), 9.0	Sig with NICOTINE DEPENDENCE (.105 - .173)	<i>weak intentions</i> G>L if nicotine dependence high, G=L if nicotine dependence low	<i>strong intentions</i> L>G if nicotine dependence high, G>L if nicotine dependence low
Van 't Riet 2010b	Physical activity (B) General population (46.3yrs, 55.1%)	299 (.16), 11.0	Ns (.014)	L=G	L=G
<i>Stage of readiness</i>					
Hsiao 2002	Exercise behavior or testing (A, I) Undergraduates (19.2yrs, 56%)	192 (.20), 8.5	Sig (A exercise behavior only) (.283)	G=L	G>L (+.274)
<b>THINKING STYLES</b>					
<i>Need for cognition</i>					
Gallagher 2011b	Physical activity (B) Undergraduates (19yrs, 81.2%)	176 (.21), 9.5	Sig with OUTCOMES (.24)	<i>Low NFC</i> G>L extrinsic/ L>G intrinsic (+/- .266)	<i>high NFC</i> G>L intrinsic/ L>G extrinsic (+/- .094)
Hsiao 2002	Exercise behavior or testing (A, I) Undergraduates (19.2yrs, 56%)	192 (.20), 8.5	Ns	L=G	L=G

## DISPOSITIONAL MODERATORS OF FRAMING

MODERATOR	OUTCOMES TESTED POPULATION GROUP (mean age, %F)	N (smallest effect size <i>r</i> ) QUALITY SCORE	MODERATOR x FRAME Interaction	G>L PREDICTION	L>G PREDICTION
<i>Need for cognition cont...</i>					
Rothman 1999 (Expt 1)	Test/inoculate fictional virus (I) Undergraduates (n/a, 50.9%)	175 (.21), 7.5	Sig (testing only) (.164)	<i>Low NFC</i> L=G	<i>high NFC</i> L>G
Sanchez 2006	Test/inoculate fictional virus (I) Undergraduates (n/a, 91.4%)	579 (.11), 7.5	Sig (inoculation only) (.110)	L=G	L>G
Steward 2003	Smoking cessation (I) General population (34yrs, 53.5%)	863 (.10), 10.0	Sig (.084)	G>L	G=L
<i>Depth of processing</i>					
Umphrey 2003	Testicular self-examination (A) Undergraduates (22.1yrs, 0%)	128 (.24), 9.0	Sig (.686)	<i>shallow processors</i> G>L (+.257)	<i>deep processors</i> L>G (-.173)
<i>Monitoring style</i>					
Miller 1999	Colposcopy test (B) Women with abnormal Pap smears (35yrs, 100%)	76 <sup>d</sup> (.36), 9.5	Sig (with Control condition)	<i>low monitors</i> L≥G (L>C .529, G>C .469)	<i>high monitors</i> L=G (L=C/ G=C <.141)
<i>Vigilance/ cognitive avoidance</i>					
Spaderna 2004	Skin self-examination (I, B) Undergraduates (n/a, 60%)	164 (.21), 8.0	Sig VIGILANCE with MESSAGE THREAT	<i>low vigilance</i> G>L when message high threat (+.332)	<i>high vigilance</i> L>G when message high threat (-.243)
<b>MOTIVATIONAL ORIENTATIONS</b>					
<i>Approach (BAS)/ promotion focus – avoidance (BIS)/ prevention focus</i>					
Gerend 2007	HPV vaccine (I) Undergraduates (19yrs, 100%)	121 (.25), 8.5	BAS x FRAME ns, BIS x FRAME Sig	<i>high BAS/ promotion</i> L=G (+.084)	<i>high BIS/ prevention</i> L>G (-.181)
Kostygina 2007	Thyroid cancer screening (I) Chernobyl residents (24yrs, 29%)	119 (.25), 9.5	Ns (.109)	L=G	L=G
Latimer 2008	Physical activity (B) General population (n/a, 89%)	118 (.25), 9.0	Sig (.200)	G>L (+.282)	L≥G (-.100)
Mann 2004	Dental flossing (B) Undergraduates (n/a)	63 (.34), 6.5	Sig (.265)	G>L	L>G
Myers 2011	Physical activity (I) Diabetic patients (58.6yrs, 52.3%)	218 (.19), 8.0	Ns	L=G	L=G

## DISPOSITIONAL MODERATORS OF FRAMING

MODERATOR	OUTCOMES TESTED POPULATION GROUP (mean age, %F)	N (smallest effect size <i>r</i> ) QUALITY SCORE	MODERATOR x FRAME Interaction	G>L PREDICTION	L>G PREDICTION
<i>Approach (BAS)/ promotion focus – avoidance (BIS)/ prevention focus cont...</i>					
Shen 2005 (Expt 1) <sup>g</sup>	Sunscreen use, flu shot, exercise, healthy diet (A, I) Undergraduates (20yrs, 72.8%)	285 (.17), 7.5	Ns	high BAS/ promotion L=G	high BIS/ prevention L=G
Shen 2005 (Expt 2) <sup>g</sup>	Smoking, glaucoma detection, pedestrian safety (A, I) Undergraduates (20.3yrs, 70.6)	286 (.17), 8.5	Ns	L≥G	L≥G
Sherman 2006	Dental flossing (I, B) Undergraduates (19.8yrs, 58%)	67 (.33), 7.0	Sig (.283)	G≥L (+.071 – +.197)	L>G (-.283 - -.374)
Updegraff 2007	Dental flossing (A, I, B) Undergraduates (19.7yrs, 68.4%)	136 (.24), 9.0	Sig (A, B only - strong article condition)	G>L	L>G
Yi 2009	Healthy eating (A) Undergraduates (n/a)	120 (.25), 9.0	BAS x FRAME ns BIS x FRAME Sig (≥.224)	G>>L (≥+.520)	G>L (≤+.308)
<i>Security orientation</i>					
Kostygina 2007	Thyroid cancer screening (I) Chernobyl residents (24yrs, 29%)	119 (.25), 9.5	Sig (.187)	low security orientation L>G	high security orientation G>L
<i>Trait reactance (value independence)</i>					
Quick 2010	Alcohol consumption (A, I). Undergraduates (19.5yrs, 63.3%)	395 (.14), 10.0	Ns	low value L=G	high value L=G
<i>Consideration of future consequences</i>					
O'Connor 2009	Read information about blood pressure testing (B) White collar workers (30.3yrs, 70%)	170 (.210), 11.0	Sig (.158)	prioritize short-term G>L (+.648)	prioritize long-term L>G (-.748)
<i>Self-discrepancies</i>					
Tykocinski 1994	Breakfast eating (I, B) Undergraduates (22.1yrs, 0%)	34 (.65), 8.0	Sig (≥.400)	actual:ought G>L (+.332)	actual:ideal L>G (≥-.257)

