The Effects of Message Framing and Ad Credibility on Health Risk Perception

By Silvia Heideker and Martina Steul-Fischer

1. Introduction

Everyday consumers need to make decisions about their health, and this health behaviour is significantly influenced by health risk perception, health attitude and health condition. Health risk perception has a particularly powerful impact on behavioural intentions (Dillard et al. 2012; Heideker and Steul-Fischer 2015; Menon et al. 2008, p. 998; Rudisill 2013). Health risk perception is the perception of the likelihood of the occurrence of a health-related negative event (Menon et al. 2008). Publishers of health advertisements (ads) must be knowledgeable about methods that can increase health perception if they want to induce stronger health behaviour intentions. Health ads can both prevent negative changes and increase positive changes in health behaviour among large populations (Fife-Schaw and Abraham 2009; Wakefield et al. 2010). Message framing and ad credibility are very important contextual antecedents of health risk perception (Menon et al. 2008, p. 995). Message framing is the presentation of objectively equivalent information about consequences using semantically different options, i.e., framing the consequences either as gains (beneficial consequences of healthy behaviour) or losses (detrimental consequences of unhealthy behaviour) (Krishnamurthy et al. 2001; Van’t Riet et al. 2014). This paper considers a variety of conclusions regarding how message framing and ad credibility influence health risk perception.

Scholars have intensively analysed the antecedents and effects of message framing, as well as the effects of message framing on health behaviour (see Tab. 1). Although health risk perception has a significant impact on health behaviour (Atkinson et al. 2015; Dillard et al. 2012; Rudisill 2013), scholars have seldom analysed the effects of message framing on health risk perception. Therefore, we aim to examine the effect of message framing on health risk perception. Rothman and Salovey (1997) also highlight this research gap and suggest that health communication should be loss-framed in terms that improve consumer health behaviour. However, the empirical findings on this issue are inconsistent. For example, Meyero-witz and Chaiken (1987) point to the efficacy of loss-frames with regard to disease-detection behaviours, while O’Keefe and Jensen (2009) identify no significant advantage of loss-frames with regard to combined detec-
Antecedents of message framing | Effects of message framing | Antecedents and effects of message framing
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**Direct effects**
- Gallagher et al. (2011)
- Van’t Riet et al. (2014)
- Van’t Riet et al. (2016)

**Dimensions of message framing**
- Chang (2007)
- Ferrer et al. (2012)
- Gerend et al. (2008)
- Gerend and Maner (2011)
- Gerend and Shepherd (2007)
- Royne and Levy (2015)
- Updegraff et al. (2015)
- Van’t Riet et al. (2010)

**Direct effects on health behaviour**
- Block and Keller (1995)
- Edwards et al. (2001)
- Gallagger and Updegraff (2012)
- Keller and Lehmann (2008)
- Levin et al. (2002)
- Levison and Chaiken (1987)
- O’Keefe and Jensen (2009)
- Rothman and Salovey (1997)
- Rothman et al. (2006)
- This study

**Message framing as mediator**
- Sherman et al. (2006)
- Updegraff and Rothman (2013)
- Abhyankar et al. (2008)
- Reinhart et al. (2007)

**Mediators of message framing**
- Van’t Riet et al. (2014)
- Gallagher et al. (2011)
- Updegraff and Rothman (2013)
- Gerend and Shepherd (2012)
- Edwards et al. (2001)
- Block and Keller (1995)
- Abhyankar et al. (2008)
- Reinhart et al. (2007)

**Dimensions of message framing**
- Chang (2007)
- Ferrer et al. (2012)
- Gerend et al. (2008)
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- Gerend and Shepherd (2007)
- Royne and Levy (2015)
- Updegraff et al. (2015)
- Van’t Riet et al. (2010)

2. Conceptual framework and hypotheses

To address our research aims, we combine different theoretical considerations to understand risk perception and the influence of message framing and ad credibility. In many explanations of health behaviour that are grounded in theory, risk perception and decisions made in the context of risk revert to Prospect Theory (Kahneman and Tversky 1979). Thus, the influence of message framing can be especially well explained by the value function of Prospect Theory. Core elements of the value function are reference dependence, loss aversion and diminished sensitivity. Reference dependence implies that gains and
losses are measured relative to a reference point rather than from absolute levels of wealth. Consumers are more sensitive to losses than to gains (loss aversion). Consequently, loss-framed-messages should increase health risk perception more than gain-framed-messages.

Many scholars have examined Prospect Theory and its broadly accepted applications in economics (e.g., Ciccarese and Marchetti 2013; Kliger and Levy 2009; Levy and Levy 2002; Zhang and Semmler 2009). Its applicability in the health context has also been the focus of research (e.g., Abellan-Perpiñán et al. 2009; Attema et al. 2013; Happich et al. 2009; Harrington and Kerr 2016; McDermott 1998; Rasiel 2005; Royne and Levy 2015; Schwartz et al. 2008; Van’t Riet 2016; Viscusi et al. 1987). In nearly four decades of research on Prospect Theory, several critical issues have been raised. Attema et al. (2013) suggest that the value function for losses is not a universal phenomenon and that the shape of this function may depend on the outcome domain (e.g., monetary outcomes). Attema et al. (2013) indicate that loss aversion can impact decision making in the health domain, but this effect may not be constant. Barberis (2013) emphasises that it is often unclear exactly what represents gains or losses in certain situations. Levy and Levy (2002) assume different consumers to have different preference types, characterised by, e.g., risk aversion, value function or even lack of consistent decision making. Another factor that is noted is the set of characteristics of risk manipulation and the response mode of framing experiments based on Prospect Theory (Kühberger 1998). Risk manipulation aims to change the reference point and thus creates framing effects. Despite all of its weaknesses and critics, “prospect theory is still widely viewed as the best available description of how people evaluate risk” (Barberis 2013, p. 173).

