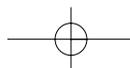
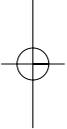


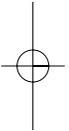
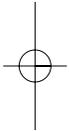
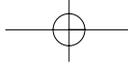


Enny H.H.J. Das

How fear appeals work

Motivational biases in the processing
of fear-arousing health communications





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Hoe angstcommunicaties werken

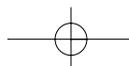
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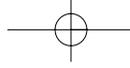


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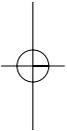
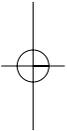
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Geboren op 16 juni 1967, te Knegsel

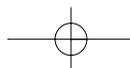


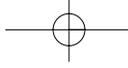


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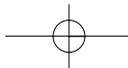
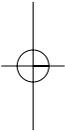


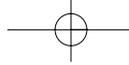
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To my mother



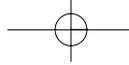


Preface

This thesis is about the way in which motivations affect our way of seeing things, thinking, and the ways in which we conduct ourselves. In this book, motivations are posited to affect the way in which we process threatening health information, and act upon it, but I believe the same motivational mechanisms apply to many other things, such as the writing (or reading) of dissertations. With respect to my writing this dissertation, I have been fortunate enough to be surrounded by people who affected my motivation to write, or finish, this book in a positive way. In this section, I will thank them.

First of all, I thank Wolfgang Stroebe for being the strict yet fair and supportive supervisor that he is: without a doubt, his ideas and comments on various theoretical and textual issues have contributed to the quality of this dissertation. I may start missing our discussions. I am also greatly indebted to John de Wit, my second supervisor, because of his confidence in me, and because I believe the way we seem to be at the exact same scientific wavelength, liking and thinking the same stuff, is quite a rare thing. It has been a pleasure. I also want to express my gratitude to my colleagues at the department of Social and Organizational Psychology at Utrecht University for the various ways in which they have supported me: in particular, I thank Hein Lodewijkx and Akko Kalma for being such good neighbors, and for reviving my enthusiasm about science at the – occasional – time I needed that, by being so incredibly passionate about the research they do, Brigitte Boon and Wendy Mensink for the work we did together and the support, Jos van Oostrum for helping me out with many things, Nel de Wildt for being so refreshingly honest and fun company, and Lizet Hoekert for the terrific way in which she manages the bureau of Psychology & Health, and particularly for her keen eye on the human factor. A special thank you goes out to Elpine de Boer, friend and colleague, for the millions of get-togethers over coffee, wine, or whatever people drink, for her support, her jokes, her good sense of fashion, and the conversations about ‘things that most people seem to overlook but which are nonetheless very important’. I will not mention them here.

Stan Steverink and Tom Frijns have been kind enough to help me with the seemingly endless task of categorizing all the thoughts that participants had written down about health threats, possible solutions, and other things that could or could not be categorized in the various experiments. Their help has been really appreciated. I thank over 600 students at Utrecht University for being brave enough to be participants in my infamous experiments, and for being so understanding when they were told they had been deceived for the sake

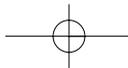
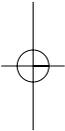
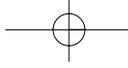


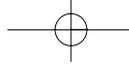
of science. Furthermore, this dissertation would not have looked so good if not for Judith Thelen, who designed the cover and took care of the layout. Roel Stavorinus made my life a lot easier by taking care of the design-business and of quite some other stuff. Thanks to the both of them. I also thank my 'new' colleagues at the department of Communication and Innovation Studies at Wageningen University for being so welcoming and supportive. It means a lot to me.

I thank my father for the many ways in which he has helped me, repairing broken down cars, bicycles, and everything else that needs fixing, picking me up at whatever place I get stranded, and lighting fires in the fireplace. I thank my two great brothers, Wim and Paul, and the incredible Karin, for their ever-present support, the jokes, vacations, and for the talks about, for instance, the uselessness of thinking, or the danger of the dreadful mental roundabouts. It seems as if Marie-Louise and Jeroen van Doorne have always been there, listening and understanding when I made sense, and also when I did not. I thank them for being such good friends. I thank Miek Berkers for being such a great woman, Annemieke Wiercx for her confidence and support, either short or very long-distance, and I thank both of them for always seeing the best in me. I thank Marique de Vries for regularly keeping my feet planted in the real world, in bars, or in worlds we invented which were even better. Ebsie -Corina Ebskamp- and Beryl Cameron, your support has been really appreciated, so now you can get out your wings and start dancing.

Finally, to all the friends and family who have been wondering for years what I have been up to, when I would finally stop 'studying', and what the hell a dissertation is anyway: this is it. Hope you like it.

Enny Das
Amsterdam, September 2001





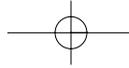
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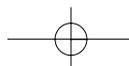
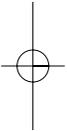
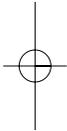
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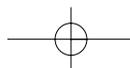
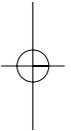
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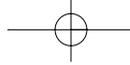
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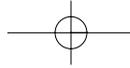


1 Theoretical accounts of the effects of fear appeals

Fear, like other human emotions, appears to be an intriguing topic for people of all kinds, be it novelists, artists, philosophers, or psychologists. It must be quite hard to find a novel in which fear does not play a prominent role; without fear there would probably be not much of a story to tell. Thus, a lot can be said about fear. According to some, fear is a disease that eats away at logic and makes man inhuman (Marian Anderson). Others say that early and provident fear is the mother of safety (Edmund Burke). Still others believe that action is the only answer to conquer fear (Norman Vincent Peale). As it seems, ideas about the potential benefits of fear are mixed: whereas some are confident that fear is guided by irrationality and therefore can not lead to anything good, others contend that we need fear in order to stay safe.

This book deals with the study of messages in which people are presented with fear-arousing health information in order to convince them they should alter unhealthy habits and adopt healthy behavior. Usually, these messages start with the presentation of the negative consequences of a certain behavior, typically stressing both the severity of the health risk and one's vulnerability to it. This message is then followed by a recommendation in which a solution to the health risk is offered. Plenty examples of these strategies can be found in public health campaigns directed at e.g. the dangers of smoking, unsafe sex, or drunk driving. The notion underlying the use of fear appeals in health persuasion is that fear of the negative consequences of a certain type of behavior will motivate people to adopt the subsequently presented recommendations. This notion resembles both Edmund Burke's and Norman Vincent Peale's statements in that it assumes that fear appeals have the potential to motivate people to 'do the right thing'. It certainly does not resemble Marian Anderson's point of view; obviously, should fear eat away at logic, not much good can be expected from the use of fear appeals.

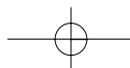
Oddly enough, perhaps, this book does not deal as much with the study of the origins and consequences of the emotion of fear as it does with the study of fear appeals, i.e. messages in which the vulnerability to and severity



1 Theoretical accounts of the effects of fear appeals

of a certain health risk are stressed. The study of fear as an emotion is certainly very fascinating (see e.g. Frijda, 1986), but also very different from the study of fear-arousing health messages. Even though the term fear appeal would suggest otherwise, it is in fact not likely that the effects of fear appeals can all be attributed to the emotion of fear, and not to other – cognitive or affective – mechanisms. Firstly, whereas a fear appeal may aim to evoke fear, we should not exclude the possibility that it may evoke other negative emotions beside fear, such as uncertainty, irritation, anger or depression. Secondly, the effects of fear appeals on persuasion can be unrelated to fear, or other negative emotions, which implies that there must be other – cognitive – mechanisms that can account for these effects (Leventhal, 1970; Rogers, 1983). Therefore, the aim of this book is to study the effects that a fear appeal may have on both affective and cognitive processes that are related to persuasion.

Possibly, the use of fear appeals in health persuasion is intuitively appealing to many people because it seems to have all the qualities a message needs to grab an individual's attention, even in a society in which we suffer from an 'information overload' on a daily basis. Obviously, when presented with vivid imagery on the effects of 20 years of smoking on the structure of one's lungs, it is hard not to be shocked and repulsed. Moreover, intuitive ideas about the benefits of fear arousing messages are confirmed by research conducted on the effects of fear appeals in health persuasion, which typically report that higher levels of fear lead to more persuasion (Sutton, 1982). Thus, fear appeals seem to be effective in motivating people to adopt healthy behaviors. These findings may probe readers to wonder if it is not a waste of time to write a thesis about a topic of which the outcome is already known. The answer to this question is a definite 'no'. On the contrary, a continued study of the effects of fear appeals is necessary. The main reason for this is that although the empirical findings seem

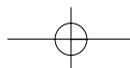




to be clear-cut, the theories on fear appeals are not. In fact, no theory has yet been able to explain why, or when, for that matter, higher levels of fear lead to more persuasion. Thus, the processes underlying the effects of fear on attitudes and intentions toward a recommended solution, or on the recommended behavior, remain largely unknown.

The present thesis aims to provide more insight into the processes underlying fear-related persuasion. An information-processing approach is adopted, in which it is examined when, and how, different people process the threatening information in a fear appeal and when, and how, people process the reassuring information in an action recommendation. Little is still known about the cognitive processing of fear appeals, and several important questions have been left unanswered. One of these questions is: 'Does the arousal of fear about a certain health risk motivate individuals to process health information in a more intensive way?' For instance, when presented with the serious consequences of a certain health risk, will an individual read and think about a subsequently presented recommendation in which ways of dealing with this health hazard are offered, in a more systematic way? Or will he or she just have a quick glance at this message and not give it much thought? Another question is 'Do people process fear-arousing health information differently depending on the content of the message?'. For instance, will people read and think about a threatening health message, bringing bad news, in the same way they will read and think about a reassuring recommendation, which brings good news? Or will they be more critical of negative information, and less likely to accept it, than they will be of positive information? This thesis aims to find an answer to these questions in order to answer the ultimate question in fear appeal research, which is: 'How do fear appeals work?'.

When examining these questions, one should bear in mind that many psychologists have developed theories and investigated the potential effects of fear appeals for decades, albeit with varying degrees of success.



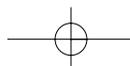


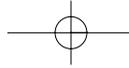
1 Theoretical accounts of the effects of fear appeals

These early theories and empirical findings have proven tremendously important in that they show us what has already been done, what we now know about fear-related persuasion, and which questions have been left unanswered. In the remaining section of this chapter, the classical theories on fear appeals will be discussed, followed by a review of the empirical findings in relation to these theories. Next, the potential effects of fear appeals will be re-examined in terms of dual-process theories, focusing on the effects a fear appeal may have on the processing of persuasive messages. In this section, it will be examined what is known about the processing of information, and the processing of threatening messages in particular. In addition, it will be argued that some fear-related topics need to be examined in more detail. Specifically, a case will be made for the inclusion of various processing motives when examining the effects of fear appeals on the processing of health information. Finally, a stage-model of fear appeals will be presented, which integrates previous theorizing on fear appeals with theories on information processing, and offers a new perspective on several issues related to the processing of threatening health communications. Empirical evidence in support of this model will be presented.

Classical theories: the effects of fear appeals on persuasion

Scientific interest in the effect of fear appeals on persuasion is in no way a modern phenomenon. Psychologists were interested in this question from as early as the 1950s. The mechanisms postulated to explain the effects of fear appeals on persuasion in various theories closely followed the leading research paradigms of those times. Around the 1950's, fear appeal research was heavily influenced by learning theory, focusing on the drive-like properties of fear, and thus on factors such as emotional arousal. From the 1970's, a shift in focus occurred, and psychologists became mainly focused on cognitive factors that may account for the effects of fear appeals on persuasion.



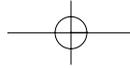


At that time, a cognitive revolution was present throughout all research areas in social psychology. Only recently, social psychologists gained renewed interest in motivational and affective mechanisms. It may be too early to speak of a revival in the interest for emotions; however, we can say with certainty that the predominance of cognitive over affective mechanisms in social psychology is not as strong as it was before.

Fear as a drive

Influenced by learning theory (e.g. Dollard & Miller, 1950; Mowrer, 1950) the earliest research on fear appeals was guided by the assumption that fear, like other unpleasant emotional states, has the functional properties of a drive (Hovland, Janis & Kelley, 1953; Janis, 1967). According to the Drive Reduction Model (or Drive Model) formulated by Carl Hovland and colleagues, when presented with threatening health information, 'notably those evoking anticipations of a threat to the self' (p.62), an individual will be motivated to try out various responses until the fear subsides. Consequently, any response that will reduce the emotional tension evoked by the fear appeal will be reinforced. When a recommendation, in which a possible solution to the health risk is offered, is presented immediately after a fear appeal, it may thus serve to reduce fear and be reinforced. Thus, the use of fear appeals will lead to higher levels of persuasion when (a) the fear appeal arouses enough fear to 'constitute a drive state' and when (b) the silent rehearsal of the recommendation is immediately followed by a reduction in emotional tension.

An implication of this reasoning is that the use of fear appeals will not always be effective in inducing persuasion. When the recommendation is e.g. seen as irrelevant to the threat, as impossible to carry out, or as only a 'partially successful means of averting the threat but with many 'loopholes'' (p.76), the recommendation will fail to reduce emotional tension and thus may not be reinforced. The latter two factors are precursors of the later

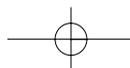


1 Theoretical accounts of the effects of fear appeals

concepts of self-efficacy and response-efficacy as defined by Protection Motivation Theory (Rogers, 1983); they imply that fear arousal and the efficacy of the recommendation interact in their effects on persuasion.

In addition, the Drive Model postulates that an individual's response to a fear appeal need not be restricted to the processing of a communicator's recommendations. Inspired by psychoanalytic accounts of defensive mechanisms (Freud, 1928, 1930) they described several additional self-protective responses to a fear appeal that may serve to reduce fear or tension, such as discounting or denying the relevance or severity of the portrayed health threat. These 'minimizing responses' (Janis, 1951) are postulated to be common defensive reactions to a fear appeal, and assumed to have the potential to seriously undermine the effectiveness of a fear appeal. Moreover, Hovland and colleagues postulated that especially high levels of fear were likely to evoke other types of defensive reactions that could undermine persuasion. One such response was defined as inattention to message content, either resulting from motivated attempts to avoid thinking about the threat, or from cognitive factors such as reduced concentration due to too much fear. Alternatively, recipients could react to a fear appeal with aggression toward the communicator, which was assumed to be evident in strategies such as a complete rejection of the message content or a derogation of the message source. In addition, after being confronted with a certain health threat, recipients could try to actively avoid any subsequent thinking or hearing about the health threat. This type of delayed defensive avoidance was postulated to occur when no – message based or other – defensive response to the health threat was perceived as successful in reducing emotional tension.

An implication of the Drive Model is that, whereas low to moderate fear will induce higher levels of persuasion, higher levels of fear will lead to a reduction in persuasion. The prediction of this curvilinear relation between fear and persuasion is based on the assumptions that (1) recommendations

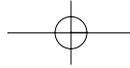


may only partially reduce the emotional tension evoked by very strong fear appeals and (2) strong fear arousal is likely to result in defensive reactions. It is interesting to note that the authors suggested that a strong fear appeal could have the unintended effect to motivate the audience to adopt 'magical', 'wishful' or other types of reassuring beliefs' (p.78), which they postulated to be antithetical to the communicator's purpose (i.e. acceptance of the recommendations). Thus, the underlying assumption seems to be that defensive reactions will always result in decreased persuasion, even if the defensive reaction involves wishful thinking. They did not consider the possibility that wishful thinking may also result in increased acceptance of a recommendation, as acceptance of even an ineffective recommendation can also be expected to alleviate emotional tension if one engages in wishful thinking. The idea that defensive reactions and adaptive reactions may co-occur was also largely ignored.

Extensions of the Drive Model

The Drive Model's prediction of a curvilinear relation between fear arousal and persuasion was elaborated by two later models of fear appeals: Janis' 'family of curves' (1967) and McGuire's reception-yielding model (1968a, 1968b, 1969). Both models share similar assumptions about the processes underlying fear-related persuasion (reception and yielding), although Janis' model is more complex in its predictions on the relation between fear and yielding.

McGuire's account of fear appeals is an application of the more general reception-yielding model of persuasion. It is postulated that fear-related persuasion will depend on the outcome of two mediating processes, i.e. reception of the persuasive message (attention, comprehension) and yielding to the recommendations in the message (acceptance of message content). According to McGuire, fear arousal will exert opposing effects on reception and yielding. Following learning theory conceptions of the cue and drive

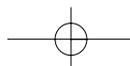


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functions of fear, he postulated that as a cue, fear will evoke habitual responses that are distracting and will interfere with the reception of the message. As a drive, fear is postulated to energize whatever responses are in progress, thus facilitating acceptance of the persuasive message. Hence, the reception-yielding model proposes that fear arousal will have a negative impact on reception-processes, and a positive effect on yielding; together these processes imply a curvilinear relation between fear and persuasion. The facilitating and interfering effects of fear are proposed to vary with situational and individual factors (situational weighting principle).

Like McGuire's reception-yielding model (1969), Janis' family of curves model assumes that reception and yielding-processes mediate the effects of fear on persuasion (Janis, 1967). However, unlike McGuire, who assumes a positive relation between fear and yielding, Janis postulates that fear-motivated instrumental responding will result in facilitating as well as interfering effects on yielding. The facilitating effects of emotional arousal on yielding to message content are postulated to be due to e.g. heightened vigilance, resulting in increased attention to threat-relevant events and thinking about courses of action for dealing with the threat, and a heightened need for reassurance that could be satisfied by accepting the communicator's recommendations. These factors are extensions of the Drive Model's postulated positive effects of fear arousal on persuasion (Hovland et al., 1953). Also like the Drive Model, Janis assumed that these facilitation effects would increase more rapidly from low to moderate levels of fear, than for higher levels of emotional arousal.

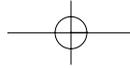
The interfering effects of fear arousal on yielding to message content reflect the Drive Model's defensive strategies for coping with the threat, which Janis referred to as 'the mobilization of resistances that interfere with acceptance' (p.178). Like the Drive Model, Janis postulated that these interference effects would be especially likely for higher levels of fear, because these would result in a higher need for reassurance. Thus, higher levels of



fear are likely to induce strategies such as defensive avoidance, source derogation, refutations of the relevance or severity of the threat, or selective attention to arguments and signs that the threat is not imminent. It is interesting to note that the intensified need for reassurance was postulated to lead to a heightened motivation to examine the communicator's recommendations critically. In this heightened vigilant state with respect to the recommendation, an individual was assumed to consider more carefully than otherwise the possible loopholes in a proposed solution, to see if it offers sufficient protection, and hence, to consider alternative means that might lend greater reassurance. This proposed heightened vigilance with respect to a communicator's recommendations can be seen as a precursor of 'systematic processing' (Chaiken, 1980) or 'central route processing' (Petty & Cacioppo, 1986) that was defined by later dual-process models of persuasion.

Similar to McGuire, Janis also postulated a mediational role for reception. However, unlike McGuire's predicted negative relation between fear and reception, Janis posited that lower levels of fear would have a positive effect on message reception, and that only extreme high levels of emotional arousal would disrupt the reception of persuasive messages. Again, these effects are similar to the predictions made by the Drive Reduction Model.

The combined effects of facilitating, interfering, and reception processes result in a prediction of a curvilinear relation between fear arousal and persuasion: whereas low to moderate levels of fear are assumed to lead to higher levels of persuasion, additional increases in fear will ultimately result in decreased persuasion. Like the reception-yielding model, Janis' account of the effects of fear on persuasion posits that situational and individual differences may affect the relative strength of both facilitating and interfering processes. Hence the name 'family of curves', predicting the effects of fear on persuasion for different situations and different individuals.

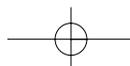


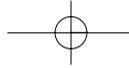
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As Janis himself acknowledged, the propositions of his ‘family of curves’ model are difficult to test. Nonetheless, some of his ideas, and those present in the Drive Model have stood the test of time quite well. Notably, the notion of potential defensive reactions to threatening information has been ignored for many years, possibly due to the difficulty in providing robust evidence for defensive processes, and due to the rise of cognitive models of persuasion. However, these ideas have recently resurfaced in contemporary dual-process theories of persuasion: much of the defensive reactions described by both the Drive Model and Janis’ family of curves are currently being re-examined in terms of their effects on information processing (e.g. Liberman & Chaiken, 1992; Chaiken, Giner-Sorolla & Chen, 1996).

Empirical evidence (1)

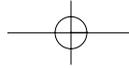
The potential effects of fear appeals on persuasion have been tested extensively on a broad variety of topics, such as tetanus inoculation (Radelfinger, 1965), seat belt use (Berkowitz & Cottingham, 1960), dental hygiene (Janis & Feshbach, 1953; Janis & Millholland, 1954; Haefner, 1965), smoking (Janis & Terwilliger, 1962; Leventhal & Niles, 1964; Rogers & Mewborn, 1976; Maddux & Rogers, 1983), and venereal disease (Duke, 1967, Rogers & Mewborn, 1976). Unfortunately, operationalizations of fear appeals across empirical studies – and thus levels of fear – show as much diversity as the research topics examined. A common fear manipulation typically includes both information about the severity of a health risk and an individual’s vulnerability to this risk, with higher levels of both severity and vulnerability in the high fear condition. However, in practice, fear-levels have been manipulated with or without vulnerability-information, and with or without variations in the severity of the consequences of the health risk (Sutton, 1982). In addition, vivid pictorial information showing the negative consequences of the health risk, such as tooth decay or tumors, presented in a realm of different ways (pictures, slides, films) was often added to the high fear conditions only, while omitting this type of information in lower fear conditions.





Of course, the postulate underlying the use of these quite dramatic manipulations was that a fear appeal could only be effective if it was strong enough to constitute a drive state. However, the inconsistencies in operationalizations of fear arousal across studies are problematic in several respects. A typical fear manipulation, involving low vulnerability/low severity versus high vulnerability/high severity levels does not allow us to examine whether fear arousal, and the dependent measures of persuasion are affected by an individual's perceived vulnerability to a health risk, the severity of this risk, or both. Similarly, the inclusion of shocking pictorial information in one condition only is problematic, because we can not be certain if persuasion, or levels of fear, are affected by these pictures, or by the vulnerability or severity information in the various conditions of the fear manipulation. In addition, deviations from the typical fear manipulation in which e.g. the main focus is either on severity or on vulnerability, or on shocking pictorial information could be qualitatively different from typical manipulations. This would imply that we can in fact not compare across studies using different manipulations. However, it is impossible to determine whether different manipulations are qualitatively different, since the effects of the various manipulations were usually checked with one measure only, assessing participants' reported fear.

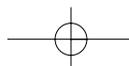
Despite this great variety in research topics and operationalizations of fear, the overall effects of fear appeals on persuasion seem to be quite clear-cut: higher levels of fear are typically associated with more persuasion (for reviews see Sutton, 1982; Boster & Mongeau, 1984). This effect seems to be more pronounced for attitudes and intentions to adopt the recommended behavior than for behavior. Thus, there is quite some empirical evidence that fear appeals are effective in inducing persuasion. Whereas this could be regarded as good news for health educators who use fear appeals on a regular basis, it is not such happy news for the Drive Model and its extensions. The irony is that these models do not predict a direct relation between fear arousal and persuasion; instead they propose mediating mechanisms.

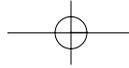


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Both the Drive Model and its extensions predict main effects of fear on persuasion only if the communicator's recommendations are presented immediately after fear arousal, and if they are perceived to be effective in averting the negative consequences of the health threat – or fear – and individuals perceive themselves as able to carry out these recommendations. When the recommendations are seen as ineffective or impossible to carry out, fear is postulated to lead to less, or no persuasion. Although the terms self-efficacy and response efficacy were not used as such in the Drive Model and its extensions, these models in fact do predict fear x efficacy interactions. However, reliable fear x efficacy interactions have only rarely been observed in empirical studies (Rogers & Mewborn, 1976; Maddux & Rogers, 1983; Rippetoe & Rogers, 1987). The lack of reliable interactions between fear arousal and efficacy expectations is quite problematic for the Drive Model and its extensions. In addition, there is not much support for the hypothesis that recommendations will be effective only if they are presented immediately after the arousal of fear (Leventhal, Singer & Jones, 1965; Leventhal & Singer, 1966; Sutton, 1982).

The typically observed main effects of fear on persuasion have also prompted some critics of the Drive Model to reject the curvilinear relation between fear and persuasion that is proposed by the Drive Model and its extensions. In fact, much of the critique regarding the Drive Model has focused on the failure to find evidence for this assumed curvilinear relation between fear and persuasion. Indeed, the evidence for a negative relation between fear and persuasion is scarce. In his meta-analytic review, Sutton (1982) reports two studies in which increases in fear led to decreases in persuasion, as reported by Janis and Feshbach (1953) and by Krisher and colleagues (1973). Particularly the former famous dental hygiene experiment had a tremendous impact on subsequent theorizing and empirical testing, precisely because they reported less conformity with recommendations for higher levels of fear. However, these findings have never been replicated

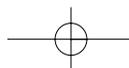


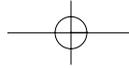


(see e.g. Haefner, 1965; Leventhal & Singer, 1966) and are thus a rarity in fear appeal literature. Still, it is important to note that the lack of evidence for the proposed curvilinear relation between fear and persuasion need not necessarily indicate that the Drive Model's predictions are at fault. Most empirical studies have not induced extreme levels of fear, but instead only low to moderate levels, most likely mainly out of ethical concerns. Therefore, the effects of extreme fear remain unknown.

More unfortunate is the relative void that is observed in empirical evidence for the affective and cognitive processes that are assumed to mediate the effects of fear appeals according to the Drive Model, Janis' family of curves model as well as McGuire's reception-yielding model; these have only rarely been tested. The main assumption of the Drive Model is that acceptance of a recommendation should be reinforced only to the extent that it reduces fear. It therefore seems odd that, even though the postulate of fear reduction is quite central to the predictions made by the Drive Model, it has remained practically untested. The few studies that did test this hypothesis found little support for the relation between fear reduction and persuasion. In one of the rare studies assessing both self-reported and physiological measures of fear at different points in time, Mewborn and Rogers (1979) found no support for this proposed mediating role of fear reduction. Similarly, Hendrick, Giesen and Borden (1975) and Leventhal and Singer (1966) reported findings that challenge the hypothesis that acceptance of a recommendation is mediated by a reduction in fear.

Similarly, only a few studies examined the cognitive processes that are assumed to mediate the effects of fear on persuasion. Some studies examined the effects of fear appeals on the reception of persuasive messages, generally providing no support for McGuire's hypothesis that fear arousal will have detrimental effects of message reception, nor for Janis' assumption that low to moderate fear will enhance message reception



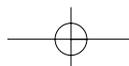


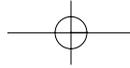
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(Janis & Feshbach, 1953; Janis & Millholland, 1954; Berkowitz & Cottingham, 1960; Janis & Terwilliger, 1962). Only a few studies measured participants' cognitive responses to threatening information, the most intriguing findings being reported by Janis and Terwilliger (1962). In this study, smokers and non-smokers were instructed to think aloud while reading a low or high fear anti-smoking message. The results indicated more verbal manifestations of resistance, more explicit rejection statements and less favorable comments in the high than in the low fear condition. In addition, smokers made fewer statements of explicit acceptance and more statements of explicit rejection than did non-smokers; however, the latter finding was not significant.

Parallel cognitive and affective responses to a fear appeal

In 1970, Howard Leventhal challenged the core assumption of the Drive Model and its extensions, i.e. that emotional arousal is a necessary antecedent of the cognitive processes involved in the adaptation to danger. Instead, his Parallel Response Model (1970) postulates that fear appeals can induce persuasion without evoking a drive state, by affecting the cognitive process of 'danger control'. According to this model the use of fear appeals can give rise to two parallel or independent processes, namely danger control and fear control. Danger control is postulated to involve both a cognitive appraisal of the threat (severity, vulnerability) and possible coping responses (effectiveness of the recommendation), and is assumed to be motivated by an individual's desire to avert danger. On the other hand, fear control is assumed to be motivated by fear arousal and will be primarily aimed at reducing negative emotions evoked by the fear appeal, e.g. by defensive avoidance or minimizing responses. An important assumption of this model is that fear control and danger control processes can occur independently of one another. Hence, danger control can lead to adaptive action regardless of whether a fear appeal actually evokes emotional tension. The distinction between danger and fear control is similar to (though more specific than)



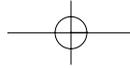


the distinction between problem focused and emotion focused coping made by cognitive stress theory (Lazarus & Folkman, 1984).