Notes:

<sup>a</sup> AI= attitude/intention composite score; A=attitude, I=intention, B=behavior

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<sup>b</sup> The 'smallest effect size  $r$ ' is an estimate of the smallest effect size that this experiment was powered to detect given the sample size  $N$ ,  $\alpha=.05$ , and  $1-\beta=0.80$ .

<sup>c</sup> The method used to calculate the method score is shown in Online Supplement B. The quality scores ranged from 5.0 to 10.5 ( $M=7.74$ ,  $SD=1.14$ ).

<sup>d</sup> Negative  $r$  values indicate a loss-frame advantage ( $L>G$ ) and positive  $r$  values indicate a gain-frame advantage ( $G>L$ )

<sup>e</sup> The sample size reported for this experiment includes participants tested in a Control condition

<sup>f</sup> In this experiment O'Connor et al. (2005) tested the effects of framing messages about the male hormonal contraceptive on both males and females. However, the data from the females are not included in this systematic review because the females were being asked to rate the likelihood that their partner intends to use male hormonal contraception. The mean age reported applies to both the male and female participants although the authors report that age did not differ significantly between the males and females.

<sup>g</sup> Some of the data from this study are also reported in Shen and Dillard (2007). However, the full analyses relevant to this systematic review are reported only hopefuin Shen (2005).



# DISPOSITIONAL MODERATORS OF FRAMING

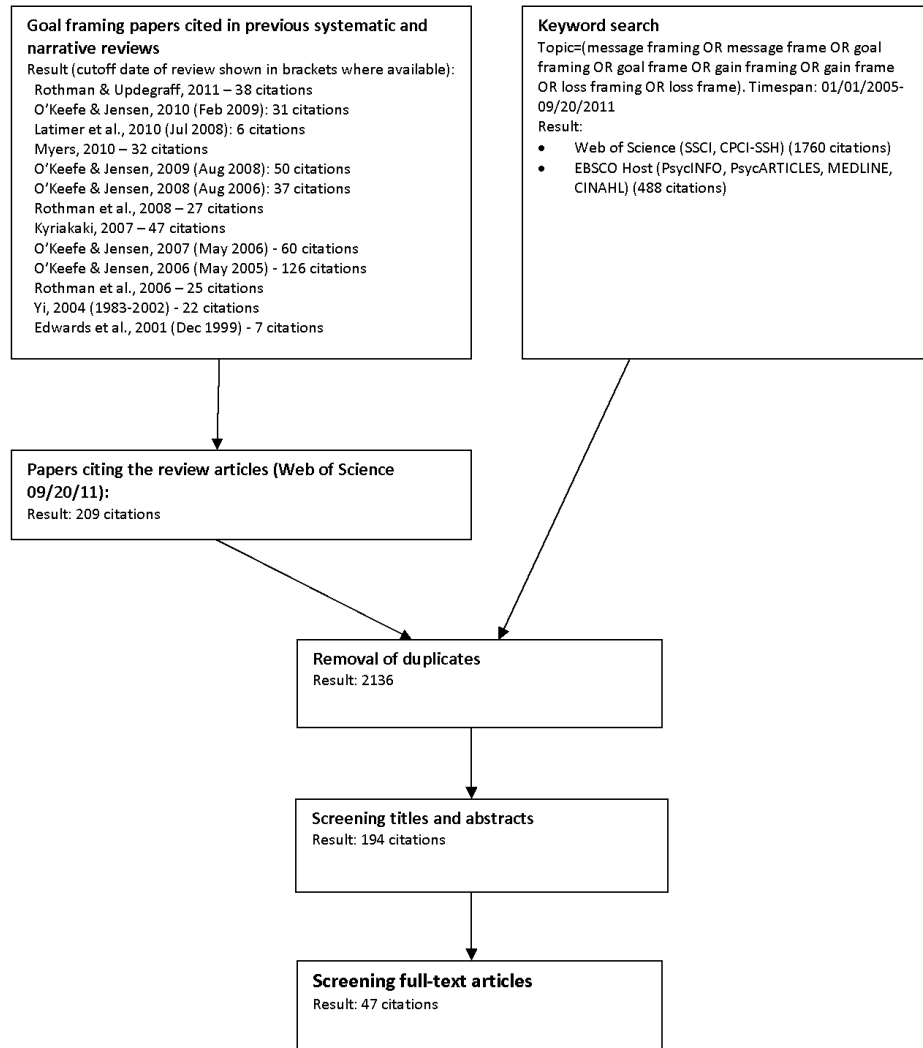


Figure 1. Article search and selection process