To understand the importance of ad credibility, we ground this study in the Source Credibility Model of Hovland and Weiss (1951). It suggests that the effectiveness of messages depends on the perceived expertise and trustworthiness of the editor. Several scholars note that sources with higher credibility are more effective than those with lower credibility (e.g., Chaiken et al. 1989; Hu and Sundar 2010; Kareklas et al. 2015; Lappalainen et al. 1998). Nevertheless, Pornpitakpan (2004) observe, quite critically, that the dimensions of trustworthiness and expertise might have differential weights. He emphasises that the trustworthiness and expertise dimensions of source credibility may also have differential importance in their effects on attitude formation and change. This may affect health behaviour as a result of health attitude, health condition and health risk perception. In addressing this issue, it is necessary to observe behavioural intentions as well.

Grounded in Prospect Theory and the Source Credibility Model, the conceptual framework of our study proposes that message framing and ad credibility influence both health risk perceptions and health behaviour intentions (see Fig. 1).

Based on these theoretical assumptions, our studies examine the influence of message framing on health risk perception (studies 1–3) and the impact of ad credibility on health risk perception, with consideration of trustmarks (studies 1–2) and argumentation style (study 3) (see Fig. 1). In all three studies, we analyse the impact of health risk perception on several behavioural intentions. The next section presents the variables and moderators of our conceptual framework.

### 2.1. Message framing and health behaviour

Several scholars recommend loss-framed messages regarding alcohol consumption (Baek et al. 2013; Gerend and Cullen 2008; Duhachek et al. 2012; Kingsbury et al. 2015). Other studies related to unhealthy nutrition (Aldridge 2006; Brug et al. 2003; Gerend and Maner 2011; van Assema et al. 2001) find either no or very little evidence that loss- and gain-framing could promote healthier nutrition. Regarding increased use of a special nutrition supplement, the research has found contrary recommendations regarding support for gain-framing (Jung et al. 2011) or loss-framing (Lensch and Simons 2001).

By weighting the losses of neglecting healthy behaviour more heavily than the gains from adopting healthy behaviour, we assume that health risk perceptions of consumers should be higher in loss-frames than in gain-frames. Loss-framed messages should be more effective

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**Fig. 1: Conceptual framework**
in cases of health behaviours with high-risk outcomes. According to the value function of Prospect Theory (Kahneman and Tversky 1979) and prior findings of studies grounded in Prospect Theory (Abhyankar et al. 2008; Bassett-Gunter et al. 2013; Edwards et al. 2001; and Yu et al. 2010), health risk perception should be higher in loss-frames compared to gain-frames. Based on this reasoning, we propose the following hypothesis:

**H1:** Loss-frames will increase health risk perception more than gain-frames.

### 2.2. Ad credibility, trustmarks and argumentation style

The effectiveness of communication depends on the source and content of the information (Kemp et al. 2015). The source credibility and content credibility account for the ad credibility perceived by the consumer of the health ad. The potential for an increase in health risk perception of consumers depends, to a large extent, on this ad credibility. The more trustworthy and accurate this information, the more consumers are concerned, given their higher levels of attention and lower defence against the content. Kroeber-Riel and Gröppel-Klein (2013, pp. 663–664) assume that the potential impact of a message increases with increasing source credibility. Thus, it appears that the effectiveness of health messages related to behaviour depends largely on the consumers’ perception of their credibility. According to these considerations, higher ad credibility should influence health risk perception. Therefore, we propose following hypothesis:

**H2:** The higher the ad credibility, the higher the health risk perception will be.

In the health context, several investigations demonstrate an increase in perceptions of trust because of testimonials or trustmarks, which are examples of an external way to signal the high quality of the provided health information (Berry and Shields 2014; Burkell 2004; Grunert et al. 2000; Kemp et al. 2015). To Burkell (2004), seals of approval certify core quality indicators, which consumers consider important but cannot easily evaluate for themselves. In our studies, we differentiate between trustmarks verifying the core quality indicators of the source of the ad (source-based trustmarks) and trustmarks providing individual quality indicators for the content of the ad (content-based trustmarks). Following Burkell (2004), only source-based trustmarks should increase ad credibility because they certify the core quality indicators of the source of the ad. Content-based trustmarks should not influence ad credibility. The following hypotheses are thus proposed:

**H3a:** Source-based trustmarks will increase ad credibility and health risk perception compared to ads without source-based trustmarks.

**H3b:** Content-based trustmarks will not increase ad credibility and health risk perception.

Argumentation style in health messages also increases content credibility and thereby ad credibility, and two-sided argumentation is described as a proven persuasive technique (Kroeber-Riel and Gröppel-Klein 2013, p. 623). Different studies have examined the positive effects of two-sided argumentation (e.g., Cornelis et al. 2013; Cornelis et al. 2014; Crowley and Hoyer 1994; Etgar and Goodwin 1982; Kamins and Marks 1987; Keller and Lehmann 2008; Pechmann 1992). Using two-sided argumentation in health messages, health ads provide information on both the positive and negative attributes of a specific health behaviour. Even two-sided argumentation offers potentially powerful persuasion toward healthier behaviour. Cornelis et al. (2013) note that most health messages are one-sided, as they argue solely using information about the damage of unhealthy behaviour. Health ads that use two-sided argumentation should increase ad credibility and result in higher health risk perception. Based on this reasoning, we propose the following hypothesis:

**H4:** Two-sided argumentation will increase ad credibility and health risk perception compared to ads using one-sided argumentation.

### 3. Study 1: Message framing, ad credibility and source-based trustmark

In study 1, we examine the influence of message framing and ad credibility on health risk perception (**H1** and **H2**). To examine the importance of the source factor in effective communication, we investigate the influence of a source-based trustmark on ad credibility (**H3a**).

