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Framing effects of cardiovascular disease messages on
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model

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Cardiovascular disease (CVD) is a leading cause of death among women worldwide (Gonsalves et al., 2016). Being largely regarded as a predominantly male disease it is, however, more common in women than in men (Appelmann et al., 2015). Although cardiovascular disease mortality rates declined in high-income countries over the past decade, it remains the main reason for women's deaths and is particularly high in middle-income European countries (World Health Organization, 2020).

Nevertheless, sex- and gender differences in the prevention of CVD risks have been overlooked for years in terms of research, funding, or policymaking – resulting in a lack of scientific and clinical attention (Regitz-Zagrosek & Kararigas, 2017). Overall, women's health has improved in recent decades, but clinicians and women continue to underestimate women-specific risks of heart disease. Hence, awareness of women's heart disease symptoms and risks remains suboptimal. Research indicated that women are also often less adherent to take prescribed medications in comparison to men (Lindquist et al., 2012) and, alarmingly, more than half of the women hesitate to call the emergency number when they experience a myocardial infarction (Den Ruijter et al., 2015).

Women have pathophysiologic and clinical features that contrast with men and older patients (Dreyer et al., 2015) and are mainly attributable to the reproductive cycle of women such as menopause and pregnancy complications (Appelmann et al., 2015). Yet, research on CVD has been mostly centered on men (Leifheit-Limson et al., 2015) and knowledge on additional specifications in most common risk factors such as diabetes mellitus, dyslipidemia, hypertension, obesity, and cigarette smoking for women is limited. For example, studies revealed a higher increase in coronary mortality for females with pre-diagnosed diabetes in comparison with males (Baviera et al., 2014). One of the factors researchers propose for a worsening outcome as compared to men is a lower risk perception, even when women are at risk, fostering particularly poor risk management in women (Leifheit-Limson et al., 2015). Such findings stress the need for effective health communication about women-specific CVD risk factors. Thus, this

present study is designed to examine framing effects of cardiovascular disease messages on women's behavior intentions.

Theory

Health Communication

Health communication pursues to inform, educate, and positively change health-related behavior. In this present paper, the term health communication encompasses all aspects of communication that relate to health. More precisely, health communication focuses on health-related transactions and the underlying factors that influence these (Berry, 2007). Thus, communication on health seeks to engage people to change their attitude and behavior. However, literature suggests that a change in behavior is more difficult to achieve than awareness of the problem, knowledge of a solution, or the motivation for a healthy behavior change (McGuire, 1981). Theories in this field have been drawn from communication, psychology, and sociology as well as education and neurosciences (Cameron et al., 2009). In recent years, the important role of effective health communication has intensified in industrialized societies where about 40% of deaths can be related to preventable social factors, such as overall high sugar intake, physical inactivity, smoking, or alcohol consumption (Snyder, 2007), which contribute to chronic diseases, such as cardiovascular disease, type 2 diabetes, or lung disease and cancers (Hekler et al., 2013).

Thus, most cardiovascular deaths are avoidable when people take action to prevent and detect risks in its infancy. However, researchers still know little about what precisely engages women in activating change in their lives (Lindquist et al., 2012). Communication on health risk should be directed towards key audience concerns and account for their existing beliefs. By evaluating a health threat as relevant and severe, women might be likely to consider their abilities and the efficacy of the approach. Conversely, if a health threat is not perceived as relevant or severe, they might be likely to take no action to mitigate the negative outcomes of a health threat (Lundgren & McMakin, 2018).

Health communication strategies that effectively influence women's behavior intentions and promote risk reduction, therefore, should provide information on lifestyle interventions that are designed around women-specific CVD mechanisms (Regitz-Zagrosek & Kararigas, 2017; Scott & Curbow, 2006).

Framing Health Messages

There exists a growing body of research on framing effects in health communication. The core of framing effects lies in the assumption that different formulations of a problem lead to different perceptions and result in a shift of preference for the audience (Tversky & Kahneman, 1981). The concept of framing was first applied in the fields of sociology and psychology (Lecheler & de Vreese, 2016) and can be explained as “the process by which a communication source constructs and defines a social or political issue for its audience” (Nelson, Oxley, & Clawson, 1997, p. 221).

Research on the framing of a health message investigates under which circumstances gain-framed and loss-framed messages encourage the recipients' motivation to behave healthy (Updegraff & Rothman, 2013). Studies in this field, thus, seek to explain why the framing of health messages may foster behavior change in recipients while other frames may not. Over the last decade of framing research, two major approaches to framing have emerged in health communication. First, matching the message frame to how individuals perceive the uncertainties and risks of the advocated health behavior, and second, matching the frame of the message to the motivational orientation of a person. The most common investigated frames in health communication are a loss- and a gain-frame. They can be distinguished by either promoting the benefits of adopting an advocated behavior (e.g., physical activity produces more alveoli and thus increases the respiratory volume) or stressing on the costs of not adopting it (e.g., smoking promotes lung cancer).

Several lines in the literature attempted to establish which frame is more effective for whom in what context. Nevertheless, studies indicate that there exists a relative effectiveness of

a gain-framed or a loss-framed message depending on factors related to the content of the message itself and factors related to the message recipient (Updegraff & Rothman, 2013). As an example, in a meta-analytic review of the persuasiveness of gain- and loss-framed messages for encouraging disease prevention behaviors, O’Keefe & Jensen (2007) found that gain-framed appeals are more persuasive than loss-framed appeals. However, the difference was small and appeared attributable to the effect of messages advocating dental hygiene behaviors only. For other preventive actions, such as safer-sex behaviors, diet and nutrition, or skin cancer prevention behaviors, their review indicated no statistically significant difference between the relative persuasiveness of gain- and loss-framed messages. In line with these findings, a newer meta-analytic review on the persuasiveness of loss- and gain-framed messages for promoting vaccination found no significant difference between the two frames (O’Keefe & Nan, 2012). Moreover, Gallagher et al. (2011) showed that perceived susceptibility influenced the extent to which loss-framed messages encouraged women to obtain a mammogram on breast cancer screening. Their results indicate, in particular, that higher perceived susceptibility for breast cancer in women, combined with a loss-framed message, persuaded women more to obtain breast cancer screening. However, women perceiving a lower susceptibility were equally persuaded by the loss- and the gain-framed messages.

Research in this field further suggests that segmenting audiences may enhance health communication effectiveness. Thus, interventions and messages which address concerns of a more specific audience may increase the effectiveness of a message (Campo et al., 2012). Similarly, findings of a recent study by Hayashi et al. (2018) signaled that targeting an audience (i.e., women) may partially work in terms of boosting risk perceptions. Hayashi et al. (2018) showed that matched graphic health warnings (GHW’s) on cigarette packaging heightened women’s risk perceptions and their intention to quit smoking when the GHWs portrayed females and not men. Previous research registered that GHWs are more effective for women than in men since they elicit negative emotional reactions, cognitive reactions, and beliefs about health risks

(Nonnemaker et al., 2015). However, the results of the study of Hayashi et al. (2018) revealed that when female subjects were depicted in the frames, it indeed increased their risk perceptions, but did not increase their intentions to quit smoking. Above all, however, effective health communication is aimed at changing health behavior positively.

Such findings support the evidence for a moderating role of risk beliefs on health behavior but also reveal the need for more attention to mediational pathways of complex models that test emotional responses to frames and information processing of recipients (Updegraff & Rothman, 2013). Researchers keep emphasizing, therefore, that future research should deeper examine psychological factors, such as personal preference or knowledge on health benefits, to add to a better understanding of framing effects (Elbert & Ots, 2018).

Overall, this section outlined that inconsistencies exist in the effectiveness of health message framing. This prospective study, thus, seeks to examine the effects of framing CVD risk messages on behavior intentions of women. Hence, two main research questions are proposed as follows:

RQ1: How do the loss- and gain-framed messages on CVD risks affect women's behavior intentions?

and, in particular,

RQ2: How do the loss- and gain-framed messages on CVD risks affect women's behavior intentions when they contain women-specific CVD risk factors?

Health-Related Models

Three main groups of health-related models which are used to predict the outcomes of (health-)risk communication can be identified in the literature. In the first group, models such as the theory of planned behavior (Ajzen, 1991), or the health belief model (Rosenstock, 1974), target risk characteristics (e.g., severity and susceptibility) and control beliefs associated with unhealthy behaviors (Chang, 2019). Second, models such as the extended parallel process model

(EPPM; Witte, 1992) focus on the role of fear-appeals and threat (e.g., susceptibility and vulnerability) and efficacy perceptions (e.g., self-efficacy and response efficacy) and the subsequent message responses such as behavioral changes (Goodall & Reed, 2013; Chang, 2019). Third, models that identify factors that drive health-related information seeking (e.g., risk information seeking and processing; Griffin, Dunwoody & Neuwirth, 1999) explain when and why people feel motivated to actively seek information about risks.

The EPPM-Model originates from health communication research and explains how and why people respond to fear-based messages (Lundgren & McMakin, 2018).

The theoretical model for this present study is fundamentally based on the extended parallel process model (EPPM; Witte, 1992) and a further extension of the EPPM (E-EPPM; So, 2013), which originates from the EPPM and, moreover, focuses on the role of negative emotions and threat (e.g. fear, anxiety). Both theories, the EPPM, and the E-EPPM were developed to measure the effects of health messages at large, although they seek to explain why and how individuals adapt to certain health behavior. It is well established in the literature that individuals can react to risks through two potential processing routes, being a dispassionate cognitive route and an emotional route (Loewenstein et al., 2001). More recent studies such as from Chang (2019) emphasize a "need to examine health issues from a bottom-top perspective" (p. 848). Chang (2019), for example, proposes a self-control-centered empowerment model that identifies health consciousness and health knowledge as important drivers of self-control. One strong argument for extensions of prior health information-related models is that they seek to investigate why and to what degree people respond to health information, besides the content and characteristics of the message. Hence, more complex models in health communication integrate a perspective on individuals' psychological traits and communicative behaviors to investigate both routes of processing a health message, the cognitive and the emotional route.

Therefore, this present study applies a conceptual model that includes the emotions of fear, hope, self-efficacy, and self-control as mediator variables. Additionally, the moderating role

of health consciousness will be examined. To investigate the effects of the frames on the proposed mediators, the third research question is:

RQ3: How do the different frames affect fear, hope, self-efficacy, and self-control?

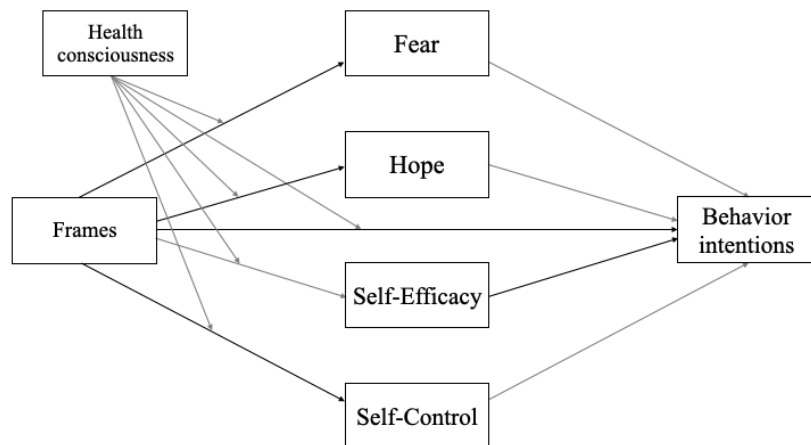


Figure 1. Proposed moderated mediation model.

Emotions

Much of the framing research in health communication has focused on cognitive responses to the message stimuli (e.g., perceived risk, message effectiveness, perceived susceptibility). However, several scholars suggest that investigating emotional aspects might be helpful to predict and understand health-related behaviors (Lee, 2019). Clore & Ortony (2008) define emotions as “cognitively elaborated affective states” (p. 629). Moreover, emotions are generally defined as internal mental states that result from an evaluation of people, events, or objects (Nabi, 2009). The appraisal theory of emotion presupposes that individuals' automatic cognitive appraisals of a situation arise emotions which are distinguishable from another by the specific patterns of cognitive appraisal (Myrick, 2015). The model suggests that appraisals of presented components in a message – such as threats (e.g., susceptibility and vulnerability) – determine message acceptance and changes in behavior (Chang, 2019). Thus, appraisals are particularly useful for investigating the effects of emotional appeals (e.g., fear-appeal).

Appraisal theory connects to the two central concepts of cognition and affection to explain why we feel afraid in one situation yet sad in another (Myrick, 2015). Hence, cognitions and emotions are tangled together one shaping the other and vice versa (Frijda et al., 2000). Models of cognitive appraisal can be further useful to predict varied emotional responses elicited by different frames. In turn, these emotions can influence social judgments and evaluations (Major, 2011). In contrast to moods that are intended to last for several hours, emotions are more temporally bound, more intense, and more specific than the general affective state of moods (Myrick, 2015). Being more likely to be evoked by a specific message-related stimulus than a mood, emotions are essential to understand the reaction to a message (Nabi, 1999; Myrick, 2015).

Fear

Fear is a common audience reaction to any message featuring a health threat. By definition, all health risks messages are threat appeals since they typically blueprint some sort of threat and/or risk that will occur if the recommended actions are not followed or the proposed threatening scenario will take place (McKay et al., 2004). Features of fear typically motivate individuals to pay greater attention and systematically process relevant information (Eich et al., 2000). In a meta-analysis of fear appeals' effectiveness for influencing attitudes, intentions, and behaviors, Tannenbaum et al. (2015) found a positive effect of fear appeals on attitudes, intentions, and behaviors. Furthermore, the moderation analysis showed that the effectiveness of fear appeals increased when the message included efficacy statements, depicted high susceptibility and severity, recommended one-time-only (vs. repeated) behaviors, and targeted audiences that included a larger percentage of female message recipients.

Several studies have tested the effects of fear-appeals using the EPPM. McKay et al. (2004a) investigated the effects of threat and efficacy messages when communicating cardiovascular disease risks due to elevated homocysteine levels. In line with previous research, their results showed that participants felt more confident to follow the recommendations after

reading a high threat/high efficacy message. Their results, moreover, revealed individual characteristics (i.e., advanced age, lower education level, an existing chronic illness, and a higher initial homocysteine level) associated with lower levels of the perceived threat and/or fear that may have attenuated the effectiveness of the message. Their findings contribute to previous research on fear-appeals, which propose a variety of personality factors influencing whether or not a fear appeal is persuasive (Witte & Allen, 2000). Ongoing, Smith et al. (2010) investigated action tendency emotions evoked by memorable breast cancer messages and found that messages that evoked fear were significantly more likely to be associated with detection behaviors compared to messages which evoked positive emotions (e.g., hope, relief). However, researchers also noted that extremely high levels of fear can attenuate the effects and point out possible backlash-mechanisms that can spur maladaptive message responses, such as avoidance or reactance (Witte & Allen, 2000; Smith et al., 2010). In particular, McKay et al. (2004a) noted that strong threat appeals combined with low-efficacy messages may lead to fear control reactions such as defensive avoidance or reactance and produce the greatest level of defensive responses. Nevertheless, moderate use of fear-appeals has been proven effective to motivate problem-solving or problem-avoiding behaviors (Lazarus, 1991a). One recurring explanation in the literature for the effectiveness of fear-appeals is that the activation of the emotion has been associated with the increase of personal risk perceptions (Witte, Meyer, & Martell, 2000) which are, in turn, are severe predictors of behavioral intentions (Myrick & Oliver, 2014; So & Nabi, 2013). Based on these findings, the following hypotheses are proposed:

H_{1a}: Loss-frames will be positively related to fear.