Similar to the Drive Model, the Parallel Response Model thus allows for defensive emotional reactions to a fear appeal, which may lead to maladaptive coping responses, as defined in the process of fear control. The important contribution of this model is the central role given to cognitive appraisal processes and the differentiation between emotional and cognitive responses to fear-arousing communications. Its weakness, however, is that it does not specify the processes of cognitive evaluation which precede the action tendencies, and that it offers no explicit hypotheses on how, and under which circumstances the processes of danger control and fear control are elicited, or may interact. Nonetheless, the Parallel Response Model has proven tremendously influential in that it introduced the assumption that cognitive responses to a fear appeal may at times be more important in determining persuasion than affective responses. This reasoning impacted most of the subsequent theorizing on the effect of fear appeals on persuasion.

Cognitive models of fear appeals

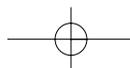
The later theoretical accounts of the effects of fear on persuasion were all heavily influenced by Leventhal's Parallel Response Model, as is evident from their focus on cognitive processes (Rogers, 1975, 1983; Beck & Frankel, 1981). In these models, the notion of fear arousal as a necessary antecedent of persuasion- as theorized by the Drive Reduction Model- is abandoned altogether, and the process of fear control – as defined by Leventhal – is largely ignored. Instead, in line with the leading zeitgeist, these models completed the task of specifying the cognitive processes involved in danger control, guided by the expectancy-value principle that behavior is a function of its expected consequences and the perceived value of these consequences. According to the leading theoretical framework, Protection Motivation Theory (e.g. Rogers, 1975; Rogers & Mewborn, 1976), danger control involves

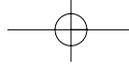


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three specific appraisal processes: (1) an appraisal of one's vulnerability to a health threat, (2) appraisal of the severity of this threat, and (3) an appraisal of the efficacy of the presented recommendations (response efficacy). Following exposure to a fear appeal, these three appraisal processes are postulated to arouse a certain level of 'protection motivation', which will in turn determine the level of persuasion. In a revised version of Protection Motivation Theory, the concept of self-efficacy, that is the person's confidence in his or her ability to enact the protective response, was added (see Bandura, 1977). In addition, following the health belief model (Rosenstock, 1974), the revised model incorporated the perceived costs of performing the adaptive behavior (response costs), as well as rewards associated with maladaptive responses.

To date then, Protection Motivation Theory postulates that protection motivation is defined by threat appraisal and by coping appraisal. Threat appraisal is defined by an appraisal of vulnerability and severity and of the rewards associated with the maladaptive response. Coping appraisal involves the appraisal of response efficacy and self-efficacy, and of the costs associated with the adaptive response. Within threat appraisal and coping appraisal processes, variables are assumed to exert additive effects. For example, threat appraisal should be higher the more vulnerable an individual perceives him/herself to be, and the more severe the health threat, and coping appraisal should be higher to the extent that self-efficacy and response efficacy are higher. An important postulate of Protection Motivation Theory is that the processes of threat appraisal and coping appraisal will exert interactive effects on persuasion. An implication of this postulate is that even the most vulnerable individuals are not expected to adopt protective actions to avert a severe health threat if they perceived the communicator's recommendations to be ineffective in averting the negative consequences of this health threat. This prediction is in fact similar to the expectations defined by the Drive Reduction Model, although the processes postulated to account for these hypothesized effects are very different.

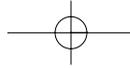




Empirical evidence (2)

There is ample empirical evidence in support of the cognitive revolution in fear appeal theorizing to the extent that the cognitive components defined by Protection Motivation Theory and related theories have typically been found to be related to persuasion. Persuasion is usually higher with higher levels of self-efficacy and response-efficacy (Mewborn & Rogers, 1979; Maddux & Rogers, 1983; Rippetoe & Rogers, 1987). Research has also shown that the vulnerability and severity components of threat appraisal, as defined by Protection Motivation Theory, affect persuasion, although the effects of vulnerability tend to be stronger than the effects of severity (Mewborn & Rogers, 1979; Floyd, Prentice-Dunn & Rogers, 2000; Milne, Sheeran & Orbell, 2000;).

However, similar to the Drive Model, Protection Motivation Theory predicts no direct relation between perceptions of threat (or fear) and persuasion, but predicts that higher levels of vulnerability and severity will induce higher levels of persuasion only to the extent that the recommendations are seen as effective in coping with the health threat. The empirical evidence in support for this predicted interaction can be interpreted as mixed, at best. In a recent review of empirical studies testing Protection Motivation Theory, Rogers and Prentice-Dunn (1997) reported that threat appraisal and coping appraisal interacted in about half of the studies (Rogers & Mewborn, 1976; Kleinot & Rogers, 1982; e.g. Maddux & Rogers, 1983; Self & Rogers, 1990). However, these figures may be overly optimistic, since some of the fear x efficacy interactions observed in these studies were not stable across the health issues investigated (Rogers & Mewborn, 1976; Self & Rogers, 1990). These findings thus imply that at least one half of the studies testing Protection Motivation Theory do not support the postulate that vulnerable individuals will not adopt protective actions to avert a severe health threat if they perceive the communicator's recommendations to be ineffective in averting the negative consequences of this health threat.

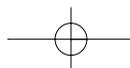


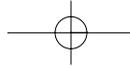
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In addition, particularly damaging to Protection Motivation Theory have been the findings of several studies revealing that increases in the severity of a threat had less impact on those who felt vulnerable than on those who did not (e.g., Berkowitz & Cottingham, 1960; Niles, 1964). Berkowitz and Cottingham (1960) reported in their study on seat-belt use that high threat communications produced increasingly favorable attitudes toward seat belts only among non-drivers. Regular drivers' attitudes toward seat-belt use were equally favorable in low and high threat conditions. Niles (1964) reported similar findings in a study on smoking cessation. Protection Motivation Theory proposes that vulnerability and severity should exert additive effects on persuasion, and thus cannot account for interactions between these variables.

In conclusion, neither the Drive Reduction Model and its extensions, nor Protection Motivation Theory and related theories have stood the empirical tests very well. Moreover, none of these theories have provided insight into the processes underlying fear-related persuasion. These models did, however, provide us with many valuable ideas about factors that may induce, or inhibit, persuasion. The Drive Model's main contribution is likely its quite extensive description of possible defensive reactions to threatening health information. This initial theorizing on defensive processes, and Janis' further description of factors inhibiting persuasion may have been underrated for decades, and have – until recently – hardly ever been tested. Nonetheless, these ideas have remained valuable and contemporary: people do react defensively to threatening information, and the possible interference of these processes in persuasion should be tested.

Leventhal's Parallel Response Model has been very important for fear appeal research in that it explicitly distinguished cognitive from affective reactions to fear appeals, and suggested the possibility that persuasion can be induced without fear, or drive-like reactions. Finally, Protection Motivation Theory (and related expectancy-value theories) made the



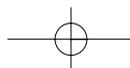


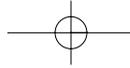
important distinction between vulnerability and severity components in a fear appeal, thus allowing us to test the relative importance of these components in inducing persuasion. Moreover, it has specified which factors related to a recommendation following a fear appeal are likely to affect persuasion: both self-efficacy and response efficacy have proven to be important factors in inducing acceptance of a recommended behavior.

From outcomes to underlying mechanisms: the processing of fear appeals

Even though the value of the past 50 years of fear-appeal research should not be underestimated, it must be noted that, despite the many theories and empirical studies in this area, little is still known about the cognitive and affective processes underlying fear-induced persuasion. Quite possibly, this is (partly) due to the fact that at the time these theories were developed, the techniques for measuring cognitive processes such as attention, reception and elaboration were poor, especially compared to today's standards. Fortunately, times have changed. The rise of dual process models of persuasion such as the Elaboration Likelihood Model (ELM; Petty & Cacioppo, 1986) and the Heuristic-Systematic Model (HSM; Chaiken, 1980, 1987; Eagly & Chaiken, 1993) has allowed us to examine both the extent and the direction of cognitive processes.

Dual process models have proven tremendously influential in providing a framework for assessing to what extent, and under what conditions, the content of – or arguments in – a persuasive communication will affect subsequent persuasion. It is argued that the amount and nature of issue-relevant elaboration of the content of a persuasive message can be depicted along a continuum, and will vary with individual and situational factors. When an individual is both motivated and able to carefully process a persuasive message, 'systematic' or 'central route' processing is postulated to occur.





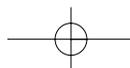
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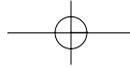
Persuasion will then depend on the quality of the arguments used in the message: strong arguments will lead to more persuasion than weak arguments. On the other hand, when one is not motivated or not able to process the message, 'heuristic' or 'peripheral route' processing is thought to occur. In this case, persuasion will not depend on substantial processing of the content of the message, and the quality of the arguments used in the persuasive message will have no (or less) effect on the individuals' attitude or behavior. Rather, any kind of cognitive, affective or social cue or heuristic may function to produce attitude change (e.g. the number of arguments used in a persuasive message, the source of the persuasive information or emotions evoked by the message).

The extent of message processing

Originally, the focus of dual process models has been on determining which factors affect the depth, or extent, of information processing. To carefully examine the potential effects of fear appeals on the extent of information processing, it is important to separately consider the specific components that usually constitute such an appeal. A fear appeal typically emphasizes both the severity of a health threat as well as participants' vulnerability to that threat. This separation of the perception of threat into a vulnerability and a severity component has first been introduced in the Health Belief Model (see Janz & Becker, 1984), and is also present in Protection Motivation Theory (Rogers, 1975; 1983).

The potential effects of a high vulnerability to a certain health threat on the processing of a subsequent message can be deduced from research investigating the effects of personal relevance of a persuasive communication on message processing. Similar to personal vulnerability, the concept of personal relevance stresses the importance of the communication for the individual. The effects of relevance of a communication on message processing have been studied extensively in dual process theories; higher levels of

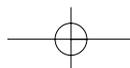


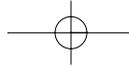


relevance have consistently been found to increase processing motivation, and, thus, elaboration likelihood (e.g. Petty, Cacioppo & Goldman, 1981; for a review, see Johnson & Eagly, 1989). This finding is consistent with the idea of people as cognitive misers, i.e. time-efficient information processors: we process messages increasingly carefully to the extent that the message topic is of higher concern to ourselves. Based on these findings one would predict that stressing one's vulnerability to a certain health risk would, similarly, induce systematic processing of a health communication.

The effects of the severity of the consequences of a certain health threat, the second component of a fear appeal, on the extent of message processing are less clear-cut (see e.g. Baron et al., 1992, 1994; Gleicher & Petty, 1992), possibly due to confounding effects of personal vulnerability information. In most studies the focus is on possible motivational effects of 'fear', and no distinction is made between manipulations of the severity of and vulnerability to a health risk. Thus, it is difficult to draw conclusions on the separate effects of severity. One could argue, however, that under conditions of low vulnerability, stressing the severity of a certain health risk could act as a motivating factor in message processing by increasing the importance of the message. However, a similar effect is not very likely to occur under conditions of high vulnerability, because in this case people would already be motivated to systematically process the message.

The above mentioned reasoning implies that higher levels of threat (vulnerability x severity) in a fear appeal will simply increase systematic of subsequently presented recommendations. In fact, this is what several researchers have argued in the past (Baron et al., 1994; Rogers & Prentice-Dunn, 1997). However, it is important to note that these predictions are based on the postulate that people are motivated to hold correct attitudes (Petty & Cacioppo, 1986). In the next section it will be argued that this postulate may not always be valid.





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The direction of message processing

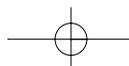
In recent research several instances have been identified under which an individuals' processing goal will be to arrive at a particular – preferred – conclusion, i.e. defense motivated, rather than to arrive at the most accurate conclusion, i.e. accuracy motivated (Pyszczynski & Greenberg, 1987; Chaiken, Liberman & Eagly, 1989; Kruglanski, 1990; Giner-Sorolla & Chaiken, 1997).

It is argued that when an attitude or belief related to a central self-concept is threatened, people's primary goal will be to defend that particular attitude or belief rather than to form 'the most accurate' attitude. In other words, individuals will be defense motivated when processing information that is threatening to a central self-concept. As one's health can be considered to be a central self-concept, this reasoning applies to fear appeals aimed at changing health behavior (also see Chaiken, Giner-Sorolla & Chen, 1996).

Obviously, when a fear appeal informs an individual that his or her health may be in danger, his or her self-concept of health is 'under attack'.

Thus, it is proposed in this thesis that in health education, the use of fear appeals is likely to result in defense motivation.

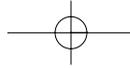
When defense motivation arises, an individual's goal will be to arrive at a particular preferred conclusion, rather than to obtain the most accurate conclusion. Thus, s/he will process information selectively in the way that best supports his or her own beliefs. This means that information that is congruent with a particular belief will be evaluated less critically and judged as more valid than information that is incongruent with this belief (Lord, Ross & Lepper, 1979; Pyszczynski, Greenberg & Holt, 1985; Pyszczynski & Greenberg, 1987; Ditto & Lopez, 1992; Chaiken et al., 1996). In other words: preference-consistent information is processed differently than preference-inconsistent information. Whereas congruent information will be processed with a positive bias, incongruent information will be processed with a negative bias.



When considering the impact of the separate components of a fear message, vulnerability and severity, on the direction of message processing, it is not yet clear from empirical research which (levels) of these two variables will lead to defense motivation. However, based on the importance of personal relevance for message processing, it can be expected that stressing the vulnerability of a health risk will be a sufficient reason to evoke defense motivation, and that the severity of the health risk will be of secondary importance only (Johnson & Eagly, 1989). Specifically, it is expected that stressing the severity of the consequences of a certain risk is not likely to have a threatening effect when an individual does not feel vulnerable to this risk. Moreover, as one's health is seen as a central self-concept, the sole fact that one could be vulnerable to even a minor health risk is likely to evoke some sort of defensive reaction.

A Stage model of the processing of fear arousing information

In predicting the impact of defense motivation on information processing and persuasion following a fear appeal, a Stage model of the processing of fear arousing information is suggested in this thesis, which draws on cognitive stress theory (Lazarus & Folkman, 1984) by introducing the distinction between primary and secondary appraisal. According to the Stage model, individuals exposed to a fear arousing communication have to engage in two types of appraisal, namely (primary) appraisal of the threat outlined in the fear appeal, and (secondary) appraisal of coping strategies available for reducing or eliminating the threat. The introduction of the distinction between threat appraisal and coping appraisal in fear appeal research is in itself by no means new; it is in fact – implicitly or explicitly – present in all theories on the effects of fear appeals (Hovland et al., 1953; Janis, 1967; Leventhal, 1970; Rogers, 1975, 1983). However, the advantage of Stage theory over earlier fear-theories is that it explicitly postulates a temporal

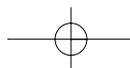


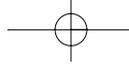
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distinction between the two appraisal processes, as is indicated by the terms primary and secondary appraisal.

Because a fear appeal usually emphasizes the severity of the health threat and individual vulnerability, it threatens the individual's self-concept of being a healthy individual. It should therefore arouse defense motivation, and motivate individuals to try to minimize this threat by scrutinizing the arguments rather critically, searching for inconsistencies and logical errors, and generally downgrading the threat. Thus, the Stage model postulates that a negative processing bias will occur in the primary appraisal process, provided that a fear appeal stresses an individual's vulnerability to a health risk.

However, even biased processing is constrained by evidence and rules of inference (Kunda, 1990). Even though an individual will be motivated to minimize the health risk presented in the fear appeal, this minimizing effort is constrained by the content of the fear appeal, especially if this message is processed systematically. Thus, exposed to a persuasive fear appeal, individuals may have to accept that they personally are at risk. The Stage model of fear appeals proposes that in this case, the processing of the recommendation (secondary appraisal) will be biased as well, but in the opposite direction. Because an action recommendation contains a possible solution to the health risk, it has the potential to moderate the negative emotions and cognitions evoked by the primary appraisal. Consequently, under defense motivation, a recommendation is postulated to be 'maximized'; i.e. to be judged as more valid and to be evaluated less critically, because acceptance of a solution to the health risk will reduce the threat and alleviate negative emotions. In terms of dual process theories this implies that defense motivation will lead to a positive bias in the processing of the action recommendation, and consequently heighten the motivation to accept a solution to a particular threat, regardless of the quality of the arguments to support this recommendation.

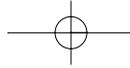




Empirical evidence (3)

In the past decade, several studies have been conducted on the impact of vulnerability on the processing of fear arousing communications. Most of this research has focused on the processing of the fear appeal rather than the action recommendation, and there is now ample evidence that people are more critical of evidence which is highly health threatening than of less threatening evidence. In a study by Kunda (1987) participants were presented with a message in which caffeine consumption was claimed to be related to fibrocystic disease. Participants were then asked to estimate their chance of developing fibrocystic disease within the next 15 years, and to indicate how convinced they were of the link between caffeine consumption and this disease. The vulnerability to the health risk was varied on the basis on self-perception of caffeine consumption, using a median-split procedure. Results showed that high vulnerability participants were less likely to believe in the link between caffeine consumption and fibrocystic disease than low vulnerability participants. However, in a second study, using a less threatening version of the message, no such differences were observed.

In a study by Liberman & Chaiken (1992) a similar paradigm was used, but this study included quite sophisticated cognitive processing measures. In addition, a high and a low threat condition were created. In the low threat condition, the link between caffeine consumption and fibrocystic disease was claimed to be disconfirmed by recent medical research. Participants in this condition were presented with four research reports, of which 3 failed to confirm the link and 1 that confirmed it. In contrast, the high threat version claimed that recent medical research had documented a link between caffeine consumption and fibrocystic disease. This version continued by reporting 4 research reports, 3 of which confirmed the link and 1 failed to confirm it. In both the high and low threat version, methodological weaknesses were embedded in each research report, such as a high subject dropout rate or poorly matched control groups, to allow vigilant participants



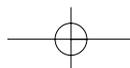
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the opportunity to be critical of the presented information. Similar to findings by Kunda (1987) results showed that high vulnerability participants (i.e. coffee-drinking females) were less likely to believe in the link between caffeine intake and fibrocystic disease, both in response to the low threat and the high threat message. In addition, high vulnerability participants saw significantly more weaknesses in the pro-link than in the anti-link reports, suggesting that they processed the pro-link reports with greater scrutiny than the anti-link reports.

Similar findings were reported by Reed and Aspinwall (1998), using a similar paradigm as Liberman and Chaiken (1992), but adding a self-affirmation condition. In this condition, participants were asked to fill out a questionnaire that affirmed their kindness. It was argued that self-affirmation would reduce defense motivation, and induce more objective processing strategies. Indeed, in this study it was found that high vulnerability participants in the self-affirmation condition showed fewer biases in processing the reports linking caffeine intake with fibrocystic disease than high vulnerability participants whose kindness had not been affirmed. In the high vulnerability self-affirmation condition, participants oriented more quickly to the risk-confirming information, rated this information as more convincing and recalled less risk-disconfirming information at a 1-week follow-up.

A study conducted by Sherman, Nelson and Steele (2000), also using a self-affirmation paradigm, reported that high vulnerability participants rejected a message linking caffeine intake to fibrocystic disease more than did low vulnerability participants. However, self-affirmation significantly reduced biased evaluation of the message among high vulnerability participants, and increased acceptance of the threatening health message.

In a study by Ditto & Lopez (1992, study 2) participants received false feedback on a medical test allegedly measuring a medical condition called TAA deficiency. Participants receiving unfavorable feedback on this test took longer to decide that the test result was complete, were more likely



to retest the validity of the result, cited more life irregularities that may have affected the results, and rated the test accuracy as lower than did participants receiving favorable feedback. In a related study (Ditto & Lopez, 1992, study 3), all participants received the same feedback on the medical test, which was that they had a rare enzyme condition called 'TAA positivity', but this time the consequences of this condition were varied. Whereas some participants were led to believe that this condition had healthy consequences (e.g. less likely to experience pancreatic disease), other were led to believe it had unhealthy consequences (e.g. more likely to experience pancreatic disease). Results of this study showed that participants who were led to believe that TAA positivity had unhealthy consequences cited more life irregularities that could have affected test results, and perceived the test as less accurate than did participants who believed TAA positivity to have healthy consequences.

Thus, there is ample evidence that threatening health information can be subject to a negative processing bias. In contrast, it has never been hypothesized that individuals who are made to feel vulnerable to a health risk will reveal a systematic positive bias in assessing an action recommendation, resulting in motivated acceptance of this recommendation. Consequently, no direct empirical evidence in support for this hypothesis can be found. However, some support for the proposed systematic positive bias can be deduced from studies by Jepson and Chaiken (1992), and Gleicher and Petty (1992).

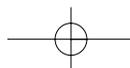
Jepson and Chaiken (1992) reported that participants with chronic fear of cancer detected fewer errors in a message on cancer checkups and listed fewer issue-relevant thoughts than did non-fearful participants. However, fearful participants did agree more with the message. These findings suggest that high fear of cancer led to less processing scrutiny and to motivated acceptance of an action recommendation. Although participants' perceived

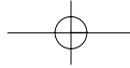


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vulnerability to the health risk was also measured in this study, the effects of this variable on message processing and persuasion were less clear-cut than those of the measure of chronic fear. Gleicher and Petty (1992) also found that moderately to highly fearful participants were more inclined to accept a recommendation aimed at reducing the threat without carefully scrutinizing the message than were low-fear participants. However, their study has a number of features that make it less directly relevant to the Stage model. First, they manipulated expectations with regard to the recommendation by having the source of the recommendation describing the likelihood of success of the program in an introductory sentence (reassurance manipulation) as either very high or rather doubtful. They had no condition without reassurance, which would have provided a more direct test of our hypothesis. In addition, their study did not assess cognitive processing of the persuasive message, which makes it impossible to assess whether the fear-induced acceptance of the persuasive message was caused by heuristic processing or biased systematic processing of the recommendation. Third, in this study the relevance of the fear-message was not varied, but was claimed to be high for all participants.

Thus, there is some empirical evidence that fear may lead to a positive bias in the processing of action recommendations, but little is still known about the nature of the processing strategies underlying this effect – whether it is based on heuristic or systematic processing – or about possible biases in the processing of a persuasive message. In addition, the question to what extent the separate component(s) of a fear-appeal – personal vulnerability to a health risk, severity of the consequences of this risk, or both – evoke this positive bias is still unanswered. This thesis aims to find an answer to these questions.

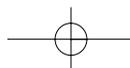


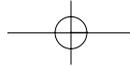


Summary and overview

In this Chapter, a newly developed Stage model of fear appeals has been presented, that provides explicit hypotheses regarding the processing of different parts of a fear appeal. It is proposed that fear-induced persuasion follow a two-stage process, involving the primary appraisal of threatening health information and the secondary appraisal of possible coping resources. According to the Stage model, defensive biases may occur in the primary and the secondary appraisal process when a fear appeal evokes defense motivation. The Stage model thus specifies the processes underlying fear-induced persuasion, in order to clarify the relation between fear appeals and persuasion. A better insight into these underlying processes is necessary, since the classical theories of fear appeals have only received partial empirical support, and have failed to provide an answer to the question how fear appeals work. In the studies reported in this dissertation, three specific issues are addressed: the processing of threatening health information, the processing of reassuring recommendations, and the relation between these two processes and fear-induced persuasion.

In Chapter 2, the processing of threatening health information is examined. Although recent empirical studies have demonstrated that people may react defensively to threatening health messages, several questions remain. Specifically, it is not yet clear from these studies whether these defensive reactions are due to variations in an individual's vulnerability to a health risk, to variations in the severity of this health risk, or to both. In addition, in most of these studies, the reported differences in the processing threatening versus less threatening health messages could reflect either differences in the extent of information processing, or differences in the direction of information processing. Both issues are addressed in the experimental study reported in this chapter.



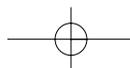


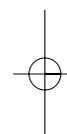
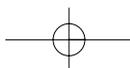
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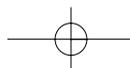
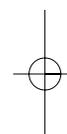
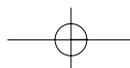
In Chapter 3, the processing of reassuring recommendations following the use of fear appeals is examined. There is some empirical evidence that higher levels of fear induce acceptance of recommendations, however, not much is known about the processes underlying these effects. In addition, the question to what extent the separate component(s) of a fear-appeal – personal vulnerability to a health risk, severity of the consequences of this risk, or both – evoke this increased acceptance is still unanswered. According to the Stage model of fear appeals, higher levels of vulnerability to a health risk will induce a positive bias in the processing of recommendations, leading to higher levels of persuasion, regardless of the quality of the arguments supporting this recommendation. This hypothesis is tested in three experimental studies.

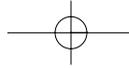
Chapter 4 addresses the relation between primary appraisal, secondary appraisal, and persuasion over time. According to the Stage model, defensive reactions in the primary appraisal process will not interfere with the secondary appraisal process, or with persuasion, due to reality constraints. This hypothesis differs from the assumptions in classical theories of fear appeals, which assumed that defensive reactions to fear appeals were likely to undermine persuasion. In addition, the effects of fear appeals over time are examined, an issue that has received very little empirical attention thus far.

Finally, Chapter 5 summarizes the findings of the empirical studies in this dissertation, presents the theoretical implications of these findings as well as possible directions for future research.







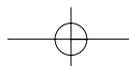


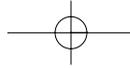
2 Looking for ways to minimize fear appeals: Negative biases in the primary appraisal process

The aim of most health promotion campaigns is to change people's behavior, or, at least, their attitudes toward a certain behavior. In order to motivate people to alter unhealthy habits and adopt healthy lifestyles, health educators quite often resort to the use of fear appeals by presenting people with information that stresses an individual's vulnerability to a health risk, the severity of this risk, or both. In the Netherlands, for example, HIV-prevention campaigns have been directed at increasing adolescents' awareness of the consequences of their own risky sexual behaviors, and at the excuses people often engage in to justify risky behaviors in the past. The aim of these strategies is in fact twofold: (1) to increase people's perceptions of risk, and thus their perceived vulnerability to HIV infection, in order to (2) motivate them to practice safe sex in the future.

However, when presenting an individual with threatening health information, health educators should bear in mind that people are very good at interpreting information about themselves in a self-serving manner. We are typically quite happy to accept good news, positive feedback, or compliments about ourselves, although the latter may cause some uneasiness in certain groups of shy or modest human beings. In contrast, we are much less appreciative and accepting when it comes to bad news, whether it concerns negative feedback on a test measuring our social intelligence or bad news about our health. When it comes to the self, people evaluate information that is consistent with their preferences more positively than they do preference-inconsistent information (Wyer & Frey, 1983; Pyszczynski, Greenberg & Holt, 1985).

Preference-consistent information is not only evaluated differently from preference-inconsistent information, it is also processed in a different way (Pyszczynski & Greenberg, 1987). Information that is congruent with a belief that is central to our identities is typically evaluated less critically and judged as more valid than information that is incongruent with this belief. This differential processing of different types of information may serve an



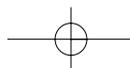


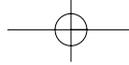
2 Looking for ways to minimize fear appeals: Negative biases in the primary appraisal process

important function: it helps us maintain images of ourselves that we consider important (Steele, 1988; Solomon, Greenberg & Pyszczynski, 1991; Aronson, Cohen & Nail, 1999).

The differential processing and evaluation of information that is consistent or inconsistent with central self-images has been incorporated in the Multiple-Motive Heuristic-Systematic Model of persuasion (Chaiken, Liberman & Eagly, 1989; Chaiken, Giner-Sorolla & Chen, 1996). This model describes a defense motivation goal that may coexist with or supplement accuracy goals, i.e. the motivation to hold correct attitudes (Chen & Chaiken, 1999). Defense motivation is defined as the desire to hold attitudes and beliefs that are congruent with existing self-definitional attitudes and beliefs. Self-definitional beliefs are attitudes and beliefs that are closely tied to the self, including social identities such as gender, ethnicity and religion, attitudes supporting one's material vested interests, and beliefs about personal attributes such as intelligence, social sensitivity, and healthiness (Chaiken, Giner-Sorolla & Chen, 1996). It is postulated that the defense motivated individual aims to preserve the self-concept and associated world views, and thus processes information selectively, in a way that best satisfies defense concerns.