#### 3.1. Method

Two hundred and forty-one participants (65.15 % female, mean age = 24.28 years, 89.63 % students) participated in study 1. They were assigned at random to one of four conditions of a 2 (frame: gain vs. loss) x 2 (trustmark: none vs. with source-based trustmark) between-subjects design. The health ad contained a text with information advising against alcohol-drinking and a picture of young adults in a car accident (see Tab. A2 in the Appendix). The picture was used not to highlight the loss dimension but rather to catch attention. To manipulate the gain- or loss-frame, different types of information followed the initial ad: in the gain condition, we presented the participants with several gains related to reducing own alcohol consumption; for the participants in the loss condition, we identified several disadvantages of maintaining or increasing own alcohol consumption (see Tab. A2 in the Appendix). In the trustmark treatments, we added a well-known trustmark of an independent German consumer organisation as a credible source-based trustmark, which qualified the source of the health ad (see Tab. A2 in the Appendix). To check the trustmark credibility of the presented trustmark and possible trustmark biases, we used seven items with a semantic differ-
We measured participants' perceived levels of health risk perception and their perceptions of ad credibility. Their health risk perception of alcohol consumption was measured with a 10-point scale (1 = no risk to health, 10 = very high risk to health). To quantify ad credibility, we used sixteen items (Beltramini 1988; Jones et al. 2003) with a semantic differential and a 7-point bipolar scale, i.e., 1 (unbelievable) to 7 (believable) (Cronbach’s $\alpha = 0.959$) (see Tab. A1 in the Appendix). These items included the advertising believability scale by Beltramini (1988) and the source expertise scale by Jones et al. (2003). With these items, we comprehensively measured ad credibility. Based on Menon et al. (2008), we asked the participants to answer questions about their health behaviour intentions, such as “increased awareness of alcohol’s consequences”, “increased interest in alcohol’s consequences”, “review of own alcohol consumption” and “share information by word-of-mouth”, each on a 7-point scale (1 = totally disagree, 7 = totally agree). To control for an individual’s knowledge of health risks, we added one question with a reversed 7-point scale (1 = very high, 7 = very low). To diminish the threat of method bias associated with online surveys with a responsive design, we added one question to assess answering accuracy with a 10-point reverse scale (1 = totally agree, 10 = totally disagree) (see Tab. A1 in the Appendix). Participants were able to read the whole health ad in an appropriate format due to this responsive design, independent of the technical advice (e.g., mobiles, tablets or laptops). Because health risk perceptions may be affected by socio-demographics, the questionnaire ended with questions about age, gender (0 = male; 1 = female) and socio-economic status (0 = student; 1 = employee; 2 = other). We pretested our studies to control and check for comprehension and to validate the measures and the duration. Our pretests demonstrated good comprehension of the questionnaire and the scenario by the participants. They were able to follow the scenarios, questions, trustmarks and logos very well.

### 3.2. Results

**Manipulation check:** Following Gerend and Cullen (2008), we asked two questions about how strongly participants agreed that the ad indicated the gains of decreasing alcohol consumption and how strongly they agreed that the ad indicated the losses of maintaining or increasing alcohol consumption (see Tab. A1 in the Appendix). We expected the participants in the gain treatment to agree significantly more strongly with the question about gains compared to the participants in the loss treatment ($M_{\text{loss}} = 4.29$ and $M_{\text{gain}} = 5.93$, $p = .000$). As expected, participants in the loss treatment agreed significantly more strongly with the question of indicated losses compared to participants in the gain treatment ($M_{\text{loss}} = 6.15$ and $M_{\text{gain}} = 5.50$, $p = .000$). Therefore, the manipulation was successful.

<table>
<thead>
<tr>
<th></th>
<th>Loss-Frame</th>
<th>Gain-Frame</th>
</tr>
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<tbody>
<tr>
<td>No source-based trustmark</td>
<td>7.60 (1.87)</td>
<td>7.82 (1.86)</td>
</tr>
<tr>
<td>With source-based trustmark</td>
<td>7.69 (1.97)</td>
<td>7.40 (2.08)</td>
</tr>
</tbody>
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**Tab. 2: Means of health risk perception of study 1 (with standard deviation)**

**Message framing, ad credibility and source-based trustmark:** Health risk perceptions do not differ significantly between frame- and gain-frames, with or without the source-based trustmark (see Tab. 2). There is no significant difference in trustmark credibility between the loss- and gain-frames ($M_{\text{loss}} = 4.28$ and $M_{\text{gain}} = 4.60$, $p > .05$, $n = 115$). An ANOVA indicates the highly significant influence of ad credibility ($F(1, 236) = 31.24$, $p = .000$) (H2) and the significant influence of the source-based trustmark ($F(1, 236) = 8.14$, $p = .005$) on health risk perception, as well as the significant interaction between the source-based trustmark and ad credibility ($F(1, 236) = 7.76$, $p = .006$, $\eta^2 = .031$) (H3a) (see Fig. 1). There is no significant effect of message framing ($F(1, 236) = 0.45$, $p > .05$) (H1) on health risk perception. Due to this analysis, we have no support for hypothesis H1. Loss-frames do not increase health risk perception more than gain-frames. Hypothesis H2 is supported. The higher the ad credibility, the higher the health risk perception. Hypothesis H3a is also supported. Compared to ads without a source-based trustmark, the use of a source-based trustmark increases ad credibility and health risk perception. Fig. 2 shows the interaction effect between the source-based trustmark and ad credibility on health risk perception.

**Health behaviour intentions:** A MANOVA indicates stronger health behaviour intentions associated with the following health risk perceptions: awareness of alcohol’s consequences ($\beta = 0.40$, $t = 3.37$, $p = .000$), interest in alcohol’s consequences ($\beta = 0.30$, $t = 5.52$, $p = .000$), review of own alcohol consumption ($\beta = 0.26$, $t = 4.85$, $p = .000$), and word-of-mouth sharing of information ($\beta = 0.23$, $t = 4.29$, $p = .000$). Nevertheless, the means of these health behaviour intentions are relatively low (see Tab. 3).