H_{1b}: Fear is positively related to behavior intentions.

Hope

As outlined previously, any message featuring a health threat is commonly suspected to lead to fearful audience reactions. Yet, research indicated that fearful messages often concurrently evoke other emotions, such as sadness, hope, guilt, or compassion (Myrick &

Oliver, 2014). Similarly, Williams-Piehot et al. (2005) showed that individuals felt fear, hope, and reassurance at the same time after being exposed to a message about mammography screening. Health communication research on hope argues that positive emotions may foster an individuals' approach to do whatever will help them to achieve any hoped-for goal or desired outcome (Myrick, 2015). Hence, Lazarus (1999) defines hope as, "to hope is to believe that something positive, which does not presently apply to one's life, could still materialize, and so we yearn for it" (p. 653). Moreover, feelings of hope connect with the longing for the betterment of a dreaded result and are, therefore, thought to be associated with behaviors towards what one (hopefully) desires (Lazarus, 1991a). Additionally, hope promotes a motivational goal to plan for the future (Roseman & Evdokas, 2004). The desired outcome can be both, a mental state or a physical state.

In a study on breast cancer messages, Smith et al. (2010) showed that women with messages about breast cancer evoking negative emotions were not any more likely to report engaging in prevention behaviors than women with messages evoking a positive emotion, such as hope or relief. Moreover, a noteworthy amount of research has linked hope and self-control. Early examinations propose hope as a driver of problem-solving coping activities when the person believes they have control over the situation (Lazarus & Folkman, 1984). More recent studies, for example from Winterich & Haws (2011) on the impact of various positive emotions on self-control related to health behaviors, showed that participants who felt hopeful ate less unhealthy food and had lower preferences for unhealthy snacks than individuals that reported to feel proud or happy. These findings are in line with the general suggestion that hope appeals may foster motivation for both forward-thinking and actions that move an individual closer to a relevant goal (Myrick, 2015). In addition, Volkman & Parrot (2012) showed that hope held a positive relationship with perceived message effectiveness and that perceived message effectiveness, in turn, predicted intentions to supplement vitamin D and calcium, and to perform

the exercise to lose weight. The findings outlined in this section lead to the following hypotheses:

H_{2a}: Gain-frames will be positively related to hope.

H_{2b}: Hope is positively related to behavior intentions.

Mixed-Emotional Appeals

The literature suggests that a blend of emotional appeals may enhance the motivation of the audience to better reflect on the meaning of the media message and, thus, to pay greater attention to the message (Oliver & Bartsch, 2010; Oliver et al., 2012). Furthermore, there exists a body of research (in the mood-as-resource paradigm) that supports the assumption that mixed-emotional appeals can enhance the effectiveness of health-related communication since they may provide recipients with positive emotions that can moderate negative processing of a health threat message (Myrick & Oliver, 2015).

Dillard & Peck (2000) examined emotional and cognitive reactions to multiple health- and safety-related public service announcements (PSA) and showed that different emotions had different effects on the perceived effectiveness of the PSAs by investigating fear, sadness, and happiness simultaneously. In line with previous research, their study set out that the analysis of a variety of emotions –positive and negative– which are triggered from the same message, can provide more insightful information into the mechanisms of message effectiveness of health messages.

In addition, it may also be possible that neutral emotional responses occur, for example, when the uncertainty one feels is inconsequential. As a result of uncertainty, combined positive and negative emotional responses can be possible. This can appear, when the perceived uncertainty includes both, elements of danger and opportunity (Goodall & Reed, 2013; Brashers, 2001). Thus, the following hypothesis is proposed:

H₃: A mix of perceived fear and hope will be positively related to behavior intentions.

Self-Efficacy

It has been established in the literature that a combination of negative appraisal (e.g., fear-appeal) and efficacy shows effects on health adaptive behaviors (Goodall & Reed, 2013). Earlier studies proposed self-efficacy as a moderator, shaping the extent to which a mediator (e.g., emotion/threat) influences behavior (Updegraff & Rothman, 2013). However, more recent research introduced self-efficacy as a mediator in their conceptual model (e.g., Lee, 2019). Particularly, the literature on self-efficacy suggests that the interplay between threat and efficacy may foster high appraisal which, in turn, drives health adaptive behaviors to better deal with one's health risks (Goodall & Reed, 2013; Lee, 2019).

Self-efficacy can be briefly defined as the belief in one's own ability to successfully follow health-promoted behavior (Witte & Allen, 2000). Being specific to a behavior (Torres & Marks, 2009), self-efficacy reflects the belief of a person to be capable of organizing and carrying out certain necessary actions in order to achieve the objectives set (Bandura, 1997). The literature on self-efficacy suggests that it plays a vital role in the process of making health decisions for individuals and influences health outcomes in a variety of populations (Torres & Marks, 2009). The health action process approach postulates that self-efficacy beliefs and intentions are one immediate motivational antecedent of health behavior (Schwarzer, 1999). Similarly, in a study on relationships between the concepts of health literacy, knowledge about hormone therapy, self-efficacy, and decision-making among postmenopausal health, Torres & Marks (2009) proposed self-efficacy as a strong precedent for behavior change and emphasize that self-efficacy as an individual's belief about the interaction between their efforts and results are critical to assess differences in motivation and persistence to behavior change.

Further, Scott & Curbow (2006) assessed the effect of message frames and CVD risk factors on behavior intentions in a randomized experiment with women who read either a gain- or a loss-frame heart disease prevention message. Their results showed that messages increased knowledge, self-efficacy, intervention efficacy beliefs, and the behavioral intentions of the

recipients. In particular, women being exposed to gain-framed messages reported increased self-efficacy levels compared to those who read a loss-framed message. However, the analysis revealed also that an increase in self-efficacy perceptions was only mildly related to increases in behavior intentions. Moreover, the self-efficacy measure applied in their experiment was not behavior-specific and, therefore, not a good predictor of intent to engage in any one behavior.

Additionally, Wolf (2007) examined the mediating role of self-efficacy in a health communication context and found a relationship between self-efficacy and self-reported HIV medication adherence (as actual behavior) and health literacy.

Recently published studies further support assumptions that self-efficacy functions as an important mediator in health-related behavior outcomes. As an example, Lee (2019) investigated the mediating effect of coping appraisal and negative emotions (fear and anxiety) in the relationship between mental health consciousness and information seeking on depression, stress, and anxiety disorder [mental illness, DSAD]. Interestingly, self-efficacy was found to be the only mediator in the proposed model (the relationship between health-consciousness and information seeking on mental illness). Based on these findings, the following hypothesis is proposed:

H_{4a}: Gain-frames will be positively related to self-efficacy.

H_{4b}: Self-efficacy is positively related to behavior intentions.

Self-Control

Theory suggests that self-control supports the depiction of an intention, thus enhancing the consistency between intention and actual behavior. Moreover, action control processes, such as self-control, planning, and resistance to temptation can serve as one possible explanation of why some people apt their goals while others fail (Schroder & Schwarzer, 2005). Self-control can be briefly defined as “a capacity to change and adapt the self to produce a better, more optional fit between self and the world” (Tangney, Baumeister & Boone, 2004, p. 275). The term includes a person’s belief that he or she has control over the outcome of events in his or her life,

more precisely, that the person perceives to control his or her health (Chang, 2019). Also, Chang (2019) proposed that self-control is driven by health consciousness and health knowledge and showed that recipients with higher levels of self-control are more likely to perceive health information as credible, pay more attention to health information, and are more likely to change their behavior so that they can maintain their health or to become healthy.

Moreover, self-control has been linked to empowerment, “a process by which individuals gain control over their lives” (Cleary & Zimmermann, 2004, p. 542), which fosters the engagement in action or adopting strategies that are empowering; the outcome is that people feel empowered (Perkins & Zimmermann, 1995). Hence, based on the literature, the following hypothesis is proposed:

H5: Self-Control is positively related to behavior intentions.

Health Consciousness

A growing body of research considers health consciousness as a key personal trait being closely related to preventive health attitudes and behaviors (Hong, 2011; Dutta-Bergmann 2004a; Jylhä, 2009). The conceptualization of the “multifaceted nature of the concept” (Hong, 2011, p. 345) has been, however, challenging. Early research on health consciousness often employed measures that assessed behavior only (e.g. Kraft & Goddell, 1993), focusing on an individual's' healthy lifestyle (e.g. regular physical exercise, eating healthy food, seeking health information).

Dutta-Bergmann (2004b, 2006) and Dutta (2007) defined health consciousness as a psychological-centered sub-dimension of health orientation. Precisely, the author conceptualizes health consciousness as the psychological predisposition towards the health of an individual. Example predispositions can be motivation and personal responsibility (Hong, 2011, p. 345; Dutta-Bergmann 2004b, 2006; Dutta, 2007). Additionally, Dutta-Bergmann (2004a), classified health consciousness as an important aspect of health orientation, which motivates a person to be

healthy. Thus, higher levels of health consciousness in individuals seem to be positively related to behaviors and cognitive processes that help to maintain health (Chang, 2019).

Supporting considerations that health consciousness is related to health-promoting behaviors, Iversen & Kraft (2006) indicated that high levels of health consciousness increase engagement in both fruit and vegetable consumption, and exercise in individuals. The same authors further revealed a positive relationship between health-conscious individuals and their adaptive coping behaviors regarding breast cancer prevention among women aged 45 years. Similarly, Hong (2011) focused on the personal aspect of health consciousness by including perceived responsibility and motivation to the concept. Thereby, health consciousness allows to include the cultural and social environment of an individual's perceptions of health. Moreover, Hong (2011) found a positive relationship between health-conscious individuals and their perceived self-efficacy. In this study, levels of efficacy determined to what extent a person accepts or rejects a message when a perceived health threat is moderate or high. One possible explanation of the author for the obtained results is that health-conscious individuals tend to be responsible for their health and perceive that they are both able and confident to control their health. This may lead most likely to a greater optimistic bias or less perceived vulnerability when being exposed to a health threat. Thus, health-conscious individuals may display higher levels of self-efficacy (Hong, 2011). These findings suggest the following hypothesis:

H₆: Health consciousness moderates the effects of the frames on self-efficacy.

Moreover, previous studies established a linkage between health consciousness and self-control. For example, the self-control-centered empowerment-model (Chang, 2019) seeks to explain reactions to a health message in people. In this model, health consciousness and health knowledge serve as driving forces of health-related self-control which consecutively leads people to be more likely to adapt to empowering strategies. Empowering strategies are, for example, perceiving health information as more credible (psychological strategy), paying more attention to mediated health information (cognitive strategy), or changing their behavior in line

with suggestions of a health risk message so that they can stay healthy (behavioral strategy) (Chang, 2019). Based on these findings, it can be hypothesized that:

H7: Health consciousness moderates the effects of the frames on self-control.

Also, a fourth research question is set to determine the interaction between health consciousness and emotions:

RQ4: How does health consciousness interact with fear and hope?

Methods

Participants

The data for this study was collected with the help of the online platform SoSci Panel. Women ($N = 636$) in Germany, Austria, and Switzerland, ($M_{age} = 42.4$ years, age range: 17-83 years) participated in the online experiment from June 14 to July 8, 2020. The SoSci Panel builds a non-representative pool of interview partners to support scientific research at universities and colleges. Lacking representativeness, the convenience sample is beneficial for the present research design as hypotheses were tested in an experimental setting.

Procedure

This study took advantage of an online questionnaire tool provided by the SoSci Survey website to conduct an experiment. Participants performed in one of five experimental conditions in an independent-measures design. The five independent variables were the stimulus groups, precisely two loss-framed groups (heart-disease and heart-disease-women) and two gain-framed groups (heart-health and heart-health-women), as well as one control group. The four mediator variables were fear, hope, self-efficacy, and self-control. One moderator variable was health consciousness. The dependent variable of the experiment was behavior intentions. In the first part of the questionnaire, participants answered basic introductory questions that included questions about their health information-seeking behavior and social media use (see Appendix A). Afterward, questions regarding the participant's perceptions of health consciousness, self-control, and self-efficacy have been answered before being exposed to the stimulus material.

Right before the stimulus treatment, the participants were randomly assigned (using a random number generator tool) to five different groups: the heart-disease group, the heart-disease-women group, the heart-health group, the heart-health-women group, or the control group.

The stimuli material for the groups designed for this study imitated a one-page, approximately DIN-A-4 sized online leaflet, which was divided into two columns. The content of the online leaflet informed about risk factors of cardiovascular disease applying either a loss- or a gain-frame. The wording and the structure of the leaflet were kept identical to create comparable stimulus material for the parts that have not been manipulated on purpose. The control group was presented with a stimulus that informed about the relationship between eating isoflavones, tofu, and cardiovascular disease. To be perceived as neutral as possible, the material for the control group included no concrete suggestions for behavior changes but contained more data and facts (see Appendix B).

Subsequently, after being exposed to the stimulus material, the participants were asked about their emotions, their perceived risk of cardiovascular disease, behavior intentions, and some questions regarding the COVID-19 pandemic. Finally, questions for a manipulation check and about the evaluation of the posts were answered before ending the questionnaire with standard demographic questions.

Measures

Behavior intentions. Behavior intentions were judged with seven items. Respondents indicated whether they would engage in detection and prevention behavior on a scale from 1 (do not agree at all) to 5 (I fully agree). They were asked the following question: “*When it comes to improving your own health in relation to cardiovascular disease, which of the following measures would you take?*”. Example items are: “...go to the doctor to check my blood pressure”, “...pay specific attention to my diet”, “...exercise regularly”, or “...quit smoking” ($\alpha = .68$). Eating a healthy diet and engaging in exercise are recognized prevention behaviors by the German Society for Cardiology.

Emotions. Immediately after being exposed to the stimulus material, participants rated their perceived emotions of fear and hope. The modified differential affect scale (M-DAS; Renaud & Unz, 2006) is a widely used scale for measuring emotions during media reception. Participants were asked to think of the messages they just read and indicate how they feel now on a scale from 1 (not at all) to 5 (very strong). For the measurement of fear, the following five items were used: *worried*, *restless*, *frightened*, *anxious*, and *insecure*. To create the final variable the items were averaged and computed into one variable for fear ($\alpha = .91$). Similarly, participants were asked to indicate how they feel to assess their perceived feelings of hope. For the measurement of hope, the following five items were used: *hopeful*, *determined*, *optimistic*, *confident*, and *motivated*. The items again were averaged and computed into one variable for hope ($\alpha = .90$).