As one's self-concept of health can be considered central to the self-image of most, most people will be motivated to sustain the belief of being a healthy individual. Because fear appeals threaten this concept, it can be expected that people will be motivated to evaluate this information more critically, and evaluate it as less valid than information confirming that one is healthy. In terms of the Multiple-Motive HSM, this means that people will be defense motivated when presented with a fear appeal in which one's self-concept of health is threatened. Thus, when presented with threatening health information, people will not only prefer one type of conclusion – I am healthy – over the other – I may have a health problem –, they will also process the information that is presented to them in a biased, self-serving manner.

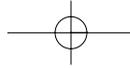




There is quite some empirical evidence that threatening health messages may be subject to defensive reactions: threatening messages seem to evoke more criticism, less praise, and may be more carefully scrutinized than non-threatening messages (Janis & Terwilliger, 1962; Jemmot, Ditto & Croyle, 1986; Kunda, 1987; Ditto & Lopez, 1992; Liberman & Chaiken, 1992; Sherman, Nelson & Steele, 2000). However, distinct theoretical explanations have been proposed for the observed difference in the processing of preference-consistent versus preference-inconsistent information. Whereas some argue that the differential evaluation of preference-consistent and preference-inconsistent information reflects differences in the quantity of information processing (Ditto & Lopez, 1992), others contend they reflect differences in the quality of information processing (Kunda, 1990). According to the quantitative perspective (Kruglanski, 1990; Ditto & Lopez, 1992), motivations may affect judgment by affecting the depth of processing, with preference-inconsistent information being more extensively processed than preference-consistent information. In terms of dual-process theories (e.g. Petty & Cacioppo, 1986), this perspective proposes that preference-inconsistent information will be processed more systematically than preference-consistent information.

The qualitative perspective, on the other hand, argues that the processing of preference-inconsistent information differs not only in quantity, but also in quality (Pyszczynski & Greenberg, 1987; Kunda, 1990). Pyszczynski & Greenberg (1987) argue that different hypotheses are generated for testing preference-consistent information as compared to preference-inconsistent information, and in addition, different rules of inference are used to evaluate these different hypotheses. In terms of dual process theories (Chaiken, Giner-Sorolla & Chen, 1996), this implies that preference-inconsistent information is subject to biased processing strategies more so than preference-consistent information.

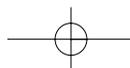
Empirical evidence for the quantitative and qualitative perspective of motivated reasoning is not clearly supportive of either perspective, mainly

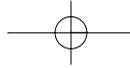


2 Looking for ways to minimize fear appeals: Negative biases in the primary appraisal process

because of difficulties in providing a clear distinction between quality and quantity of processing hypotheses, or because of the absence of cognitive processing measures. For example, Ditto and Lopez (1992) argue that their findings support a quantitative perspective; however, their findings could just as easily be interpreted as supporting the qualitative perspective. Liberman and Chaiken (1992), who did assess cognitive processing of the health message, reported that high vulnerability participants saw significantly more weaknesses in messages confirming a link between caffeine intake and fibrocystic disease than in the reports disconfirming such as link. Again, however, these findings could reflect either selectively applied greater scrutiny (quantitative perspective) or differences in the generation of hypotheses or evaluation of the hypotheses with respect to the different messages (qualitative perspective).

Also problematic about the empirical evidence concerning the differential evaluation of more threatening versus less threatening health messages is the fact that it is not clear which type of threatening health messages evoke defensive reactions, and which do not. Most of the empirical studies conducted in this research area manipulated participants' vulnerability to a health risk, but not the severity of this risk. Typically, the health risk was portrayed as a serious condition, such as TAA-deficiency (Jemmot, Ditto & Croyle, 1986; Ditto & Lopez, 1992) or fibrocystic disease (Kunda, 1987; Liberman & Chaiken, 1992; Reed & Aspinwall, 1998; Sherman, Nelson & Steele, 2000). Although the level of threat of the health risk was varied in some studies, this was done by providing either strong or weak evidence for the link between this health risk and caffeine consumption (Liberman & Chaiken, 1992; Reed & Aspinwall, 1998). Whereas this manipulation does affect threat, it does not manipulate the severity of the health risk, but rather the level of evidence for participants' vulnerability to the health risk. Ditto and Lopez (1992, study 3) manipulated the consequences

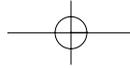




of the health condition by providing participants with information that the condition had either healthy or unhealthy consequences. In other words, they did not vary the level of severity of the health risk, but the presence of absence of a health risk. Hence, these – otherwise very intriguing – studies do not provide an answer to the question whether high vulnerability participants' defensive reactions to the health threat would similarly have been observed if the health risk were portrayed as less severe. Similarly, it does not answer the question which – low, moderate or high – levels of severity evoke defensive reactions, and which do not.

There is some evidence, however, that higher levels of the portrayed severity of a certain health risk evoke more defensive reactions. In a study by Janis and Terwilliger (1962), a high-fear version about the negative health consequences of smoking was found to evoke more criticism and less praise than the low fear message. The vulnerability to the health risk – measured on the basis of self-perception – also affected reactions to the health messages: high vulnerability participants made fewer statements of explicit acceptance and more statements of explicit rejection of the health messages than did low vulnerability participants, although the latter finding was not significant. Kunda (1987) also found that high vulnerability participants were less likely to believe in a purported link between caffeine consumption and fibrocystic disease than low vulnerability participants. However, in a second study, using a less threatening version of the health message, no such differences were observed.

To summarize, there is ample evidence that people react defensively to health messages if they are led to believe that they are vulnerable to the presented health risk and if this health risk is portrayed as severe. There is also some evidence that higher levels of the severity of the portrayed health risk evoke more defensive reactions than do lower levels of this health risk. More research is needed, however, regarding the effects of the severity of



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health messages on information processing and defensive reactions. In addition, little is known about the differences in the nature of the processing strategies used for threatening versus less threatening health messages: are more threatening health messages merely processed more extensively, or are they processed in a qualitatively different way than less threatening versions of health messages?

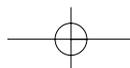
Experiment 2.1

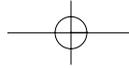
The aim of this experiment was twofold: (1) to determine to what extent variations in the vulnerability to a health risk and variations in the severity of this risk evoke differences in the processing of health information, and (2) whether differences in the processing of health messages reflect qualitatively or quantitatively distinctive processing strategies. To address these questions, we manipulated both the vulnerability to a health risk (between participants) and the severity of this risk (within participants). To assess the cognitive processing of health messages, a method similar to the one used by Liberman & Chaiken (1992) was used, assessing both recall and cognitive responses to the various health messages.

Method

Participants and design

One hundred and two male and female students at Utrecht University participated in the 30-minute experiment in exchange for Fl. 15,- (approximately \$6). Vulnerability to the health risk was manipulated between participants, by providing participants with false feedback on a test allegedly measuring their vulnerability to stress, indicating that their vulnerability to stress was either quite low or quite high. The severity of the consequences of the health risk was varied within participants: all participants were instructed to read 4 articles purportedly reporting research results on the relation between stress and illness. In two out of four articles, the consequences of stress were made out to be quite mild, in the remaining two articles, the consequences of stress were made out to be very severe. The four articles were presented to participants in random order. The experiment thus consisted of a 2 (high versus low vulnerability) x 2 (low versus high severity) design, with the severity of the consequences of stress measured as a within participants variable (2 mild versus 2 severe articles).



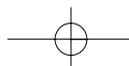
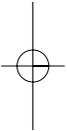
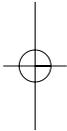


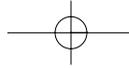
Independent Variables

Vulnerability to the health risk (low, high) was manipulated by giving participants false feedback from a test allegedly measuring their risk of developing stress-related health problems. This risk was described as either rather low or fairly high. Severity of the consequences of the health risk (low, high) was manipulated within participants: all participants were presented with 2 research reports in which the consequences were presented as mild and 2 research reports in which the consequences were presented as severe. The varying levels of severity in the research reports were assessed in a pilot study.

Procedure

Participants were told they would be participating in a survey on stress and health, for which they would have to fill out a questionnaire and give their opinion on some texts. The experiment was fully computerized and conducted individually. In the introduction, a cover text was presented in which participants were told that a new method had recently been developed to measure an individual's chance of developing stress-related illnesses within the next 10 years, called the 'Chicago Stress Vulnerability Inventory (CSVI)'. The measure was said to consist of a simple questionnaire that had been translated into the Dutch language. It was mentioned that the CSVI had proven to be unrelated to people's own perceptions of stress vulnerability. After reading this text, participants were asked to fill out the CSVI-questionnaire, consisting of 45 items that were copied from neuroticism and introversion-extraversion scales. Participants then received bogus feedback on their computer screens about their CSVI scores. Participants were told that the risk that they would develop stress-related illnesses at some point in the future was either rather low or quite high. Next, severity of the health consequences of stress was manipulated within participants by presenting all participants with four research reports on the health consequences of stress. In two out of four reports, evidence was presented that the consequences of stress vulnerability were quite harmless (e.g. fever or cold hands and feet), whereas in the other two reports, evidence was given that the consequences of stress vulnerability were quite severe (e.g. stomach ulcers or heart disease). To give participants the opportunity to criticize the reports, methodological weaknesses were added to each report in the last paragraph, (following Liberman & Chaiken, 1992), such as poorly matched control groups, a high subject dropout rate in a longitudinal study, and potential confounds (e.g. patients with stress-related illnesses smoked more cigarettes). Following these manipulations, participants were asked to answer questions measuring





2 Looking for ways to minimize fear appeals: Negative biases in the primary appraisal process

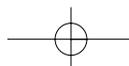
their general recall of the 4 reports, as well as specific recall questions on the methodological weaknesses of each report (Appendix 1). Furthermore, participants were asked to write down for each report to what extent they thought it provided evidence that the consequences of stress are severe (directed thought-listing task).

Manipulation checks

The vulnerability manipulation was assessed by 6 items on a 7-point scale measuring participants' perceived vulnerability to stress. Examples are: 'The chance that I will develop stress related health problems is high' and 'Due to my sensitivity to stress I am more prone to stress-related health problems' (Alpha = .93). The within participants severity manipulation was assessed by having participants rate on a 7-point scale how severe and damaging the health consequences of stress were in each research report (mean Alpha = .93). Scores for the two 'mild' reports were compared to scores for the two 'severe' reports. Furthermore, to control for possible differences in quality of the four research reports, participants' evaluation of the four research reports was measured with 4 items on a 7-point scale. Participants were asked to write down for each research report how good, reliable, interesting and important the report was (mean Alpha = .84).

Dependent Measures: cognitive processing

To assess cognitive processing, two recall-tasks and one thought-listing task were administered relating to all four research reports, after participants had read all articles. The directed recall-tasks were constructed following Liberman & Chaiken (1992). For each report, one recall question concerned general recall of the information in the message, and another concerned recall of the methodological weaknesses in the report (see Appendix 1). An example of a general recall question is 'Were there any between group differences on stress vulnerability in the study?' An example of a weaknesses-recall question was 'Can you remember any details about the control group? If so, which?'. In the thought-listing task, participants were asked to write down for each research report to what extent they thought it indicated that the consequences of stress vulnerability were severe. These thoughts were categorized by two independent raters on valence and on specific content, resulting in 7 categories for each report (mean Kappa = .81; all interrater-reliabilities were >.70). Two categories referred to explicit thoughts about the severity of the consequences of stress vulnerability. In the category severe, all thoughts on these consequences being severe were included (mean Kappa over 4 reports = .78).



In the category harmless, all thoughts on these consequences being harmless were included (mean Kappa over 4 reports = .86).

Two categories included references to the personal relevance of the consequences of stress. In the category relevant, all references to the consequences of stress being personally relevant were included (mean Kappa = .80). In the category not relevant, all references to the consequences of stress being not personally relevant were included (mean Kappa = .80).

Two categories referred to the relation between stress and health complaints. In the category acceptance, all thoughts were included that referred to the acceptance of this relation (mean Kappa = .78). In the category rejection, all thoughts were included that referred to the rejection of a relation between stress and health complaints (mean Kappa = .75).

The remaining category (critical comments) included all negative thoughts on methodological issues, and other critical comments on the validity of the research presented (mean Kappa = .83).

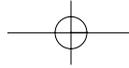
Results

Manipulation checks

To assess the effectiveness of the vulnerability manipulation, an analysis of variance was conducted on the perceived vulnerability of the consequences of stress, revealing a main effect of vulnerability, $F(1,100) = 4.38$, $p < .05$; vulnerability was perceived as higher in the high vulnerability condition ($M=3.40$) than in the low vulnerability condition ($M=2.86$).

To assess the effectiveness of the within participants severity manipulation, an analysis of variance was conducted with vulnerability as an independent factor (high versus low) and the severity of the consequences of stress as a within participants variable (2 mild versus 2 severe researches). This analysis yielded a severity main effect, $F(1,100) = 42.43$, $p < .001$, indicating that the severe research reports were perceived as more severe ($M=4.74$) than the mild research reports ($M=3.89$). No effect of vulnerability was observed, and no interaction.

On participants' evaluation of the quality of the research reports, an analysis of variance was again conducted with vulnerability as an independent factor (high versus low) and the severity of the consequences of stress as a within participants variable (2 mild versus 2 severe researches). No effects of vulnerability or severity, and no interaction was observed (M over research reports = 4.34), demonstrating that there are no qualitative differences between the research reports.



2 Looking for ways to minimize fear appeals: Negative biases in the primary appraisal process

Dependent measures: cognitive processing

Recall

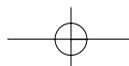
Analyses were conducted with MANOVA's, with vulnerability as an independent variable (high versus low) and the severity of the research reports as a within participants variable (2 mild versus 2 severe reports). All means range from 0 (no recall) to 1 (perfect recall). A MANOVA on recall of general knowledge about the various reports revealed a marginally significant effect of vulnerability to the health risk, $F(1,100) = 3.18$, $p < .10$; when vulnerability was high, participants recalled more general information in all research reports ($M = .77$) than when vulnerability was low ($M = .69$). No severity effects were observed, and no interaction.

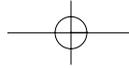
Regarding recall of methodological weaknesses in the presented research reports, a main effect of severity was observed, $F(1,99) = 21.85$, $p < .001$; when the consequences of stress were presented as severe in the research report, participants had a better recall of the methodological weaknesses in the report ($M = .72$) than when these consequences were presented as mild ($M = .51$). No vulnerability or interaction effects were observed.

Thought-listing

Analyses on the cognitive responses were conducted with MANOVA's, with vulnerability as an independent variable (high versus low) and severity of the research reports as a within participants variable (2 mild versus 2 severe reports). Considering that only very few participants listed more than one thought per category, it was decided to simply code all thoughts as 0 or 1 (no thoughts versus one or more thoughts). To control for possible effects of recall of general information or recall of methodological weaknesses in the four research reports on the thoughts listed, the recall measures were entered as covariates in each analysis concerning cognitive responses.

On thoughts referring to the consequences of stress being severe, a main effect of severity was observed, $F(1,96) = 7.22$, $p < .01$, indicating that more thoughts about the consequences of stress being severe were listed about the severe research reports ($M = .35$) than about the mild reports ($M = .22$). No effects of vulnerability or recall were found. On thoughts referring to the consequences of stress being harmless, a main effect of severity was again observed, $F(1,96) = 46.94$, $p < .001$, indicating that more thoughts about the consequences of stress vulnerability being harmless were listed about the mild research reports ($M = .40$) than about the severe reports ($M = .14$). No effects of vulnerability or recall were found.





With respect to thoughts indicating that participants felt vulnerable to the health risk, no effects of severity or vulnerability were observed. On thoughts indicating that participants saw themselves as not vulnerable to the health risk, a main effect of vulnerability was observed, $F(1,96) = 6.29$, $p < .05$. When vulnerability was high, participants more often rejected their vulnerability to the consequences of stress ($M = .12$) than when vulnerability was low ($M = .05$). No further effects were found.

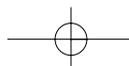
Regarding thoughts referring to the acceptance of a relation between stress and health complaints, a main effect of severity was observed, $F(1,96) = 4.68$, $p < .05$, indicating that participants more often accepted the existence of a relation between stress and health complaints when these consequences were portrayed as mild ($M = .48$) than when they were portrayed as severe ($M = .39$). No effects of vulnerability or recall were observed on this variable.

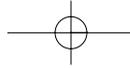
On thoughts referring to a rejection of a relation between stress and health complaints, a main effect of severity was again observed, $F(1,96) = 56.84$, $p < .001$. When the consequences of stress were presented as severe, participants more often rejected the relation between stress and health complaints ($M = .35$) than when these consequences were presented as mild ($M = .09$). In addition, a main effect of vulnerability was observed, $F(1,96) = 4.31$, $p < .05$, indicating that when vulnerability to the health risk was high, participants more often rejected the existence of the stress-health complaints relation ($M = .26$) than when vulnerability was low ($M = .19$). No further effects were found.

With respect to thoughts containing critical comments about the severity messages, a main effect of severity was again observed, $F(1,97) = 6.07$, $p < .05$. When the consequences of stress were presented as severe, more critical comments on the validity of the research were made ($M = .43$) than when these consequences were presented as mild ($M = .33$). However, when controlling for recall of the methodological weaknesses in the reports, this effect disappeared.

Discussion

The present findings suggest that both an individual's vulnerability to a health risk and the portrayed severity of this risk can affect the processing of health messages. Participants – in both high and low vulnerability conditions – were more critical of messages in which the consequences of stress

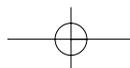


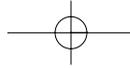


2 Looking for ways to minimize fear appeals: Negative biases in the primary appraisal process

were portrayed as severe than of messages in which these consequences were made out to be mild. The higher scrutiny for the severe consequences-messages as compared to mild consequences-messages is evident from both recall of specific information in the research reports and from the cognitive responses to these reports. When the consequences of stress were presented as severe, participants had a better recall of the methodological weaknesses in the reports – but not of the general information in these reports – than when these consequences were presented as mild. The severe research reports were also found to elicit more cognitive responses criticizing the methodology of these reports. However, the effects of severity on these cognitive responses were found to be mediated by a better recall of weaknesses in the severe as compared to the mild reports. Furthermore, participants more often rejected the existence of a relation between stress and health complaints when the consequences of stress were made out to be severe rather than mild, and, conversely, more often accepted a relation between stress and health consequences when these consequences were made out to be mild. The latter effects are not caused by different qualities of the research reports, as is evident from the similar evaluations of both severe and mild research reports.

Thus, higher levels of severity of the consequences of a health risk seem to lead to a higher scrutiny of the health messages: participants not only had a better recall of the methodological weaknesses in the severe reports, they also more often rejected the existence of a relation between stress and health when the consequences of stress were presented as severe. It is interesting to note that participants did not minimize (Hovland et al., 1953) the severity of the consequences of stress more often when these consequences were presented as severe rather than mild: more thoughts concerning the severity of the consequences of health risk were listed when these consequences were portrayed as severe rather than mild. Instead, participants were more critical of the relation between cause (stress) and effect (health

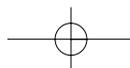


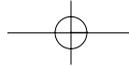


consequences), or of the validity of the message in which this relation was addressed, but not of the severity of the consequences itself. These findings are similar to findings in a study by Janis and Terwilliger (1962) in which a high threat message on the negative consequences of smoking evoked more criticism and less praise than a low threat message.

Although higher levels of vulnerability to the health risk were found to induce a more careful scrutiny of the general information in the health messages, the findings on participants' cognitive responses suggest that this scrutiny may not have been totally objective. The findings on recall of the general information by itself would suggest that high vulnerability participants systematically processed all research reports, more so than low vulnerability participants did. High vulnerability participants had a slightly better recall of the general information in the messages than did low vulnerability participants (although the means for both low and high vulnerability participants are quite high). This finding is in accordance with usually observed relevance-effects on message processing, with higher levels of relevance inducing a higher motivation for systematic processing (Johnson & Eagly, 1989).

The findings on participants' cognitive responses suggest that, even though high vulnerability participants systematically processed the health information, they tended to process all messages in the direction of one favored conclusion (i.e. with a negative bias). When vulnerability was high, participants more often rejected the existence of a relation between stress and health complaints than when vulnerability was low. This effect was observed for all research reports, regardless of the portrayed severity of the consequences of the health risk. These findings are very much in line with findings in earlier studies by Kunda (1987) and Liberman and Chaiken (1992) in which high vulnerability participants were less likely to believe in a link between caffeine intake and fibrocystic disease. In addition, in the present study, high vulnerability participants more often rejected the personal





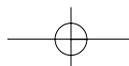
2 Looking for ways to minimize fear appeals: Negative biases in the primary appraisal process

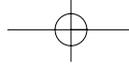
vulnerability of the health risk than did low vulnerability participants, which may be a reactance-like response to the vulnerability-manipulation. This response is quite similar to – although less creative than – reactions following a negative test result reported by Ditto and Lopez (1992). In these studies, participants who had received unfavorable feedback on a medical test allegedly measuring a rare enzyme condition, showed evidence of various defensive reactions, such as rating the test results as less accurate, more often conducting replications of the test, and citing more life irregularities that may have affected the test result than did participants who had received favorable feedback.

Quality versus quantity of processing

In the current study, participants were found to process the health messages more critically when they were vulnerable to the health risk than when they did not feel vulnerable, and when the health risk was presented as severe rather than mild. But were these processing differences caused by differences in the depth of processing, by differences in the quality of processing, or by both?

If the differences in processing were solely caused by differences in the depth of processing, the effects of severity and vulnerability on participants' cognitive responses would – ideally – have to be mediated by their recall of message content. For, in this case, more critical cognitive responses to the research reports would be a result of more elaborate systematic processing of the (methodological weaknesses in the) research reports, which would have to be evident in their recall of the content of these reports. This is exactly the pattern observed on participants' critical thoughts concerning the validity of the research reports. The severe research reports elicited more critical thoughts than the mild research reports, however, this effect was found to be mediated by participants' better recall of the methodological weaknesses in the severe as compared to the mild research reports. These findings suggest

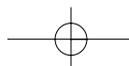


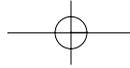


that, indeed, individuals process health information more extensively when it contains severe, rather than mild, health consequences. These findings provide support for the hypothesis that more severe health messages are processed more systematically than less severe messages.

Participants also more often rejected the existence of a relation between stress and health complaints when these complaints were made out to be severe rather than mild. However, in this case, this severity effect was not mediated by recall of either general message content or of methodological weaknesses. In addition, it is not likely that these findings can be attributed to either differences in the quality of the severe versus the mild research reports or to differential expectancies regarding the potential consequences of stress. Of course we can not rule out the possibility that these findings are caused by some unknown aspect of the different health messages that was not captured by the recall-measures. Nonetheless, the findings suggest that the quantity of processing account (Ditto & Lopez, 1992) may not be sufficient in explaining the differential evaluation of preference-inconsistent information. Rather, it seems that participants were more critical of the more severe research reports, regardless of the actual weaknesses in these reports. Therefore, these findings would be more consistent with a qualitative perspective, which suggests the use of different hypothesis testing strategies as well as differential evaluation of the evidence in favor of these hypotheses (Pyszczynski & Greenberg, 1989; Kunda, 1990).

More direct evidence in favor of the qualitative perspective comes from the effects of vulnerability on participants' cognitive responses. High vulnerability participants more often rejected the existence of a relation between stress and health complaints than did low vulnerability participants, regardless of the severity of these complaints. High vulnerability participants were also found to have a better recall of the general information in all research reports, but not of the methodological weaknesses in each report.





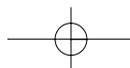
2 Looking for ways to minimize fear appeals: Negative biases in the primary appraisal process

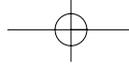
Although these findings suggest the use of more systematic processing strategies with higher levels of vulnerability, they do not indicate a more critical evaluation of the (lack of) quality of the health messages.

In addition, the depth of processing of the health messages was unrelated to the main effect of vulnerability on the rejection of a relation between stress and health. These findings can not be explained by a quantity of processing account (Ditto & Lopez, 1992), because this account proposes that high vulnerability participants' more negative evaluation of the health messages will be due to more intensive processing of the methodological weaknesses in the various health messages. Instead, participants who felt vulnerable to the health risk more often rejected the presented evidence in the research reports in favor of the existence of a relation between stress vulnerability and health complaints, regardless of the severity of these health complaints, and regardless of the perceived quality of the research reports. Together, these findings strongly suggest that low and high vulnerability participants differentially evaluated the evidence in favor of a relation between stress and health, which is very much in line with a qualitative account of differences in processing (Pyszczynski & Greenberg, 1989; Kunda, 1990). When participants felt vulnerable to the health risk, they were less likely to believe in a link between their vulnerability and actual health complaints, regardless of the evidence presented in favor of such a link. These findings support the hypothesis that high vulnerability to a health risk may evoke defense motivation, leading to a negative bias in the processing of threatening health messages.

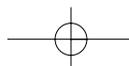
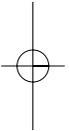
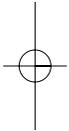
Conclusions

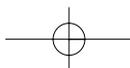
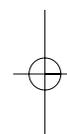
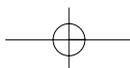
The presented findings suggest that both an individual's vulnerability to a health risk and the portrayed severity of this risk affect the processing of health messages. Whereas previous studies examining the processing of threatening health messages typically manipulated an individual's

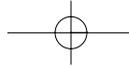




vulnerability to a health risk, but not the severity of this risk, in the current experiment both vulnerability and severity were manipulated. The findings of this study suggest that health messages in which the consequences of a health risk are made out to be quite severe are processed more systematically, and evaluated more negatively than messages in which these consequences are presented as quite harmless. In addition, a high vulnerability to a health risk seems to evoke a systematic bias in the processing of health messages, and, consequently, a more negative evaluation of these messages as compared to low vulnerability participants.



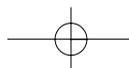


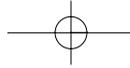


3 Looking for the bright side in recommendations: Positive biases in the secondary appraisal process

People are quite creative when dealing with threatening information. In the previous chapter it was argued that people can have a realm of defensive reactions to the threatening information in a fear appeal, such as an overly critical scrutiny of the arguments in the health message and the downgrading of the severity or relevance of the threat. This means that the information that is supposed to make people more conscious of the seriousness and relevance of a potential health problem may not be interpreted as was originally intended by health educators. It may also mean that the motivating effect of fear appeals on the processing of subsequent recommendations, and on persuasion, may not be as great as planned. If a health threat will be downplayed rather than 'objectively' evaluated on many occasions, will a fear appeal still have the potential to motivate people to accept recommendations and change unhealthy behaviors? In the current chapter, an answer to this question is sought by examining the effects of a fear appeal on the processing of action recommendations, and consequently, on persuasion.

According to all the leading theoretical models on fear appeals (Hovland et al., 1953; Leventhal, 1970; Rogers, 1983) the answer to this question would be that defensive reactions to a fear appeal will have detrimental effects on persuasion. The Drive Model postulates that self-protective defensive mechanisms in response to – especially high levels of – fear, such as minimizing responses, defensive inattention, and defensive avoidance have the potential to seriously undermine the effectiveness of fear appeals (Hovland et al., 1953). In fact, the proposed curvilinear relation between fear and persuasion is based on the postulate that strong fear appeals are especially likely to evoke defensive reactions, leading to decreased persuasion. In addition, strong fear appeals are assumed to have the potential to motivate the recipient to adopt wishful reassuring beliefs, which are also postulated to lead to decreased acceptance of recommendations. The Parallel Response Model (Leventhal, 1970) distinguishes the cognitive process of danger control from the affective process of fear control. Defensive reactions like



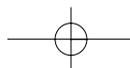


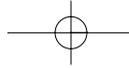
3 Looking for the bright side in recommendations: Positive biases in the secondary appraisal process

the minimizing of a threat presented in a fear appeal are postulated to be part of fear control processes, which are motivated by an individual's desire to reduce negative emotions. More importantly, however, fear control processes are postulated to lead to maladaptive coping responses. Since fear control and danger control can occur independently, these maladaptive coping responses per se need not interfere with adaptive responses. However, if a health threat is perceived as less serious or less relevant as a result of defensive processing of a fear appeal, this will also affect the process of danger control, resulting in a decreased perception of threat, ultimately leading to less persuasion.