<table>
<thead>
<tr>
<th></th>
<th>Loss-Frame</th>
<th>Gain-Frame</th>
</tr>
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<tbody>
<tr>
<td>Awareness of alcohol’s consequences</td>
<td>3.90 (1.70)</td>
<td>4.05 (1.88)</td>
</tr>
<tr>
<td>Interest in alcohol’s consequences</td>
<td>3.55 (1.64)</td>
<td>3.50 (1.79)</td>
</tr>
<tr>
<td>Review of own alcohol consumption</td>
<td>3.01 (1.62)</td>
<td>3.30 (1.73)</td>
</tr>
<tr>
<td>Word-of-Mouth</td>
<td>2.48 (1.60)</td>
<td>2.56 (1.71)</td>
</tr>
</tbody>
</table>

**Tab. 3: Means of health behaviour intentions in study 1 (with standard deviation)**

**Other results:** An ANOVA indicates the highly significant influence of age ($F(1, 233) = 14.24$, $p = .000$), gender ($F(1, 233) = 5.45$, $p = .020$), and socio-economic status ($F(1, 233) = 6.08$, $p = .003$) but no significant influence of knowledge of health risks in general ($F(1, 233) = 0.02$, $p > .05$) on health risk perception. In this sample, health risk perception is significantly higher for students compared to employees ($M_{\text{student}} = 7.72$ and $M_{\text{employee}} = 6.76$, $p = .028$). Women have significantly higher health risk perceptions than men ($M_{\text{female}} = 7.53$ and $M_{\text{male}} = 7.35$, $p = .039$).
risk perception compared to men ($M_{women} = 7.85$ and $M_{men} = 7.20$, $p = .012$). ANOVAs reveal no significant effect of gender on ad credibility ($M_{women} = 4.71$ and $M_{men} = 4.42$, $p > .05$) but do reveal significant differences in knowledge about health risks in general between women and men: women have better knowledge than men ($M_{women} = 5.64$ and $M_{men} = 5.25$, $p = .011$). Women perceive the presented trustmark as significantly more credible than do men ($M_{women} = 4.67$ and $M_{men} = 4.02$, $p = .022$).

4. Study 2: Message framing, ad credibility and content-based trustmark

In study 2, we analyse the effects of content-based trustmarks because companies and organisations also use content-based trustmarks in health ads. In contrast to study 1, where the health ad contained source-based trustmarks and a picture, we investigate the influence of message framing and ad credibility on health risk perception without a picture next to the health information presented in the health ad ($H1$ and $H2$). We predict that the content-based trustmark has no influence on ad credibility or health risk perception ($H3b$).

4.1. Method

Two hundred and forty-eight participants (66.90 % female, mean age = 24.09 years, 92.74 % students) participated in study 2. They were assigned at random to one of four conditions of a 2 (frame: gain vs. loss) x 2 (trustmark: none vs. with content-based trustmark) between-subjects design. The health ad contained a text warning against unhealthy nutrition and encouraging an increase in one’s intake of vegetables and fruits. Conditional on the gain- or loss-frame, different health information followed: in the gain condition, we advised participants about several advantages of reducing unhealthy nutrition, and in the loss condition, we identified several disadvantages of maintaining or increasing unhealthy nutrition (see Tab. A3 in the Appendix). In the trustmark treatments, we added the trustmark of an independent German association focused on healthy nutrition as a credible content-based trustmark; it did not qualify the source of the health ad but made reference to healthy nutrition (see Tab. A3 in the Appendix). Consistent with study 1, the same scales were used to measure participants’ perceived levels of health risk perception, ad credibility (Cronbach’s $\alpha = 0.948$), trustmark credibility (Cronbach’s $\alpha = 0.907$), and health behaviour intentions; reversed scaled questions measured knowledge about health risks in general and unhealthy nutrition, and a reversed scaled question also assessed the accuracy of answers (see Tab. A1 in the Appendix). As in study 1, the questionnaire ended with questions about the socio-demographic variables of age, gender and socio-economic status.

4.2. Results

Manipulation check: Similar to study 1, two questions were used to test how strongly participants in the gain treatment agreed that the ad reflected the advantages of decreasing unhealthy nutrition and how strongly the ad reflected the disadvantages of maintaining unhealthy nutrition. Participants in the gain treatment agreed significantly more strongly with the gain question compared to participants in the loss treatment ($M_{loss} = 4.94$ and $M_{gain} = 5.93$, $p = .000$). As expected, participants in the loss treatment agreed significantly more strongly with the question of indicated losses compared to the participants in the gain treatment ($M_{gain} = 6.13$ and $M_{gain} = 5.78$, $p = .022$). Therefore, the manipulation was successful.

Message framing, ad credibility and content-based trustmark: Health risk perceptions do not differ significantly between the loss-frame and the gain-frame for treatment
with or without the content-based trustmark (see Tab. 4). There is no trustmark bias regarding trustmark credibility between the loss- and gain-frames (Mloss = 5.06 and Mgain = 5.10, p > .05, n = 124).

An ANOVA again emphasizes the highly significant influence of ad credibility (F(1, 243) = 16.29, p = .000) (H2), but there is no significant influence of the content-based trustmark (F(1, 243) = 0.00, p > .05) on health risk perception as well as no significant interaction between the content-based trustmark and ad credibility (F(1, 243) = 0.01, p > .05, η² = .000) (H3b). In addition, there is no significant effect of message framing (F(1, 243) = 0.50, p > .05) on health risk perception. Similar to study 1, there is no support for hypothesis H1, but there is support for H2. Loss-frames do not increase health risk perception more than gain-frames, but the higher the ad credibility, the higher the health risk perception. Hypothesis H3b is supported with no significant interaction of content-based trustmark and ad credibility. Content-based trustmarks do not increase ad credibility and health risk perception.

Health behaviour intentions: MANOVA indicates, again, stronger health behaviour intentions associated with health risk perception: awareness of the consequences of unhealthy nutrition (β = 0.13, t = 2.03, p = .044), interest in the consequences of unhealthy nutrition (β = 0.20, t = 3.21, p = .001), as well as word-of-mouth sharing of information (β = 0.19, t = 3.14, p = .002), but there is no effect on the review of own nutrition behaviour (β = 0.10, t = 1.51, p > .05) or perceived need to change own nutrition (β = -0.02, t = -0.32, p > .05). Similar to study 1, the means for each behavioural intention, compared to the health risk perception of unhealthy nutrition, are relatively low (see Tab. 5).