Self-efficacy. For the measurement of self-efficacy, three items have been adopted from previous studies (Johnston & Warkentin, 2010; Sun et al., 2013). However, respondents of the pre-test indicated that the wording of the initial questions was difficult to understand. Thus, the items have been modified to ensure that they are generally well understood into the following three items: “*I find it easy to access information on health in general*”, “*I am able to take advantage of preventive measures (for example a prophylactic appointment with the dentist).*”, and “*I am able to improve my heart health without much effort*” ($\alpha = .57$).

Self-control. Participants rated on two items of the health internal locus control scale adopted from Wallston et al. (1978). Items are, for example: “*I have control over my health*” and “*I can stay healthy if I behave properly*”. Furthermore, one item was used from the widely used brief self-control scale (Tangney et al., 2004): “*If I take care of myself, I can avoid diseases*” ($\alpha = .78$).

Health consciousness. A scale from Dutta-Bergman (2004a) consisting of five items was adopted for measuring health consciousness. Example questions are: “*To live a life in best*

possible health is very important for me” and *“Proper nutrition, exercise, and preventive measures keep me healthy”* ($\alpha = .78$).

Perceived risk. Four items have been used to measure the perceived risk of cardiovascular disease. Participants were asked to answer two statements adopted by Dillard & Peck (2000) as well as by So et al. (2016) on a scale from 1 (I do not agree at all) to 5 (I fully agree): *“I am afraid of cardiovascular disease”*, *“I am afraid of being affected by cardiovascular disease”*, and to two further items which were worded as follows: *“I take cardiovascular diseases and their consequences very seriously”* and *“I think I am at risk of developing cardiovascular disease”* ($\alpha = .76$).

COVID-19. The data collection was delayed for some weeks to avoid possible biases in the data collection due to the ongoing COVID-19 pandemic. However, the following three items were included in the questionnaire to function as control items regarding the COVID 19 pandemic: *“Due to the COVID19 pandemic, I am more interested in health news than before”*, *“Since the COVID19 pandemic, I am more aware of my own health in general”*, and *“The COVID19 pandemic means that my cardiovascular health is more important to me than before”* ($\alpha = .83$). Participants were asked to answer the statements on a scale from 1 (I do not agree at all) to 5 (I fully agree).

Results

Manipulation Check

The manipulation check was analyzed in order to test whether the participants have read the relevant health-information leaflets carefully and understood the content of the messages. The respondents of the heart-disease group were asked to answer with “yes”, “no”, or *“I can’t remember”* to the following statement: *“Please remember the brochure you saw a few minutes ago. Did it discuss...cardiovascular diseases and measures to treat risk factors?”*. Similarly, participants of the heart-disease women group were asked whether the leaflet that they have just seen did discuss *“...cardiovascular diseases and measures to treat risk factors, especially for*

women?”. For the group of heart-health, the question was whether the leaflet discussed “...*heart health and prevention to prevent risk factors?*”. Participants of the heart-health-women group were asked whether the leaflet discussed “...*heart health and prevention to prevent risk factors, especially for women?*” and, finally, participants of the control group were asked whether the brochure they just saw thematized “...*that isoflavones and tofu reduce the risk of cardiovascular disease?*”.

The analysis of variance (ANOVA) was conducted in SPSS to control for significant differences in the recognition of the key messages among all treatment groups.

The heart-disease group was recognized significantly more by the participants in the heart-disease group ($M = 1.82$) than by the participants in the control group ($M = 1.27$), the heart-disease-women group ($M = 1.73$), the heart-health group ($M = 1.81$), and the heart-health-women group ($M = 1.74$), $F(4, 631) = 26.89$, $p = .000$. The heart-disease-women group was recognized significantly more by participants in the heart-disease-women group ($M = 1.73$) than by participants in the control group ($M = .98$), the heart-disease group ($M = 1.23$), the heart-health group ($M = .97$), and the heart-health-women group ($M = 1.78$), $F(4, 631) = 99.02$, $p = .000$. The heart-health group was recognized significantly more by participants in the heart-disease-women group ($M = 1.97$) than by participants in the control group ($M = 1.91$), the heart-disease group ($M = 1.45$), the heart-disease-women group ($M = 1.76$), and the heart-health-women group ($M = 1.84$), $F(4, 631) = 23.95$, $p = .000$. The heart-health-women group was recognized significantly more by participants in the heart-health-women group ($M = 1.79$) than by participants in the control group ($M = 1.31$), the heart-disease group ($M = .98$), the heart-disease-women group ($M = 1.78$) and the heart-health group ($M = .94$), $F(4, 631) = 97.45$, $p = .000$. Statistically significant differences among all experiment groups indicate that the manipulation was successful.

Evaluation of the Stimulus Material

For the purpose of testing whether the participants perceived the stimulus leaflets as equally informative, convincing, and appealingly designed, the respondents of all groups were asked the following three questions: “*The leaflet I saw was informative*”, “*the leaflet I just saw was convincing*”, “*the leaflet I just saw was appealingly designed*”. All answers were measured on a scale from 1 (I do not agree at all) to 5 (I fully agree). A second analysis of variance was conducted to examine whether there are significant differences in the perceived informativeness of the messages among all stimulus groups to establish comparability between the framing conditions. The groups excluding control were entered as the independent variable, and the informative variable was entered as the dependent variable. ANOVA revealed significant differences between the stimulus groups on the perceived informativeness of the leaflets, $F(3, 505) = 8.16, p = .024$. Bonferroni post hoc tests revealed no significant differences between the groups with the mean score for the condition heart-disease ($M = 3.85$) not being significantly different than the heart-health group ($M = 4.10$), the heart disease women group ($M = 4.12$), and the heart-health-women group ($M = 4.10$). A third ANOVA was conducted in SPSS to check for significant differences in perceiving the stimulus leaflet as equally convincing between the groups of the experiment. This ANOVA showed significant differences between the experimental conditions regarding the perception to find the leaflets of the experiment equally convincing, $F(3, 502) = 3.74, p = .007$. Bonferroni post hoc test revealed significant differences between the heart-disease group ($M = 3.40$), the heart-disease-women group ($M = 3.76$), the heart-health group ($M = 3.74$), and the heart-health-women group ($M = 3.73$). Moreover, a fourth ANOVA was conducted to check whether the leaflets during the stimulus presentation were perceived as equally appealingly designed in the treatment groups. The results show significant differences between the groups on perceiving the leaflets as appealingly designed, $F(3, 504) = 4.24, p = .006$. Bonferroni post hoc test indicates significant differences between the experimental group heart-disease ($M = 2.53$), the heart-health group ($M = 2.98$), and the heart-health-women group ($M = 2.99$).

Analysis

In order to assess the proposed moderated mediation, PROCESS macro model 8 was implemented (Hayes, 2017). The bootstrapping method was applied to probe the mediation. The PROCESS macro allows entering a multicategorical variable as an independent variable and the program performs dummy coding automatically. Moreover, parallel mediators are not modeled to transmit their effects to any other mediators of the model which allows to enter several mediators operating in parallel (opposed to serial mediation) in the PROCESS macro model 8 (Hayes, 2017). Therefore, it was possible to estimate the proposed moderated mediation by performing only one analysis where the message where the stimulus groups were entered as multicategorical independent variables, the emotions fear and hope, self-efficacy, and self-control were entered as parallel mediators. Health consciousness was included as a moderator and, finally, behavior intentions was entered as the dependent variable.

Perceived risk has been proposed as an important predictor for behavior intentions in the literature (e.g., Updegraff & Rothman, 2013). However, since the ANOVA did not indicate a significant difference in perceived risk between the experimental groups, $F(4, 616) = 2.31, p = .057$, it was not controlled for in the analysis. Further, other potential covariates were excluded from the analysis as no significant differences were detected between the groups.

All variables that define products were mean-centered, and heteroscedasticity consistent covariance matrix version HC3 was implemented (Levin, Davidson, & MacKinnon, 1994).

Heart-disease frame

RQ_1 asked how the loss- and gain-framed messages on CVD risks affect women's behavior intentions. Moreover, RQ_3 aimed to answer the question of how the frames affect the proposed mediators in the model being fear, hope, self-efficacy, and self-control. The results, as shown in Figure 2, indicated that the loss frame indeed elicited significantly more fear ($b = .28, SE = .10, p < .05$) compared to the control group. Hence, H_{1a} is supported. Interestingly, individuals of the heart-disease group perceived also significantly more hope than individuals of

the control group ($b = .72$, $SE = .13$, $p < .001$). Addressing RQ_3 , the results suggest that the heart-disease frame elicited a mix of both – negative and positive – emotions. Ongoing, RQ_3 was set to further look into the effects of the frames on self-efficacy and self-control. However, the analysis revealed no significant effect of the heart-disease group on self-efficacy and self-control. It was hypothesized that fear and hope will be positively related to behavior intentions (H_{1b} and H_{2b}) and that, moreover, a mix of perceived fear and hope will enhance behavior intentions (H_3). Though, there was no evidence for one of the proposed hypotheses found in the data. Thus, H_{1b} , H_{2b} , and H_3 were not supported. Further, it was hypothesized that health consciousness moderates the relationship between the heart-disease frame and self-efficacy (H_6) and between the heart-disease frame and self-control (H_7). Yet, self-efficacy and self-control appeared to be unaffected by health consciousness. Hence, H_6 and H_7 are rejected. With regards to the research question RQ_4 , which aimed to answer whether health consciousness interacts with fear and hope, no evidence was found for a significant interaction. Furthermore, addressing RQ_3 again, there was no significant indirect effect of the heart-disease group through the mediator fear, hope, self-efficacy, and self-control on behavior intentions. With regard to RQ_1 , finally, the direct effect of the heart-disease frame on behavior intentions was significant and negative ($b = -.35$, $SE = .08$, $p < .001$).

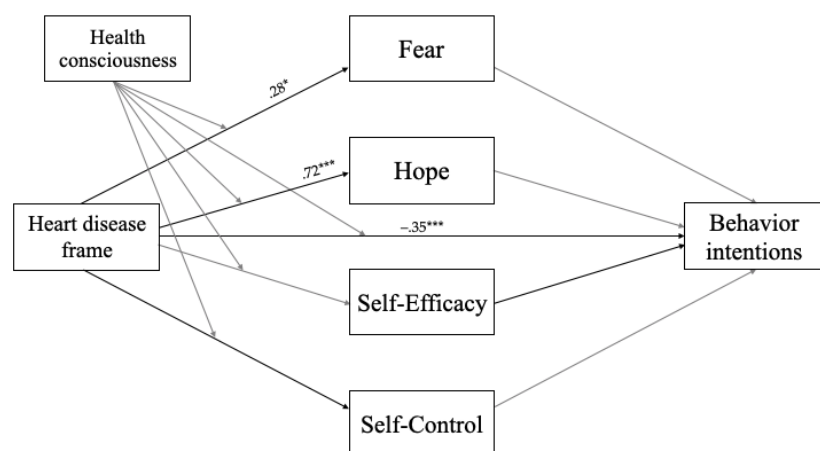


Figure 2. Direct relationships between proposed variables for the heart-disease frame.
Note: unstandardized beta coefficients. $*p < .05$; $**p < .01$; $***p < .001$.

Heart-health frame

The heart-health frame similarly elicited significantly more hope than the control group ($b = .74$, $SE = .13$, $p < .001$), hence, H_{2a} was supported. Also, H_{2b} stated that hope is positively related to behavior intentions, but no increase was found for the indirect effect of the heart-health frame through hope on behavior intentions. In contrast to the loss-framed heart disease messages, participants of the gain-framed heart-health condition did not report more fear than participants of the control group. The analysis revealed no significant effect of the heart-health frame on self-efficacy, thus, H_{4a} was rejected. Addressing RQ_3 , the heart-health frame did not significantly affect self-control. Additionally, answering RQ_4 , no evidence was found in the results for a moderation of health consciousness on one of the proposed mediators fear, hope, self-efficacy, and self-control. Thus, the present study finds no support for H_6 and H_7 . Moreover, RQ_1 aimed to investigate the direct effect of the gain-frames on behavior intentions. The results of the analysis indicated a significant and negative effect of the heart-health frame on women's behavior intentions ($b = -.33$, $SE = .08$, $p < .001$).

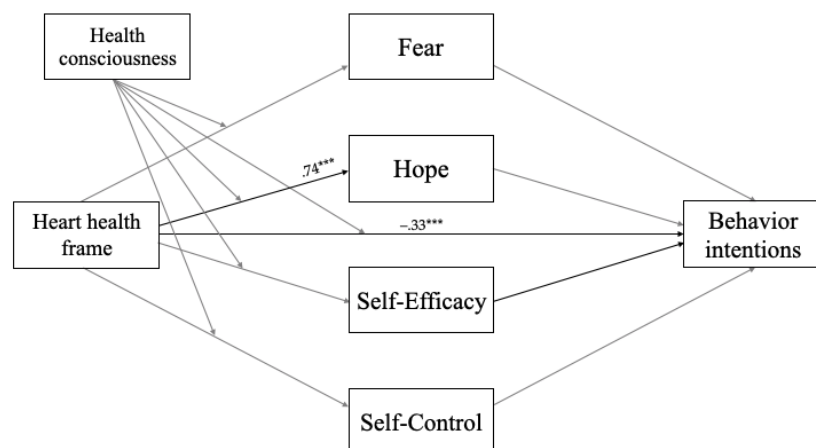


Figure 3. Direct relationships between proposed variables for the heart-health frame.
Note: unstandardized beta coefficients. * $p < .05$; ** $p < .01$; *** $p < .001$.

Heart-disease-women frame

RQ_2 was set to examine how the loss- and gain framed messages about CVD risks affect women's behavior intentions when they, additionally, emphasize women-specific CVD risk factors. The results of the analysis indicated that the heart-disease-women frame elicited both, significantly more fear ($b = .62, SE = .11, p < .001$) and also significantly more hope than the neutral frame ($b = .60, SE = .12, p < .001$). Hence, H_{1a} was supported was also supported. Although it was hypothesized that increased fear (H_{1b}) and increased hope (H_{2b}) are positively related to behavior intentions, there was no support for these hypotheses in the analysis. Moreover, H_3 must be rejected since there was no significant effect found which supported the hypothesis that a mix of perceived emotions (fear and hope) is positively related to behavior intentions.

Regarding RQ_3 , no support in the data was found for an interaction between the heart-disease-women frame and self-efficacy, however, the analysis indeed revealed a significant negative effect of the heart-disease-women frame on self-control ($b = -.21, SE = .09, p < .05$). The effect of the frame on self-control did not appear to be moderated by health consciousness. RQ_4 was implemented in this present research to test how health consciousness interacts with fear and hope. The data suggested no interaction between health consciousness and fear, but indeed found support for a significant and positive moderation of health consciousness on hope in the heart-disease-women condition ($b = .54, SE = .20, p < .01$). Overall, the indirect effect of the heart-disease-women frame on behavior intentions through hope was positive and significant for all levels of health consciousness (see Table 1). The point estimate was .07 and the index of moderated mediation indicated that the 95% bootstrap confidence interval did not include zero, $SE = .03, 95\% CI [.01, .14]$.