Similarly, Protection Motivation Theory (Rogers, 1983) postulates that higher levels of perceived threat will induce higher levels of persuasion, provided that the recommendation is seen as effective and self-efficacy is perceived as high. Consequently, if a health risk is perceived as less threatening as a result of defensive mechanisms, individuals are expected to be less motivated to adopt recommendations.

Compared to the earlier theories on fear appeals, the Stage model of fear appeals that is presented in this thesis proposes divergent hypotheses regarding the effects of defensive reactions to fear appeals on the processing of subsequent recommendations, and on persuasion. It is postulated that, even though in the primary appraisal process defense motivated people will try to minimize the threat portrayed in the fear appeal, they will still be constrained in their minimizing efforts (Kunda, 1990). Obviously, even biased processing is constrained by evidence and rules of inference (Festinger, 1957; Pyszczynski & Greenberg, 1987). People do not process information in a void, and reality places constraints on people's efforts to alter their beliefs. If, for example, in a fear appeal strong evidence is presented that an individual is vulnerable to a serious health risk, this individual will be motivated to process this information in a biased way, but s/he can not discard the information altogether.

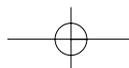


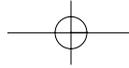


Hence, even under defense motivation, people will still have a sense of reality. In fact, it is quite likely that people may not even be aware of the fact that they processed a fear appeal in a biased way, instead, they may have been convinced they were motivated to have an accurate perception of the facts (Petty & Wegener, 1999). The presence of defensive motives need not imply the absence of accuracy motives, both motives will often co-occur (Chen & Chaiken, 1999).

Thus, people may eventually have to accept that they are personally at risk, even if they processed a fear appeal in a biased way. According to the stage-model of fear appeals, in this case the processing of the recommendation (secondary appraisal) will be biased as well, but in a positive direction. In contrast with a fear appeal, which contains preference-inconsistent information concerning a health threat, an action recommendation contains a possible solution to this health threat, which can be expected to be preference-consistent information. For, an action recommendation has the potential to moderate the negative emotions and cognitions evoked by the primary appraisal. In simpler words, an individual who is vulnerable to a certain health risk may experience less negative emotions, and have less worries about the health risk when there is a solution to this risk than when there is not. Thus, under defense motivation, a recommendation is expected to be 'maximized'; i.e. to be judged as more valid and to be evaluated less critically, because acceptance of a solution to the health risk will reduce the threat and alleviate negative emotions. In terms of dual process theories this implies that defense motivation will lead to a positive bias in the processing of the action recommendation, and consequently heighten the motivation to accept a solution to a particular threat, regardless of the quality of the arguments to support this recommendation.

There is some evidence that highly threatening health messages may induce motivated acceptance of action recommendations (Jepson & Chaiken, 1990;

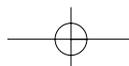




3 Looking for the bright side in recommendations: Positive biases in the secondary appraisal process

Gleicher & Petty, 1992). However, little is still known about the nature of the processing strategies underlying these effects. The acceptance of recommendations regardless of the quality of the supportive arguments could indicate the use of either heuristic processing strategies or biased systematic processing strategies. In addition, the question to what extent the separate component(s) of a fear-appeal – the personal vulnerability to a health risk, the severity of the consequences of this risk, or both – evoke acceptance of recommendations is still unanswered. The present thesis aims to examine the effects of different levels of fear/threat on the processing of an action recommendation and on persuasion in detail. More specifically, the hypothesis is tested that the use of fear appeals may lead to a positive bias in the processing of a subsequent action recommendation. In this chapter, three studies are reported in which the personal vulnerability and the severity of a health threat are varied, in order to assess how these two variables separately as well as together affect message processing and subsequent persuasion. The quality of the arguments contained in the action recommendation is varied to identify message-processing effects. Furthermore, a thought-listing measure is added as a detailed and specific measure of message processing. The main dependent variables are measures of persuasion (i.e. attitudes, intentions and behavior).

It is hypothesized that under conditions of high vulnerability to a health threat, individuals will be defense motivated, and prone to have a positive perception of the action recommendation. Consequently, high vulnerability to a health threat is expected to evoke a systematic positive bias in the processing of an action recommendation, which will be evident from participants' cognitive responses. In particular, the cognitive responses of high vulnerability participants are expected to both show differentiation in the evaluation of strong and weak arguments (indicating systematic processing), and a more positive overall evaluation of the message than under conditions of low vulnerability (indicating a positive processing bias). This positive response



tendency will subsequently result in increased persuasion, regardless of the quality of the arguments supporting the recommended action.

Experiment 3.1

Method

Design and participants

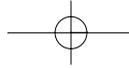
The hypotheses concerning the effects of fear appeals on message processing and persuasion were tested in a 2 (vulnerability) x 2 (severity of health consequences) x 2 (argument quality in the action recommendation) factorial design. A total of 184 male and female students at Utrecht University received Fl. 10,- (\$5) for participating in the experiment.

Procedure

Participants were told that they would be completing a survey on stress-related health problems. This survey would contain questionnaires as well as texts. First, participants' self-perceived vulnerability to stress was measured. This item was presented in between filler-items. Next, severity of the health consequences of stress was manipulated by presenting participants with one of two different texts on the health consequences of stress. In the low severity condition these consequences were described as very mild (e.g. fever or cold hands and feet), whereas in the high severity condition consequences were made out to be quite serious (e.g. stomach ulcers or heart disease). Following this manipulation, participants were presented with a fictitious letter submitted to an American health journal. In this letter stress management training was presented as a way to reduce the risk of suffering from stress-related illnesses. This persuasive message contained either three weak or three strong supporting arguments. Following the procedure described by Petty and Cacioppo (1986), these arguments were selected from a pool of arguments that had been rated as weak or strong in a pilot study. After completing the dependent measures, participants were very carefully debriefed.

Independent variables

Vulnerability was measured on the basis of a risk-perception item, measuring participants' self-rated likelihood of ever suffering from stress-related illnesses on a 9-point scale (1 = very small, 9 = very high likelihood). Using a median split procedure, participants were next divided into a low ($n=101$; $M=3.44$) and a high ($n=83$; $M=6.73$) vulnerability



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group (Median = 5). Severity (low, high) was manipulated by describing the consequences of stress either as very mild or rather severe. Argument quality (low, high) was manipulated by using either three strong or three weak arguments in the text supporting the action recommended to protect individuals against the deleterious health effects of stress. Examples of weak and strong arguments are 'If you participate in a stress management training now at least you need not blame yourself when you develop stress-related health problems later on in life' and 'Scientific studies have shown that knowledge of stress management strategies improves both physical and psychological wellbeing', respectively.

Manipulation checks

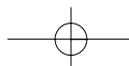
The severity manipulation was assessed by having participants rate on 9-point scales how severe and alarming they thought the health consequences of stress were ($r = .44$). Perceived argument quality of the action recommendation was assessed by one item, asking participants to rate on a 9-point scale how good or bad they thought the arguments were (1 = very bad quality; 9 = very good quality).

Dependent measures

Measures of persuasion. Participants' attitude toward the stress management training was assessed with 5 semantic differentials, measuring on 9-point scales how useful, positive, important, interesting and reliable participants perceived the training to be ($\text{Alpha} = .91$). The intention to participate in a stress management training was measured on a 9-point scale (1 = definitely not, 9 = definitely).

Negative affect. To allow for the possibility that a fear appeal will not only evoke emotions of fear, but various other negative emotions as well, a general measure of negative affect was used. Stress-related negative affect was assessed with four semantic differentials, measuring how good, depressed, anxious and positive participants felt about their vulnerability to stress ($\text{Alpha} = .93$). Lower scores on the scale indicate more negative emotions (1 = negative, 9 = positive).

Processing measures. To assess the amount and valence of cognitive processing of the action recommendation, a thought-listing task was added. Participants were asked to write down the thoughts they had while reading the action recommendation concerning the stress management training.



Results

Manipulation checks

Analyses of variance conducted on the manipulation checks revealed that both manipulations were successful. A 2 (perceived vulnerability) x 2 (severity) x 2 (argument quality) factor ANOVA conducted on the severity index yielded a severity main effect, $F(1,179) = 18.99$, $p < .001$. Participants in the high severity condition rated the consequences of stress as more severe than did participants in the low severity condition ($M_{high} = 6.65$ vs. $M_{low} = 5.64$). A similar ANOVA on the manipulation check for argument quality revealed that the quality of the arguments in the action recommendation was perceived as higher in the strong arguments condition ($M_{strong} = 5.83$) than in the weak arguments condition ($M_{weak} = 4.57$), $F(1,173) = 20.00$, $p < .001$. No further effects were found.

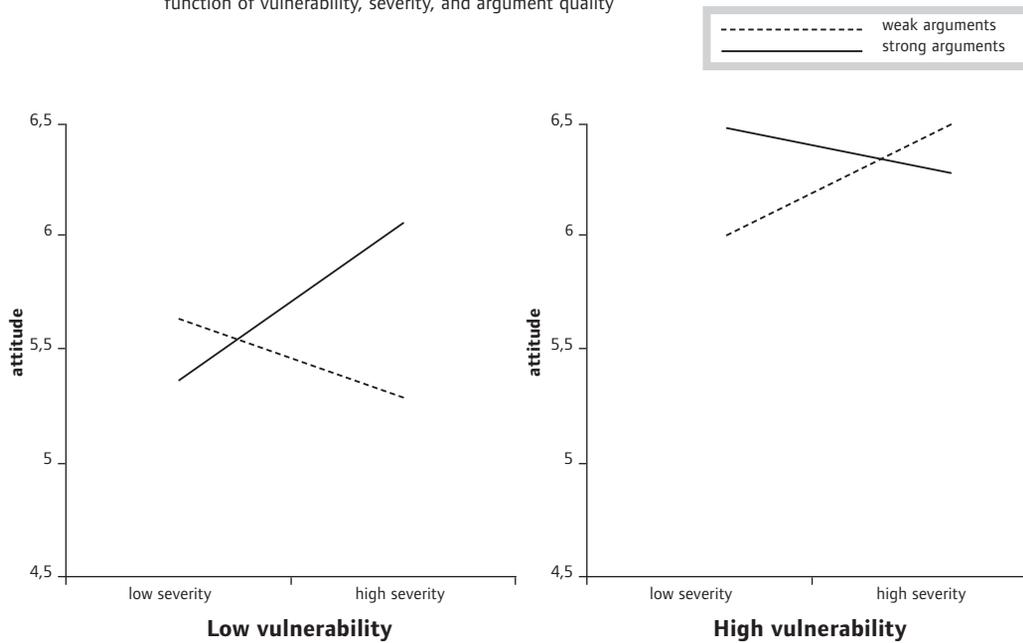
Dependent measures

Persuasion. A 2 (perceived vulnerability) x 2 (severity) x 2 (argument quality) factor ANOVA conducted on the *attitude* toward the stress management training revealed a main effect for vulnerability, $F(1,169) = 9.97$, $p < .01$. More favorable attitudes toward the recommended solution were reported when participants felt vulnerable to stress ($M = 6.31$) than when participants did not feel vulnerable to stress ($M = 5.58$). In addition, a marginally significant three-way interaction between vulnerability, severity and argument quality was observed, $F(1,169) = 3.51$, $p < .06$. Simple effects analyses revealed that an increase in the level of severity led to a near significant differentiation between strong and weak arguments under conditions of low vulnerability, $F(1,172) = 3.67$, $p = .06$. Under conditions of high vulnerability, no significant simple effects were observed (Figure 3.1).

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Figure 3.1: Participants' attitudes toward the action recommendation as a function of vulnerability, severity, and argument quality



A similar ANOVA on the *intention* to participate in a stress management training revealed only a significant main effect of vulnerability, $F(1,173) = 13.18, p < .001$. When vulnerability was high, the intention was higher ($M_{high} = 5.01$) than when vulnerability was low ($M_{low} = 3.88$). No effects of severity or argument quality and no interactions were found.

Negative affect. A 2 (perceived vulnerability) x 2 (severity) x 2 (argument quality) factor ANOVA conducted on negative affect revealed a main effect of vulnerability, $F(1,169) = 23.35, p < .001$. when participants felt vulnerable to stress, they experienced more negative emotions ($M = 6.81$) than when they did not feel vulnerable to stress ($M = 7.81$).

Processing measures. Two independent raters scored the number of thoughts in each of three categories (mean $r = .82$): positive (Range 0-4), negative (Range 0-5) and neutral thoughts (Range 0-5) concerning the action recommendation. A 3-factor ANOVA conducted on the number of positive thoughts revealed a main effect of vulnerability

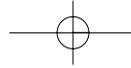
$F(1,168) = 8.47$ $p < .01$. When vulnerability was high, more positive thoughts were elicited ($M=1.24$) than when vulnerability was low ($M=.82$). No effects of severity and argument quality were observed. A similar ANOVA conducted on the number of negative thoughts revealed a main effect of argument quality, $F(1,168) = 5.89$, $p < .05$. Weak arguments elicited more negative thoughts ($M=1.11$) than did strong arguments ($M=.71$). No further effects were found on this dependent measure. On neutral thoughts no effects of the independent variables were found.

Mediation

To assess a possible mediation of the effects of vulnerability on measures of persuasion by either negative emotions concerning the health threat or by thoughts about the recommended solution, hierarchical regression analyses were performed on attitudes and intentions with negative affect and positive thoughts about the action recommendation entered as predictors. Following Baron and Kenny (1986), variables were only entered as possible mediators if the following three conditions were met: (1) the independent variable affected the mediator, (2) the independent variable affected the dependent variable, (3) the mediator affected the independent variable. These conditions were met by positive thoughts as a possible mediator for the effects of vulnerability on attitudes (but not intentions), and negative affect as a possible mediator for vulnerability on intentions (but not on attitudes). Negative thoughts were not entered as mediator because these thoughts were not affected by vulnerability.

The analyses revealed that the effect of vulnerability on attitudes was mediated by positive thoughts concerning the action recommendation: higher levels of vulnerability induced more positive thoughts about the action recommendation, which in turn led to more positive attitudes toward this recommendation. On the intention to participate in the recommended solution, attitudes were found to mediate the main effect of vulnerability. In addition, stress related negative affect significantly added to the mediating effect of attitudes: higher levels of vulnerability induced more negative affect, which directly led to higher intentions (Table 3.1).

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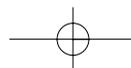
Table 3.1: Results of hierarchical regression analyses predicting attitudes and intentions in Experiments 3.1, 3.2 and 3.3

Dependent variable	Experiment 3.1		Experiment 3.2		Experiment 3.3	
	β	ΔR^2	β	ΔR^2	β	ΔR^2
Attitude						
Step 1						
Vulnerability	.23**	.06**	.38***	.14***		
Step 2						
Vulnerability	.12 ns		.24**			
Positive thoughts recommended action	.44***		.28**			
Positive thoughts arguments		.18***	.17 ns	.13***		
Intention						
Step 1						
Vulnerability	.25***	.06***	.56***	.31***	.27**	.07**
Step 2						
Vulnerability	.09 ns		.42***		.23**	
Attitudes	.65***	.40***	.37***	.11***	.47***	.22***
Step 3						
Vulnerability	.03 ns		.35***		.19*	
Attitudes	.66***		.35***		.46***	
Negative affect	-.14*	.02*	-.18*	.03*	-.15*	.02*

*** $p < .001$ ** $p < .01$ * $p < .05$

Discussion

On participants' attitude toward the recommended action, a main effect of vulnerability was observed. When participants felt that they were vulnerable to stress, their attitudes toward the action recommendation were more positive than when participants did not feel vulnerable to stress. In addition, a three-way interaction between vulnerability, severity and argument quality was observed. When participants did not consider themselves vulnerable to the health risk, an increase in the portrayed severity of this risk resulted in a more positive attitude toward the recommended action when the recommendation was supported by strong rather than weak arguments. Under conditions of high vulnerability, this pattern seemed to reverse: less differentiation between strong and weak arguments in the action recommendation was observed for higher levels of severity. However, more

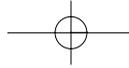


detailed analyses of these findings revealed that the differentiation between strong and weak arguments was significant only under conditions of low vulnerability and high severity, but not significant when vulnerability was high and severity low. Thus, the attitude of high vulnerability participants was high, regardless of the severity, and, more importantly, regardless of the quality of the arguments supporting the action recommendation.

For participants' intention to participate in a stress management training, and thus to accept the recommended action, only a main effect of vulnerability was observed. Individuals who felt that they were liable at some future date to suffer from stress-related illness were more willing to participate in a stress management training. No effects of either severity of the consequences of the health risk, or of the quality of the arguments in the action recommendation were observed. On stress-related negative affect, again a main effect of vulnerability was observed: high vulnerability participants experienced more negative affect than low vulnerability participants. Again, no effects of severity or arguments quality were observed.

The findings on the processing measures shed more light on the different information processing strategies used by low and high vulnerability participants. Interestingly, findings on positive and negative thoughts on the recommendation were quite different. With respect to negative thoughts, a main effect of argument quality was observed. More negative thoughts about the action recommendation were listed when this recommendation was supported by weak rather than strong arguments. The fact that no effect of vulnerability was observed on these negative thoughts suggests that both low and high vulnerability participants processed the action recommendation systematically. In contrast, no argument quality effect was observed on positive thoughts about the action recommendation. On this measure, only a main effect of vulnerability was observed, indicating more positive thoughts when participants felt vulnerable to stress than when they considered themselves not vulnerable to stress. Together these findings suggest that higher levels of vulnerability introduced a positivity bias in the processing of the action recommendation. Whereas the effect of argument quality on negative thoughts proves that all participants processed the action recommendation systematically, the effect of vulnerability on positive thoughts provides evidence that higher levels of vulnerability led to a more positive perception of all arguments in the recommendation.

Mediation analyses corroborate the biased processing hypothesis, revealing that the effect of vulnerability on participants' attitude toward the action recommendation was partly mediated by positive – but not negative – thoughts about this recommendation.



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The attitude, in turn, partly mediated vulnerability-effects on the intention to participate in a stress management training, the recommended solution. This finding is in line with social cognitive models of behavior (Ajzen, 1991), in which attitude is postulated to be a proximal determinant of intention. However, in contrast with these models, stress related negative affect was found to add to the mediating effect of attitudes on intentions. This finding suggests that the acceptance of a recommended action can be inherently reinforcing, most likely because it may lead to a reduction of negative emotions induced by a fear appeal (Hovland, Janis, & Kelley, 1953). In conclusion, both negative emotions about the health threat and positive thoughts concerning the recommended solution to this threat (via attitudes) mediated the persuasive effects of vulnerability on intentions.

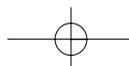
Experiment 3.2

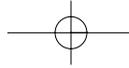
To validate the findings of Experiment 3.1, a replication-study was conducted in which the manipulation of argument quality and the assessment of dependent measures were refined. Specifically, one condition was added to provide more evidence for the biased processing interpretation of the persuasion-effects found in Experiment 3.1. In this additional 'systematic processing condition', participants were instructed to carefully read the action recommendation and were led to believe that they would have to have to defend their opinion on the action recommendation in a group discussion later on in the experiment. It was reasoned that if the persuasion effects of high vulnerability obtained in Experiment 3.1 were in fact due to sub-optimal levels of message processing instead of biased systematic processing, effects of argument quality on persuasion would have to be evident in the specific instructions condition only. Furthermore, two behavioral measures were added to assess whether the vulnerability effects on intention in Experiment 3.1 would translate into behavior.

Method

Design and participants

The hypotheses were tested in a 2 (vulnerability) x 2 (severity of health consequences) x 2 (specific instructions) x 2 (argument quality in the action recommendation) design. A total of 111 male and female first year graduate students at the Utrecht University received Fl. 15,- (\$8) for participating in the experiment.





Independent variables

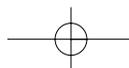
The *vulnerability* of the possible health consequences of stress was measured on the basis of a 6-item 7-point scale of participants' perceived vulnerability to stress. Examples are: 'The probability that I will develop stress related health problems is high' and 'Due to my sensitivity to stress I am more prone to stress related health problems' (Alpha = .92). Using a median split procedure, participants were divided into either a low (n=51, M=2.25) or a high (n=60, M=4.42) vulnerability group (Median = 3.50). *Severity* (low, high) was manipulated in the same way as in Experiment 1, describing the consequences of stress either as very mild or rather severe. *Argument quality* (low, high) was manipulated by using either 8 strong or 8 weak arguments in the text supporting the recommended action to protect individuals against the deleterious health effects. Three strong and three weak arguments were copied from Experiment 3.1. The remaining arguments were again selected in a pilot study, following the procedure described by Petty & Cacioppo (1986). *Specific instructions* were manipulated by telling participants in one condition that they had to read the action recommendation carefully, as they would have to defend their opinion on this text in a group discussion later on in the experiment. In the other condition, no such instructions were given. Instructions were given before the action recommendation.

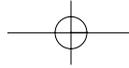
Procedure

In the present study, all questionnaires and texts were presented on computer terminals. Other than that, the procedure that was followed was identical to the one used in Experiment 3.1.

Manipulation checks

The effectiveness of the *severity* manipulation was assessed by 3 items measuring on a 7-point scale how severe, damaging and serious the health consequences of stress were perceived to be (Alpha = .81). Perceived *argument quality* of the action recommendation was assessed by 3 items, measuring on a 7-point scale how strong, supportive and sensible participants rated the arguments (Alpha = .88). *Specific instructions* were assessed by 3 items, measuring on a 7-point scale participants effort in understanding and thinking about the text, thoroughness in reading the text, and perceived success in recalling the text (Alpha = .69).





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Dependent variables

Persuasion. Participants' *attitude* toward the stress management training was assessed by a semantic differential scale with 6 items, measuring on a 7-point scale how good, useful, reliable, important, interesting and effective participants thought this training was (Alpha = .87). Participants' *intention* to participate in a stress management training was measured by 4 items on a 7-point scale. Examples are: 'Do you intend to participate in a stress management training?' and 'How likely is it that you are going to participate in a stress management training?' (Alpha = .89). Two *behavioral measures* were added to assess participants' reactions toward the stress management training. Participants could directly subscribe to a stress management training (5 sessions of 2 hours); this item had a 'yes' or 'no' option. Participants could also request more information about the training; this item also had a 'yes' or 'no' option.

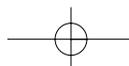
Negative affect. Stress-related affect was assessed with a 9 item semantic differential scale. Participants had to indicate how depressed, fearful, insecure, relaxed, at ease, helpless, positive, tense and pessimistic they felt when thinking about the consequences of stress (Alpha = .89). Lower scores on the scale indicate more negative affect.

Processing measures. To assess the amount of cognitive processing of the action recommendation, a thought-listing task was added. Participants were instructed to enter all thoughts they had concerning the action recommendation, including their feelings and ideas about the content of the text. Two independent raters then categorized these thoughts.

Results

Manipulation checks

2 (vulnerability) x 2 (severity) x 2 (argument quality) x 2 (specific instructions) Analyses of variance were conducted on all manipulation checks. The ANOVA on the severity index yielded a severity main effect, $F(1,95) = 12.91, p < .001$. Participants in the high severity condition rated the consequences of stress as more severe than participants in the low severity condition ($M_{high} = 5.38$ vs. $M_{low} = 4.73$). No further effects were found. The manipulation check on specific instructions revealed that participants' perceived effort and conscientiousness in reading the recommendation was greater with specific instructions ($M = 4.74$) than without specific instructions ($M = 4.29$), $F(1,95) = 4.88, p < .05$.



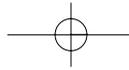
No further effects were observed on this variable. The ANOVA on the manipulation check of perceived argument quality revealed that the quality of the arguments in the persuasive message was perceived as higher in the strong arguments condition ($M_{\text{strong}} = 4.40$) than in the weak arguments condition ($M_{\text{weak}} = 3.62$), $F(1,95) = 10.05$, $p < .01$. Also, an interaction between severity and specific instructions was found on perceived argument quality, $F(1,95) = 6.48$, $p < .05$. Overall, perceived argument quality increased with specific instructions under high severity conditions, but decreased with similar instructions under low severity conditions. No further effects were found.

Dependent measures

Persuasion. A $2 \times 2 \times 2 \times 2$ ANOVA was conducted on participants' *attitude* toward the stress management training, revealing two main effects. A significant main effect of perceived vulnerability was observed, $F(1,95) = 16.49$, $p < .001$; when vulnerability was perceived as high, the attitude toward the training was more favorable ($M = 5.10$) than when perceived vulnerability was low ($M = 4.28$). Also, a main effect of argument quality was found, $F(1,95) = 3.99$, $p < .05$, indicating that the attitude was more favorable when the recommendation contained strong arguments ($M = 4.94$) rather than weak arguments ($M = 4.51$). However, additional analyses revealed that the differentiation between weak and strong arguments was significant only under conditions of low vulnerability, $F(1,108) = 4.55$, $p < .05$, but not significant when vulnerability was high, $F(1,108) = .83$, ns.

A $2 \times 2 \times 2 \times 2$ ANOVA on participants' *intention* to participate in a stress management training revealed only one significant effect, namely a main effect of vulnerability, $F(1,95) = 49.53$, $p < .001$. When vulnerability was high, the intention was higher ($M_{\text{high}} = 4.73$) than when vulnerability was low ($M_{\text{low}} = 2.93$). No effects of severity, instructions or argument quality and no interactions were found.

The effects of the independent variables on the *behavioral measures* were tested with logistic regression analyses. A main effect of vulnerability was observed on participants' request for more information about the training, $\text{Wald}(1) = 12.58$, $p < .001$; when vulnerability was perceived as high, participants more often requested more information on the stress management training (88.3%) than when vulnerability was low (58.8%). On participants' actual subscription to the stress management training, again a main effect of vulnerability was found, $\text{Wald}(1) = 16.86$, $p < .001$, indicating that participants more often subscribed to the training when vulnerability was perceived as high (50%) rather than low (9.8%). No further main effects or interactions were found.



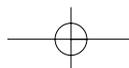
3 Looking for the bright side in recommendations: Positive biases in the secondary appraisal process

Negative affect. A $2 \times 2 \times 2 \times 2$ ANOVA on stress-related affect also revealed a main effect of vulnerability, $F(1,95) = 28.83$, $p < .001$, with high vulnerability participants experiencing more negative affect ($M=4.78$) than low vulnerability participants ($M=5.53$). Furthermore, a four-way interaction was observed between all independent variables, $F(1,95) = 5.51$, $p < .05$. Simple effects analyses revealed that argument quality had an effect on stress related emotions when vulnerability was low, severity was high and no specific instructions were given, $F(1,102) = 6.43$, $p < .05$. Only in this specific condition, more negative emotions were experienced when arguments were weak ($M=4.89$) rather than strong ($M=6.07$). No other simple effects were observed. Considering the difficulty in interpreting this 4-way interaction, this effect will not be further discussed. No other effects were found.

Processing measures. According to the defense motivation hypothesis, the primary goal of high vulnerability participants will be to have a positive perception of the recommended action, more so than to carefully scrutinize the arguments supporting the action recommendation. Thus, in participants' thoughts, differences would have to be evident between thoughts about the content of (arguments in) the action recommendation on one hand and thoughts about the recommended solution to the health risk per se on the other hand. In order to test this hypothesis, it was decided to differentiate between thoughts about the arguments in the action recommendation and thoughts about the recommended action per se, resulting in four categories¹. Because most participants listed not more than one thought per category, all categories were coded 0 when no thoughts were listed, and 1 when 1 or more thoughts were listed in a certain category. All thoughts were analyzed with logistic regression analyses.

Two categories referred to the quality of the arguments in the recommendation. One category included all *positive thoughts about the arguments* used in the action recommendation ($Kappa = .75$). In the counterpart of this category (*negative thoughts about the arguments*), all negative thoughts about the arguments presented were included ($Kappa = .86$). The two remaining categories referred to the recommended action per se. In the category *positive thoughts about the recommended action per se*, all positive remarks on the recommended action were included ($Kappa = .85$), whereas the category *negative thoughts about the recommended action per se* contained all negative comments on the proposed stress management training ($Kappa = .85$).

¹ Because all thoughts, with the exception of 5, could be categorized as either positive or negative, no neutral thoughts are reported.