Other results: An ANOVA indicates no significant influence of age (F(1, 233) = 0.49, p > .05), gender (F(1, 233) = 0.812, p > .05), socio-economic status (F(1, 233) = 1.96, p > .05), knowledge of health risks in general (F(1, 233) = 0.33, p > .05) or knowledge of health risks of unhealthy nutrition (F(1, 233) = 1.17, p > .05) on health risk perception. ANOVAs reveal no significant difference between genders with regard to ad credibility.
An ANOVA again underlines the highly significant influence of ad credibility (F(1, 177) = 12.28, p = .001) (H2) but finds no significant influence of argumentation style (F(1, 177) = 0.00, p > .05) (H4) on health risk perception and no significant interaction between argumentation style and ad credibility (F(1, 177) = 0.05, p > .05, η² = .000). Hypothesis H2 is again supported: The higher the ad credibility, the higher the health risk perception. Thus, hypothesis H4 is not supported. Two-sided argumentation does not increase ad credibility and health risk perception compared to ads with one-sided argumentation. In contrast to studies 1 and 2, a significant effect of message framing (F(1, 177) = 4.68, p = .032) on health risk perception exists (H1). There is support for hypothesis H1, with significantly higher health risk perception through the loss-frame compared to the gain-frame, independently of whether one- or two-sided argumentation is used.

Health behaviour intentions: A MANOVA again indicates stronger health behaviour intentions according to health risk perception: awareness of alcohol’s consequences (β = 0.40, t = 6.93, p = .000), interest in alcohol’s consequences (β = 0.30, t = 5.14, p = .000), review of own alcohol consumption (β = 0.33, t = 5.17, p = .000), word-of-mouth sharing of information (β = 0.28, t = 4.35, p = .000), as well as perceived need to change own alcohol consumption (β = 0.15, t = 2.49, p = .014). Similar to studies 1 and 2, the values for each behavioural intention regarding alcohol consumption are low (see Tab. 7). The very low perceived need to change own alcohol consumption reflects the assumption of internalized acceptance of behaviour, which is marginally flat compared to the perceived need to change own nutrition in study 2.

Other results: An ANOVA indicates no significant influence of age (F(1, 174) = 0.17, p > .05) or gender (F(1, 174) = 0.84, p > .05), a significant influence of socio-economic status (F(1, 174) = 5.69, p = .004), and no significant influence of knowledge of health risks in general (F(1, 174) = 3.75, p > .05) or knowledge of health risks of alcohol (F(1, 174) = 1.81, p = .05) on health risk perception. Health risk perception is significantly higher for students compared to employees (M_students = 7.36 and M_employees = 6.13, p = .002). ANOVAs reveal no significant difference between genders with regard to ad credibility (M_women = 4.76 and M_men = 4.88, p > .05) and, between women and men, no significant differences in knowledge about health risks in general (M_women = 5.24 and M_men = 5.11, p > .05) or knowledge about the health risks of alcohol (M_women = 5.42 and M_men = 5.23, p > .05).

6. Discussion and implications

These empirical results are relevant for publishers of health ads, namely companies and organisations that aim to increase health risk perception to create a stronger possibility of changes in health behaviour, as previous studies excluded health risk perception. The findings provide major theoretical and managerial implications.

6.1. Theoretical implications

In this study, we examined the effects of message framing and ad credibility on health risk perception. We examined the impact of health risk perception on health be-
haviour intentions. We attempted to determine whether gain- or loss-framing in health ads increases health risk perception and analysed whether higher ad credibility increases health risk perception.

Our results demonstrate that loss-frames do not increase health risk perception significantly compared to gain-frames when only health arguments are included. The impact of higher risk perception due to loss-frames may depend on the motivation (health vs. appearance) of consumers (Cornelis et al. 2014). Cornelis et al. 2014 emphasise that health-focused arguments are more efficient for health-motivated consumers and that appearance-focused messages have higher efficiency for appearance-motivated consumers. The low value of the perceived need to change own alcohol consumption reflects the relatively low health motivation (see Tab. 7). The arguments of loss-framed messages need to match the individual’s motivation to increase health risk perception. Keller and Lehmann (2008) assume that the recommendations of message framing depend on individual differences such as consumers’ promotion- or prevention-focus. These antecedents of message framing should be addressed in further research, as they are widely ignored in the message-framing literature (Van’t Riet et al. 2016).

All three studies indicate higher health risk perception through higher ad credibility for loss- and gain-frames. This is consistent with the findings of Kareklas et al. (2015) about the efficiency of antivaccination health messages. Additionally, Chaiken et al. (1989) underline the important role of ad credibility in persuasion, and Hu and Sundar (2010) examine the interaction among source credibility, information and behavioural intentions. They reveal stronger behavioural intentions through more credible sources. Lappalainen et al. (1998) note that there are significant differences in the trustworthiness of sources of health information.

Source-based trustmarks increase ad credibility and health risk perception more than ads without source-based trustmarks (study 1). This result is consistent with Aiken and Boush (2006) and Grunert et al. (2000). In contrast, in study 2, content-based trustmarks do not increase the effect of ad credibility on health risk perception. An explanation for the different effects of source-based and content-based trustmarks may be the distinction that these trustmarks are verified. Source-based trustmarks verify core quality indicators of the source, while content-based trustmarks verify quality indicators of the ad content. Consumers may have more difficulty estimating the quality of the source than the quality of the ad content.

Two-sided argumentation does not increase ad credibility and health risk perception compared to ads with one-sided argumentation. Regarding purchase intentions, where two-sided argumentation is mostly used, Crowley and Hoyer (1994) cite mixed empirical results of the impact of two-sided argumentation. They point to the possible persuasive importance of two-sided arguments, achieved through the refutation of the negative arguments in the message itself. Other factors, such as the refutation type of the message (Cornelis et al. 2013), the opposed attitude of consumers (Keller and Lehmann 2008) or consumers’ motivation (Cornelis et al. 2014) may also influence two-sided argumentation. Cornelis et al. (2014) analyse differences in argumentation styles depending on whether participants were health- or appearance-motivated. Comparing the means in study 3 between the health consciousness scale and the importance of appearance scale (Mhealth_consciousness = 4.99 and Mappearance_importance = 5.35) reveals the greater importance of appearance than health consciousness. Thus, our health-focused arguments are less efficient, and we should have used more appearance arguments. Keller and Lehmann (2008) mention the opposed attitude of consumers. They find two-sided messages to be more effective when the consumers were initially opposed to the recommendation. In the case of alcohol consumption, we believe that the majority of our participants are aware that alcohol consumption is not healthy, and so they cannot be opposed to the recommendation given in the health ad.