Additionally, it was hypothesized that health consciousness moderates the effects of the frames on self-efficacy (H_6). In support of H_6 , the data showed a significant and positive interaction between health consciousness and self-efficacy ($b = .44, SE = .12, p < .001$). The

point estimate was .09 and the 95% bootstrap confidence interval did not include zero, $SE = .03$, 95% CI [.03, .16]. Interestingly, health consciousness moderated perceptions of self-efficacy only on low levels of health consciousness $-.06$, $SE = .03$, 95% CI $[-.12, -.01]$ and on high levels of health consciousness $.04$, $SE = .02$, 95% CI [.00, .08], but not on medium levels on health consciousness. At medium levels of health consciousness, the bootstrap confidence interval crosses zero, $SE = .02$, 95% CI $[-.05, .01]$. These findings indicate that the effect of the heart-disease-women group on self-efficacy changes at different levels of the moderator health consciousness.

Addressing RQ_2 , the direct effect of the heart-disease-women frame on behavior intentions appeared to be non-significant.

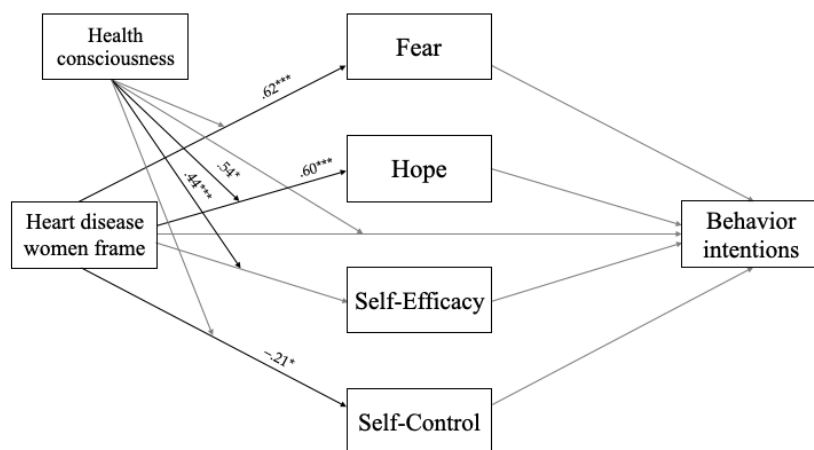


Figure 4. Direct relationships between proposed variables for the heart-disease-women frame.
Note: unstandardized beta coefficients. * $p < .05$; ** $p < .01$; *** $p < .001$.

Heart-health-women frame

As shown in Figure 5, the gain-framed messages elicit significantly more hope ($b = .82$, $SE = .12$, $p < .001$) and also significantly more fear ($b = .30$, $SE = .10$, $p < .05$) compared to the control condition. Thus, H_{2a} was supported. However, increased fear and hope did not affect behavior intentions. Hence, H_{1b} and H_{2b} were rejected. Since there was, moreover, no effect of both emotions (fear and hope) on behavior intentions, H_3 found no support in the analysis.

Additionally, RQ_3 asked how the frames affect self-efficacy and self-control. The data revealed no effect of the frame on self-efficacy and self-control. Consequently, the results did not support H_6 and H_7 , which proposed an interaction between health consciousness and self-efficacy and between health-consciousness and self-control.

Addressing RQ4, which was set to examine the effects of health consciousness on fear and hope, the analysis revealed a significant interaction between health consciousness and hope for the participants of the heart-health-women frame ($b = .47, SE = .13, p < .05$). Overall, the indirect effect of the heart-health-women frame on hope appeared to be positive at all levels of health consciousness (see Table 1). The point estimate was .06 and the 95% bootstrap confidence interval was entirely above zero, $SE = .03$, 95% CI [.00, .13]. Thus, health consciousness moderated the indirect effect of the heart-health-women frame on hope.

Finally, with regards to RQ_2 , the direct effect of the heart-health-women frame on behavior intentions was significant and negative ($b = -.21$, $SE = .09$, $p < .05$).

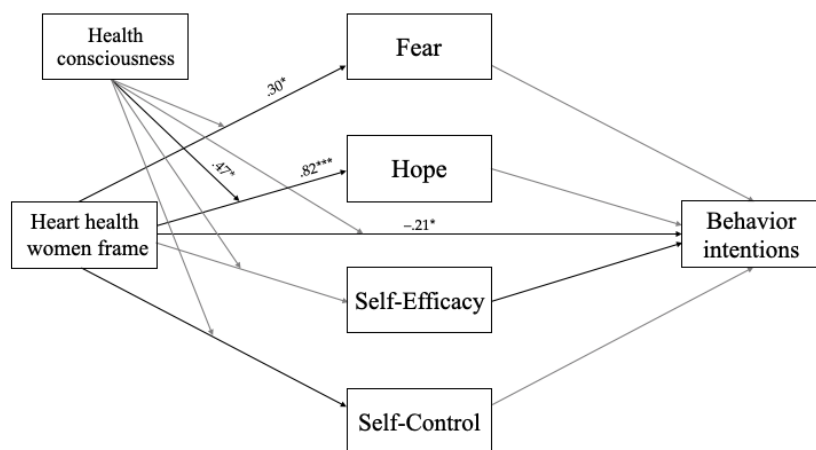


Figure 5. Direct relationships between proposed variables for the heart-health-women frame.
Note: unstandardized beta coefficients. * $p < .05$; ** $p < .01$; *** $p < .001$.

ANOVA on behavior intentions

In this study, behavior intentions were measured with a set of seven items on which participants of the experiment indicated whether they would engage in detection and prevention

behaviors. A final ANOVA was conducted in SPSS to test whether there existed significant differences on behavior intentions among all stimulus groups.

The analysis indicates a significant difference among the groups for two of the seven items. One of the two items appearing significantly different between the groups asked whether individuals would see a doctor to check their insulin and cholesterol levels, $F(4, 599) = 3.56, p = .007$. The second item that indicated a significant difference among the stimulus groups on behavior intentions was established to assess whether participants would avoid industrial sugar in their diet to a large extent in future, $F(4, 615) = 3.60, p = .007$.

Bonferroni post hoc test indicated significant differences between the control group ($M = 4.06$), the heart-disease group ($M = 3.60$), and the heart-health group ($M = 3.48$) in their intentions to see a doctor to check their insulin and cholesterol levels. Moreover, the control group ($M = 3.69$), the heart-disease group ($M = 3.27$), and the heart-health-women group ($M = 3.72$) significantly differ in their intentions to avoid industrial sugar in their diet to a large extent in future.

Table 1. Indirect effects of frames on behavior intention through fear, hope, self-efficacy, and self-control at different levels of health consciousness

Mediator	Low health consciousness (–.53)			Medium health consciousness (–.01)			High health consciousness (.59)		
	<i>b</i>	<i>SE</i>	CI	<i>b</i>	<i>SE</i>	CI	<i>b</i>	<i>SE</i>	CI
<i>The heart-disease frame compared to the control group</i>									
Fear	.003	.01	[–.02, .02]	.002	.01	[–.01, .02]	.002	.01	[–.01, .02]
Hope	.07	.03	[.02, .13]	.09	.03	[.04, .15]	.12	.03	[.05, .21]
Self-efficacy	.004	.02	[–.04, .05]	.01	.02	[–.02, .04]	.02	.02	[–.02, .07]
Self-control	–.004	.01	[–.03, .01]	–.004	.01	[–.02, .01]	–.004	.01	[–.02, .01]
<i>The heart-disease-women frame compared to the control group</i>									
Fear	.01	.03	[–.04, .06]	.01	.02	[–.03, .05]	.01	.01	[–.02, .04]
Hope	.04	.02	[.01, .09]	.07	.03	[.03, .13]	.11	.04	[.04, .20]
Self-efficacy	–.06	.03	[–.12, –.01]	–.02	.02	[–.05, .01]	.04	.02	[.00, .08]

Self-control	-.01	.01	[-.04, .02]	-.01	.01	[-.03, .01]	-.003	.01	[-.02, .01]
<i>The heart-health frame compared to the control group</i>									
Fear	.003	.01	[-.01, .02]	.004	.01	[-.02, .03]	.01	.01	[-.02, .03]
Hope	.07	.03	[.02, .13]	.10	.03	[.04, .17]	.13	.04	[.06, .23]
Self-efficacy	-.01	.02	[-.05, .04]	-.01	.02	[-.04, -.03]	.000	.02	[-.05, .04]
Self-control	-.01	.01	[-.03, .01]	-.002	.01	[-.02, .01]	.003	.01	[-.01, .02]
<i>The hear-health-women frame compared to the control group</i>									
Fear	.003	.01	[-.02, .03]	.003	.02	[-.02, .03]	.004	.01	[-.02, .03]
Hope	.10	.03	[.04, .17]	.10	.03	[.04, .20]	.08	.03	[.03, .16]
Self-efficacy	-.004	.03	[-.07, .04]	-.002	.02	[-.04, -.03]	.001	.02	[-.04, .05]
Self-control	-.005	.01	[-.04, .02]	-.01	.01	[-.03, .01]	-.01	.01	[-.04, .01]

Discussion

Several lines of research have noted the importance of raising awareness on women-specific cardiovascular disease risk factors to promote disease prevention. Early diagnosis of potential heart disease risks in women can prevent many deaths worldwide (Gonsalves et al., 2016). However, reports on framing health risks keep showing inconsistent results as to whether a loss- or a gain-frame is more effective (van't Riet et al., 2010). Moreover, previous research has failed to properly investigate the specific effects of CVD risks message framing on a segmented audience, e.g., women.

This present study aimed to examine the effects of loss- and gain-framed CVD risk messages on women's behavior intentions. In particular, the indirect effect of the loss- and gain-framed messages through fear, hope, self-efficacy, and self-control has been tested. Moreover, the study was designed to examine the moderating role of health consciousness in a parallel mediation model.

Overall, women's behavior intentions diminished after being exposed to both loss-framed and gain-framed messages. Interestingly, one exception for a negative effect of the frame on behavior intentions was found in the data for the heart disease women-specific frame. In this

case the direct negative effect of the frame on behavior intentions appeared non-significant. There are several possible explanations for this result. One may be that the manipulation during the online experiment was not strong enough since the treatment groups received the framed health messages only once. Moreover, it may be that the stimulus material provided so precise information about possible risks that participants assessed their risk of heart disease and possibly classified it as so low that they saw no reason to adjust their prevention behavior accordingly.

The experiment confirmed that the loss- and gain-framed messages do elicit emotions. The findings are consistent with those of Dillard & Peck (2000) which indicate a variety of emotions being triggered from the same message. In this study, fear and hope have been generated from both, loss- and gain-framed messages. One important finding was that fear perceptions increased when the gain- and loss-frame outlined women-specific CVD disease risk factors. This finding reflects those of Hayashi et al. (2018) who also found that targeting an audience (i.e., women) may partially work in terms of boosting risk perception since segmented health(threat-) messages to women do elicit negative emotional reactions, cognitive reactions, and beliefs about health risks (Nonnemaker, Choiniere, Farrelly, Kamyab & Davis, 2015). After comparing the effects of the gain-framed messages on the heart health group and the heart-health-women group, it turned out that the latter not elicited high levels of hope, but also increased fear, whereas the heart health group showed no fear reactions to the gain-frame. That the gain-framed messages do not raise fear perceptions is intuitive, but it is interesting that, in contrast, when the heart health messages include women-specific information, fear is activated. Similarly, it was no surprise that all frames elicited hope. Although fear is a common audience reaction to any message featuring a health threat, previous research indicated that fearful messages often simultaneously evoke contradicting emotions such as hope and compassion (Myrick & Oliver, 2014).

However, it was very unexpected that this study found no support for a mediating effect of emotions on behavior intentions. Previous studies examining fear appeals noted defensive

responses such as defensive avoidance or reactance after being exposed to high threat/low-efficacy messages and, thus, suggested that strong threat appeals combined with low-efficacy messages foster fear control reactions (McKay, 2004a). Such earlier findings may serve as one alternative explanation for the absence of a mediation effect of the frames through fear on behavior intentions.

Contrary to outcomes of Scott & Curbow (2006), this study has been unable to demonstrate that women being exposed to gain-framed messages reported increased self-efficacy levels compared to those who read a loss framed messages. Moreover, unlike earlier findings (e.g., Lee, 2019), no evidence was found for a mediating role of self-efficacy. As outlined in the literature review of this paper, researchers fundamentally disagree on whether self-efficacy acts as a mediator or moderator. On the one hand, Updegraff & Rothman (2013), introduced self-efficacy as a moderator shaping the extent to which a mediator (e.g., emotion/threat) influences behavior. On the other hand, studies from Scott & Curbow (2006), Wolf (2007), and Lee (2019) established self-efficacy as a mediator in health-related behavior outcomes. Overall, inconsistencies among results further emphasize the need to closer examine alternative health behavior models, including key mediators and moderators.

Another notable finding was that the heart disease women frame diminished self-control. The observed decrease in self-control by the heart disease women frame could be related to the increase in fear perceptions after reading the information that emphasized women-specific additional risk factors in a loss-frame. Firstly, it seems possible that the provided content about women-specific CVD risk factors was unknown for some recipients and, thus, they may have felt fearful and helpless (losing control) over their health. Second, the information provided in the online-leaflets may have increased the participant's risk perceptions and that recipients, moreover, couldn't help being female meaning that they simply share additional risk factors which seem to be uncontrollable –to some extent– compared to men, such as underlying a distinct hormonal cycle or risks being related to pregnancy complications.

Additionally, this study confirms, on some level, that health consciousness relates self-efficacy and hope; however, a moderating role between health consciousness and hope has been found only between the women-specific frames. Yet, an interaction between health consciousness and self-efficacy appeared to the heart-disease-women condition only in this experiment. The results partly reflect those of Hong (2011) who indicated that health conscious individuals share a greater optimistic bias or less perceived vulnerability when being exposed to a health threat which in turn induces a positive interaction between health consciousness and self-efficacy. Moreover, researches showed that the interplay between threat and self-efficacy fosters high appraisal, a driver of health behavior change (Goodall & Reed, 2013; Lee, 2019). It seems possible that the heart-disease-women condition was the only experimental group that arose such higher levels of cognitive appraisal and, thus, health conscious individuals also activated their perceived responsibility and motivation.

The findings of this study come with limitations. First, the treatment groups received the cardiovascular disease risk messages only once. As outlined by Chang (2019), almost all-time accessibility of information offline and online renders vast media content that individuals are exposed to nowadays. Although the manipulation check indicated that the manipulation was successful, the leaflets designed for the online experiment contained quite many words to read and health information presented with rather medical terms. During the experiment, the recipients only saw textual messages for a very limited period of time. It is possible that the participants did not read the information as thoroughly as hoped for. Especially in terms of medical advice, the ecological validity in this experimental setting was compromised since individuals might be accustomed to talk to their doctors in person. Moreover, risk messages have been tailored to women, but they did not make further specifications in terms of the women's socio demographic context or individual characteristics.

There is room for further progress in determining effective framing in health communication. The present research tested the moderation of health consciousness in a parallel

mediation model on path A yet researchers rarely consider whether the moderation is affecting path B, even though it might provide a more accurate description of what happens when recipients are exposed to framed health messages (Updegraff & Rothman, 2013).