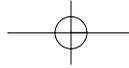
With respect to *positive thoughts about the arguments* in the action recommendation, a main effect of vulnerability was observed, $Wald(1) = 6.13, p < .05$, indicating that high vulnerability participants more often listed positive thoughts about the arguments (40%) than low vulnerability participants (13,7%). This main effect was qualified, however, by a significant interaction between vulnerability and argument quality, $Wald(1) = 6.45, p < .05$. An ANOVA was conducted to determine simple effects, revealing a significant effect of vulnerability for strong arguments. High vulnerability participants more often had positive thoughts about strong arguments (53,1%) than low vulnerability participants (21,4%), $F(1,108) = 19.03, p < .001$. This effect was not observed for weak arguments.

With respect to *negative thoughts about the arguments* in the action recommendation, a main effect of instruction-type was observed, $Wald(1) = 8.01, p < .01$: when specific instructions were given, negative comments regarding the arguments in the recommendation were made more often (67,3%) than when no such instructions were given (42,9%). Furthermore, a significant interaction between vulnerability and argument quality was found, $Wald(1) = 4.85, p < .05$. A simple effects ANOVA revealed a marginally significant effect of vulnerability for weak arguments, $F(1,108) = 3.27, p < .10$; High vulnerability participants had negative thoughts about weak arguments less often (42,9%) than low vulnerability participants (64,3%). This effect was not observed for strong arguments.

With respect to *positive thoughts about the recommended action per se*, a main effect of vulnerability was observed, $Wald(1) = 9.07, p < .01$: when vulnerability was perceived as high, positive thoughts regarding the recommended action were listed more often (46,7%) than when vulnerability was perceived as low (17,6%). No further effects were found. Regarding *negative thoughts about the recommended action per se*, no effects of the independent variables were observed.

Mediation analyses

To assess a possible mediation of the effects of the independent variables on measures of persuasion by either negative emotions concerning the health threat or by cognitive responses to the action recommendation, regression analyses were performed on attitudes and intentions (Table 3.1 and 3.2). Variables were selected as possible mediators only when the three conditions specified in Experiment 1 were met (Baron & Kenny, 1986). Both positive thoughts about the recommended action per se and positive thoughts about the arguments in the recommendation met the criteria for possible mediators for the effects of vulnerability on attitudes. Negative thoughts about either the recommended action per se



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or the arguments in the recommendation did not meet these criteria. Negative affect and attitudes met the criteria as possible mediator for vulnerability on intentions. Intentions met the criteria as possible mediator for vulnerability on behavior.

On the attitude, a significant mediating effect was observed only for positive thoughts about the recommended action per se, but not for positive thoughts about the arguments in the action recommendation. Similar to Experiment 3.1, the intention was predicted both by the attitude toward the action recommendation and by negative stress-related affect. Thus, similar to Experiment 3.1, a high vulnerability to the health risk evoked both a positive attitude about the action recommendation and negative emotions about the health risk. Both attitudes and negative affect were found to predict intentions to participate in the recommended solution. Finally, the effects of vulnerability on both behavioral measures were found to be mediated by intentions (Table 3.2).

Table 2: Results of hierarchical regression analyses predicting behavior in Experiments 3.2 and 3.3

Dependent variable	Experiment 3.2		Experiment 3.2		Experiment 3.3	
	Request for info	subscriptions	Request for info	subscriptions	Request for info	subscriptions
	β	ΔR^2	β	ΔR^2	β	ΔR^2
Step 1						
Vulnerability	.34***	.12***	.43***	.19***	.29**	.08**
Step 2						
Vulnerability	.06 ns		.11 ns		.15 ns	
Intention	.72***	.35***	.57***	.22***	.53***	.26***
*** p<.001 **p<.01 *p<.05						

Discussion

The findings of the present study replicate and extend the results of Experiment 3.1. On participants' attitude, again a main effect of vulnerability was observed. Attitudes toward stress management training were more favorable when participants felt vulnerable to stress. In addition, a main effect of the quality of the arguments in the persuasive message was observed, indicating more favorable attitudes when the recommendation was supported by strong rather than weak arguments. Contrary to the findings in Experiment 3.1, the severity of the consequences of stress had no effect on attitudes. Similarly, no

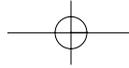


effects of reading instructions were observed on this measure of persuasion. Thus, in the present experiment, participants' perception of the action recommendation was more favorable when it contained strong, rather than weak arguments, and when participants felt vulnerable to the health risk. However, additional analyses revealed that, similar to Experiment 3.1, the quality of the arguments in the recommendation affected attitudes only under conditions of low vulnerability. When vulnerability was perceived as high, attitudes were favorable regardless of the quality of the arguments in the recommendation, and regardless of the severity of the consequences of the health risk.

Main effects of vulnerability were also observed on all other measures of persuasion: when vulnerability to the health threat was perceived as high, higher intentions, more requests for additional information about the suggested solution, as well as more actual subscriptions were observed. Neither argument quality nor the severity of the consequences of the health risk had a direct effect on any of these measures. Similarly, the specific processing instructions had no effect on the various measures of persuasion: no main effects, and no interactions with argument quality were found.

A replication of the findings in Experiment 3.1 was also observed on negative emotions concerning the health threat. On stress-related negative affect, a main effect of perceived vulnerability was observed, indicating more negative affect for high vulnerability of the health risk rather than low. Again, no effect of the severity of the consequences of the health risk was observed on negative emotions, nor was there an interaction-effect of vulnerability and severity of the health risk.

Perceived vulnerability to the health risk was also found to be the most important factor in affecting participants' cognitive responses to the projected action recommendation. Main effects of perceived vulnerability were observed on positive thoughts concerning the recommended action per se as well the arguments in the action recommendation. High vulnerability participants more often listed positive thoughts concerning both the recommended solution and the arguments in the action recommendation than low vulnerability participants. In addition, with respect to positive thoughts about the arguments in the action recommendation, the vulnerability effect was qualified by an interaction between argument quality and vulnerability: high vulnerability participants more often listed positive thoughts about strong arguments in the action recommendation than low vulnerability participants. This effect was not observed for weak arguments.



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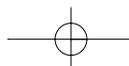
With respect to negative thoughts concerning the recommended action per se, no effects of the independent variables were observed. For negative thoughts regarding the arguments in the action recommendation, however, again an interaction between vulnerability and argument quality was observed: when arguments were weak, negative thoughts were listed less often under conditions of high rather than low vulnerability. This effect was not observed for strong arguments. This finding seems the exact reverse of the interaction-effect of vulnerability and argument quality on positive thoughts concerning the arguments in the recommendation. Whereas on the latter variable it was found that high vulnerability induced positive thoughts concerning **strong** arguments in the action recommendation **more often**, the present findings suggests it also induced negative thoughts concerning **weak** arguments **less often** than the low vulnerability condition.

The specific instructions did not affect any of the cognitive processing measures, with the exception of negative thoughts regarding the arguments in the action recommendation. For this variable, a main effect of specific instructions was observed: with specific processing instructions, negative thoughts concerning the arguments in the recommendation were listed more often than without processing instructions.

The findings regarding participants' cognitive responses argue in favor of the decision to refine the cognitive processing measures in the present study, of which the purpose was to assess possible differences between responses to the arguments in the action recommendation and cognitive responses to the recommended solution per se. In line with our prediction that high vulnerability participants' primary goal would be to have a positive perception of the recommended solution, their responses to the recommended solution were positive, regardless of the quality of the arguments in the persuasive message. In addition, participants' thoughts about the arguments in the recommendation perfectly fit the systematic processing bias hypothesis, in which less scrutiny is expected of information that is congruent with one's beliefs or, better in this case, with one's wishes. When participants felt vulnerable to stress, they became less critical of weak support for a possible solution and more enthusiastic about strong support for this solution. Together, then, these findings suggest biased systematic processing by high vulnerability participants.

Mediation

The analyses concerning possible mediators of the effects of the independent variables on persuasion replicate and extend the findings in Experiment 3.1. It was found that positive thoughts concerning the recommended action per se, but not positive thoughts

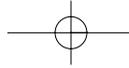


concerning the arguments in the action recommendation, mediated the effects of vulnerability on attitudes. This finding provides further evidence for the hypothesis that high vulnerability participants' motivation will be to have a positive attitude toward the recommended action, rather than to base their attitudes toward this action on careful scrutiny of the arguments in the action recommendation. Furthermore, although the vulnerability of the health risk did affect negative cognitions concerning the arguments in the action recommendation, these negative thoughts did not mediate the effects of the independent variables on persuasion. Thus, high vulnerability participants' attitudes toward the action recommendation were mainly based on positive thoughts regarding the recommended action per se.

Similar to Experiment 3.1, on participants' intention to participate in the recommended action, a mediating effect of participants' negative emotions as a result of their perceived vulnerability to the health risk was observed, that added to the effect of participants' attitude toward the recommended action, the primary predictor of intention. The intention to participate in the recommended action was found to be the unique predictor of behavior, as measured by requests for information and actual subscriptions to the stress management training. Thus, both negative feelings concerning the health threat (via intentions) and positive thoughts concerning the projected solution (via attitudes and subsequently via intentions) to this threat mediated the persuasive effects of vulnerability on actual behavior.

Heuristic versus biased systematic processing

In the present study, a systematic processing factor was added by giving participants specific instructions for reading the action recommendation in one condition and not in another. The underlying rationale for including this factor was to rule out the possibility that earlier null-findings of argument quality on persuasion are in fact due to sub-optimal levels of message processing, and not to biased processing. If this were true, argument quality effects would have to be observed on measures of persuasion only in the specific instructions condition, in which participants were encouraged to engage in higher levels of message processing, and not in the condition in which no such instructions were given. However, no such differences were observed. Even though the manipulation of specific instructions was successful, as was evident from the increased effort and conscientiousness in reading the recommendation, as well as from an enhanced critical appraisal of the action recommendation, these effects did not translate into higher persuasion for strong



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as opposed to weak arguments. In fact, no effects of specific instructions whatsoever were observed on persuasion-measures. Thus, the present findings confirm that the null-findings of argument quality on intentions and behavior cannot be attributed to sub-optimal (or heuristic) levels of message processing. Furthermore, they suggest that, although more critical scrutinizing can be induced, the effects of this higher message scrutiny seem to be overruled by participants' motivation: a positive processing bias was observed for all high vulnerability participants, regardless of instructions.

Experiment 3.3

In Experiments 3.1 and 3.2, the measure of vulnerability was based on participants' already existing perceptions of their personal vulnerability to stress, which leaves open the possibility that the effects of vulnerability on persuasion were in fact caused by a third-unknown-factor. To rule out this possibility, a third experiment was conducted, in which vulnerability to stress was manipulated. The specific instructions-condition was removed from the design.

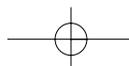
Method

Design and Participants

The same 2 (vulnerability) x 2 (severity of health consequences) x 2 (argument quality) factor design was used as in Experiment 3.1. A total of 118 male and female students at the University of Utrecht participated as participants and received a compensation of Fl. 10,- (\$ 5.-).

Procedure

All texts were presented on the computer screen, and responses to the questions were typed in (Authorware). In the introduction, participants were told that a new scale had recently been developed – the Chicago Stress Vulnerability Inventory (CSVI) – to measure the risk of individuals of developing stress-related health problems in the future. Participants were also informed that research had shown that people's own perceived stress resistance was unrelated to the Stress Vulnerability Score and that their perception of their own stress resistance was not a good predictor of their future risk of developing stress-related health problems. In reality, the CSVI consisted of three scales with a total of 54 items measuring neuroticism, introversion-extraversion and schizoid-type personality traits. Participants had to fill in the CSVI and then received false feedback on their



computer-screens. In the low vulnerability condition participants were informed that their future risk of developing stress-related illnesses was low. In the condition of high vulnerability participants were led to believe that their future risk of developing stress-related illnesses was quite high. The manipulations of severity of consequences and argument quality were identical to the ones used in Experiment 2. After completing the questionnaires by computer, participants were carefully debriefed.

Manipulation checks

The effectiveness of the *vulnerability* manipulation was assessed by having participants rate 6 items on their own perceived vulnerability on a 7-point scale. Examples are: 'The chance that I will develop stress related health problems is high' and 'Due to my sensitivity to stress I am more prone to stress related health problems' (Alpha = .92). The manipulation checks of *severity* (Alpha = .82) and *argument quality* (Alpha = .90) were copied from Experiment 3.2.

Dependent measures²

Persuasion. All dependent measures of persuasion were copied from Experiment 2: participants' *attitude* toward the recommended action (Alpha = .82), the *intention* to participate in a stress management training (Alpha = .83), as well as the behavioral measures of *request for more information* about stress management training (yes/no) and *subscriptions* to the training (yes/no).

Negative affect. Stress-related affect was assessed with the scale used in Experiment 3.2 (Alpha = .93). Lower scores on the scale indicate more negative affect.

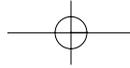
Results

Manipulation checks

To assess the effectiveness of the manipulations, 2 (vulnerability) x 2 (severity) x 2 (argument quality) factor ANOVA's were conducted on the manipulation checks of vulnerability, severity, and argument quality. The analyses revealed that all manipulations had been effective. Vulnerability was perceived as significantly higher in the high vulnerability condition ($M=3.70$) than in the low vulnerability condition ($M=2.81$), $F(1,110) = 17.34$, $p < .001$. The analysis of the severity index yielded a main effect of severity, $F(1,110) = 4.87$, $p < .05$. High severity participants rated the consequences of stress as more severe than low

² Experiment 3.3 does not contain thoughts listed by participants. We did include a thought-listing measure, similar to

Experiment 3.1. However, due to technical problems the thoughts listed were incomplete, rendering this measure inadequate.



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severity participants ($M_{high} = 5.58$ vs. $M_{low} = 5.18$). There was also a main effect of vulnerability on this variable: high vulnerability participants rated the consequences of stress as less severe ($M_{high} = 5.08$) than low vulnerability participants did ($M_{low} = 5.70$), $F(1,110) = 11.40$, $p < .005$. A main effect of argument quality was observed on the check for argument quality, $F(1,110) = 6.96$, $p < .05$. The quality of the arguments in the persuasive message was perceived as higher in the strong arguments condition ($M_{strong} = 4.51$) than in the weak arguments condition ($M_{weak} = 3.86$). No further effects were observed.

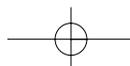
Dependent measures

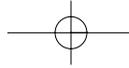
Persuasion. The 2 (vulnerability) x 2 (severity) x 2 (argument quality) ANOVA conducted on the attitude toward stress management training revealed a marginally significant interaction between vulnerability and severity, $F(1,114) = 3.70$, $p = .06$. Simple effects analyses revealed that an increase in severity led to more positive attitudes under conditions of low vulnerability, $F(1,115) = 4.72$, $p < .05$. This effect was not observed when vulnerability was high. No further effects were found.

A similar ANOVA on participants' intention to participate in a stress management training resulted in a main effect of vulnerability, $F(1,110) = 9.47$, $p < .01$: when vulnerability was high, the intention was higher ($M_{high} = 4.69$) than when vulnerability was low ($M_{low} = 3.88$). No effects of severity or argument quality were found.

The effects of the independent variables on the request for more information about stress management training were tested using logistic regression. A main effect of vulnerability was found, $Wald(1) = 10.98$, $p < .001$: When vulnerability was high, participants more often requested additional information about the training (55.5%) than when vulnerability was low (36.7%). This effect was qualified by a significant interaction between vulnerability and severity, $Wald(1) = 5.60$, $p < .05$: When severity was low, the request was greater when participants felt vulnerable to the health risk (76.9%) than when they did not feel vulnerable (25%). When severity was high, no significant differences between low (46.9%) and high vulnerability (56.3%) were observed. No additional effects of argument quality were found on this measure.

On the subscription to the training, no effects of the independent variables were found. In total, there were only 9 subscriptions (7.6%). The participants that had subscribed to the stress management training had all asked for more information about this training as well.





Negative affect. A 2 x 2 x 2 ANOVA on stress-related negative affect yielded a main effect of personal vulnerability, $F(1,110) = 7.43, p < .01$. High vulnerability participants reported experiencing significantly more negative affect ($M=3.23$) than low vulnerability participants ($M=3.63$). No further effects were found.

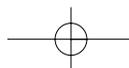
Mediation. To assess a possible mediation of the effects of vulnerability on persuasion by either negative emotions concerning the health threat or by attitudes toward the action recommendation regression analyses were performed, following the three criteria specified in Experiment 3.2 (Baron & Kenny, 1986). These analyses revealed mediating effects for both attitudes and negative affect (Table 3.1) on participants' intentions. Furthermore, participants' intentions to participate in the recommended solution mediated the effect of vulnerability on the behavioral measure of request for information (Table 3.2).

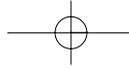
Discussion

On participants' attitude toward the recommended solution, a marginally significant interaction between vulnerability and severity was observed. When participants did not feel vulnerable to the health risk, an increase in the severity of the consequences of this risk boosted their attitude toward stress management training. No severity-effects were observed when participants had been told they were vulnerable to the health risk: in this condition, attitudes were positive regardless of the severity of the health risk. In contrast with Experiments 3.1 and 3.2, no effects of the quality of the arguments in the action recommendation were observed on the attitude toward the recommended action, despite a successful manipulation of this variable.

The intention to participate in a stress management training was only affected by personal vulnerability. Participants who felt at risk of suffering from stress-related illnesses at some point in the future, were more willing to accept the recommended action aimed at reducing this risk, in this case to participate in a stress management training. No effects of severity or argument quality were observed on this measure. These main effects of vulnerability on intention replicate the findings from Experiments 3.1 and 3.2, in which the measure of vulnerability was based on self-perception.

In line with the findings for intentions, the data on the request for information again revealed a main effect of vulnerability. Thus, under high vulnerability conditions, participants were not only more likely to express the intention to participate in a stress management training, they also were more likely to request information about the



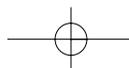


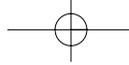
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training on offer. However, on requests for information, this main effect of vulnerability was moderated by the severity of the threat. Additional analyses revealed that high vulnerability participants requested additional information more often than low vulnerability participants only when the consequences of the health risk were portrayed as quite mild. No differences between low and high vulnerability participants were observed when the consequences of the health risk were presented as quite severe. Similar to the findings on attitudes, these additional effects of severity on behavior occurred independent of the processing of the action recommendation: no effects of argument quality were found on behavior.

On stress-related negative affect, only a main effect of vulnerability was observed, with high vulnerability participants experiencing more negative emotions than low vulnerability participants. This result replicates the findings of Experiments 3.1 and 3.2, in which vulnerability was measured rather than manipulated. Also similar to Experiments 3.1 and 3.2, the effect of vulnerability on participants' intention was partly mediated by both the attitude toward the recommended solution and stress-related negative emotions. Participants' intention, in turn, was the sole predictor of the behavioral measure of requests of information about the recommended solution.

In addition, Experiment 3.3 also provided evidence indicative of a negative bias in the processing of information about a health treat. Participants who had been informed that they were at high risk of developing stress-related problems, rated the consequences of such illnesses as less alarming and less severe than participants who had been told that they were not vulnerable to stress. These findings are in line with those of Ditto and Lopez (1992), Kunda (1987), Liberman & Chaiken (1992), and Reed & Aspinwall (1998). In all these studies, the manipulation of personal vulnerability of a health risk resulted in high vulnerability participants reacting to the health threat with minimizing responses (Hovland et al., 1953): downgrading the importance of the threat, not believing it or questioning the validity of the measures used. It is quite likely that a manipulation of vulnerability evokes stronger reactions than self-perceptions of vulnerability, which may explain why this minimizing response was found in the present experiment but not in Experiments 3.1 and 3.2.





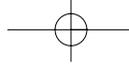
General Discussion

In this chapter, the hypothesis was tested that the use of fear appeals in health persuasion may lead to biased systematic processing of an action recommendation in which a possible solution to the health risk was proposed. It was argued that higher levels of vulnerability to a health risk would evoke defense motivation, rather than accuracy motivation, when processing a recommendation, based on the assumption that high vulnerability participants' goal would be to have a positive perception, rather than to have the most accurate perception of the recommended action.

The effects of fear appeals on persuasion

The convergence of findings on the dependent measures is quite strong, despite the differences in designs used in the three presented studies. When participants felt vulnerable to the health risk, their intentions to participate in the recommended action were higher, they more often requested information about the training, and even more often subscribed to this training. No effects of the quality of the arguments in the persuasive message were found with respect to these measures, and no effects of the severity of the consequences of the health risk (with the exception of the request for information in Experiment 3.3). Obviously, one's vulnerability to a presented health risk constitutes the dominant factor in affecting both cognitive and behavioral measures of persuasion, regardless of whether this vulnerability is based on self-perception or manipulated.

The one divergence from this very consistent pattern comes from the results on participants' attitude toward the action recommendation. Similar to the remaining measures of persuasion, high vulnerability participants' attitudes toward the recommended solution are, again, very consistent. Under conditions of high vulnerability, attitudes toward the recommended solution were positive in all three studies, regardless of severity, and



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regardless of the quality of the arguments in the action recommendation. However, under conditions of low vulnerability, different patterns are observed on attitudes. In Experiment 3.1, more positive attitudes toward the action recommendation were observed when it was supported by strong rather than weak arguments, but only when the consequences of the health risk were presented as severe. In Experiment 3.2, in which an extra manipulation of reading instructions was added, low vulnerability participants' attitudes toward stress management training were more favorable for strong than for weak arguments, regardless of the severity of the consequences of stress. Finally, in Experiment 3.3, in which vulnerability was manipulated instead of being based on self-perception, higher levels of severity enhanced low vulnerability participants' attitudes regardless of the arguments in the action recommendation.

Together, the persuasion-effects observed over studies suggest that the quality of the arguments in a persuasive message following a fear appeal can affect attitudes – but not intentions and behavior – regarding a recommended action, but only for people who do not feel vulnerable to the health risk presented in the fear appeal. Similarly, higher levels of severity of the consequences of a health risk can affect attitudes, – but not intentions and behavior – but also only for people who do not consider themselves vulnerable to this health risk. These results emphasize the importance of including measures of behavioral intentions and behavior toward a recommended solution in a persuasive message, along with attitudes toward a persuasive message. In addition, the current data strongly support the hypothesis that high vulnerability to a health risk (whether the consequences are mild or serious) will evoke a motivation to arrive at a preferred conclusion (i.e. defense motivation), which will 'override' persuasion-effects based on the content of (arguments in) the persuasive message. Obviously, when vulnerable to a certain health risk, an individual's goal will not be to scrutinize a possible solution to this health risk in an unbiased way, as

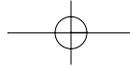
unbiased scrutiny could lead to the conclusion that there is no real solution to the health risk. Instead, higher levels of defense motivation will boost the motivational goal to arrive at the conclusion that, indeed, there is an effective way to reduce the health risk.

Biased processing of action recommendations

In both Experiments 3.1 and 3.2, a main effect of vulnerability was found on positive (but not negative) thoughts listed concerning the recommended solution: high vulnerability participants listed more positive thoughts (Experiment 3.1), or listed positive thoughts more often (Experiment 3.2) than did low vulnerability participants. Thus, high vulnerability participants were more enthusiastic about the recommended action than were low vulnerability participants, regardless of the quality of the arguments in the action recommendation. This is not to say that high vulnerability participants totally ignored the content of the persuasive message. Evidence was found that although high vulnerability participants did differentiate between strong and weak arguments in the action recommendation, they selectively elaborated on these arguments. The more refined cognitive response measures used in Experiment 3.2 revealed that high vulnerability participants were more enthusiastic about the content of the persuasive message when it contained strong arguments, but also less critical about the persuasive message when it contained weak arguments. Together, these findings strongly support the hypothesis that higher levels of vulnerability lead to a systematic positive bias in the processing of an action recommendation.

Cognitive and affective mediation

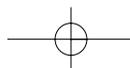
In both Experiments 3.1 and 3.2, it was found that positive cognitive responses, and not negative cognitive responses to the recommended action mediated the effects of vulnerability on participants' attitude toward the recommended solution. Although vulnerability to the health risk did affect

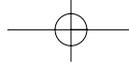


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negative cognitions concerning the arguments in the recommendation in Experiment 3.2, these negative thoughts did not mediate the effects of vulnerability on persuasion. In addition, in Experiment 3.2 it was found that positive thoughts concerning the recommended action per se, but not positive thoughts concerning the arguments in the action recommendation, mediated the effects of vulnerability on attitudes. This finding provides further evidence for the hypothesis that high vulnerability participants' motivation will be to have a positive attitude toward the recommended action, rather than to base their attitudes toward this action on careful scrutiny of the arguments in the action recommendation. Thus, high vulnerability participants' attitudes were mainly based on positive thoughts about a possible solution to the health risk.

Interestingly, in all three studies, modest but very consistent mediating effects of participants' negative emotions as a result of their perceived vulnerability to the health risk were observed on participants' intentions, adding to the effect of participants' attitude toward the recommended action, the primary predictor of intention. No such mediating effects of negative emotions were observed on the attitude toward the action recommendation. Thus, negative emotions evoked by a high vulnerability to the health risk directly affected intentions to participate in the recommended solution, regardless of participants' attitudes toward the recommendation. The intention to participate in the recommended action was found to be the unique predictor of behavior, as measured by actual subscriptions to the stress management training. These findings suggest that both negative feelings concerning the health threat and positive thoughts concerning the projected solution to this threat may – indirectly – mediate the persuasive effects of vulnerability on actual behavior.

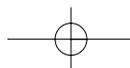
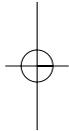


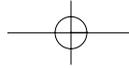


Conclusions

The findings of the experiments reported in this chapter demonstrate the importance of differentiating between vulnerability and severity of a health threat when assessing message processing and persuasion effects of a fear appeal. Most previous studies did not differentiate between vulnerability and severity within their manipulation of fear level, and little information is, thus, available on the independent effects of these two variables on the processing of persuasive messages and on persuasion. However, similar to the current findings, vulnerability appeared to have a more powerful effect on intention than severity in studies in which the two variables were manipulated separately to assess persuasion – but not processing – effects of both variables (e.g. Maddux & Rogers, 1976; Rogers & Mewborn, 1983; see Conner & Norman, 1996). Also, as some have suggested, it may be that ‘severity must reach a certain magnitude to figure in health decisions, but once that magnitude has been reached decisions are solely a function of perceived susceptibility’ (Sheeran & Abraham, 1996, p.34). Consistent with this notion, in all three studies, persuasion, as well as processing measures were mainly affected by personal vulnerability.

Two conclusions can be drawn from the current results: First, the willingness to adopt a recommended protective action following a fear appeal depends mainly on an individual’s vulnerability to a health threat. Second, increases in vulnerability do not increase a person’s motivation to assess the validity of an action recommendation. Rather, increased vulnerability seems to lead to motivated acceptance of a recommendation via (1) biased systematic processing of the arguments in support for this recommendation, as well as (2) negative emotions evoked by one’s vulnerability to the health risk.

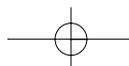
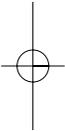
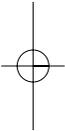


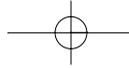


4 Looking ahead: Primary appraisal, secondary appraisal and persuasion over time

In the previous chapter it was demonstrated that, when people are presented with threatening health information, they may become motivated to have a positive perception of a recommendation presented subsequently, resulting in a positive bias in the processing of this recommendation, and, consequently, in increased persuasion. This means that the use of relevant fear appeals in health persuasion may induce 'instantaneous' acceptance of recommendations, because an individual who feels vulnerable to a health risk will be motivated to perceive subsequently presented recommendations in a positive light. When reflecting on these findings one might wonder whether this fear-induced persuasion is 'real', i.e. reflective of a true and lasting change in attitudes, intentions or behavior, or merely a temporary reaction to a threatening situation. One could argue, on the one hand, that people who are made to feel vulnerable to a health risk simply accept recommendations in order to reduce the seriousness of the health risk, their vulnerability to the health risk, or the emotional tension evoked by a fear appeal. This could be interpreted to imply that, once the salience of the health risk or the associated emotional tension decreases, persuasion would simultaneously decrease. On the other hand, one could just as easily argue that people who feel vulnerable to a health risk will process the content of a subsequently presented persuasive message thoroughly, and this thoroughness should ensure a certain stability of attitudes, intentions or behavior over time. In the present chapter, these assumptions will be tested by examining the effects of fear appeals on persuasion over time.