The findings of the three experimental studies indicate that healthier behaviour intentions are associated with health risk perception. This is consistent with Dillard et al. (2012), Heideker and Steul-Fischer (2015) and Rudsill (2013). The means of health behaviour intentions are relatively low (see Tab. 3, Tab. 5, and Tab. 7). Despite comparatively high health risk perceptions of alcohol consumption and unhealthy nutrition, participants have no healthier behaviour intentions in equal proportion to their health risk perceptions. Hivert et al. (2009) find similar results. Grunert et al. (2000) explain this and refer to the immense importance of trustworthy and credible information if the intended behaviour is incongruent with consumers’ internalized intentions. Especially, alcohol consumption is widespread, popular among younger people, and partially accepted as a common behaviour. Even if health risk perception is highly correlated with behaviour, there could be other factors that interact with health risk perception as moderators or that could mediate its effects on health behaviour (Menon et al. 2008, p. 998). For example, Updegraff et al. (2015) note that messages influence long-term health behaviour when gain- or loss-framed information matches consumers’ beliefs about their health outcome risks. Therefore, the frames of messages should match personal factors, such as susceptibility or motivational orientation, to increase participants’ attention.

Analysing gender differences in study 1, gender demonstrated a significant influence on health risk perception. Women reported higher risk perception compared to men. This is consistent with the findings of Heideker and Steul-Fischer (2015). High perceived trustmark credibility is one main premise upon which trustmarks operate. In studies 1 and 2, women perceived the presented trustmarks as more credible than did men. The reported means of trustmark credibility were relatively high for
both women and men. In contrast to study 2 and study 3, study 1 indicates that age has a significant influence on health risk perception. Based on the high percentage of younger participants in all three studies, age may also influence health behaviour intentions (see Tab. 3, Tab. 5, and Tab. 7). Age-related differences in health risk perceptions, behaviour intentions and motivation were the focus of the studies of Bonem et al. (2015). Older adults tended to perceive more risk in health domain than younger ones and rated risk behaviour as less enjoyable than younger participants did. Potential biases according to age should not be ignored and will be discussed in the limitations.

6.2. Managerial implications

Actual discussions about fat and sugar taxes on food and beverages, clear labelling, or labels with traffic light systems on food, for example, demonstrate the practical relevance of health ads to companies and organisations seeking to address consumers’ unhealthy behaviour. For publishers of health ads or health campaigns, it is beneficial to provide evidence of how message framing and ad credibility influence health risk perception. Several practically relevant implications can be derived from our studies. These are especially relevant for companies widely seen as having lower credibility, such as health insurers, insurers offering private health services, and organisations with the essential prerequisite of high credibility, such as governmental institutions (e.g., ministry of health, ministry of health education) and their health campaigns against alcohol consumption or unhealthy nutrition. The implications described below are also relevant to non-profit organisations (e.g., health foundations) interested in healthier behaviours.

Many health campaigns use loss-frames. However, our findings indicate that the arguments of messages using loss-frames need to match the individual’s health- or appearance motivation. Publishers of health ads must complete a segmentation of their target groups and determine whether they are more health- or appearance motivated. The optimal solution is to offer different health ads that match the motivations of all individuals in the target group. All three studies have shown that publishers need to increase their ad credibility to increase health risk perception. Source-based trustmarks can increase ad credibility, such as health insurers, insurers offering private health services, and organisations with the essential prerequisite of high credibility, such as governmental institutions (e.g., ministry of health, ministry of health education) and their health campaigns against alcohol consumption or unhealthy nutrition. The implications described below are also relevant to non-profit organisations (e.g., health foundations) interested in healthier behaviours.

The use of pictures in health ads, as in study 1, may be perceived as persuading to consumers. In line with Rayner et al. (2008), we assume that the additional picture appeared to be too persuasive for participants and distracted too much from the text and its content. Another problem with the picture may be negative priming, as the ad shows a car accident. In their research on the effectiveness of health messages, Agrawal et al. (2007) emphasise that negative priming hinders the messaging process. In addition, previous research about the effectiveness of loss- and gain-frames recommends only providing text information about health risks, without any pictures (Basset-Gunter et al. 2013; Kingsbury et al. 2015). Publishers of health ads should be aware of effects of pictures and deliberate about whether health ads actually need pictures.

7. Limitations and further research directions

To understand the effects of message framing and ad credibility on health risk perception, further studies are required, as this study is not without limitations. Five issues are highlighted below.

In this study, we focused on contextual antecedents. As Menon et al. (2008) mention, other antecedents of health risk perception exist. Individual differences — such as actual alcohol drinking (ranging from non-drinkers to excessive drinkers), eating behaviours (vegans, etc.), cultural and religious backgrounds (Islam, Hinduism, Buddhism, etc.), and attitudes about alcohol drinking or unhealthy eating — may also influence health risk perceptions of alcohol consumption and unhealthy eating and should be included in further studies. Regarding the younger sample, other possible relevant variables of motivational antecedents, such as self-control, self-positivity bias and peer group pressure, should also be included in further research. Including further affective antecedents, such as positive or negative states and emotions, or cognitive antecedents, e.g., past experience, could provide a broader conceptual model of health risk perception. The focus on contextual antecedents is especially relevant to organisations and companies that create...
health ads. Influencing motivation, affect, cognition or individual differences is much more difficult for companies than using message framing and methods such as trustmarks to increase ad credibility. Regarding its practical relevance, we assume our conceptual framework to be appropriate but not finally exhaustive.