In spite of its limitations, this study adds to our understanding of framing effects of CVD risk messages on women's behavior intentions. The findings contribute to a growing body of research that stresses the need to raise awareness on a) CVD risk factors that are specific to women, and b) which types of framing generate the most interest to the audience in order to make health campaigns effective.

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Appendix A.

Fragebogen (Originalversion)



Hallo liebe TeilnehmerInnen,

herzlich willkommen und vielen Dank für Ihr Interesse an dieser Studie.

Ich bin Sophie Mayen, Studentin des Studiengangs Kommunikationswissenschaften an der Universität Wien. Im Rahmen meiner Masterthesis möchte ich etwas über Risikofaktoren von Herzgesundheit erfahren.

Sie haben die Chance, einen Avocadostore-Gutschein im Wert von 25 Euro zu gewinnen. Wenn Sie am Gewinnspiel teilnehmen möchten, setzen Sie bitte das entsprechende Häkchen am Ende dieser Seite und geben Sie ihre E-Mailadresse an. Der Gewinner wird nach dem Zufallsprinzip aus dem Pool aller TeilnehmerInnen ausgewählt und per E-Mail benachrichtigt.

Sie können mich über diese Mailadresse kontaktieren: sophiemayen@live.de.

Wie informieren Sie sich zum Thema Gesundheit?

Sehen Sie sich die folgende Liste an. Denken Sie nun an das vergangene Jahr und dann kreuzen Sie an, über welches Medium Sie sich am meisten über Krankheiten und deren Vorbeugung informiert haben (z.B. HIV/AIDS, Krebserkrankungen, Diabetes, Grippe, Asthma, Verletzungen usw.) Sie können drei verschiedene Quellen auswählen.

Radio
Fernsehen
Internet
Veranstaltung/Kongress
Magazin
Zeitung
Buch
Social Media
Podcast
Broschüre
Ärztin oder Arzt
Fachzeitschrift
Werbeplakat
Soziales Umfeld
--
Andere

Nun möchte ich gerne etwas über Ihre Social Media Nutzung erfahren. Stellen Sie sich Ihren gewöhnlichen Alltag vor.

Wie häufig nutzen Sie etwa Social Media?

Bitte antworten sie auf einer Skala von "nie" bis "häufiger als ein Mal pro Tag".

In diesem Teil möchte ich gerne mehr über Ihre Meinung zum Thema Gesundheit wissen.

Bitte antworten Sie auf einer Skala von „stimme gar nicht zu“ bis „stimme voll zu“.

Ein Leben in bestmöglicher Gesundheit zu leben ist für mich sehr wichtig.
 Ich tue alles, was ich kann, um gesund zu bleiben.
 Richtige Ernährung, Bewegung und vorbeugende Maßnahmen halten mich gesund.
 Ich versuche aktiv, Krankheit und Leiden in meinem Leben zu verhindern.
 Meine Gesundheit hängt davon ab, wie gut ich mich um mich selbst kümmere.
kann ich nicht beurteilen

Wie würden Sie diese unterschiedlichen Lebensbereiche ordnen, wenn Rang 1 bedeutet, dass dies der wichtigste Bereich in Ihrem Leben ist?

Bitte ordnen Sie die Bereiche mit abnehmender Wichtigkeit an.

Familie und Freunde	Karriere und Geld
Physisches Umfeld	Gesundheit
Persönliche Entwicklung	Hobbies und Freizeit

Inwiefern stimmen Sie den folgenden Aussagen zu?

Bitte antworten Sie auf einer Skala von „stimme gar nicht zu“ bis „stimme voll zu“.

Ich habe die Kontrolle über meine Gesundheit.
 Ich kann gesund bleiben, wenn ich mich richtig verhalte.
 Wenn ich für mich selbst Sorge, kann ich Krankheiten vermeiden.
kann ich nicht beurteilen

Inwiefern stimmen Sie den folgenden Aussagen zu, wenn Sie an sich selbst denken?

Bitte antworten Sie auf einer Skala von „stimme gar nicht zu“ bis „stimme voll zu“.

Es fällt mir leicht, an Informationen zum Thema Gesundheit im Allgemeinen zu gelangen.
 Ich bin in der Lage, Präventionsangebote (zum Beispiel einen Prophylaxetermin beim Zahnarzt) zu nutzen.
 Ich bin in der Lage, meine Herzgesundheit ohne großen Aufwand zu verbessern.
kann ich nicht beurteilen

Sie werden nun eine Broschüre sehen, die in Arztpraxen ausgelegt und online auf Internetseiten von Gesundheitszentren verwendet wird, um Patienten und Patientinnen über Herz-Kreislaufkrankungen zu informieren.

Ich möchte Sie bitten, die Informationen **sorgfältig** zu lesen und danach einige weitere Fragen zu beantworten.

Bitte nehmen Sie sich so viel Zeit zum Lesen, wie Sie benötigen. Frühestens nach 35 Sekunden erscheint in der unteren rechten Ecke der "Weiter"-Button, um mit dem Fragebogen fortzufahren.

-Stimulus Material folg-

Wenn Sie jetzt an den Text denken, den Sie gerade gelesen haben, wie fühlen Sie sich?

Bitte antworten Sie auf einer Skala von „überhaupt nicht“ bis „sehr stark“.

besorgt
 entschlossen
 unruhig
 verunsichert
 motiviert
 zuversichtlich
 optimistisch
 hoffnungsvoll
 ängstlich

kann ich nicht beurteilen

Wenn Sie noch einmal an die Information der online Broschüre denken, welche drei Worte kommen Ihnen in denn Sinn?

Bitte geben Sie ihre spontanen Antworten in die unteren drei Eingabefelder ein.

[...]

Wie gefährdet sehen Sie sich selbst, wenn es um Herz-Kreislauferkrankungen geht?

Bitte antworten Sie auf einer Skala von „stimme gar nicht zu“ bis „stimme voll zu“.

Ich habe Angst vor Herz-Kreislauferkrankungen.

Ich fürchte mich davor, von Herz-Kreislauferkrankungen betroffen zu sein.

Ich nehme Herz-Kreislauferkrankungen und deren Folgen sehr ernst.

Ich bin der Ansicht, dass ich ein Risiko habe, an Herz-Kreislauferkrankungen zu erkranken.

kann ich nicht beurteilen

Wenn es darum geht, ihre eigene Gesundheit in Bezug auf Herz-Kreislauferkrankungen zu verbessern, welche der folgenden Maßnahmen würden Sie ergreifen?

Bitte antworten Sie auf einer Skala von „stimme gar nicht zu“ bis „stimme voll zu“.

Um meine Herzgesundheit zu verbessern und Herz-Kreislauferkrankungen vorzubeugen würde ich...

...gezielt auf meine Ernährung achten.

...Industriezucker in meiner Ernährung zukünftig weitgehend vermeiden.

...aufhören zu rauchen.

...einen Arzt aufsuchen, um meinen Insulin- und Cholesterinspiegel überprüfen zu lassen.

...neue Methoden lernen, um Stress abzubauen und den Blutdruck zu senken.

...zur Kontrolle meines Blutdrucks zum Arzt gehen.

...regelmäßig Sport treiben.

kann ich nicht beurteilen/ trifft auf mich nicht zu

Ich habe nun noch einige Fragen zu Ihrem Interesse an Gesundheit während der COVID19-Pandemie.

Bitte antworten Sie auf einer Skala von „stimme gar nicht zu“ bis „stimme voll zu“.

Ich interessiere mich aufgrund der COVID19-Pandemie stärker für Nachrichten über Gesundheit als davor.

Seit der COVID19-Pandemie achte ich bewusster auf meine eigene Gesundheit allgemein.

Die COVID19-Pandemie führt dazu, dass mir meine Herz-Kreislauf-Gesundheit wichtiger ist als davor.

kann ich nicht beurteilen

Danke, dass Sie bis hierhin alle Fragen beantwortet haben. Wir sind fast am Ende des Fragebogens. Erinnern Sie sich bitte noch einmal an die Broschüre, den Sie vor wenigen Minuten gesehen haben.

Bitte wählen Sie zwischen „Ja“ und „Nein“.

Thematisierte diese...

...Herz-Kreislauferkrankungen und Maßnahmen, um Risikofaktoren zu behandeln?

...Herz-Kreislauferkrankungen und Maßnahmen, um Risikofaktoren zu behandeln, speziell für Frauen?

...Herzgesundheit und Prävention, um Risikofaktoren vorzubeugen?

...Herzgesundheit und Prävention, um Risikofaktoren vorzubeugen, speziell für Frauen?

...,dass Isoflavone und Tofu das Risiko von Herz-Kreislauferkrankungen senken?

Ich kann mich nicht erinnern

Ich würde gerne noch wissen, wie Sie die Broschüre bewerten, die Sie gerade gesehen haben.

Bitte antworten Sie auf einer Skala von „stimme gar nicht zu“ bis „stimme voll zu“.

Die Broschüre, die ich gesehen habe,...

...ist informativ.

...ist überzeugend.

...ist ansprechend gestaltet.

kann ich nicht beurteilen

Markieren Sie bitte das entsprechende Feld, wenn eines dieser Dinge oder mehrere auf Sie zutreffen.

Sie können mehrere Felder markieren.

Ich rauche.

Ich bin DiabetikerIn.

Ich habe eine Vorerkrankung (zum Beispiel eine angeborene Herzinsuffizienz).

Ich habe vorher einen Herzinfarkt oder Schlaganfall erlitten.

Ich bin genetisch vorbelastet.

keine Angabe/ trifft auf mich nicht zu

Mit welchem Geschlecht identifizieren Sie sich?

[bitte auswählen]

Wie alt sind Sie?

Ich bin [...] Jahre

In welchem Land leben Sie derzeit?

Deutschland

Österreich

Schweiz

Anderes Land

Vielen Dank für Ihre Teilnahme!

Ich möchte mich ganz herzlich für Ihre Mithilfe bedanken.

Diese Studie zielt darauf ab, Effekte von unterschiedlichen Informationen über Herz-Kreislaufkrankungen und dessen Risiken zu untersuchen. Sie ist dazu angelegt, etwas über die Mechanismen der Wirkung von Informationen in diesem Bereich zu erforschen, welche die Unterschiede von Risikofaktoren und Krankheitsverläufen bei Frauen und Männern berücksichtigen und sich speziell an Frauen richten.

Die Broschüren, die Sie im Rahmen des Experiments gelesen haben sind fiktiv und wurden für diese Umfrage erstellt. Sie basieren auf Informationen und Daten die aus medizinischer Fachliteratur Herold, G. (Hrsg.). (2015). Innere Medizin 2015, sowie von den Internetseiten des Deutschen Ärzteblattes, der Deutsche Gesellschaft für Kardiologie-, Herz-, und Kreislaufforschung e.V., und vom Robert Koch Institut entnommen sind.

Wenn Sie Rückfragen zum Fragebogen oder zur Studie haben, wenden Sie sich gerne an diese E-Mailadresse: sophiemayen@live.de

Ihre Antworten wurden gespeichert, Sie können das Browser-Fenster nun schließen.

B.A. Sophie Mayen, Communication Science, Universität Wien – 2020

Questionnaire (English version)

Hello dear participants,

Welcome and thank you for your interest in this study.

I'm Sophie Mayen, a student in the Communication Studies course at the University of Vienna.

As part of my master's thesis, I would like to learn about risk factors for heart health.

You have the chance to win an **Avocadostore** voucher worth 25 euros. If you would like to take part in the competition, please tick the appropriate box at the end of this page and enter your email address. The winner will be selected at random from the pool of all participants and notified by email.

You can contact me at this email address: sophiemayen@live.de.

How do you find out about health?

Take a look at the list below. Now think about the past year and then tick the medium through which you obtained the most information about diseases and their prevention (e.g. HIV / AIDS, cancer, diabetes, flu, asthma, injuries, etc.). You can have up to three select different sources.

Radio
 Television
 Internet
 Event / Congress
 Magazine
 Newspaper
 Book
 Social Media
 Podcast
 Brochure
 Doctor's Trade
 Journal
 Advertising Poster
 Social Environment
 -
 Other

Now I would like to learn something about your use of social media. Imagine your everyday life.

How often do you use social media, for example?

Please answer on a scale from “never” to “more than once a day”.

In this part, I would like to know more about your thoughts on health.

Please answer on a scale from “strongly disagree” to “fully agree”.

Living a life in the best possible health is very important to me.

I do everything I can to stay healthy.

Proper diet, exercise, and preventive measures keep me healthy.
 I actively try to prevent illness and suffering in my life.
 My health depends on how well I take care of myself.
I can't judge.

How would you rank these different areas of life if rank 1 means that this is the most important area in your life?

Please arrange the areas in decreasing importance.

Family and friends	Careers and money
Physical environment	Health
Personal development	Hobbies and free time

To what extent do you agree with the following statements?

Please answer on a scale from “strongly disagree” to “fully agree”.

I am in control of my health.
 I can stay healthy if I do the right thing.
 If I take care of myself, I can avoid illness.
I can't judge.

To what extent do you agree with the following statements when thinking about yourself?

Please answer on a scale from “strongly disagree” to “fully agree”.

I find it easy to get information on health in general.
 I am able to take advantage of prevention offers (e.g. a prophylactic appointment at the dentist).
 I am able to improve my heart health with little effort.
I can't judge.

You will now see a brochure that will be displayed in doctor's offices and used online on health center websites to inform patients about cardiovascular diseases.

I would ask you to read the information **carefully and** then answer a few more questions.

Please take as much time as you need to read. After 35 seconds at the earliest, the "Continue" button appears in the lower right corner to continue with the questionnaire.

-Stimulus material follows-

If you think about the text you have just read, how do you feel?

Please answer on a scale from “not at all” to “very much”.

worried
 determined
 restless
 insecure
 motivated
 confident
 optimistic
 frightened

hopeful

anxious

I can't judge.

If you think about the information in the online brochure again, which three words come to mind?

Please enter your spontaneous answers in the three input fields below.

[...]

How at risk do you see yourself when it comes to cardiovascular disease?

Please answer on a scale from “strongly disagree” to “fully agree”.

I am afraid of cardiovascular disease.

I am afraid of being affected by cardiovascular disease.

I take cardiovascular diseases and their consequences very seriously.

I believe I am at risk of developing heart disease.

I can't judge.

When it comes to improving your own health in relation to cardiovascular disease, which of the following actions would you take?

Please answer on a scale from “strongly disagree” to “fully agree”.

In order to improve my heart health and prevent cardiovascular diseases, I would ...

...pay close attention to my diet.

...largely avoid industrial sugar in my diet in the future.

...stop smoking.

...see a doctor to check my insulin and cholesterol levels.

...learn new methods to relieve stress and lower blood pressure.

...go to a doctor to check my blood pressure.

...do sports regularly.

I can't judge/do not apply to me.

I now have a few more questions about your interest in health during the COVID19 pandemic.

Please answer on a scale from “strongly disagree” to “fully agree”.

I'm more interested in health news than before because of the COVID19 pandemic.

Since the COVID19 pandemic, I have been more conscious of my own health in general.

The COVID19 pandemic means that my cardiovascular health is more important to me than it was before.

I can't judge.

Thank you for answering all the questions so far. We are almost at the end of the questionnaire. Please remember the brochure you saw a few minutes ago.