Although the aim of most health promotion campaigns – with or without fear appeals – is to produce lasting changes in health behavior, the general opinion regarding the temporal effects of persuasive messages seems to be that the attitude changes induced by these messages will decay over time (Cook & Flay, 1978). In reality, the empirical basis for this assumption is only very weak, possibly because of the practical drawbacks in testing persuasion-effects over time. The lack of empirical studies on this topic leaves a considerable void, since a systematic study of temporal persuasion effects could be regarded as a core





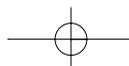
4 Looking ahead: Primary appraisal, secondary appraisal and persuasion over time

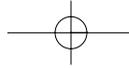
topic both in a theoretical and applied sense. In the present chapter a start is made to assess theoretical assumptions regarding the persistence of fear-induced persuasion in an empirical study. In the next section, the sparse theoretical assumptions and empirical studies in this field will be discussed, followed by a reformulation of these assumptions from a dual process perspective, and, finally, by an empirical test of the hypotheses defined by the Stage Model of fear appeals.

Temporal effects of fear appeals on persuasion:

Classical theoretical assumptions

When considering the leading theoretical frameworks regarding the effects of fear appeals on persuasion, assumptions about the temporal effects of fear appeals on persuasion are few and far between. However, some assumptions about delayed effects of fear on persuasion can be found in the Drive Model (Hovland et al., 1953) and in the Parallel Response Model (Leventhal, 1970), albeit mainly indirectly, i.e. as a possible result of defensive reactions to highly threatening information. The Drive Model proposes that individuals will become motivated avoid, ignore or minimize the importance of the threat when the emotional tension evoked by a fear appeal is not relieved by the rehearsal of the communicator's recommendations. These delayed minimizing responses, defined as defensive avoidance, are postulated to be especially likely after the presentation of (partially) ineffective recommendations following strong fear appeals. Thus, the Drive Model's primary postulate about delayed effects of fear on persuasion concerns the possible decrease in persuasion over time when the residual tension following the processing of an action recommendation motivates individuals into defensive avoidance. No predictions are made about the temporal effect of fear appeals when a recommendation is effective in relieving the emotional tension evoked by a fear appeal. However, considering their defensive avoidance hypothesis, it seems reasonable to assume that the Drive Model would in this case predict that persuasion will remain stable over time.



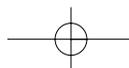


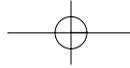
Contrasting the Drive Model's assumptions concerning the possible negative effects of defensive strategies on persuasion over time, Leventhal's Parallel Response Model (1970) proposes that the process of fear control following strong fear appeals may interfere with immediate persuasion, but is unlikely to affect delayed persuasion. When fear cues are especially strong, i.e. immediately after exposure to the threat, individuals are expected to be concerned with the control of fear rather than the control of danger control. However, over time, danger control is expected to be prominent since 'fear cues will fade while danger cues may still be present' (Leventhal, 1970, p.142). Thus, in effect, the Parallel Response Model predicts that persuasion may increase over time, since defensive fear control processes which may interfere with persuasion will dissipate over time, whereas danger control processes will not (at least not as quickly).

Temporal effects of fear appeals on persuasion:

Empirical evidence

Paralleling the scarcity of theoretical assumptions about the effects of fear appeals on persuasion over time is the relative void that is observed in empirical studies on this issue. Moreover, the few studies that did assess delayed persuasion provide only little support for the assumptions made by either the Drive Model (Hovland et al., 1953) or the Parallel Response Model (Leventhal, 1970). The famous dental hygiene experiment (Janis and Feshbach, 1953) which was interpreted as evidence in support of the defensive avoidance hypothesis proposed by the Drive Model (Hovland et al., 1953) in fact lacks any clear support in favor of this hypothesis. In this study, participants' dental hygiene practices were assessed one week prior to the persuasive messages, varying from minimal to moderate to strong, and again one week after. In the one-week follow-up, resistance to counterpropaganda was also measured as an indicator of the stability of the attitude built up by the fear-arousing messages. In addition, participants were asked to write down their evaluations of this counterpropaganda.



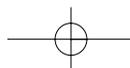


4 Looking ahead: Primary appraisal, secondary appraisal and persuasion over time

The results of this study revealed a negative relation between fear arousal and persuasion and, similarly, a negative relation between resistance to counterpropaganda and level of induced fear. The authors concluded that these findings were consistent with a defensive avoidance hypothesis, in that relatively greater acceptance of the counterpropaganda, which discounted and contradicted the original persuasive message, suggested a tendency to minimize the original persuasive message. In addition, the finding that participants in the minimal fear condition were found to be the most likely to refer to arguments presented in the original persuasive message as compared to the moderate and strong fear conditions was interpreted as more direct evidence for this hypothesis.

However, there are several reasons to question these conclusions. Firstly, neither the relatively weaker tendency to resist counterpropaganda nor the lack of direct reference to the original persuasive message observed in the higher fear condition provides strong support for the defensive avoidance hypothesis. In fact, the results showed that all participants showed evidence of resistance to counterpropaganda; the only group that was persuaded by this message was a control group. The fact that participants in the strong fear condition still resisted the counterpropaganda, as compared to the control group, would suggest some form of acceptance of the original communication, rather than a delayed rejection of this message. Secondly, the studies that were conducted to replicate these findings revealed totally different findings. In one of these replication studies, using low and high fear conditions identical to the ones used in the Janis and Feshbach study (1953), as well as adjusted low and high fear conditions, Haefner (1953) found that higher levels of fear induced more – rather than less – persuasion. Moreover, in all conditions, a similar resistance to counterpropaganda was observed, arguing against the defensive avoidance hypothesis.

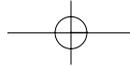
Some support for the delayed effects of fear appeals as proposed by the Parallel Response Model can be found in a study conducted by Leventhal and Watts (1966). In this study, using low, medium, or high fear movies about the negative



consequences of smoking, participants were recommended to take X-rays and to stop smoking. Whereas the X-ray taking was measured immediately after the fear appeal, smoking was measured after a delay of five months. The results of the first study showed that participants in the high fear condition took fewer X-rays than participants in the low or medium fear condition. No such differences were observed for nonsmokers. In contrast, the results of the five-month follow-up showed that, although 82% of the smokers had claimed some effort in cutting down their smoking, reports of success in smoking reduction were greater in the high fear condition (79%) than in the low (57%) or medium (57%) fear conditions. The authors suggested that the negative effect of high fear on X-ray taking was due to fear control processes, and the positive effect of high fear on delayed smoking behavior was due to danger control processes. Since the Parallel Response Model predicts that fear control processes will be strongest immediately following a fear appeal, and that danger control processes will be more likely with delay, the results were interpreted as evidence in favor of the Parallel Response Model's hypotheses.

However, the authors acknowledged that the comparison of immediate versus delayed behavior is problematic in this study, since the immediate behavior itself, i.e. X-ray taking, is threatening, and it may have been this threat, rather than the immediacy of the response, that was responsible for avoidance behavior. One might add that the delayed behavior, i.e. reported success in smoking reduction, is somewhat problematic too, because perceptions of success can be expected to vary greatly from one participant to another. In addition, differences in perceptions of success could be conditional of the level of evoked threat; highly threatened smokers could e.g. have been more motivated to see a small reduction in smoking as successful than less threatened participants.

In view of the meager empirical basis of these experiments, none of the reported studies provide conclusive evidence for either the predictions made by the Drive Model or the predictions made by the Parallel Response Model.

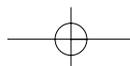


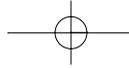
4 Looking ahead: Primary appraisal, secondary appraisal and persuasion over time

Nonetheless, it is interesting to note that the theoretical assumptions made by both models are similar in that they predict that – in some instances – defensive processes may interfere with persuasion. However, whereas the Drive Model predicts that defensive avoidance may interfere with delayed persuasion, the Parallel Response Model predicts that defensive processes may interfere with immediate, but not delayed persuasion. In terms of the Stage model of fear appeals that is presented in this thesis this implies that the primary appraisal of the threat presented in a fear appeal may interfere with the secondary appraisal of the recommended solution to this threat. In the current chapter, this hypothesis will be examined in more detail.

Reformulating temporal effects of fear appeals from an information processing perspective

The Stage model of fear appeals that is proposed in this thesis derives its hypotheses concerning the temporal effects of threatening messages on persuasion from dual-process models of persuasion (Chaiken, 1980; Petty & Cacioppo, 1987). Unlike the rather vague assumptions in the earlier models of fear appeals, dual process models' predictions regarding the stability of persuasion effects based on heuristic or systematic processing strategies are quite straightforward. Specifically, Postulate VII in the ELM (Petty & Cacioppo, 1987) states that attitude changes that results from processing issue-relevant arguments (central route) will show greater temporal persistence, greater prediction of behavior, and greater resistance to counterpersuasion than attitude changes that results mostly from peripheral cues. Similarly, the heuristic-systematic model proposes that systematic processing will produce more stable attitudes than heuristic processing. However, it must be noted that, similar to the hypotheses derived from the classic models of fear appeals, this postulate in dual-process models has only rarely been tested. The few studies that did test temporal effects of message processing generally found evidence in support for the hypothesis that

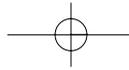




persuasion based on systematic processing is more stable than persuasion based on heuristic processing strategies (Chaiken, 1980; Chaiken & Eagly, 1983; Petty & Cacioppo, 1986; Mackie, 1987).

The Stage model of fear appeals predicts that people who are made to feel vulnerable to a health risk will process a subsequently presented recommendation systematically, albeit with a positive bias. Based on the dual-process model postulate that systematic processing of a persuasive message will result in more stable attitudes, intentions, and behavior than heuristic processing, it can thus be expected that this fear-induced persuasion, which is based on systematic processing strategies, will maintain a certain stability over time. On the other hand, when people do not perceive themselves as vulnerable to a health risk, and this health risk is not perceived as severe, the Stage model of fear appeals would predict heuristic processing of a subsequently presented recommendation. Since persuasion based on heuristic strategies is assumed to be less stable over time, it is expected that in this case, attitudes, intentions and behavioral measures of persuasion will decline over time. In the current chapter, these hypotheses will be tested.

In addition, the current study aims to gain more insight into the relation between the primary appraisal of a fear appeal, the secondary appraisal of possible coping resources and persuasion over time. Although some studies have been conducted to assess possible interfering effects of defensive reactions to threatening information on persuasion over time, none of these studies included processing measures. The Stage model of fear appeals predicts that people who feel vulnerable to a health risk will typically be motivated to accept a recommendation, even if they processed the fear appeal with a negative bias, because even biased processing is constrained by evidence and rules of inference. This means that the primary appraisal process will typically not result in a complete rejection of the vulnerability and severity of a health threat presented in a fear appeal, simply because people are constrained by reality in their attempts to minimize a health threat. Thus, contrary to predictions from



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the Drive Model and the Parallel Response Model, the Stage model predicts that the negative bias that is expected to occur with respect to the fear appeal will typically not interfere with either immediate or delayed persuasion.

Experiment 4.1

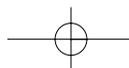
In the current chapter, an empirical study regarding the effects of fear appeals on persuasion over time will be presented. Although there is some evidence that persuasion that resulting from processing issue-relevant arguments (central route) will show greater temporal persistence than persuasion resulting from peripheral cues (Chaiken, 1980; Chaiken & Eagly, 1983; Petty & Cacioppo, 1986; Mackie, 1987), no study has yet been reported on the temporal effects of fear appeals. Similar to dual-process predictions, it is expected that persuasion based on – objective or biased – systematic processing of the action recommendation will show greater temporal persistence than persuasion based on heuristic processing strategies. In addition, the relation between primary appraisal of the health threat, secondary appraisal of coping resources and persuasion over time will be examined. Until now, a systematic investigation of the relation between the two appraisal processes and persuasion over time is still lacking in fear appeal literature. Contrary to the Drive Model and Parallel Response Model, the Stage model of fear appeals predicts that the primary appraisal of the health threat will typically not interfere with either immediate or delayed persuasion, since, even under defense motivation, people will be guided by reality constraints.

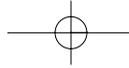
In the current experiment, the temporal effects of fear appeals on persuasion are assessed by varying the timing of the posttest-measure, assessing persuasion either immediately after the manipulations, or after a 15-minute cognitive filler-task. In addition, vulnerability to the health risk is manipulated, as are quality of the arguments in the action recommendation. To avoid an overly complex design, it was decided to drop the manipulation of severity, instead presenting the consequences of the health risk as severe for all participants. Furthermore, thought-listing measures concerning both the health risk and the action recommendation were added as specific measures of primary and secondary appraisal processes. The main dependent variables were measures of persuasion (i.e. attitudes, intentions and behavior).

Method

Design and participants

The hypotheses were tested in a 2 (vulnerability) x 2 (argument quality in the action recommendation) x 2 (timing of posttest-measure) design. A total of 126 male and female graduate students at Utrecht University received Fl. 15,- (\$6) for participating in the experiment.





Procedure and independent variables

The procedure in the present study was almost identical to the one used in Experiment 3.3 and will be presented only briefly in this section. In the introduction, participants read the cover story on the Chicago Stress Vulnerability Inventory (CSVI) and received false feedback on their computer-screens after completing this fictitious test. In the low vulnerability condition participants were informed that their future risk of developing stress-related illnesses was low. In the condition of high vulnerability participants were led to believe that their future risk of developing stress-related illnesses was quite high. Next, severity of the consequences of stress was presented as high for all participants (e.g. stomach ulcers or heart disease). Following this, argument quality was varied in the same way as in experiment 3.2, with either 8 strong or 8 weak arguments in a fictitious letter about the efficacy of stress-management training. Timing of the posttest-measure (immediate vs. later) was varied by assessing all dependent measures either immediately after the manipulations, or after a cognitive filler-task, which took about 15 minutes. This filler-task consisted of 25 digit-span backward trials. In each trial, participants were presented with 7 digits each appearing on their computer screens for 1 second. Subsequently, they were asked to recall these digits backwards. After completing the questionnaires by computer, participants were carefully debriefed.

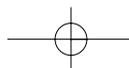
Manipulation checks

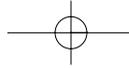
Similar to Experiment 3.3, the effectiveness of the vulnerability manipulation was assessed by having participants rate 6 items on their own perceived vulnerability on a 7-point scale. Examples are: 'The chance that I will develop stress related health problems is high' and 'Due to my sensitivity to stress I am more prone to stress related health problems' (Alpha = .94). Perceived argument quality of the action recommendation was again assessed by 3 items, measuring on a 7-point scale how strong, supportive and sensible participants rated the arguments (Alpha = .88).

Dependent variables

Measures of persuasion

Participants' *attitude* toward the stress management training was assessed with a scale consisting of 6 semantic differential items, measuring how good, useful, reliable, important, interesting and effective participants thought this training was (Alpha = .87). Participants' *intention* to participate in a stress management training was measured with the 4 items from study 3.3 (Alpha = .88). Examples are: 'Do you intend to participate in a stress





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management training?’ and ‘How likely is it that you are going to participate in a stress management training?’ Participants could again directly *subscribe to a stress management training* (5 sessions of 2 hours); this item had a ‘yes’ or ‘no’ option. Participants could also *request more information about the training*; this item also had a ‘yes’ or ‘no’ option. If participants either requested information or directly subscribed to the training, they were asked to type out their names and addresses, after which they were told they would receive information about the training within 2 weeks.

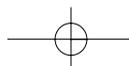
Negative affect

Stress-related negative affect was assessed with a 9-item semantic differential scale. Participants had to indicate how depressed, fearful, insecure, at ease, helpless, positive, tense and pessimistic they felt when thinking about the consequences of stress (Alpha= .91).

Processing measures

To assess the amount and the direction of cognitive processing of the action recommendation, participants were instructed to write down the thoughts they had while reading the text about the stress-management training (cf. Cacioppo & Petty, 1981). All thoughts – with the exception of 8 irrelevant thoughts – could be categorized as either positive or negative thoughts concerning the action recommendation as appraised by two independent judges. In the category *positive thoughts about the action recommendation*, all positive thoughts on the recommended action were included (Kappa = .85). Examples of this category are ‘I think this training is a very good idea’ and ‘I think stress management training will be very useful for many people’. The category *negative thoughts about the action recommendation* contained all negative comments on the recommended action (Kappa = .85). Examples of this category are ‘I found the arguments in the text not at all convincing’ and ‘The article on stress management training seemed to be some sort of commercial advertisement based on the logic ‘it works as long as you believe in it’.

In addition, to assess participants’ responses to the manipulation of vulnerability and the portrayed severity of the consequences of the health risk, they were also asked to write down all thoughts they had concerning the health threat. Two independent judges again categorized these thoughts, revealing two categories, one concerning participants’ vulnerability to the health risk, and one concerning the validity of the CSVI, the instrument to measure this vulnerability. In the category *vulnerability-thoughts* all thoughts were included that referred to the personal vulnerability of stress, i.e. thoughts which showed that people saw themselves



as either vulnerable (affirmative) or not vulnerable (rejecting) to stress (Kappa = .90). Affirmative responses were coded positively, rejecting responses were coded negatively. An example of an affirmative response in this category is 'According to the test, I am quite vulnerable to stress; I think this may be true', an example of a rejecting response: 'I do not attach much value to the feedback on the test; I am just not a nervous person'.

The category *questioning the validity of the CSVI* included all thoughts criticizing the validity of the CSVI for various reasons (Kappa= .92). Examples of this category are 'I do not agree that being vulnerable to stress is solely predicted by personality traits; how you cope with stress is just as important' and 'Wasn't the test made in the USA? I think it may not predict Dutch people's vulnerability to stress as accurately'.

Results

Preliminary analyses

A preliminary analysis on the manipulation check of vulnerability revealed that the responses of 5 high vulnerability participants fell outside the normal distribution range, i.e. were more than 2 SD's below the mean score in this group ($M=3.43$, $SD=1.20$). Although a 2 (vulnerability) x 2 (argument quality) ANOVA conducted on the manipulation check of perceived vulnerability did reveal the expected main effect of vulnerability, $F(1,122) = 4.85$, $p < .05$, it was decided to remove these outliers from the analyses of the dependent measures to avoid a contamination of the results due to these extreme scores. The removal of the outliers significantly increased the effect of the manipulation of vulnerability on the manipulation check, $F(1,117) = 10.90$, $p < .001$ ($M_{low} = 2.92$, $M_{high} = 3.57$). All analyses reported in the next section are conducted on the remaining group ($n = 121$). The results on the independent variables on the total group ($N=126$) are reported in Appendix 2.

Manipulation check

An ANOVA on the manipulation check of perceived argument quality revealed that the quality of the arguments in the persuasive message was perceived as higher in the strong arguments condition ($M=4.69$) than in the weak arguments condition ($M=3.90$), $F(1,117) = 15.03$, $p < .001$. In addition, an interaction between vulnerability and argument quality was found on the measure of perceived argument quality, $F(1,117) = 6.32$, $p < .05$. Simple effects analyses revealed that participants differentiated between strong ($M= 5.01$) and weak arguments ($M=3.64$) only under conditions of low vulnerability, $F(1,118) = 19.04$, $p < .001$ (Table 1). No further effects were found.

4 Looking ahead: Primary appraisal, secondary appraisal and persuasion over time

Dependent measures

Persuasion

Attitude. A 2 x 2 x 2 ANOVA was conducted on participants' attitude toward the stress management training, revealing a significant interaction between vulnerability and argument quality, $F(1,113) = 4.77$, $p < .05$. Simple effects analyses revealed that argument quality had an effect on participants' attitude toward the training only under conditions of low vulnerability, $F(1,118) = 8.63$, $p < .01$ (Table 4.1). No effects of timing of measurement, and no further effects were observed.

Table 4.1: Means on attitudes and intentions as a function of vulnerability and argument quality

Attitudes	weak arguments	strong arguments
Low vulnerability	4.14	4.89
High vulnerability	4.47	4.43
Intentions	weak arguments	strong arguments
Low vulnerability	2.89	3.75
High vulnerability	3.48	3.59

Intention. A 2 x 2 x 2 ANOVA on participants' intention to participate in a stress management training revealed a marginally significant interaction between vulnerability and argument quality, $F(1,113) = 3.54$, $p = .063$. Similar to the findings on attitudes, participants were found to differentiate between strong and weak arguments only under conditions of low vulnerability, $F(1,118) = 5.10$, $p < .05$ (Table 4.1). No effects of the timing of measurement and no further effects were found.

Behavior. The effects of the independent variables on the behavioral measures were tested with logistic regression analyses. Regarding the request for information, again, an interaction between vulnerability and argument quality was observed ($Wald(1) = 5.10$, $p < .05$), revealing a differentiation between strong (75%) and weak arguments (55,2%) only under conditions of low vulnerability. When vulnerability was high, the differentiation between strong (53,1%) and weak (68,8%) arguments was not significant. In addition, a marginally significant interaction between vulnerability and timing of measurement was observed, $Wald(1) = 2.79$, $p < .10$. No significant simple effects were observed, suggesting that overall, the slight decrease in



requests for information that was observed under conditions of low vulnerability (T1 70,4%; T2 60%) differed from the increase in requests for information that was observed under conditions of high vulnerability (T1 51,5%; T2 70%). (Table 4.2).

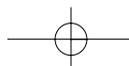
Table 4.2: Relative amount of requests for information about the recommended action as a function of vulnerability, timing of measurement and argument quality

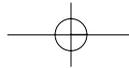
Low vulnerability	Time 1	Time 2
Weak arguments	57,1%	53,3%
Strong arguments	84,6%	66,7%
High vulnerability	Time 1	Time 2
Weak arguments	62,5%	75%
Strong arguments	41,2%	66,7%

On participants' actual subscription to the stress management training, a main effect of vulnerability was observed $Wald(1) = 4.75, p < .05$). When vulnerability was high, participants more often subscribed to the recommended action (39,3%) than when vulnerability was low (17 %). In addition, a marginally significant main effect of argument quality was observed, $Wald(1) = 3.04, p < .10$, revealing that participants more often subscribed to the recommended action when the recommendation was supported by strong (38,7%) rather than weak arguments (28,8%). This main effect was qualified, however, by a marginally significant interaction between vulnerability and argument quality, $Wald(1) = 2.96, p < .10$). Again, a differentiation between strong (32,1%) and weak arguments (10,3%) was only observed under conditions of low vulnerability, $F(1,118) = 3.34, p = .07$ (Table 4.3). No effects of timing of measurement and no further effects were observed on this measure.

Table 4.3: Relative amount of subscriptions to the recommended action as a function of vulnerability and argument quality

% subscriptions	weak arguments	strong arguments
Low vulnerability	10,3%	32,1%
High vulnerability	37,5%	37,5%





4 Looking ahead: Primary appraisal, secondary appraisal and persuasion over time

Negative affect

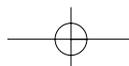
A 2 x 2 x 2 ANOVA on the measure of stress-specific negative affect revealed a significant interaction between argument quality and timing of measurement, $F(1,113) = 3.99, p < .05$. Simple effects analyses revealed that when the recommendation was supported by weak arguments, participants experienced more negative emotions over time, $F(1,118) = 3.67, p = .058$. No such effect was observed for strong arguments. No effects of vulnerability and no further effects were found.

Processing measures

Because there was no delay in measurement of the cognitive responses, differences in thoughts were analyzed using 2 (vulnerability) x 2 (argument quality) ANOVA's. With respect to *positive thoughts about the action recommendation*, no effects of vulnerability or argument quality were found (M for entire sample is .46; range 0–4). Regarding *negative thoughts about the action recommendation*, a main effect of argument quality was observed, $F(1,117) = 20.90, p < .001$; more negative thoughts were listed when the recommendation contained weak ($M = 1.00$) rather than strong arguments ($M = .38$) (range is 0–3). This main effect was qualified, however, by an interaction between vulnerability and argument quality, $F(1,117) = 17.07, p < .001$. Simple effects analyses revealed that when vulnerability was low, more negative thoughts were listed for weak ($M = 1.38$) than for strong arguments ($M = .14$), $F(1,118) = 35.97, p < .001$. This effect was not observed under conditions of high vulnerability.

With respect to cognitive responses to the health threat, an interaction between vulnerability and argument quality was observed on *vulnerability thoughts*, $F(1,117) = 8.98, p < .01$. Simple effects analysis revealed that high vulnerability participants listed more positive thoughts concerning their vulnerability to stress when the recommendation was supported by weak ($M = .41$) rather than strong arguments ($M = .04$), $F(1,118) = 6.58, p < .05$ (range is -2 to 2). This differentiation was not observed under conditions of low vulnerability. No further effects were found.

Regarding thoughts *questioning the validity of the CSVI*, a main effect of vulnerability was observed, $F(1,117) = 4.22, p < .05$; more doubts were raised about the validity of the CSVI when vulnerability was high ($M = .27$) rather than low ($M = .11$) (range is 0–2). No further effects were found.



Correlations

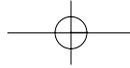
To assess the relation between participants' cognitive responses to the health threat, the action recommendation and attitudes over time, additional correlational analyses were conducted between high and low vulnerability participants' cognitive responses and their attitudes at Time 1 and 2. These analyses revealed that high vulnerability participants' thoughts about the health threat were unrelated to their attitudes at either Time 1 or Time 2, whereas their thoughts about the recommendation were strongly related to attitudes at both points in time. Low vulnerability participants' thoughts about the health threat were also unrelated to their attitudes at either Time 1 or Time 2 (with the exception of the positive relation between vulnerability-thoughts and attitudes at Time 1), and their thoughts about the recommendation were also related to attitudes at both points in time (except for the non-significant relation between positive thoughts and attitudes at Time 1) (Table 4.4).

Table 4.4: correlations between low and high vulnerability participants' attitudes and cognitive responses at Time 1 and Time 2

Low vulnerability	Time 1	Time 2
(1) Thoughts vulnerability	.50**	.02 ns
Questioning validity CSVI	.14 ns	.30 ns
(2) Positive thoughts recom.	.18 ns	.39*
Negative thoughts recom.	-.48*	-.53**
High vulnerability	Time 1	Time 2
(1) Thoughts vulnerability	-.14 ns	.24 ns
Questioning validity CSVI	.09 ns	.10 ns
(2) Positive thoughts recom.	.51**	.46**
Negative thoughts recom.	-.44*	-.56***
*p<.05, **p<.01, ***p<.001		

Discussion

The aim of the current study was twofold. Firstly, it was designed as a first systematic attempt to examine the temporal effects of fear appeals on persuasion from an information processing perspective. Secondly, the



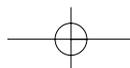
4 Looking ahead: Primary appraisal, secondary appraisal and persuasion over time

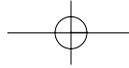
current study aimed to gain more insight into the relation between the primary appraisal of a fear appeal, the secondary appraisal of possible coping resources, and persuasion over time. The next section will start with a discussion of the effects of fear appeals on negative affect and on persuasion over time. Next, the primary and secondary appraisal processes underlying these effects will be discussed. In the remaining section, an integration of the findings on persuasion and cognitive processing measures will be presented, and theoretical implications of these findings will be discussed.

Persuasion and negative emotions over time

The Stage model of fear appeals predicts that higher levels of vulnerability will introduce a positive bias in the processing of an action recommendation, resulting in higher levels of persuasion regardless of the quality of the arguments in an action recommendation. This is exactly what was observed on the strongest measure of persuasion, i.e. the behavioral measure of subscriptions to the recommended action. On this measure, a main effect of vulnerability was observed, indicating that when participants were told they were vulnerable to the health risk, they more often directly subscribed to the recommended action than low vulnerability participants, regardless of the quality of the arguments in the action recommendation. This finding replicates the results from previous studies (Chapter 3) which also revealed a main effect of vulnerability on the relative amount of subscriptions to the recommended action.

Also similar to previous findings are the interactions between vulnerability and argument quality that were observed on attitudes, intentions, and both behavioral measures. When participants were not vulnerable to the health risk, the action recommendation was processed systematically, as well as objectively, as is evident from the systematic differentiation between strong and weak arguments on attitudes, intentions, requests for information and subscriptions that was observed under conditions of low vulnerability. No such differentiation was observed on any of the measures of persuasion when participants felt



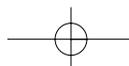


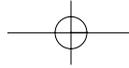
vulnerable to the health risk. Thus, in line with predictions, higher levels of vulnerability did not increase objective systematic processing of the action recommendation, but instead evoked a bias in the processing of this recommendation, resulting in decreased – instead of increased – differentiation between strong and weak arguments.