Although special attention was devoted to the experimental designs and data collection, online studies have some limitations. For example, we cannot be certain that the participants’ answers were completely honest and correct. To address the threat that participants answered by just clicking through the survey, we used reversed scaled questions and a question about answering accuracy. Further studies should include questions about remembering the components of the ad to make sure participants read the whole scenario. If pictures are included, it is important to check whether the results are valid for the health ad’s picture, text or both. Additionally, reading behaviour could be controlled by eye-tracking systems. Another important issue is about the sustainability of health behaviour intentions. Concrete health behaviour, such as less alcohol drinking or healthier nutrition, after reading health ads is unclear. Further (long-term) studies should analyse the influence of health ads on long-term health behaviour, e.g., choosing non-alcoholic or alcoholic beverages. In our study, the samples contained mainly younger consumers, with students as the majority. However, representativeness and external validity for the general population is limited. Nevertheless, alcohol consumption and unhealthy eating are relevant health risks to younger consumers. The significantly higher means of health risk perception among students compared to employees in studies 1 and 3 underline the relevance of health risks to younger consumers. Further studies should observe and check potential age-related biases toward health risk perception, health behaviour intentions or even ad credibility regarding trustmarks. Future research should use balanced samples regarding gender and age.

In addition to message framing, Roberto and Kawachi (2014) argue that health ads can be improved by altering the default options and by using simple and meaningful information, carefully constructed frames, and efforts to reduce the unintended consequences of interventions by considering health decision-making processes. These results raise the question of whether other methods of framing – instead of loss- and gain-framing – are more effective at increasing health risk perception. Regarding argumentation style, Cornelis et al. (2014) examined differences depending on whether consumers were health- or appearance-motivated. Further research on two-sided argumentation should consider whether health-focused or appearance-focused arguments better fit the consumer, depending on the health risk. In the case of alcohol consumption or healthy nutrition, appearance-motivated consumers may need more appearance-focused arguments. Finally, the health risks examined in our studies were alcohol consumption and healthy nutrition. According to Ezzati and Riboli (2013), other health risks, such as high blood pressure and smoking, are also responsible for a large share of global diseases. Further investigations should apply our results to other health risks.

In addition to our findings, we need further research: We assume that health ads and health campaigns against alcohol consumption and unhealthy nutrition should present short-term consequences when using message-framing effects. Gerend and Cullen (2008) report lower alcohol use and drinking behaviour when short-term consequences are used instead of long-term consequences. Most health consequences are temporally more distant than appearance consequences and are less concrete to consumers, especially to younger ones. Health campaigns, e.g., “alcohol – know your limit” by the ministry of health education or e.g., “steaming up – healthy eating in kindergarten and school” by the ministry of food, already use short-term consequences. Vidrine et al. (2007) have demonstrated that fact-based messages produce higher risk perception for participants with a higher need for cognition than do emotion-based messages. For consumers with a lower need for cognition, a higher increase in risk perception was measured for emotion-based messages. Based on these findings, the weight of fact-based and persuasion-based information may also influence the potency of health ads. In practice, health campaigns, such as “slow down” for safer driving by the ministry of transport, use emotion-based messages compared to health ads against smoking, such as “smoke-free” by the ministry of health education, which uses more fact-based information. Depending on the individual differences of the target group of the health ad, this may also affect health risk perception. These and other extensions of our findings should be investigated.
### Appendix

<table>
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<tr>
<th>Construct</th>
<th>Item</th>
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<tr>
<td><strong>Health risk perception</strong></td>
<td>HRP1: Scenario is risky to your health.</td>
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</table>
| **Ad credibility (adapted from Beltramini 1988 and Jones et al. 2003)** | ADC1: The health advertisement is ___ unbelievable/believable.  
ADC2: The health advertisement is ___ untrustworthy/trustworthy.  
ADC3: The health advertisement is ___ not convincing/convincing.  
ADC4: The health advertisement is ___ not credible/credible.  
ADC5: The health advertisement is ___ unreasonable/reasonable.  
ADC6: The health advertisement is ___ dishonest/honest.  
ADC7: The health advertisement is ___ questionable/unquestionable.  
ADC8: The health advertisement is ___ inconclusive/conclusive.  
ADC9: The health advertisement is ___ not authentic/authentic.  
ADC10: The health advertisement is ___ unlikely/likely.  
ADC11: The source of the health advertisement has ___ low knowledge/high knowledge.  
ADC12: The source of the health advertisement is ___ incompetent/competent.  
ADC13: The source of the health advertisement is ___ irrational/rational.  
ADC14: The source of the health advertisement is ___ implausible/plausible.  
ADC15: The source of the health advertisement is ___ dislikeable/likable.  
ADC16: The source of the health advertisement has ___ low expertise/high expertise. |
| **Trustmark credibility** | TRC1: The trustmark has ___ low knowledge/high knowledge.  
TRC2: The trustmark is ___ incompetent/competent.  
TRC3: The trustmark is ___ irrational/rational.  
TRC4: The trustmark is ___ implausible/plausible.  
TRC5: The trustmark is ___ dislikeable/likable.  
TRC6: The trustmark has ___ low expertise/high expertise. |
| **Health behaviour intentions (adapted from Menon et al. 2007)** | BI1: My awareness of the negative consequences of alcohol/unhealthy nutrition increased.  
BI2: My interest in the negative consequences of alcohol/unhealthy nutrition increased.  
BI3: I will review my own alcohol consumption/nutrition.  
BI4: I will share the information with my friends.  
BI5: I need to change my own alcohol consumption/nutrition. |
| **Health consciousness scale (adapted from Gould 1988)** | HCS1: I reflect on my health a lot.  
HCS2: I’m very self-conscious about my health.  
HCS3: I’m generally attentive to changes in my health.  
HCS4: I’m constantly examining my health.  
HCS5: I’m alert to changes in my health.  
HCS6: I’m usually aware of my health.  
HCS7: I try to change something in the event of negative health changes.  
HCS8: I notice how I feel physically as I go through the day.  
HCS9: I’m involved with my health. |
| **Importance of appearance scale (adapted from Lawrence et al. 2006)** | APS1: I pay attention to my weight.  
APS 2: My appearance is important to me.  
APS 3: It is important to me that other people think I look good.  
APS 4: It is important to me to weigh an ideal amount.  
APS 5: I want to be good looking.  
APS 6: It is important to me to impress other people with my appearance.  
APS 7: It is important to me to weigh the right amount for my height.  
APS 8: The way I look is important to me. |
| **Knowledge about health risks in general** | KRG1: My knowledge about health risks in general is ___ very high/very low. |
| **Knowledge about health risks of alcohol/unhealthy nutrition** | KRS1: My knowledge about the health risks of alcohol/unhealthy nutrition is ___ very high/very low. |
| **Manipulation check (adapted from Gerend and Cullen 2008)** | MC1: The health advertisement indicates the advantages of decreasing alcohol consumption/healthy nutrition.  
MC2: The health advertisement indicates the disadvantages of maintaining or increasing alcohol consumption/unhealthy nutrition. |
| **Answering accuracy** | AA1: I have answered the questions really accurately |