Please choose between "Yes" and "No".

Discussed this...

...cardiovascular disease and measures to treat risk factors?

...cardiovascular disease and measures to treat risk factors, especially for women?

...heart health and prevention to prevent risk factors?

...heart health and prevention to prevent risk factors, especially for women?

...that isoflavones and tofu reduce the risk of cardiovascular disease?

I can't remember.

I would like to know how you rate the brochure you just saw.

Please answer on a scale from “strongly disagree” to “fully agree”.

The brochure I saw ...

...is informative.

...is convincing.

...is attractively designed.
I can't judge.

Please tick the appropriate box if one or more of these things apply to you.

You can mark several fields.

I smoke.

I am diabetic.

I have a previous illness (for example congenital heart failure).

I have had a heart attack or stroke before.

I am genetically predisposed.

No answer/ does not apply to me.

Which gender identify with?

[please select]

How old are you?

I am [...] years

In which country do you currently live?

Germany

Austria

Switzerland

Other country

Thank you for participating!

I would like to thank you very much for your help.

This study aims to investigate the effects of various information on cardiovascular diseases and their risks. It is designed to research something about the mechanisms of the effects of information in this area which takes into account the differences in risk factors and disease courses in women and men and is specifically aimed at addressing women.

The brochures you read as part of the experiment are fictional and were created for this survey.

They are based on information and data from the medical literature Herold, G. (Ed.). (2015). Internal Medicine 2015, as well as from the websites of the Deutsches Ärzteblatt, the German Society for Cardiology, Heart and Circulatory Research e.V., and the Research Robert Koch Institute.

If you have any questions about the questionnaire or the study, please contact this email address:
sophiemayen@live.de

Your answers have been saved. You can now close the browser window.

BA Sophie Mayen, Communication Science, University of Vienna - 2020

Appendix B.

Heart-disease frame

Herz-Kreislauferkrankungen



Koronare Herzkrankheit, Herzinfarkt und Schlaganfall sind weit verbreitet. Herz-Kreislauferkrankungen verursachen etwa 80% aller Todesfälle in der Europäischen Region. Menschen mit Risikofaktoren die nicht gezielt vorbeugen, haben ein erhebliches Risiko an Herz-Kreislauferkrankungen zu leiden.

Studien weisen darauf hin, dass verschiedene Faktoren einen Einfluss auf das Herzinfarktrisiko haben.

Die gefährlichsten allgemeinen Risikofaktoren für Herz-Kreislauferkrankungen sind:

- Bluthochdruck
- Diabetes
- Fettstoffwechselstörungen
- Übergewicht

...sowie Verhaltensweisen, welche die Gesundheit stark verschlechtern und das Risiko für koronare Herzkrankheiten erheblich steigern können. Zu diesen zählen:

- Rauchen
- Bewegungsmangel
- Ungesunde Ernährung

Rauchen erhöht das Risiko für Herz-Kreislauferkrankungen und verstärkt negative Auswirkungen weiterer Risikofaktoren, wie Insulinresistenz und Typ-2-Diabetes. Eine notwendige Behandlung der Patienten sollte daher die unterschiedlichen Risikofaktoren berücksichtigen.

Wenn das Verhalten von Risikopatienten nicht angepasst und medikamentöse Therapien unwirksam bleiben, können sich die Risikofaktoren für Herz-Kreislauferkrankungen erheblich verschlechtern.

Maßnahmen

Ziel der kardiovaskulären Prävention ist es, das Bewusstsein für die Gefahren von nicht behandelten Risikofaktoren und mangelnden vorsorgenden Maßnahmen zu stärken und eine schlechte Patientenversorgung zu verhindern.

- Blutdruckmessung
Zielwert für den Blutdruck: Generell < 140/90 mmHg.
- Einstellung eines Diabetes mellitus
Eine mangelhafte Blutzuckereinstellung kann das Herz-Kreislauf-Risiko um 50 % erhöhen!
- Übergewicht behandeln
Eine ungesunde Kost (mit regelmäßigem Verzehr von Zucker, Alkohol, Transfetten, Konservierungsstoffen) erhöht das kardiovaskuläre 10-Jahresrisiko um 50 %!
- Rauchen aufgeben
Nikotinkonsum erhöht das kardiovaskuläre 10-Jahresrisiko um bis zu 50 %! Rauchen erhöht das Risiko für Herz-Kreislauferkrankungen. Das Risiko für die Entstehung weiterer Faktoren, wie Insulinresistenz und Typ-2-Diabetes wird gesteigert.
- Bewegungsmangel verhindern
Ungenügende Bewegung schadet dem Herz-Kreislaufsystem und kann das Risiko für Typ-II Diabetes erhöhen!
Körperliche Inaktivität kann negative Folgen für die Herzgesundheit haben.

Der akute Brustschmerz als Leitsymptom kann bei Diabetikern fehlen! Hier wird eventuell nur über untypische Symptome wie Übelkeit, Schwindel und Atemnot geklagt.

Untersuchungen zeigen, dass bei Verdacht auf Herzinfarkt so schnell wie möglich die Notrufnummer gewählt werden sollte, um frühe Infarktsterblichkeit zu vermeiden.

Heart-health frame

Herzgesundheit



Koronare Herzkrankheit, Herzinfarkt und Schlaganfall sind weit verbreitet. Mindestens jeder dritte Todesfall durch Herz-Kreislauf-Erkrankungen in Europa ist vermeidbar. Menschen mit Risikofaktoren können gezielt vorbeugen, damit Herz und Kreislauf gesund bleiben.

Studien weisen darauf hin, dass verschiedene Faktoren einen Einfluss auf das Herzinfarktrisiko haben.

Die wichtigsten beeinflussbaren allgemeinen Risikofaktoren für Herz-Kreislauferkrankungen sind:

- Bluthochdruck
- Diabetes
- Fettstoffwechselstörungen
- Übergewicht

...sowie Verhaltensweisen, welche die Gesundheit stark verbessern und das Risiko für koronare Herzkrankheiten erheblich senken können. Zu diesen zählen:

- Rauchfrei leben
- Regelmäßiger Sport
- Gesunde Ernährung

Rauchfrei zu leben kann das Risiko für Herz-Kreislauferkrankungen verringern und die Entstehung weiterer Risikofaktoren, wie Insulinresistenz und Typ-2-Diabetes vermindern. Eine optimale Behandlung der Patienten sollte daher die unterschiedlichen Risikofaktoren berücksichtigen.

Durch gesundheitsbewusstes Verhalten und medikamentöse Therapien können Risikofaktoren positiv beeinflusst werden und eröffnen ein großes Präventionspotential für Herz-Kreislauferkrankungen.

Prävention

Ziel der kardiovaskulären Prävention ist es, das Bewusstsein für Risikofaktoren und für die wichtige Bedeutung von vorsorgenden Maßnahmen zu stärken und die Patientenversorgung zu verbessern.

- Blutdruckmessung
Zielwert für den Blutdruck: Generell < 140/90 mmHg.
- Optimale Einstellung eines Diabetes mellitus
Eine optimale Blutzuckereinstellung kann das Herz-Kreislauf-Risiko um 50 % verringern!
- Gewichtsnormalisierung
Eine "mediterrane" Kost (mit regelmäßigem Verzehr von Obst, Salat, Gemüse, Olivenöl, Fisch, mäßiger Weinkonsum) vermindert das kardiovaskuläre 10-Jahresrisiko um 50 %!
- Rauchen aufgeben
Nikotinabstinenz vermindert das kardiovaskuläre 10-Jahresrisiko um bis zu 50 %!
Rauchfrei zu leben senkt das Risiko für Herz-Kreislauferkrankungen. Die Entstehung weiterer Faktoren, wie Insulinresistenz und Typ-2-Diabetes wird verringert.
- Kontrolliertes körperliches Training
3 bis 7x pro Woche für 15-30 Minuten bei 40-60 % der maximalen Leistungsfähigkeit in der Primärprävention vermindert das kardiovaskuläre 10-Jahresrisiko um 50 %!
Leichte körperliche Belastung erhöht die Lebenserwartung um 3 Jahre.

Der akute Brustschmerz als Leitsymptom kann bei Diabetikern fehlen! Hier wird eventuell nur über untypische Symptome wie Übelkeit, Schwindel und Atemnot geklagt.

Schnelles Handeln bei einem Herzinfarkt erhöht die Überlebenschancen für den Patienten. Deshalb ist es wichtig, bei den ersten Anzeichen von Symptomen sofort einen Notarzt zu rufen.

Heart-disease-women frame

Herz-Kreislaufkrankungen bei Frauen



Koronare Herzkrankheit, Herzinfarkt und Schlaganfall sind weit verbreitet. Herz-Kreislaufkrankungen verursachen etwa 80 % aller Todesfälle in der Europäischen Region. Frauen mit Risikofaktoren die nicht gezielt vorbeugen, haben ein hohes Risiko an Herz-Kreislaufkrankungen zu erkranken.

Studien weisen darauf hin, dass einige Faktoren einen größeren Einfluss auf das Herzinfarktrisiko bei Frauen haben. Zudem gibt es zusätzliche Risikofaktoren für Frauen, wie etwa Schwangerschaftsdiabetes und der weibliche Hormonzyklus, der sich nach den Wechseljahren verändert.

Die gefährlichsten allgemeinen Risikofaktoren für Herz-Kreislaufkrankungen sind:

- Bluthochdruck
- Diabetes
- Fettstoffwechselstörungen
- Übergewicht

...sowie Verhaltensweisen, welche die Gesundheit stark verschlechtern und das Risiko für koronare Herzkrankheiten erheblich steigern können. Zu diesen zählen:

- Rauchen
- Bewegungsmangel
- Ungesunde Ernährung

Rauchen erhöht besonders bei Frauen das Risiko für Herz-Kreislaufkrankungen und verstärkt negative Auswirkungen weiterer Risikofaktoren, wie Insulinresistenz und Typ-2-Diabetes. Weitere, geschlechtsspezifische, Risikofaktoren sind häufig auftretende endokrine Störungen bei Frauen im reproduktiven Alter (z.B. polyzystisches Ovarsyndrom (PCOS) und frühe Wechseljahre). Eine notwendige Behandlung der Patientinnen sollte daher die geschlechtsspezifischen Risikofaktoren berücksichtigen.

Wenn das Verhalten von Risikopatientinnen nicht angepasst und medikamentöse Therapien unwirksam bleiben, können sich die Risikofaktoren für Herz-Kreislaufkrankungen erheblich verschlechtern.

Maßnahmen

Ziel der kardiovaskulären Prävention ist es, das Bewusstsein für die Gefahren von nicht behandelten Risikofaktoren und mangelnden vorsorgenden Maßnahmen zu stärken und eine schlechte Patientinnenversorgung zu verhindern.

- Blutdruckmessung
Zielwert für den Blutdruck: Generell < 140/90 mmHg.

- Einstellung eines Diabetes mellitus
Frauen mit Diabetes haben ein 2 bis 4-fach erhöhtes Risiko an koronarer Herzkrankheit zu erkranken. Eine mangelhafte Blutzuckereinstellung kann das Herz-Kreislauf-Risiko um 50 % erhöhen!
Etwa 2–4 % aller Schwangeren erkranken in Deutschland an einem Gestationsdiabetes. Unzureichende Behandlung eines Gestationsdiabetes kann die Gesundheit von Kind und Mutter gefährden.

- Übergewicht behandeln
Eine ungesunde Kost (mit regelmäßigem Verzehr von Zucker, Alkohol, Transfetten, Konservierungsstoffen) erhöht das kardiovaskuläre 10-Jahresrisiko um 50 %!
- Rauchen aufgeben
Nikotinkonsum erhöht das kardiovaskuläre 10-Jahresrisiko um bis zu 50 %! Rauchen erhöht besonders bei Frauen das Risiko für Herz-Kreislaufkrankungen. Das Risiko für die Entstehung weiterer Faktoren, wie Insulinresistenz und Typ-2-Diabetes wird gesteigert.

- Bewegungsmangel verhindern
Ungenügende Bewegung schadet dem Herz-Kreislaufsystem und kann das Risiko für Typ-2-Diabetes erhöhen!
Körperliche Inaktivität kann negative Folgen für die Herzgesundheit haben.

Der akute Brustschmerz als Leitsymptom kann bei Frauen und Diabetikern fehlen! Hier wird eventuell nur über untypische Symptome wie Übelkeit, Schwindel und Atemnot geklagt.

Untersuchungen zeigen, dass mehr als die Hälfte der Frauen immer noch zögern würden, die Notrufnummer anzurufen, wenn sie glauben, einen Herzinfarkt zu erleiden.

Heart-health-women frame

Herzgesundheit bei Frauen



Koronare Herzkrankheit, Herzinfarkt und Schlaganfall sind weit verbreitet. Mindestens jeder dritte Todesfall durch Herz-Kreislauf-Erkrankungen in Europa ist vermeidbar. Frauen mit Risikofaktoren können gezielt vorbeugen, damit Herz und Kreislauf gesund bleiben.

Studien weisen darauf hin, dass einige Faktoren einen größeren Einfluss auf das Herzinfarktrisiko bei Frauen haben. Zudem gibt es zusätzliche Risikofaktoren für Frauen, wie etwa Schwangerschaftsdiabetes und der weibliche Hormonzyklus, der sich nach den Wechseljahren verändert.

Die wichtigsten beeinflussbaren allgemeinen Risikofaktoren für Herz-Kreislaufkrankungen sind:

- Bluthochdruck
- Diabetes
- Fettstoffwechselstörungen
- Übergewicht

...sowie Verhaltensweisen, welche die Gesundheit stark verbessern und das Risiko für koronare Herzkrankheiten erheblich senken können. Zu diesen zählen:

- Rauchfrei leben
- Regelmäßiger Sport
- Gesunde Ernährung

Rauchfrei zu leben kann insbesondere bei Frauen das Risiko für Herz-Kreislaufkrankungen verringern und die Entstehung weiterer Risikofaktoren, wie Insulinresistenz und Typ-2-Diabetes vermindern. Weitere, geschlechtsspezifische, Risikofaktoren sind häufig auftretende endokrine Störungen bei Frauen im reproduktiven Alter (z.B. polyzystisches Ovarsyndrom (PCOS) und frühe Wechseljahre). Eine optimale Behandlung der Patientinnen sollte daher die geschlechtsspezifischen Risikofaktoren berücksichtigen.

Durch gesundheitsbewusstes Verhalten und medikamentöse Therapien können Risikofaktoren positiv beeinflusst werden und eröffnen ein großes Präventionspotential für Herz-Kreislaufkrankungen.

Prävention

Ziel der kardiovaskulären Prävention ist es, das Bewusstsein für die wichtige Bedeutung von vorsorgenden Maßnahmen zu stärken und die Patientinnenversorgung zu verbessern.

- Blutdruckmessung
Zielwert für den Blutdruck: Generell < 140/90 mmHg.