Although the current pattern of findings is generally in line with expectations, it is important to note that some specific findings are somewhat inconsistent with earlier observed effects (Chapter 3). Firstly, contrasting the results of earlier studies, the effects of the manipulation of vulnerability on the measures of persuasion and on the measure of negative affect were less pronounced as compared to earlier studies. In the current study, a main effect of vulnerability was observed on the strongest measure of persuasion, i.e. subscriptions to the recommended action, but no main effects of vulnerability were observed on participants' attitudes, intentions, requests for information about the recommended action, or on the measure of negative affect. Secondly, the effects of the manipulation of argument quality were found to be more pronounced compared to earlier studies. Whereas the quality of the arguments in the recommendation mainly affected attitudes in previous studies, in the current study it was found to affect all of the dependent measures, albeit only under conditions of low vulnerability.

One can only speculate as to why this slightly discrepant pattern is observed in the current study, as compared to the studies reported in Chapter 3. Possible causes are the delay in measurement that was included in this study, or the fact that this study was the last in a series of experiments using the same research paradigm in the same research area (Utrecht University) – although of course the participants were different in each experiment – due to which the experiment may have become somewhat 'infamous'.

With respect to the temporal effects of the independent variables, in general persuasion did not significantly decrease over time for either low or high vulnerability participants: for both groups, the effects of the independent variables

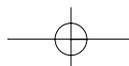




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on attitudes, intentions and subscriptions remained stable over time. The one deviation from this pattern was observed on the requests for information. On this measure, a marginally significant interaction between vulnerability and timing of measurement was observed, suggesting that overall, the slight decrease in requests for information that was observed for low vulnerability participants differed from the increase in requests for information that was observed for high vulnerability participants. The separate time-effects for the low and high vulnerability conditions were not significant, however. Overall, these findings are consistent with the dual-process postulate that persuasion based on systematic processing strategies will maintain a certain stability over time. Furthermore, also in line with our hypothesis, they suggest that persuasion based on biased systematic processing, which was observed under conditions of high vulnerability, will be – at least – just as stable over time as persuasion based on the objective systematic processing strategies that were observed under conditions of low vulnerability. Thus, the current findings show that persuasion based on biased systematic processing is not a short-lived reaction to a threatening situation. Although the direction of biased systematic processing strategies may differ from objective systematic strategies, the depth of processing remains the same; and it is the depth of processing that determines the stability of persuasion-effects over time.

Two qualifications must be made with respect to these conclusions. Firstly, in the current study, the temporal lag was approximately 15 minutes, which is really only quite short a period of time. More importantly, however, the measure of negative affect revealed that participants' negative emotions concerning the health risk did not decrease over time. On the contrary, the interaction between timing of measurement and argument quality that was observed on this measure suggests that, for weakly argued recommendations, negative affect may in fact increase rather than decrease over time. In addition, contrary to previous findings, the expected main effect of vulnerability on the measure of negative affect was not observed in the current study. Certainly, these findings are



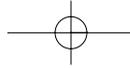
fascinating in that they show that the negative emotions evoked by fear appeals will not subside as easily as was expected; on the contrary, they may even increase over time. However, these findings preclude us from testing the possibility that over time, a decrease in vulnerability induced negative affect will lead to a decrease in persuasion. Thus, the assumption that persuasion based on biased systematic processing strategies will decline once the negative emotions evoked by a fear appeal have subsided remains to be tested.

Primary and secondary appraisal processes

To ensure that participants' cognitive responses reflected their thoughts while processing the messages as closely as possible, all thoughts were measured immediately after the presentation of the health threat and the action recommendation (following Petty & Cacioppo, 1986). As a reminder to readers, this means that no effects of the timing of measurement can be expected on these dependent measures. In the current section, participants' cognitive responses to the health threat (primary appraisal) and to the action recommendation (secondary appraisal) will be discussed.

With respect to thoughts referring to one's vulnerability to the health risk, an interaction between vulnerability to the health threat and the quality of the arguments in the recommendation was found, revealing that high vulnerability participants more often acknowledged their vulnerability to the health risk when the recommendation was supported by weak rather than strong arguments. With respect to thoughts questioning the validity of the CSVI – the instrument allegedly measuring participants' vulnerability to stress – high vulnerability participants were found to more often question the validity of the instrument measuring their vulnerability to the health risk than low vulnerability participants.

Together, participants' cognitive responses to the health threat support the hypothesis that higher levels of vulnerability to a health threat will induce a systematic negative bias in the primary appraisal process. Firstly, high vulnerability participants more often questioned the validity of the test allegedly

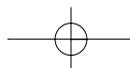


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measuring their vulnerability to stress than did low vulnerability participants. This findings is in line with the findings of Kunda (1987), Ditto and Lopez (1992; study 2 and 3), Liberman & Chaiken (1992), and Reed & Aspinwall (1998), in which manipulations of high vulnerability to a health risk resulted in defensive reactions such as minimizing the health threat or questioning the validity of the measures used.

Furthermore, the interaction between vulnerability and argument quality that was observed on participants' vulnerability-thoughts suggests that the primary appraisal of the health risk and the secondary appraisal of possible coping resources are closely interrelated and, thus, can not simply be viewed separately. Both primary and secondary appraisal are thus ongoing processes that do not simply stop because someone tells you to, or because new information presents itself. In addition, the observed interaction between vulnerability and argument quality provides evidence for the hypothesis that high vulnerability participants processed the action recommendation systematically, albeit in a somewhat unconventional way: their vulnerability-thoughts were affected by the quality of the arguments in the recommendation.

With respect to positive thoughts about the recommended action, no effects of vulnerability or argument quality were observed. These findings contrast the main effects of vulnerability on this measure that were observed in previous studies, with higher levels of perceived vulnerability inducing more positive thoughts than lower levels of vulnerability (Experiments 3.1 and 3.2). Possible explanations for these divergent findings may be found in the extended thought-listing instructions that were added in the current study, instructing participants to write down all thoughts they had about the health threat, or the fact that vulnerability was manipulated in the current study, whereas it was based on self-perception in Experiments 3.1 and 3.2. Consequently, high vulnerability participants may have been more preoccupied with writing down critical comments about the health threat than in previous studies, resulting in a lack of positive comments about the recommendation. It may be worth

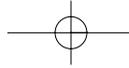


noting that, in line with expectations, high vulnerability participants' positive thoughts about the recommendation were more strongly correlated with attitudes at Time 1 and Time 2 than the positive thoughts of low vulnerability participants.

The findings on negative thoughts about the recommended action replicate the results of Experiment 3.2. On this measure, an interaction between vulnerability and argument quality was found, revealing that participants differentiated between strong and weak arguments only under conditions of low vulnerability, with more negative responses when the action recommendation was supported by weak rather than strong arguments. No such differentiation was observed for high vulnerability participants. These findings – again – provide clear evidence that low vulnerability participants systematically processed the action recommendation. In addition, they are also consistent with the biased systematic processing hypothesis, predicting less critical comments about a weakly supported recommendation for high vulnerability participants as compared to low vulnerability participants.

Theoretical implications

Overall, the current data fit the predictions made by Stage model of fear appeals. This model predicts that persuasion based on systematic processing strategies, whether they be biased or objective, will remain more stable over time than persuasion based on heuristic strategies. In the present study, this stability over time was observed on attitudes, intentions and the behavioral measure of subscriptions. Furthermore, although the Stage model does account for defensive reactions to threatening information to appear in the primary appraisal process, it predicts that, due to reality constraints, these defensive reactions are unlikely to affect the secondary appraisal process, in which coping strategies are evaluated. This is exactly what is observed in this study. Although high vulnerability participants did show a negative bias in the primary appraisal process, this negative bias was not related to persuasion



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at either Time 1 or Time 2. Thus, the predicted positivity bias in the processing of an action recommendation was observed for high vulnerability participants, regardless of the occurrence of a negative bias in the primary appraisal process.

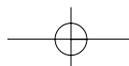
The current findings hardly provide any support for the hypotheses regarding the temporal persuasion effects of fear appeals as formulated by either the Drive Model (Hovland et al., 1953) or the Parallel Response Model (Leventhal, 1970). Little support is found for the Parallel Response Model's prediction that the process of fear control may interfere with immediate, but not delayed persuasion. The negative bias that was observed in the primary appraisal process, which is reflective of a fear control process, did not interfere with either immediate or delayed persuasion. Similarly, no support is found for the Drive Model's prediction that persuasion is likely to decrease over time when the residual tension following the processing of (partially) ineffective action recommendation motivates individuals into defensive avoidance. In the current study, the measure of negative affect did reveal a slight increase in negative emotions over time following a weakly supported recommendation. However, contrary to the Drive Model's predictions, this residual tension did not result in higher levels of defensive avoidance, or in decreased persuasion following a weakly supported recommendation at Time 2.

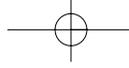
In conclusion, not much support is found for the predictions made by the earlier theories of fear appeal. It must be noted, however, that both the Drive Model and Parallel Response Model predict that defensive processes are especially likely to occur with high levels of fear. It therefore remains possible that, under more extreme conditions than the ones evoked in the current study, defensive processes will interfere with persuasion.

Conclusions

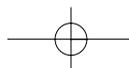
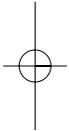
Three important conclusions can be drawn from the current study.

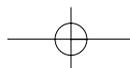
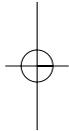
Firstly, although individuals who are made to feel vulnerable to a presented

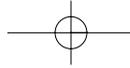




health risk are likely to process threatening information about this risk with a systematic negative bias, they will nevertheless process a subsequently action recommendation with a systematic positive bias, resulting in increased persuasion regardless of the quality of the arguments in this recommendation. Secondly, in line with dual process predictions regarding the persistence of persuasion, persuasion is likely to remain stable over time if it is based on systematic processing strategies, whether they be biased or objective. Thirdly, fear appeals should be used with some caution in health persuasion, since the associated negative emotions will not be completely relieved, and may even increase, after the acceptance of recommendations.



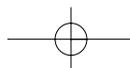
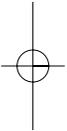
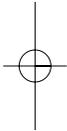


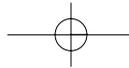


5 Discussion

The aim of this dissertation was to find an answer to the question how fear appeals work. This important question has been left unanswered, despite the numerous empirical studies conducted in this research area. The most obvious reason for the lack of understanding of the processes underlying fear-induced persuasion is the fact that the earlier theories of fear appeals focused mainly on the effects of fear on outcome measures such as attitudes toward a recommended action or intentions to adopt recommended behaviors. Consequently, potential mediating mechanisms such as cognitive and affective reactions to threatening health information have largely been ignored. In this thesis, it was argued that a detailed examination of these underlying mechanisms is necessary to increase our understanding of the effects of threatening health messages on persuasion.

A newly developed two-stage cognitive processing model of fear appeals has been presented, in which the focus is on cognitive and motivational processes underlying fear-induced persuasion. It was argued that the stage model of fear appeals contributes to our understanding of the effects of fear appeals on persuasion by clarifying the role of cognitive responses to threatening health information and to reassuring recommendations in the persuasion-process. In addition, the Stage model can account for several troubling inconsistencies that are observed in empirical studies. In the next section, a brief description of the Stage model and its advantages over earlier theorizing on fear appeals will be given, followed by a summary of the empirical tests of the hypotheses generated by the model. After that, I will return to the research questions that were posed in this dissertation, and discuss the contributions of the current findings to our understanding of fear-induced persuasion.



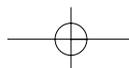


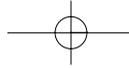
5 Discussion

A Stage model of fear appeals

The Stage model of fear appeals builds on dual-process models of persuasion (Chaiken, 1980; Petty & Cacioppo, 1986) by describing how the use of fear appeals may affect the extent and direction of information processing. It proposes that fear-induced persuasion follow a two-stage process, involving the primary appraisal of a health risk and the secondary appraisal of possible coping resources. It is hypothesized that relevant fear appeals will typically evoke defensive motives, which will exert **opposite** effects on the primary appraisal of the threat outlined in a fear appeal and the secondary appraisal of coping strategies available for reducing or eliminating the threat. When an individual feels vulnerable to a portrayed health threat, a negative processing bias is proposed to occur in the primary appraisal process, because a fear appeal contains preference-inconsistent information. The negative bias will involve attempts to 'minimize' the presented health threat by means of a biased search for inconsistencies and logical errors, and a biased evaluation of the presented evidence in a negative direction.

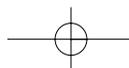
However, since these minimizing attempts will be guided by reality-constraints, they will not result in a complete rejection of the health threat (provided, of course, that the evidence presented is reasonably persuasive), and defense motivation will thus continue to exist in the processing of action recommendations (secondary appraisal process). However, since action recommendations present preference-consistent information, i.e. potential solutions to a health risk, this information is expected to be processed with a positive bias. This positive bias will involve attempts to 'maximize' the presented action recommendation by means of a biased search for arguments supporting the usefulness of this recommendation, and a biased evaluation of the presented evidence in a positive direction. Hence, it is expected that higher levels of vulnerability will induce a positive bias in the processing of action recommendations, leading to increased persuasion regardless of the quality of the arguments supporting this recommendation.

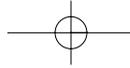




The main contribution of the Stage model, as opposed to earlier models of fear appeals, lies in its specification of the cognitive processes underlying fear-induced persuasion. This is a major advance compared to the classical theories of fear appeals, which focused mainly on the effects of fear appeals on outcome measures, hereby largely ignoring the processes underlying fear-induced persuasion. In this sense, the Stage model also allows for empirical testing of several processing-assumptions that were implicitly present in classical theories of fear appeals. For instance, the Drive Model, Parallel Response Model and Protection Motivation Theory all share assumptions about the processing of action recommendations following the use of fear appeals. The Drive Model explicitly posits that higher levels of fear will lead to a heightened vigilant state, in which an individual is assumed to consider more carefully than otherwise the possible loopholes in a proposed solution, to see if it offers sufficient protection. Hence, the Drive Model proposes that higher levels of fear will induce objective systematic processing of recommendations. The Parallel Response Model and Protection Motivation Theory do not address the processing of action recommendation as explicitly. Nonetheless, both models do assume that the cognitive process of danger control involves an objective appraisal of the threat and of possible coping resources. Since an objective appraisal of coping resources is only possible following objective systematic processing of the message presenting these resources, these models implicitly assume that recommendations will be processed systematically. At the time these theories were developed this assumption could not be subjected to proper empirical testing. The Stage model enables us to test these assumptions.

Secondly, the Stage model of fear appeals is the first model of fear appeals that offers explicit hypotheses on the relation between defensive processes and persuasion. According to the Stage model, defense motivation will exert opposite effects on the processing of threatening information (primary appraisal) and the processing of reassuring recommendations

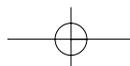


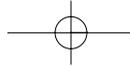


5 Discussion

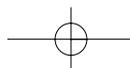
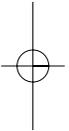
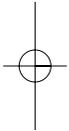
(secondary appraisal). The model proposes that negative defensive reactions to threatening health information will be common in the primary appraisal process for individuals who feel vulnerable to a presented health risk. However, it is hypothesized that, due to reality constraints, this negative bias in the primary appraisal process will typically not interfere with the secondary appraisal process, or with persuasion. On the contrary, the Stage model of fear appeals proposes that, under defense motivation, a recommendation will be 'maximized'; i.e. to be judged as more valid and to be evaluated less critically. In other words, the Stage model of fear appeals proposes that in the secondary appraisal process, positive – rather than negative – defensive reactions will be common, enhancing persuasion rather than impairing it.

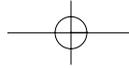
These hypotheses differ from the assumptions made by the classical theories on fear appeals in two important respects. Firstly, although the Drive Model and its extensions do not offer explicit hypotheses regarding the relation between defensive reactions to fear appeals and persuasion, they do propose that defensive reactions are likely to seriously undermine the effectiveness of a fear appeal. In terms of the Stage model, this implies the negative bias in the primary appraisal process may interfere with the secondary appraisal process, resulting in decreased persuasion following defensive reactions to a fear appeal. Similarly, the Parallel Response Model assumes that the defensive fear control processes may interfere with persuasion, especially given higher levels of fear, although, again, no explicit hypotheses were offered as to when these interfering effects were expected to occur. Secondly, the Stage model is the first model of fear appeals to propose that in the secondary appraisal process, defensive reactions will enhance rather than reduce persuasion-effects. Hence, the Stage model is the first model of fear appeals that allows us to test newly developed hypotheses as well as classical theoretical assumptions concerning the relation between defensive processes and persuasion.





Finally, the Stage model builds a bridge between classical motivational and cognitive accounts of the effects of fear appeals on persuasion. As was reviewed earlier, the relation between fear and persuasion was originally explained in terms of motivation, proposing that people will not be persuaded unless they are 'forced' into a drive state, i.e. a state of emotional tension. This drive state was deemed to be necessary to motivate an individual to take action in order to reduce emotional tension, i.e. what Leventhal (1970) labeled 'fear control'. In later theories, fear-induced persuasion was explained in strictly cognitive terms, proposing that people are more or less rational actors, who will be motivated to protect themselves after an objective and rational evaluation of the health threat and possible coping resources, i.e. after a process of 'danger control'. The Stage model bridges the gap between motivational and cognitive accounts of fear appeals, and between the assumed 'fear control' and 'danger control' processes, by introducing the concept of defense motivation into fear appeal theory. It is proposed that the use of relevant fear appeals will evoke defense motivation, i.e. a motivation to protect one's self-concept of being a healthy individual. This assumption differs from earlier theoretical accounts, which proposed that fear appeals will motivate an individual to reduce fear (fear control) or motivate an individual to protect one's health (danger control). Furthermore, the consequences of defense motivation are neither strictly motivational nor strictly cognitive in nature; they are best viewed as a mixture of both. The Stage model proposes that following defense motivation, an individual will process the information that is presented in a biased way, minimizing threatening health information and maximizing potential solutions to the health risk. In this sense, the Stage model re-integrates fear control and danger control processes: biased processing involves danger control processes, i.e. a systematic evaluation of the presented information, as well as fear control processes, i.e. defensive reactions to the information presented. Hence, the Stage model proposes that processes of danger control and fear control are unlikely to be





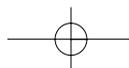
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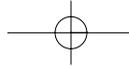
independent, since defensive motives will exert their effects through cognitions, and cognitions will affect motivations. Fear-induced persuasion is proposed to be the combined result of both danger control and fear control processes.

With respect to earlier processing accounts of the effects of fear appeals, an important contribution of the stage model lies in its prediction that different directional biases may occur in the cognitive processing of different aspects of one and the same fear appeal. Whereas several researchers have argued that defensive negative biases may occur in the processing of threatening health information, the assumption of the occurrence of positive biases in the processing of subsequently presented action recommendations is new. The proposition that different directional biases may occur in the processing of fear appeals may explain observed inconsistencies in fear appeal literature.

Measuring negative and positive biases in the processing of fear appeals

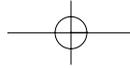
To accurately test the hypotheses generated by the Stage model of fear appeals, a new research paradigm was needed. Firstly, a clear differentiation between the vulnerability and severity information in a fear appeal was necessary, in order to assess the independent as well as the joint effects of these two variables on message processing and subsequent persuasion. Most previous studies on fear appeals did not differentiate between vulnerability and severity within their manipulation of fear level, and little information is, thus, available on the independent effects of these two variables on the processing of persuasive messages and on persuasion. A clear differentiation between these two variables is crucial, especially since the Stage model hypothesizes that vulnerability-information will have a stronger effect on message processing and persuasion than severity-information.





A new research paradigm was developed to meet these requirements, using an extensive fictitious cover story to ensure a certain degree of credibility of the manipulation of vulnerability. In this cover story, participants were told that a new scale had recently been developed – the Chicago Stress Vulnerability Inventory (CSVI) – to measure the risk of individuals of developing stress-related health problems in the future. Participants were then asked to fill in the CSVI and then received false feedback on their computer-screens, thus manipulating participants' vulnerability to the health risk. In the low vulnerability condition participants were informed that their future risk of developing stress-related illnesses was low. In the condition of high vulnerability participants were led to believe that their future risk of developing stress-related illnesses was quite high. After this feedback, the severity of the health risk was manipulated by presenting participants with one of two texts on the consequences of stress. In the low severity condition these consequences were described as very mild (e.g. fever or cold hands and feet), whereas in the high severity condition consequences were made out to be quite serious (e.g. stomach ulcers or heart disease).

A second requirement of the new research paradigm was to enable detailed assessment of information processing strategies, in such a way that both differences in the extent of processing and differences in the direction of message processing could be examined. In dual-process models of persuasion, differences in the extent of information processing are typically assessed by varying the quality of the arguments in a persuasive message (Petty & Cacioppo, 1986). If message processing is based on systematic processing strategies, persuasion will depend on the quality of the arguments used in the message: strong arguments will lead to higher levels of persuasion than weak arguments. With heuristic processing strategies, persuasion will not depend on substantial processing of the content of the message, and the quality of the arguments used in the persuasive message will have no (or less) effect on the individuals' attitude or behavior.

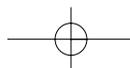


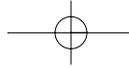
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A similar approach was taken in the research paradigm described in this thesis. Following the manipulations of vulnerability and severity, participants were presented with a fictitious letter submitted to an American health journal. In this letter stress management training was presented as a way to reduce the risk of suffering from stress-related illnesses. This persuasive message contained either weak or strong supporting arguments, which were selected from a pool of arguments that had been rated as weak or strong in a pilot study (following Petty & Cacioppo, 1986).

However, in order to test the hypotheses generated by the Stage model of fear appeals, additional processing measures were needed for several reasons. Firstly, variations in argument quality alone do not suffice when assessing differences in the direction of information processing in addition to differences in the extent of processing. The Stage model predicts that higher levels of vulnerability will induce a positive bias in the processing of a subsequently presented recommendation. However, when a strong systematic positive bias occurs, weak arguments may be judged as equally valid as strong arguments, thus showing no argument quality effect even if a message is processed systematically. A bias can thus eliminate effects of argument quality, a finding that should be indicative of heuristic processing strategies only. Hence, within the argument quality paradigm, one can not accurately distinguish between heuristic and biased systematic processing strategies. Secondly, this paradigm does not really contribute to our understanding of the strategies that are used when processing is biased: mere variations in argument quality can not determine how exactly different parts of a persuasive message are processed in order to arrive at a preferred conclusion.

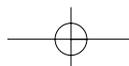
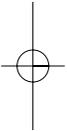
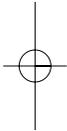
For these reasons, several different processing measures beside variations in argument quality were used in the empirical studies in this thesis in order to assess the extent and direction of processing of action recommendations (Experiments 3.1, 3.2, 3.3, and 4.1). Firstly, a thought-listing procedure was added to each experiment, asking participants to write down the thoughts

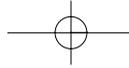




they had while reading the action recommendation. These cognitive responses were categorized into positive, negative, and neutral thought-categories, which were then analyzed separately. Secondly, an extra processing-instruction was added in one experiment (Experiment 3.2), prompting participants to read the recommendation carefully, by telling them that they would have to defend their opinion on the article later on in a group discussion.

With respect to the processing of threatening health information, similar thought-listing techniques were used (Experiment 4.1). In addition, a different research paradigm was used in one study (Experiment 2.1) to gain a more detailed view on possible defensive processing strategies. Following the manipulation of vulnerability as described previously, participants were presented with four research reports on the health consequences of stress (adapted from Liberman and Chaiken, 1992). In two out of four reports, evidence was presented that the consequences of stress vulnerability were quite harmless (e.g. fever or cold hands and feet), whereas in the other two reports, evidence was given that the consequences of stress vulnerability were quite severe (e.g. stomach ulcers or heart disease). To give participants the opportunity to criticize the reports, methodological weaknesses were added to each report in the last paragraph, such as poorly matched control groups, a high subject dropout rate in a longitudinal study, and potential confounds (e.g. patients with stress-related illnesses smoked more cigarettes). Following these manipulations, participants were asked to answer questions measuring their general recall of the 4 reports, as well as specific recall questions on the methodological weaknesses of each report (Appendix 1). Furthermore, participants were asked to write down for each report to what extent they thought it provided evidence that the consequences of stress are severe (directed thought-listing task). These cognitive responses were then categorized not only in terms of valence (positive, negative, neutral), but also in terms of specific defensive strategies, such as rejection of evidence, critical comments on methodological issues and





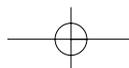
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thoughts about the presented health risk. It was argued that a more detailed analysis of cognitive responses would provide a better understanding of possible reactions to threatening health information.

Empirical evidence

In Chapter 2, the latter paradigm was used to answer the following research questions: (1) how do variations in an individual's vulnerability to and the severity of a certain health risk affect the processing of threatening health information? and (2) do differences in the processing of threatening versus less threatening health messages reflect differences in the extent of processing, differences in the direction of information processing, or both? Following the manipulations vulnerability and severity, participants were asked to write down their thoughts about the various health messages, and answered questions concerning a guided-recall task. The cognitive responses were categorized by two independent raters on valence and on specific content, resulting in 7 categories for each report: thoughts referring to the health risk as (1) severe or (2) mild, thoughts (3) acknowledging and thoughts (4) rejecting one's vulnerability, thoughts (5) accepting and thoughts (6) rejecting a relation between stress and health complaints, and (7) critical comments about the validity of the health messages. The guided recall-responses included general recall as well as recall of the methodological weaknesses in the health messages.

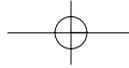
The results showed that both an individual's vulnerability to a health risk and the portrayed severity of this risk affected the processing of health messages. With respect to severity-effects, participants were found to have a better recall of the methodological weaknesses in the health messages when the consequences of the health risk were described as severe rather than mild. The severe research reports were also criticized more often than the mild research reports, however, this effect disappeared when controlling



for the previously described recall-measure. Furthermore, participants more often rejected the existence of a relation between stress and health complaints when the consequences of stress were made out to be severe rather than mild. These findings were not mediated by a better recall of the severe as opposed to the mild health messages. Together, the effects of severity on cognitive responses suggest that the higher incidence of critical comments on messages in which the consequences of a health risk were presented as severe as opposed to mild can at least partly be attributed to an increase in the extent of processing. Severe health messages are thus likely to be processed more systematically than messages in which the consequences of a health risk are presented as mild.

With respect to vulnerability-effects, individuals who felt vulnerable to the health risk were found to have a slightly better recall of the general information in all health messages – but not of the methodological weaknesses in these messages – than individuals who did not feel vulnerable to the health risk. In addition, participants in the high vulnerability condition evaluated all research reports more negatively than participants who did not feel vulnerable to this risk. This effect was not mediated by recall. Thus, high vulnerability participants evaluated all health messages more negatively than low vulnerability participants, regardless of the severity of these messages, and regardless of message scrutiny. The effect of vulnerability on cognitive responses suggest that high vulnerability participants' more negative evaluation of the health messages can not be attributed to an increase in the extent of processing. Instead, the findings suggest that being vulnerable to a health risk will introduce a negative bias in the processing of threatening health messages, leading to a more negative evaluation of these messages, regardless of the extent of processing.

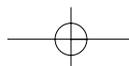
In Chapters 3 and 4, the previously described argument quality paradigm was used to test the Stage model's hypothesis that under conditions of high vulnerability to a health risk, an action recommendation will be 'maximized',



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i.e. processed with a systematic positive bias. Consequently, it is expected that higher levels of vulnerability to a health risk will induce increased persuasion, regardless of the quality of the arguments in an action recommendation. The findings of the four experimental studies described in these chapters were generally consistent with this hypothesis. Across studies, the measures of persuasion were mainly affected by an individual's vulnerability to the health risk, whether this variable was manipulated (Experiments 3.3 and 4.1) or based on self-perception (Experiments 3.1 and 3.2). When participants felt vulnerable to a health risk, they had higher intentions to participate in the recommended action, more often requested information about it, and more often subscribed to it, regardless of the severity of the consequences of the health risk, and regardless of the quality of the arguments in the action recommendation. The quality of the arguments was found to mainly affect the attitudes of people who did not feel vulnerable to the health risk (Study 3.1, 3.2 and 4.1). Similarly, the severity of the consequences of the health risk only affected attitudes of people who did not feel vulnerable to the health risk (Study 3.1 and 3.3).