**Tab. A1: Measures**

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*[Appendix continues]*
Alcohol is an important part of today’s society. It can not only be found at celebrations, parties on the weekend or at special occasions but also at after-work-parties with colleagues or during a well-earned evening off with company or alone. However, this ubiquitous beverage harms your body immediately with every glass and reduces life expectancy drastically. Moreover, every single episode of alcohol intoxication leads not only to liver damage but also kills millions of brain cells immediately. First, it harms memory and concentration; next, it affects judgment and intelligence. Rapid changes in personality, such as irritability, unreliability, unrest and fear, are also effects of alcohol consumption. Furthermore, high blood pressure and overweight lead to a direct reduction in life expectancy. Every day, more people die due to the direct consequences of alcohol consumption than die in car accidents.

A retention or an increase [A reduction] in your own alcohol consumption would lead to many disadvantages [advantages] that can be perceived after only a few days or even hours. If you choose to maintain or even increase [reduce] your usual quantity of alcohol consumed at drinking facilities, you will promptly decrease [increase] the health of your liver and at the same time your performance due to the degradation [conservation] of your brain cells devoted to memory and concentration. This would lead to the destruction of [maintenance of] your personality and [the continuity] your existing social contacts.

Don’t miss [Benefit from] the opportunity to change [positive aspects of changing] your alcohol consumption. You have it in your hand / in your glass!

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**Loss-Frame** [Gain-Frame]

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**Loss-Frame** [Gain-Frame]

The study of the “nutrition report Germany”, which was published last Monday, presents the latest findings about the consequences of unhealthy nutrition. Surprisingly, many severe, restrictive and even fatal diseases can be attributed to unhealthy nutrition. The reason is that in Germany there is a higher consumption of animal, adipose and sugary food in comparison to vegetable food. Direct consequences of this poor nutrition are lower performance, lack of fitness, discomfort, hypertension, and obesity, as well as a significantly higher risk of colon cancer, diabetes and heart diseases. It is well known that these consequences are already occurring in children and adolescents, in whom they are partly irreversible.

Good nutrition can be implemented easily. To reach the required amount of vitamins, minerals and fibre, it is sufficient to eat five small portions of vegetables and fruits throughout the whole day. This also includes juices and tasty smoothies. Even the replacement of snacks such as chocolate or jelly candy with a small fruit salad or a fruit juice reduces the risk of nutritional diseases immensely and, at the same time, immediately improves physical and mental performance. It is a small change that is very effective!

There are many disadvantages [advantages] of not [ ], replacing an unhealthy snack / meal with a portion of vegetables or fruit! If you decide not [ ] to replace a snack with (more) vegetables and fruit, you will be [will not be] affected by a higher risk of colon cancer, diabetes and heart diseases due to poor nutrition. You will feel unfit [fit], worse [better] and more uncomfortable [comfortable]. Furthermore, your performance during your study and exam periods will be significantly limited [will not be limited] based on your poor [optimal] care of your body.

Don’t miss [Benefit from] the opportunity to replace a snack with (more) vegetables and fruits. You can only benefit!
Loss-Frame [Gain-Frame] with one-sided /two-sided/ argumentation

The study of the research institute for health education, which was published last Monday, presents the latest findings regarding alcohol consumption in Germany. [Alcohol consumption is socially acceptable and is often a habit. Alcohol is often used to relax and to cope with stressful or intense situations.] In addition to its direct and immediate effects on the liver, it is now possible to prove that alcohol causes the prompt and simultaneous death of cerebral cells in diverse brain areas, affecting the concentration and intelligence of the observed test persons.

Interestingly, these effects are independent of the age of the test persons. [The relaxing and loosening impact of alcohol is especially known by youngsters and heights accident rates.] Indirect damages caused by higher accident rates, injuries and traffic accidents have been collected for the first time and can be associated with alcohol consumption. [Very often alcohol, especially cocktails, is linked with good taste and is therefore very popular. The good taste is, however, accompanied by several other consequences.] Direct measurements show a connection between previous alcohol consumption and increased hypertension as well as the percentage of body fat on a scale worthy of consideration. This finding, as well as the frequent use of alcohol throughout society, leads to a required reasonable limit on the consumption of alcohol.

There are many disadvantages [advantages] that would affect you immediately if you were to maintain or increase your own drinking behaviour! If you decide to drink the same amount of or more alcohol [less alcohol] than usual, you will be flabby [fitter] and inefficient [more efficient] by the next day. Furthermore, you will prepare yourself more poorly [better] for exams and waste [use] more time during the day in an inefficient [efficient] way. You will be perceived by others as more unattractive [attractive] because your body is tired [recovered] and communicates that. Moreover, you will decrease [increase] the regeneration of your liver cells and lose [maintain] the memory and concentration cells in your brain, which will be shown in your poor [improved] performance in your studies as well as in your professional life.

Don’t miss [Benefit from] the opportunity to enjoy the positive aspects of changing your alcohol consumption at your next drinking occasion. You can only benefit!

References


**Keywords**

Advertisement, Health Advertisement, Health Risk Perception, Health.
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