- Optimale Einstellung eines Diabetes mellitus
Frauen mit Diabetes haben ein 2 bis 4-fach erhöhtes Risiko an koronarer Herzkrankheit zu erkranken. Eine optimale Blutzuckereinstellung kann das Herz-Kreislauf-Risiko um 50 % verringern!
Etwa 2–4 % aller Schwangeren erkranken in Deutschland an einem Gestationsdiabetes. Frühe Behandlung eines Gestationsdiabetes verbessert die Gesundheit von Kind und Mutter.

- Gewichtsnormalisierung
Eine "mediterrane" Kost (mit regelmäßigem Verzehr von Obst, Salat, Gemüse, Olivenöl, Fisch, mäßiger Weinkonsum) vermindert das kardiovaskuläre 10-Jahresrisiko um 50 %!
- Rauchen aufgeben
Nikotinabstinenz vermindert das kardiovaskuläre 10-Jahresrisiko um bis zu 50 %! Rauchfrei zu leben senkt besonders bei Frauen das Risiko für Herz-Kreislaufkrankungen. Die Entstehung weiterer Faktoren, wie Insulinresistenz und Typ-2-Diabetes wird verringert.

- Kontrolliertes körperliches Training
3 bis 7x pro Woche für 15-30 Minuten bei 40-60 % der maximalen Leistungsfähigkeit in der Primärprävention vermindert das kardiovaskuläre 10-Jahresrisiko um 50 %!
Leichte körperliche Belastung erhöht die Lebenserwartung um 3 Jahre.

Der akute Brustschmerz als Leitsymptom kann bei Frauen und Diabetikern fehlen! Hier wird eventuell nur über untypische Symptome wie Übelkeit, Schwindel und Atemnot geklagt.

Schnelles Handeln bei einem Herzinfarkt erhöht die Überlebenschancen für Patientinnen. Deshalb ist es wichtig, bei den ersten Anzeichen von Symptomen sofort einen Notarzt zu rufen.

Control group

Isoflavone und Tofu senken das Herz-Kreislaufisiko

Der häufige Verzehr von Tofu und Lebensmitteln, die höhere Mengen an Isoflavonen enthalten, wurde in 3 großen prospektiven Beobachtungsstudien mit einem leicht verminderten Risiko auf Herz-Kreislauf-Erkrankungen verbunden. Eine schützende Wirkung war laut den in dem Magazin *Circulation* Ergebnissen vor allem bei jüngeren Frauen und Frauen nach der Menopause erkennbar, die keine Hormone einnahmen.

Die häufige Verwendung von Soja-Produkten und insbesondere Tofu in der ostasiatischen Küche, wird seit längerem als ein Grund für die im Vergleich zu westlichen Ländern niedrigere Rate von Herz-Kreislauf-Erkrankungen angesehen. Das verminderte Risiko wird dabei auf den hohen Gehalt von Isoflavonen zurückgeführt.

Die U.S. Food and Drug Administration (FDA) hat die Zusammenhänge zeitweise als wissenschaftlich erwiesen angesehen und den Herstellern die Werbung mit einer protektiven Wirkung gegen Herzinfarkte erlaubt, wovon sie allerdings wieder abgerückt ist. Auch die American Heart Association geht von einer allenfalls minimalen Schutzwirkung aus.

Ein Team um Qi Sun von der T.H. Chan School of Public Health in Boston hat jetzt die Daten von 3 großen prospektiven Beobachtungsstudien ausgewertet.

Dies waren die Nurses' Health Study (NHS), die 1984 bis 2012 mehr als 74.000 Frauen begleitet hat, die NHSII-Studie, die seit 1991 den Gesundheitszustand von 94.000 Frauen prüft, und die Health Professionals Follow-Up Study, an der zwischen 1986 und 2012 mehr als 42.000 Männer teilnahmen.

Die Auswertung war auf Personen beschränkt, die zu Beginn der Studie frei von Herz-Kreislauf-Erkrankungen oder Krebs waren. Die Ernährungsdaten wurden alle 2 bis 4 Jahre durch Fragebögen aktualisiert.

Daten zu Herzerkrankungen wurden aus medizinischen Unterlagen und anderen Dokumenten entnommen. Die Todesfälle an Herzerkrankungen wurden in den Sterbeurkunden identifiziert.

Während einer Nachbeobachtungszeit von 4.826.122 Personenjahren ist es zu insgesamt 8.359 Herzerkrankungen gekommen. Nach den Berechnungen von Sun ist es bei den Teilnehmern im Quintil mit der höchsten Isoflavon-Zufuhr zu 21 % seltener zu Herz-Kreislauf-Erkrankungen gekommen. Die Hazard Ratio von 0,79 war mit einem 95%-Konfidenzintervall von 0,73 bis 0,85 signifikant. Nach der Berücksichtigung einer Reihe von Begleitfaktoren verminderte sich die adjustierte Hazard Ratio auf 0,87 (0,81 bis 0,94). Der Einfluss der Isoflavone in der Nahrung war demnach relativ gering, er war allerdings in allen 3 Studien nachweisbar. Etwas deutlicher war der Einfluss von Tofu. Teilnehmer, die häufiger als 1 Mal in der Woche Tofu verzehrten, was in den USA relativ selten der Fall ist, erkrankten zu 18 % seltener an Herz-Kreislauf-Erkrankungen als Personen, die seltener als 1 Mal pro Monat Tofu verzehrten.

Appendix C.

SPSS output PROCESS Model 8

Notes

Resources	Processor Time	00:00:23,09
	Elapsed Time	00:00:24,00

[DataSet1] /Users/SophieMayen/Desktop/Thesis data.sav

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 3.4 *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

Model : 8
Y : behav1
X : ST01
M1 : fear
M2 : hope
M3 : seffic
M4 : scont
W : hconsc

Sample Size: 539

Coding of categorical X variable for analysis:

ST01	X1	X2	X3	X4
1,000	,000	,000	,000	,000
2,000	1,000	,000	,000	,000
3,000	,000	1,000	,000	,000
4,000	,000	,000	1,000	,000
5,000	,000	,000	,000	1,000

OUTCOME VARIABLE:
fear

Model Summary

P	R	R-sq	MSE	F(HC3)	df1	df2
.00	,3090	,0955	,5963	4,9471	9,0000	529,0000

Model

	coeff	se(HC3)	t	p	LLCI	ULCI
constant	1,4859	,0650	22,8515	,0000	1,3582	1,6136
X1	,1880	,0972	1,9345	,0536	-,0029	,3790
X2	,6167	,1121	5,4995	,0000	,3964	,8371
X3	,2985	,0960	3,1093	,0020	,1099	,4870
X4	,2803	,0983	2,8509	,0045	,0872	,4734
hconsc	-,1697	,1118	-,1518	,1296	-,3894	,0499

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Int_1	Int_2	Int_3	Int_4
-,1083	-,3009	,1802	,0206
,1847	,2193	,1801	,1687
-,5862	-,13722	1,0004	,1224
,5580	,1706	,3176	,9026
-,4712	-,7316	-,1736	-,3108
,2546	,1299	,5340	,3521

Product terms key:

Int_1	Int_2	Int_3	Int_4
X1	X2	X3	X4
x	x	x	x
hconsc	hconsc	hconsc	hconsc

Test(s) of highest order unconditional interaction(s):

R2-chng	F(HC3)	df1	df2	p
,0126	1,1762	4,0000	529,0000	,3203

OUTCOME VARIABLE:
hope

Model Summary

P	R	R-sq	MSE	F(HC3)	df1	df2
.00	,5109	,2610	,6452	22,1274	9,0000	529,0000

Model

	coeff	se(HC3)	t	p	LLCI	ULCI
constant	2,7927	,1004	27,8247	,0000	2,5955	2,9899
X1	,7356	,1262	5,8297	,0000	,4877	,9834
X2	,5983	,1198	4,9936	,0000	,3629	,8336
X3	,8158	,1197	6,8153	,0000	,5806	1,0509
X4	,7228	,1279	5,6505	,0000	,4715	,9741
hconsc	,3408	,1599	2,1313	,0335	,0267	,6550
Int_1	,3440	,2300	1,4959	,1353	-,1078	,7957
Int_2	,5386	,1899	2,8367	,0047	,1656	,9117
Int_3	,4733	,2131	2,2209	,0268	,0547	,8920
Int_4	-,1425	,2232	-,6387	,5233	-,5809	,2958

Product terms key:

Int_1	Int_2	Int_3	Int_4
X1	X2	X3	X4
x	x	x	x
hconsc	hconsc	hconsc	hconsc

Test(s) of highest order unconditional interaction(s):

R2-chng	F(HC3)	df1	df2	p
,0270	4,6466	4,0000	529,0000	,0011

Focal predict: ST01 (X)
Mod var: hconsc (W)

Conditional effects of the focal predictor at values of the moderator(s):

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Moderator value(s):
hconsc -,5334

	Effect	se(HC3)	t	p	LLCI	ULCI
X1	,5521	,1702	3,2429	,0013	,2177	,8866
X2	,3110	,1477	2,1052	,0357	,0208	,6011
X3	,5633	,1630	3,4566	,0006	,2432	,8834
X4	,7989	,1651	4,8373	,0000	,4744	1,1233

Test of equality of conditional means

F(HC3)	df1	df2	p
6,9323	4,0000	529,0000	,0000

Estimated conditional means being compared:

ST01	hope
1,0000	2,6109
2,0000	3,1630
3,0000	2,9219
4,0000	3,1742
5,0000	3,4098

Moderator value(s):
hconsc -,0134

	Effect	se(HC3)	t	p	LLCI	ULCI
X1	,7310	,1260	5,8006	,0000	,4834	,9785
X2	,5911	,1195	4,9445	,0000	,3562	,8259
X3	,8094	,1197	6,7646	,0000	,5744	1,0445
X4	,7247	,1276	5,6780	,0000	,4740	,9755

Test of equality of conditional means

F(HC3)	df1	df2	p
12,6647	4,0000	529,0000	,0000

Estimated conditional means being compared:

ST01	hope
1,0000	2,7881
2,0000	3,5191
3,0000	3,3792
4,0000	3,5976
5,0000	3,5129

Moderator value(s):
hconsc ,5866

	Effect	se(HC3)	t	p	LLCI	ULCI
X1	,9374	,1905	4,9203	,0000	,5631	1,3116
X2	,9142	,1727	5,2934	,0000	,5750	1,2535
X3	1,0934	,1753	6,2387	,0000	,7491	1,4377
X4	,6392	,1926	3,3194	,0010	,2609	1,0175

Test of equality of conditional means

F(HC3)	df1	df2	p

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	10,8404	4,0000	529,0000	,0000
Estimated conditional means being compared:				
ST01	hope			
1,0000	2,9927			
2,0000	3,9300			
3,0000	3,9069			
4,0000	4,0861			
5,0000	3,6319			

OUTCOME VARIABLE:
seffic

Model Summary

P	R	R-sq	MSE	F(HC3)	df1	df2
.00	,4075	,1660	,2759	11,4315	9,0000	529,0000

Model

	coeff	se(HC3)	t	p	LLCI	ULCI
constant	4,3548	,0507	85,8139	,0000	4,2551	4,4545
X1	-,0595	,0689	-,8637	,3881	-,0758	,1948
X2	-,0661	,0743	-,8891	,3743	-,2120	,0799
X3	-,0275	,0707	-,3891	,6974	-,1665	,1114
X4	-,0096	,0762	-,1261	,8997	-,1593	,1401
hconsc	,2447	,0889	2,7518	,0061	,0700	,4194
Int_1	,0789	,1388	,5684	,5700	-,1937	,3515
Int_2	,4348	,1200	3,6231	,0003	,1990	,6705
Int_3	,0469	,1410	,3325	,7396	-,2301	,3239
Int_4	,0208	,2039	,1020	,9188	-,3797	,4213

Product terms key:

Int_1	Int_2	Int_3	Int_4
X1	X2	X3	X4
x	x	x	x
hconsc	hconsc	hconsc	hconsc

Test(s) of highest order unconditional interaction(s):

R2-chng	F(HC3)	df1	df2	p
,0275	4,2718	4,0000	529,0000	,0021

Focal predict: ST01 (X)
Mod var: hconsc (W)

Conditional effects of the focal predictor at values of the moderator(s):

Moderator value(s):
hconsc -,5334

	Effect	se(HC3)	t	p	LLCI	ULCI
X1	,0174	,1080	,1615	,8718	-,1947	,2296

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X2	-,2979	,1112	-2,6800	,0076	-,5163	-,0795
X3	-,0525	,1091	-,4817	,6303	-,2668	,1617
X4	-,0207	,1505	-,1375	,8907	-,3164	,2750

Test of equality of conditional means

F(HC3)	df1	df2	p
--------	-----	-----	---

2,4821	4,0000	529,0000	,0429
--------	--------	----------	-------

Estimated conditional means being compared:

ST01	seffio
1,0000	4,2243
2,0000	4,2418
3,0000	3,9264
4,0000	4,1718
5,0000	4,2036

Moderator value(s):

hconsc -,0134

	Effect	se(HC3)	t	p	LLCI	ULCI
X1	,0584	,0692	,8449	,3985	-,0775	,1944
X2	-,0719	,0748	-,9611	,3369	-,2188	,0750
X3	-,0281	,0710	-,3966	,6918	-,1676	,1113
X4	-,0099	,0771	-,1283	,8980	-,1613	,1415

Test of equality of conditional means

F(HC3)	df1	df2	p
--------	-----	-----	---

,8905	4,0000	529,0000	,4693
-------	--------	----------	-------

Estimated conditional means being compared:

ST01	seffio
1,0000	4,3516
2,0000	4,4100
3,0000	4,2797
4,0000	4,3234
5,0000	4,3417

Moderator value(s):

hconsc -,5866

	Effect	se(HC3)	t	p	LLCI	ULCI
X1	,1058	,0989	1,0690	,2856	-,0886	,3001
X2	,1890	,0864	2,1884	,0291	,0193	,3586
X3	,0000	,1024	-,0001	,9999	-,2012	,2012
X4	,0026	,1208	,0214	,9829	-,2347	,2399

Test of equality of conditional means

F(HC3)	df1	df2	p
--------	-----	-----	---

1,8115	4,0000	529,0000	,1252
--------	--------	----------	-------

Estimated conditional means being compared:

ST01	seffio
1,0000	4,4984

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X3	-,2140	,0872	-2,4530	,0145	-,3853	-,0426
X4	-,3482	,0809	-4,3046	,0000	-,5072	-,1893
fear	,0123	,0307	,4012	,6884	-,0480	,0726
hope	,1222	,0332	3,6800	,0003	,0570	,1875
seffio	,2111	,0510	4,1392	,0000	,1109	,3113
scont	,0302	,0403	,7499	,4537	-,0489	,1093
hconsc	,3828	,0913	4,1933	,0000	,2034	,5621
Int_1	,0763	,1236	,6168	,5376	-,1666	,3191
Int_2	,0170	,1471	,1157	,9080	-,2720	,3060
Int_3	-,1029	,2051	-,5017	,6161	-,5059	,3000
Int_4	-,1002	,1409	-,7112	,4773	-,3769	,1766

Product terms key:

Int_1	:	X1	x	hconsc
Int_2	:	X2	x	hconsc
Int_3	:	X3	x	hconsc
Int_4	:	X4	x	hconsc

Test(s) of highest order unconditional interaction(s):

R2-chng	F(HC3)	df1	df2	p
---------	--------	-----	-----	---

X*W	,0037	,4844	4,0000	525,0000	,7472
-----	-------	-------	--------	----------	-------

***** DIRECT AND INDIRECT EFFECTS OF X ON Y *****

Relative conditional direct effect(s) of X on Y:

	hconsc	Effect	se(HC3)	t	p	LLCI	ULCI
ULCI							
X1	-,5334	-,3731	,0997	-3,7436	,0002	-,5688	-,
1773							
X1	-,0134	-,3334	,0777	-4,2902	,0000	-,4861	-,
1807							
X1	,5866	-,2877	,1087	-2,6458	,0084	-,5012	-,
0741							
X2	-,5334	-,1688	,1187	-1,4226	,1554	-,4020	,
0643							
X2	-,0134	-,1600	,0824	-1,9418	,0527	-,3218	,
0019							
X2	,5866	-,1498	,1136	-1,3180	,1881	-,3730	,
0735							
X3	-,5334	-,1591	,1535	-1,0361	,3006	-,4607	,
1425							
X3	-,0134	-,2126	,0878	-2,4202	,0159	-,3852	-,
0400							
X3	,5866	-,2744	,1330	-2,0627	,0396	-,5356	-,
0131							
X4	-,5334	-,2948	,1112	-2,6523	,0082	-,5132	-,
0764							
X4	-,0134	-,3469	,0809	-4,2856	,0000	-,5059	-,
1879							
X4	,5866	-,4070	,1149	-3,5434	,0004	-,6327	-,
1814							

Relative conditional indirect effects of X on Y:

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2,0000	4,6042
3,0000	4,6874
4,0000	4,4984
5,0000	4,5010

***** OUTCOME VARIABLE: scont

Model Summary

	R	R-sq	MSE	F(HC3)	df1	df2	
--	---	------	-----	--------	-----	-----	--

P	,4512	,2036	,4574	11,2708	9,0000	529,0000	,00
---	-------	-------	-------	---------	--------	----------	-----

Model

	coeff	se(HC3)	t	p	LLCI	ULCI
constant	3,7688	,0648	58,1895	,0000	3,6416	3,8960
X1	-,1365	,0921	-,14820	,1389	-,3175	,0445
X2	-,1990	,0916	-,2,1730	,0302	-,3789	-,0191
X3	-,0676	,0890	-,7589	,4483	-,2425	,1073
X4	-,1854	,1048	-,1,7695	,0774	-,3912	,0204
hconsc	,4851	,1230	3,9438	,0001	,2435	,7268
Int_1	-,0113	,1623	-,0697	,9445	-,3302	,3076
Int_2	,1884	,1727	1,0910	,2758	-,1508	,5276
Int_3	,3051	,1977	1,5436	,1233	-,0832	,6934
Int_4	-,0688	,3727	-,1845	,8537	-,8010	,6635

Product terms key:

Int_1	:	X1	x	hconsc
Int_2	:	X2	x	hconsc
Int_3	:	X3	x	hconsc
Int_4	:	X4	x	hconsc

Test(s) of highest order unconditional interaction(s):

R2-chng	F(HC3)	df1	df2	p
---------	--------	-----	-----	---

X*W	,0109	1,0611	4,0000	529,0000	,3751
-----	-------	--------	--------	----------	-------

***** OUTCOME VARIABLE: behavi

Model Summary

	R	R-sq	MSE	F(HC3)	df1	df2	
--	---	------	-----	--------	-----	-----	--

P	,5560	,3091	,3025	14,5504	13,0000	525,0000	,00
---	-------	-------	-------	---------	---------	----------	-----

Model

	coeff	se(HC3)	t	p	LLCI	ULCI
constant	2,6904	,2780	9,6786	,0000	2,1443	3,2365
X1	-,3324	,0778	-4,2739	,0000	-,4852	-,1796
X2	-,1598	,0822	-1,9439	,0524	-,3212	,0017

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INDIRECT EFFECT:

ST01	hconsc	Effect	BootSE	BootLLCI	BootULCI
X1	-,5334	,0030	,0089	-,0132	,0238
X1	-,0134	,0023	,0064	-,0098	,0170
X1	,5866	,0015	,0055	-,0089	,0150

Index of moderated mediation:

	Index	BootSE	BootLLCI	BootULCI
--	-------	--------	----------	----------

hconsc	-,0013	,0069	-,0193	,0110
--------	--------	-------	--------	-------

	hconsc	Effect	BootSE	BootLLCI	BootULCI
X2	-,5334	,0096	,0239	-,0374	,0600
X2	-,0134	,0076	,0189	-,0297	,0471
X2	,5866	,0054	,0140	-,0216	,0363

Index of moderated mediation:

	Index	BootSE	BootLLCI	BootULCI
--	-------	--------	----------	----------

hconsc	-,0037	,0114	-,0305	,0173
--------	--------	-------	--------	-------

	hconsc	Effect	BootSE	BootLLCI	BootULCI
X3	-,5334	,0025	,0078	-,0105	,0224
X3	-,0134	,0036	,0095	-,0139	,0246
X3	,5866	,0050	,0127	-,0202	,0323

Index of moderated mediation:

	Index	BootSE	BootLLCI	BootULCI
--	-------	--------	----------	----------

hconsc	,0022	,0075	-,0127	,0191
--------	-------	-------	--------	-------

	hconsc	Effect	BootSE	BootLLCI	BootULCI
X4	-,5334	,0033	,0090	-,0133	,0242
X4	-,0134	,0034	,0088	-,0136	,0224
X4	,5866	,0036	,0095	-,0154	,0248

Index of moderated mediation:

	Index	BootSE	BootLLCI	BootULCI
--	-------	--------	----------	----------

hconsc	,0003	,0053	-,0107	,0120
--------	-------	-------	--------	-------

INDIRECT EFFECT:

ST01	hconsc	Effect	BootSE	BootLLCI	BootULCI
X1	-,5334	,0675	,0267	,0201	,1240
X1	-,0134	,0893	,0290	,0369	,1510
X1	,5866	,1146	,0401	,0456	,2034

Index of moderated mediation:

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```

hconsc      Index      BootSE      BootLLCI      BootULCI
---
hconsc      ,0420      ,0304      -,0068      ,1137

```

```

hconsc      Effect      BootSE      BootLLCI      BootULCI
X2      -,5334      ,0380      ,0210      ,0038      ,0838
X2      -,0134      ,0722      ,0249      ,0295      ,1262
X2      ,5866      ,1117      ,0385      ,0453      ,1960

```

Index of moderated mediation:

```

hconsc      Index      BootSE      BootLLCI      BootULCI
---
hconsc      ,0658      ,0311      ,0133      ,1357

```

```

hconsc      Effect      BootSE      BootLLCI      BootULCI
X3      -,5334      ,0689      ,0276      ,0228      ,1301
X3      -,0134      ,0989      ,0312      ,0428      ,1651
X3      ,5866      ,1337      ,0433      ,0575      ,2256

```

Index of moderated mediation:

```

hconsc      Index      BootSE      BootLLCI      BootULCI
---
hconsc      ,0579      ,0312      ,0047      ,1262

```

```

hconsc      Effect      BootSE      BootLLCI      BootULCI
X4      -,5334      ,0976      ,0325      ,0383      ,1667
X4      -,0134      ,0886      ,0291      ,0374      ,1519
X4      ,5866      ,0781      ,0333      ,0246      ,1551

```

Index of moderated mediation:

```

hconsc      Index      BootSE      BootLLCI      BootULCI
---
hconsc      -,0174      ,0272      -,0694      ,0402

```

INDIRECT EFFECT:

```

ST01      ->      sefflc      ->      behavi

```

```

hconsc      Effect      BootSE      BootLLCI      BootULCI
X1      -,5334      ,0037      ,0223      -,0426      ,0479
X1      -,0134      ,0123      ,0153      -,0165      ,0448
X1      ,5866      ,0223      ,0212      -,0159      ,0691

```

Index of moderated mediation:

```

hconsc      Index      BootSE      BootLLCI      BootULCI
---
hconsc      ,0166      ,0277      -,0333      ,0780

```

```

hconsc      Effect      BootSE      BootLLCI      BootULCI
X2      -,5334      -,0629      ,0287      -,1243      -,0128
X2      -,0134      -,0152      ,0168      -,0514      ,0157
X2      ,5866      ,0399      ,0203      ,0047      ,0843

```

Index of moderated mediation:

```

hconsc      Index      BootSE      BootLLCI      BootULCI
---
hconsc      ,0918      ,0336      ,0310      ,1631

```

```

hconsc      Effect      BootSE      BootLLCI      BootULCI
X3      -,5334      -,0111      ,0231      -,0557      ,0368
X3      -,0134      -,0059      ,0153      -,0365      ,0245
X3      ,5866      ,0000      ,0220      -,0470      ,0422

```

Index of moderated mediation:

```

hconsc      Index      BootSE      BootLLCI      BootULCI
---
hconsc      ,0099      ,0297      -,0529      ,0656

```

```

hconsc      Effect      BootSE      BootLLCI      BootULCI
X4      -,5334      -,0044      ,0279      -,0691      ,0415
X4      -,0134      -,0021      ,0158      -,0350      ,0300
X4      ,5866      ,0005      ,0233      -,0403      ,0545

```

Index of moderated mediation:

```

hconsc      Index      BootSE      BootLLCI      BootULCI
---
hconsc      ,0044      ,0366      -,0526      ,0934

```

INDIRECT EFFECT:

```

ST01      ->      scont      ->      behavi

```

```

hconsc      Effect      BootSE      BootLLCI      BootULCI
X1      -,5334      -,0039      ,0089      -,0262      ,0103
X1      -,0134      -,0041      ,0072      -,0214      ,0079
X1      ,5866      -,0043      ,0081      -,0245      ,0084

```

Index of moderated mediation:

```

hconsc      Index      BootSE      BootLLCI      BootULCI
---
hconsc      -,0003      ,0081      -,0171      ,0178

```

```

hconsc      Effect      BootSE      BootLLCI      BootULCI
X2      -,5334      -,0090      ,0134      -,0378      ,0169
X2      -,0134      -,0061      ,0090      -,0249      ,0109
X2      ,5866      -,0027      ,0066      -,0196      ,0086

```

Index of moderated mediation:

```

hconsc      Index      BootSE      BootLLCI      BootULCI
---
hconsc      ,0057      ,0107      -,0146      ,0301

```

```

hconsc      Effect      BootSE      BootLLCI      BootULCI
X3      -,5334      -,0070      ,0114      -,0335      ,0136
X3      -,0134      -,0022      ,0052      -,0154      ,0065
X3      ,5866      ,0034      ,0068      -,0098      ,0182

```

Index of moderated mediation:

```

hconsc      Index      BootSE      BootLLCI      BootULCI
---
hconsc      ,0092      ,0143      -,0183      ,0408

```

```

hconsc      Effect      BootSE      BootLLCI      BootULCI
X4      -,5334      -,0045      ,0126      -,0364      ,0163
X4      -,0134      -,0056      ,0094      -,0282      ,0098
X4      ,5866      -,0068      ,0113      -,0355      ,0104

```

Index of moderated mediation:

```

hconsc      Index      BootSE      BootLLCI      BootULCI
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hconsc      -,0021      ,0135      -,0318      ,0274

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***** ANALYSIS NOTES AND ERRORS *****

Level of confidence for all confidence intervals in output:
95,0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
5000

W values in conditional tables are the 16th, 50th, and 84th percentiles.

NOTE: A heteroscedasticity consistent standard error and covariance matrix estimator was used.

NOTE: The following variables were mean centered prior to analysis:
hconsc

----- END MATRIX -----

Abstract

There exists a need to raise awareness of cardiovascular disease risk factors that are specific to women. This present study examines the framing effects of cardiovascular disease messages on women's behavior intentions in a moderated mediation model. The relationships between loss- and gain-framed messages and fear, hope, self-efficacy, and self-control are examined.

Moreover, the effects of framing messages to women's risks are researched. Also, the moderating role of health consciousness is explored in this context. An online experiment with women from Germany, Austria, and Switzerland (N = 636) was conducted to probe the moderated mediation model. Overall, the analysis revealed a negative direct effect of all frames on behavior intentions, except the heart-disease-women frame. The data shows that loss- and gain-framed messages elicit hope and that loss-frames as well as the women-specific gain-frame elicit fear and hope simultaneously. Yet, the analysis revealed that an increase in perceived fear and hope does not relate to behavior intentions in this study. Besides, the heart-disease-women frame lowers self-control. Health consciousness moderates the effects on hope and self-efficacy for the heart-disease-women frame and hope for the heart-health-women frame. However, the analysis revealed no mediation effect through fear, hope, self-efficacy, and self-control on women's behavior intentions. Implications are discussed.

Keywords: health communication, women's health, cardiovascular disease, framing, emotions, health consciousness

Abstract

Es besteht die Notwendigkeit, das Bewusstsein für Risikofaktoren für Herz-Kreislauf-Erkrankungen zu erweitern, die frauenspezifisch sind. Diese Studie untersucht die Framing-Effekte von Informationen über Herz-Kreislauf-Erkrankungen und deren Risiken auf die Verhaltensabsichten von Frauen in einem moderierten Mediationsmodell. Die Beziehungen zwischen verlust- und gewinnorientierten Frames und Angst, Hoffnung, Selbstwirksamkeit und Selbstkontrolle werden untersucht. Darüber hinaus wird die Wirkung des Framings von

Informationen gezielt für Frauen getestet. In diesem Zusammenhang wird auch die moderierende Rolle von Gesundheitsbewusstsein untersucht. Ein Online-Experiment mit Frauen aus Deutschland, Österreich und der Schweiz (N = 636) wurde durchgeführt, um das moderierte Mediationsmodell zu testen. Die Ergebnisse zeigen einen negativen direkten Effekt aller Frames auf die Verhaltensabsichten mit Ausnahme des Herzkrankheiten-Frauen-Frames. Die Daten deuten darauf hin, dass verlust- sowie gewinnorientierte Frames Hoffnung hervorrufen und dass Verlust-Frames sowie der gewinnorientierte Herzgesundheit-Frauen-Frame gleichzeitig Angst und Hoffnung hervorrufen. In dieser Studie hängt eine Zunahme von wahrgenommener Angst und Hoffnung jedoch nicht mit einer Änderung der Verhaltensabsichten zusammen. Außerdem mindert der Frame für Herzkrankheiten bei Frauen die wahrgenommene Selbstkontrolle. Gesundheitsbewusstsein verringert die Auswirkungen auf Hoffnung und Selbstwirksamkeit für den Herzkrankheiten-Frauen-Frame und Hoffnung für den Herzgesundheit-Frauen-Frame. Die Analyse ergab jedoch keinen Mediationseffekt durch Angst, Hoffnung, Selbstwirksamkeit und Selbstkontrolle auf die Verhaltensabsichten von Frauen. Implikationen werden diskutiert.

Stichwörter: Gesundheitskommunikation, Frauengesundheit, Herz-Kreislauf-Erkrankungen, Framing, Emotionen, Gesundheitsbewusstsein