The one divergence from a very consistent pattern of vulnerability main effects on the measures of persuasion was observed in Experiment 4.1, in which the dependent variables were measured with a delay in timing in one condition. Although in this study, a main effect of vulnerability was again observed on the strongest measure of persuasion, i.e. participants' subscriptions to the recommended action, no main effects were observed intentions and the request for information. On these measures, an interaction between vulnerability and argument quality was observed, indicating that – similar to the findings on attitudes in Study 3.1 and 3.2 – the quality of the arguments affected persuasion only under conditions of low vulnerability. One can only speculate about the cause of this divergent pattern. Possible causes are the delay in measurement that was included in this study, or the fact that this study was the last in a series of experiments using the same research

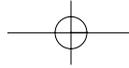


paradigm in the same research area (Utrecht University) – although of course the participants were different in each experiment – due to which the experiment may have become somewhat ‘infamous’.

Nonetheless, the overall persuasion-effects observed across studies suggest that the quality of the arguments in a persuasive message following a fear appeal can affect persuasion, but only for people who do not feel vulnerable to the health risk presented in the fear appeal. Similarly, higher levels of severity of the consequences of a health risk can affect persuasion, but also only for people who do not consider themselves vulnerable to this health risk. Hence, the findings strongly support the hypothesis that high vulnerability to a health risk (whether the consequences are mild or serious) will evoke a motivation to arrive at a preferred conclusion (i.e. defense motivation), resulting in increased acceptance of an action recommendation, regardless of the quality of the arguments supporting it.

More detailed evidence for the hypothesized systematic positive processing bias was found in participants’ cognitive responses to the action recommendation. In Experiment 3.1, participants’ positive and negative thoughts about the action recommendation were analyzed separately. In this study, a main effect of vulnerability was found on the amount of positive thoughts listed concerning the recommended solution: high vulnerability participants listed more positive thoughts than did low vulnerability participants. With respect to negative cognitive responses to the action recommendation, a main effect of argument quality was observed, indicating that (both low and high vulnerability) participants reported more negative thoughts about the action recommendation when it was supported by weak rather than strong arguments.

In Experiment 4.1, using the same positive and negative thoughtlisting-categories, no effects of vulnerability or argument quality were observed on the amount of positive thoughts listed. However, similar to Experiment 3.1,

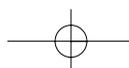


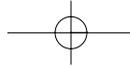
a main effect of argument quality was observed on negative thoughts, with more negative thoughts listed when the recommendation was supported by weak rather than strong arguments. This main effect was qualified, however, by an interaction between vulnerability and argument quality, revealing that the differentiation between strong and weak arguments was only observed under conditions of low vulnerability.

In Experiment 3.2, participants cognitive responses were categorized not only according to valence (positive versus negative) but also according to topic (recommended action versus arguments in the persuasive message), resulting in four categories. In addition, the relative amount, as opposed to the absolute amount, of cognitive responses was analyzed, because the majority of participants listed not more than one thought per category. In this study, main effects of perceived vulnerability were again observed on positive thoughts concerning the recommended action per se as well the arguments in the action recommendation. High vulnerability participants more often listed positive thoughts concerning both the recommended solution and the arguments in the action recommendation than low vulnerability participants.

In addition, interactions between vulnerability and argument quality were observed on positive thoughts about the arguments in the action recommendation, as well as on negative thoughts about the arguments in the recommendation. These interactions revealed that high vulnerability participants listed positive thoughts concerning **strong** arguments in the action recommendation **more often**, and listed negative thoughts concerning **weak** arguments **less often** than did low vulnerability participants.

Together, the findings on participants' cognitive responses across studies provide more detailed support for the hypothesis that higher levels of vulnerability will induce a systematic positive bias in the processing of an action recommendation. Firstly, the observed differentiation between strong and weak arguments suggests that both low and high vulnerability



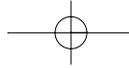


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participants will typically process an action recommendation systematically. Secondly, the general pattern across studies suggests that high vulnerability participants have more positive thoughts, as well as fewer negative thoughts about an action recommendation than low vulnerability participants.

It is important to note that, although the general pattern of findings on participants' cognitive responses provides strong support for the assumption of a positive directional bias, the exact mechanisms underlying this positive bias were not entirely consistent across studies and need to be examined further. Although the more detailed method used for analyzing cognitive responses in Experiment 3.2 as opposed to Experiments 3.1 and 4.1 offered the advantage of gaining more insight into the exact defensive processes at work, it has the drawback of rendering comparison across studies somewhat more difficult. Specifically, it is difficult to conclude from the current findings whether the difference between objective and positively biased systematic processing strategies can be attributed to an increase in positive thoughts, to a decrease in negative thoughts, or to an increase in positive thoughts as well as a decrease in negative thoughts about a recommendation. Future studies should aim at investigating this issue in more detail. In addition, it may be worthwhile investigating whether directional biases are best captured by relative differences, or by absolute differences in cognitive responses.

As was seen, in Chapter 2, evidence was found that higher levels of vulnerability will introduce a negative bias in the processing of threatening health information (primary appraisal). In Chapter 3, evidence was found that higher levels of vulnerability will introduce a positive bias in the processing of an action recommendation (secondary appraisal). According to the Stage model, the vulnerability-induced negative bias in the primary appraisal process will not interfere with the secondary appraisal process, or with persuasion, due to reality constraints. The findings presented in Chapter 4 were consistent with this hypothesis. High vulnerability participants more often questioned the validity of the instrument used to measure their vulnerability to the health



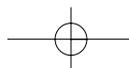
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risk than low vulnerability participants, providing evidence for the hypothesized negative bias in the primary appraisal process. However, in line with expectations, this negative bias in the primary appraisal process did not interfere with persuasion: participants' defensive reactions to the health risk were unrelated to either cognitive responses to the action recommendation or to persuasion.

Finally, the findings in Chapter 4 regarding the effects of fear appeals on persuasion over time were generally consistent with dual-process predictions, attitudes, intentions, and subscriptions did not decrease over time for either low or high vulnerability participants. The one deviation from this pattern was observed on the requests for information. On this measure, a marginally significant interaction between vulnerability and timing of measurement was observed, suggesting that overall, the slight decrease in requests for information that was observed for low vulnerability participants differed from the increase in requests for information that was observed for high vulnerability participants. The separate time-effects for the low and high vulnerability conditions were not significant, however. Overall, these findings suggest that persuasion based on biased systematic processing, which was observed under conditions of high vulnerability, will be – at least – just as stable over time as persuasion based on the objective systematic processing strategies that were observed under conditions of low vulnerability.

Theoretical implications

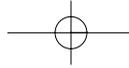
In the introduction of this thesis, it was argued that, in order to find an answer to the question 'how do fear appeals work?' one should examine the cognitive and affective mechanisms underlying the effects of fear appeals on persuasion. It was proposed that the Stage model of fear appeals may provide an answer to this question because it specifies these underlying mechanisms. Considering that I have reviewed the Stage model as well as its



empirical tests, it seems time to formulate my answer to this question. In this section, I will describe what I consider the most important theoretical implications of the theory and empirical studies described in this dissertation. I will start with a review of the question 'when do fear appeals work?', describing the often overlooked distinction between vulnerability and severity information. Next, I formulate my answer to the question why fear appeals work, and propose a possible reconciliation of the observed inconsistencies in fear appeal literature. Finally, the merits of the Stage model in terms of the incorporation of defensive processes will be described, followed by some concluding comments.

When do fear appeals work?

The findings in this thesis demonstrate the importance of differentiating between vulnerability and severity of a health threat when assessing message processing and persuasion effects of a fear appeal. Most previous studies did not differentiate between vulnerability and severity within their manipulation of fear level, and, until now, little information was available on the independent effects of these two variables on the processing of persuasive messages and on persuasion. However, vulnerability appeared to have a more powerful effect on intention than severity in studies in which the two variables were manipulated separately to assess persuasion-effects of both variables (e.g. Maddux & Rogers, 1976; Rogers & Mewborn, 1983; see Conner & Norman, 1996). Also, as some have suggested, it is not unlikely that 'severity must reach a certain magnitude to figure in health decisions, but once that magnitude has been reached decisions are solely a function of perceived susceptibility' (Sheeran & Abraham, 1996, p. 34). Consistent with this notion, in the current thesis, the willingness to adopt a recommended protective action following a fear appeal depended mainly on an individual's vulnerability to a health threat. Higher levels of vulnerability to the health risk were consistently found to affect attitudes, intentions, and behavioral measures.



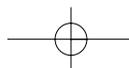
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Moreover, these effects were observed in studies that manipulated vulnerability as well as in studies in which variations in vulnerability were based on self-perception. In contrast, the severity of the health risk did not affect any measure of persuasion, with the exception of low vulnerability participants' attitudes in two studies.

The answer to the question 'when do fear appeals work?' is thus quite straightforward. Fear appeals work when people feel vulnerable to the health risk presented. In other words, fear appeals work when people have the feeling the message applies to them. Fear appeals will not work when people do not feel vulnerable to the health risk described in the persuasive message, no matter how scary the consequences of this health risk may be.

These findings have strong theoretical as well as practical implications. With respect to theory, the current findings suggest that a differentiation between the vulnerability- and severity components is crucial when examining the effects of fear appeals on message processing and persuasion. Although this may seem self-evident, the distinction between these two components has often been ignored, instead the focus in fear appeal research has typically been on the amount of fear elicited by a fear appeal, treating fear as an independent instead of a dependent variable (for a review see Sutton, 1982). It is not unlikely that the focus on fear instead of fear appeals is partly due to the fact that the concept of fear appeals seems to imply that it should evoke fear in order to be effective. The current thesis shows that this view is wrong, and should therefore be altered.

The findings in this dissertation also have strong implications for health education practice. They suggest that health campaigns should aim at conveying an individual's vulnerability to a health risk, and not at merely exemplifying the severity of this risk. Quite often, health education campaigns aim at 'shocking people into persuasion' by presenting vivid, scary material that shows the horrible consequences of a certain health risk. In the Netherlands, recent campaigns using this strategy included posters of people who were

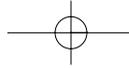


mutilated due to fireworks, and television-campaigns showing the gory details of a car accident due to drunk driving. It is unlikely that these campaigns lead to anything else than aversion. A successful health education campaign should thus include vulnerability-information by e.g. providing information on the high prevalence of this health risk among the target audience, or by exemplifying that 'this may happen to you'.

Why do fear appeals work?

The empirical evidence for the Stage model's hypothesis that defense motivation will induce a positive bias in the processing of action recommendations that was presented in this thesis offers a new perspective on the processing and acceptance of recommendations following the use of fear appeals. It implies that stressing an individual's vulnerability to a health risk in a fear appeal will not induce either increased objective systematic processing, as posited by Baron and colleagues (1994) and by Rogers and Prentice-Dunn (1997), or a motivated acceptance of subsequently presented recommendation based on heuristic processing strategies, as Gleicher and Petty (1992) proposed. Instead, an individual who is vulnerable to a health risk will be motivated to see the bright side to arguments in recommendations, resulting in a more positive perception of strong arguments and a less negative perception of weak arguments.

These findings may reconcile some of the inconsistencies that have been observed in the fear appeal literature. The lack of reliable interactions between fear and efficacy, as well as the typically observed main effects of fear/threat on persuasion in empirical studies are inconsistent with predictions of all classical theories of fear appeals. However, they can be accounted for by the Stage model, by proposing that a positive processing bias applies to efficacy expectations in the same way it applies to arguments supporting an action recommendation. Consequently, variations in response efficacy are most likely to affect persuasion when an individual's vulnerability to a health



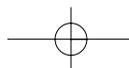
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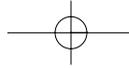
risk is low, because in this case, s/he is most likely to be accuracy motivated. However, an individual who is vulnerable to a health risk will be defense motivated, resulting in a positive bias in the processing of efficacy information, and, consequently in increased persuasion, regardless of variations in response efficacy. Interestingly, this is exactly what is observed when re-examining a study by Maddux and Rogers (1983), which is one of the few studies that reported reliable threat x efficacy interactions. This re-evaluation in light of the Stage model's predictions showed that, consistent with the positive bias hypothesis, intentions were only affected by the manipulation of response efficacy when the probability of occurrence of the health risk (vulnerability) was low, i.e. under accuracy motivation. When vulnerability was high, intentions were high regardless of the efficacy of the recommended action.

Thus, the answer to the question why fear appeals work is that they work because relevant fear appeals motivate people to see the bright side to recommendations, leading to a less negative perception of weak arguments or of only partly effective suggestions. In other words: fear appeals work because people who feel vulnerable to the health risk presented want them to work. Perhaps this focus on the bright side of recommendations reflects the incurable optimistic nature of man: when we find ourselves vulnerable to health risks, we perceive potential solutions to this risk to be better than they really are.

Defensive processes and persuasion

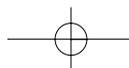
An important contribution of the Stage model is that it is the first model of fear appeals to propose clear hypotheses regarding the relation between defensive reactions to threatening health information and persuasion. The empirical studies that were presented in this thesis provide support for the stage model's hypothesis that fear appeals will typically induce persuasion even if people react to the presentation of a health risk with minimizing

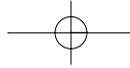




responses. The Stage model of fear appeals and the empirical findings in this thesis fill the gap in fear appeal literature with respect to possible defensive reactions to threatening information. Even though Hovland and colleagues (1953) gave an extensive account of possible defensive reactions to threatening information in a fear appeal, they did not specify under what conditions these defensive reactions would interfere with persuasion and under what conditions they would not. Moreover, empirical studies on this issue have been a scarce thing.

In addition, the Stage model's proposition of different directional biases in the processing of different parts of a fear appeal reconciles the findings of recent studies reporting defensive reactions to threatening health information (Ditto & Lopez, 1992; Liberman & Chaiken, 1992; Reed & Aspinwall, 1998; Sherman et al., 2000) and studies reporting a positive relation between fear or threat and persuasion (Jepson & Chaiken, 1990; Gleicher & Petty, 1992). It has often been assumed that negative biases in the processing of threatening health messages reflect an individual's way of trying to reject these health messages altogether, posing a potential problem for preventive or precautionary behavior (Ditto & Croyle, 1995; Aspinwall & Taylor, 1997). Several researchers have thus been concerned that these defensive processes will ultimately lead to the persistence of bad habits and of maladaptive behavior in general. However, the findings in the current thesis show that there is no need to be overly pessimistic. Evidence was presented that even biased processing will typically be constrained by reality, and that it is unlikely that a negative bias in the processing of a threatening health message will lead to a complete rejection of the health threat, or to decreased persuasion. In fact, the findings in this dissertation suggest the exact opposite: when people process a threatening health message with a negative bias, it is reasonable to assume that they will process a reassuring recommendation with a positive bias.



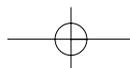


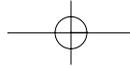
Future directions

In the previous section, I have argued in what way the findings in this dissertation may contribute to theory and practice relating to fear appeals and persuasion. Of course, this does not imply that this dissertation has solved all the questions with respect to fear-induced persuasion, nor does it imply that it has captured all of the creative strategies that people seem to have in store when dealing with threatening information. In the next section, I will address some of the issues which I think are worthwhile investigating in future research. Although I am aware that there are more issues that are fascinating enough to be addressed here, I limit myself to mentioning two topics, i.e. the persistence of persuasion-effects and the role of fear in fear appeals.

The effects of fear appeals on persuasion over time

In the current thesis, evidence was presented that the effects of fear appeals on persuasion are not merely a short-lived reaction to a threatening situation, which disappears as soon as the immediate threat is removed. In Chapter 4, an experimental study was reported that included a delay in measurement, in order to assess the effects of fear appeals on persuasion over time. The findings of this study revealed that persuasion based on biased systematic processing strategies was just as stable as persuasion based on and persuasion based on objective processing strategies: persuasion did not decrease over time for either low or high vulnerability participants. These findings are important, notably because so far, empirical studies on the persistence of fear-induced persuasion have been extremely scarce. Of course, the study that was reported in Chapter 4 should be viewed as a starting point, and certainly more studies are needed with respect to the effects of fear appeals on persuasion over time.

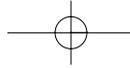




5 Discussion

First of all, although the findings were generally consistent with expectations, one deviation from this pattern was observed on one measure of persuasion. On the relative amount of requests for information about the recommended solution, a marginally significant interaction between vulnerability and timing of measurement was observed, suggesting that there may in fact be differences in the persistence of persuasion-effects of low and high vulnerability participants. Whereas low vulnerability participants' requests for information decreased slightly over time, high vulnerability participants' requests for information increased over time. The latter finding could suggest that under defense motivation, high vulnerability participants' hypothesized positive response tendency with respect to action recommendation may even continue after the acceptance of recommendations, causing a further increase in the evaluation of this recommendation. However, one should be cautious in drawing conclusions from this marginally significant interaction, particularly since it is the one deviation from a consistent pattern of findings. Future studies should address this issue.

A second drawback of the study reported in Chapter 4 is the fact that the temporal lag in measurement was only approximately 15 minutes, which is only quite a short period of time. Thus, future studies should aim at including longer time intervals when examining the persistence of fear-induced persuasion. A longer time interval is especially important since the relation between vulnerability and negative emotions, that was observed in all other studies (Chapter 3) was not observed in the one study which included differences in the timing of measurement. A study showing that persuasion remains stable over time, even once the negative emotions associated with one's vulnerability to a health risk have subsided, would make a stronger case for the persistence-effects observed in this thesis.

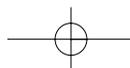


5 Discussion

The role of fear in fear appeals

In Chapter 1, it was argued that it is not certain that fear appeals will always evoke fear, and not likely that it is the emotion of fear that is responsible for the typically observed persuasion-effects. When looking at the empirical evidence presented in this thesis, what can we conclude about the role of fear in persuasion following the use of fear appeals? In the empirical studies presented in this thesis, a situation-specific measure of negative affect was used, assessing several negative emotions – including fear – induced by the presentation of the health risk. The main reason for using a generalized measure of negative affect, rather than a measure of reported fear, was the assumption that people may experience negative emotions other than fear when confronted with threatening health information. The empirical evidence supports this assumption. In all experiments, there was a very strong correlation between all emotions, with no exception whatsoever.

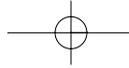
With respect to the relation between fear appeals and fear, the effects of the independent variables on the measure of negative affect were quite clear-cut across studies. Fear – as well as other negative emotions – was found to be mainly affected by one's vulnerability to the health risk, and not by the severity of the consequences of this risk. Moreover, these negative emotions were consistently found to directly affect intentions to participate in the recommended solution, with more negative emotions inducing higher intentions to participate in the recommended solution. These findings indicate that the fear, as well as other negative emotions, evoked by the presentation of a relevant health threat does in fact induce persuasion, although the role of affect as compared to cognitions in affecting persuasion seems to be a modest one. However, as is typically the case with science, many questions remain with respect to the role of emotions in fear-induced persuasion. Firstly, the question as to whether fear appeals evoke some sort of generalized negative affect or, alternatively, specific negative emotions should be addressed in future research.



Secondly, in the current dissertation, negative emotions were not measured until after the presentation of the action recommendation. It was reasoned that a measure of negative affect directly after the presentation of the health risk was likely to make participants suspicious about the research paradigm. However, it is important that future studies aim at including measures of negative affect right after the presentation of the health risk as well as after the presentation of the recommendation. A repeated measure of negative affect would make it possible to assess immediate affective responses to fear appeals as well as possible decreases (or increases) in negative emotions after the processing of reassuring recommendations. Furthermore, a measure of negative affect – particularly a measure aimed at assessing specific emotions – immediately after the presentation of a health risk may allow us to gain more insight into the origins of defense motivation. In the current dissertation, the focus was on consequences of defense motivation, and the origin of defense motivation was proposed to lie in a motivation to protect the self. Although this proposition is firmly based in theory as well as research (see e.g. Steele, 1988; Chaiken et al., 1989; Baumeister, 1996; Chen & Chaiken, 1999; Sherman et al., 2000), the origins of defense motivation are definitely fascinating enough to be examined in future research. Notably, the relation between general or specific negative emotions and the occurrence of defense motivation is worth to be investigated further.

Conclusions

Throughout this dissertation, it has been shown that our understanding of how fear appeals work is increased by a detailed investigation of the motivational and cognitive processes underlying the effects of fear appeals on persuasion. The findings in this dissertation show that the processes underlying fear-induced persuasion are very subtle, involving motivated attempts to minimize some parts of a fear-arousing message and maximize

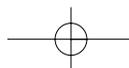


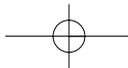
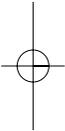
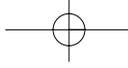
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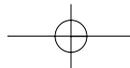
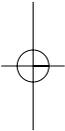
other parts of the same message. These subtle differences could not have been documented without the different cognitive response measures that were used in the various experiments, and thus demonstrate the value of the approach that was taken in this dissertation.

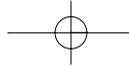
It is also evident from the current findings that – possibly contrary to the hopes of health educators – people are not particularly objective when processing fear-arousing health communications. To quote Marian Anderson once again, it seems that fear appeals do eat away at logic. This may not seem too surprising, since most people will prefer health to illness, and can not be expected to be very enthusiastic about a message claiming that their health may be in danger. However, the assumption of objectivity has pervaded much of the theory and research on fear appeals for decades. The current dissertation shows that this assumption is not warranted. It therefore seems safe to propose that strictly cognitive theories of fear appeals do no justice to the creative ways in which people deal with threatening health information.

Finally, it was also shown in this dissertation that biases in the processing of fear appeals need not necessarily lead to maladaptive responses and reduced persuasion. It is interesting to note that in the field of fear appeals, motivated defensive responses to fear appeals have typically been viewed as something that should be prevented, and objective cognitive responses as something that should be stimulated. Perhaps this view stems from the classic idea that fear should be conquered by ratio, and that people should always try to be objective as possible. Either way, the findings in this dissertation show that this view should be altered. Responses based on defense motivation are not necessarily something that need to be prevented when trying to persuade people, since even defensive biases will still be constrained by reality. Moreover, defensive biases could even be viewed as a good thing, since they were consistently found to lead to increased, instead of decreased persuasion.





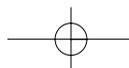


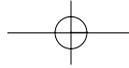


6 Summary

This dissertation has dealt with the study of fear appeals, i.e. messages in which people are presented with fear-arousing health information, in order to convince them they should alter unhealthy habits and adopt healthy lifestyles. Fear appeals typically start with the presentation of the negative consequences of a certain behavior, followed by a recommendation in which a solution to the health risk is offered. The countless examples of fear appeals that can be found in health education practices across the various continents suggest that fear appeals are an effective strategy for changing attitudes or behaviors. And in a way, one could say that they are, since the majority of empirical studies examining the effects of fear appeals on persuasion has found that more fear leads to more persuasion. Unfortunately, the accumulated empirical evidence in support for the positive effect of fear on persuasion has not provided an answer to one crucial question, which is how this effect comes about. Although over the years, various theoretical accounts have been given of the effects of fear appeals on persuasion (Chapter 1), the empirical evidence has not been particularly supportive of any of these theories. In fact, no theory has been able to explain why, or when, for that matter, higher levels of fear lead to more persuasion.

Clearly, the lack of understanding of how fear appeals affect persuasion leaves a considerable void. The aim of this thesis was to fill this void by examining the processes underlying fear-induced persuasion. An information-processing approach was adopted in which it was examined when, and how, different people process the threatening information in a fear appeal and when, and how, people process the reassuring information in an action recommendation. Little is still known about the cognitive processing of fear appeals, and several important questions have been left unanswered. For instance, although the classical theoretical models of fear appeals (implicitly) assume that an individual will typically be motivated to read and think about recommendations following threatening health information intensively, this assumption has never been tested. Furthermore, within





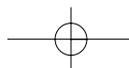
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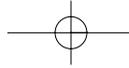
the field of fear appeals, no attention has been paid to the question whether people will process threatening parts of a fear appeal in the same way they will process about the reassuring parts of a fear appeal. In other words, is it reasonable to assume that people will process threatening health messages with the same 'objective' strategies as messages offering potential solutions to a health risk? This thesis aimed to find answers to these questions by proposing a new two-stage model of fear appeals, which is based on dual process theories of persuasion.

The Stage model of fear appeals, which is based on dual-process theories of persuasion (Chaiken, 1980; Petty & Cacioppo, 1986), proposes that, within a fear appeal, one should differentiate between the fear-arousing information on one hand and the reassuring recommendation on the other, because these two parts of a fear appeal are opposite in valence. Furthermore, it is proposed that, within the fear-arousing information, one should differentiate between vulnerability – and severity – information. According to the Stage model, fear appeals can affect the extent of processing as well as the direction of information processing. These effects are particularly likely to occur when an individual's vulnerability to a health risk is stressed.

The Stage model proposes that individuals exposed to a fear arousing communication have to engage in two types of appraisal, namely (primary) appraisal of the threat outlined in the fear appeal, and (secondary) appraisal of coping strategies available for reducing or eliminating the threat. When an individual's vulnerability to a health risk is emphasized in the primary appraisal process, defense motivation is proposed to occur, resulting in a negative bias in the processing of the presented health information. This negative bias will involve motivated attempts to minimize the health threat by scrutinizing the arguments rather critically, searching for inconsistencies and logical errors, and generally downgrading the threat.

However, even biased processing will be constrained by evidence and rules of inference (Kunda, 1990). Thus, exposed to a persuasive fear appeal,

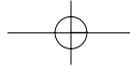




individuals may have to accept that they personally are at risk (provided that the fear appeal is reasonably persuasive), and thus, defense motivation will continue to exist in the secondary appraisal process. However, since an action recommendation contains preference-consistent information, in this case a possible solution to the health risk, a positive bias is proposed to occur in the secondary appraisal process. This systematic positive bias involves motivated attempts to 'maximize' an action recommendation by evaluating it less critically and generally judging the information as more valid. In conclusion, the Stage model proposes that defense motivation will lead to a positive bias in the processing of an action recommendation, and consequently heighten the motivation to accept it, regardless of the quality of the arguments in this recommendation

Primary appraisal: Negative biases in the processing of threatening messages

Although there is some evidence that people respond defensively to threatening health information, several questions have been left unanswered. In Chapter 2, an empirical study was described that aimed to answer the following questions: (1) How do variations in an individual's vulnerability to and the severity of a certain health risk affect the processing of threatening health information? and, (2) do differences in the processing of threatening versus less threatening health messages reflect differences in the extent of processing, differences in the direction of information processing, or both? In Experiment 2.1, participants' vulnerability to a health risk was manipulated, after which participants were presented with 2 severe and 2 mild messages on the negative consequences of this health risk. Each of these messages contained planted methodological weaknesses to give participants the possibility to criticize the health messages. Participants were asked to write down the thoughts they had while reading these messages, as well as

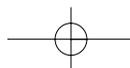


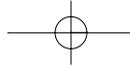
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their recollection of the information in each message. The cognitive responses were broken down into separate thought-categories, which were analyzed separately.

The results showed that participants had a better recall of the methodological weaknesses in the health messages when the messages described the consequences of the health risk as severe rather than mild. Furthermore, the relation between the health risk and actual health consequences was rejected more often when these consequences were described as severe rather than mild. In addition, the severe research reports were criticized more often than the mild research reports, however, this effect disappeared when controlling for the previously described recall-measure. These findings suggest that messages in which the consequences of a health risk are presented as severe will be processed more systematically, and evaluated more critically, than messages in which the consequences of a health risk are presented as mild.

It was also observed that individuals who felt vulnerable to the health risk had a slightly better recollection of the general information – but not of the methodological weaknesses – in all health messages as compared to participants in the low vulnerability condition. Furthermore, highly vulnerable participants were found to evaluate all health messages more negatively than people who did not feel vulnerable to this risk, regardless of their recollection of the information in these messages, and regardless of the severity of the messages. The more negative evaluation of health messages in the high vulnerability condition was not caused by higher levels of systematic processing in this condition, compared to participants in the low vulnerability condition. Hence, the current findings suggest that higher levels of vulnerability to a health risk will induce a negative bias in the processing of threatening health information, resulting in a more negative evaluation of this information, regardless of message scrutiny.



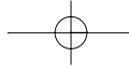


Secondary appraisal: Positive biases in the processing of recommendations

The Stage model of fear appeals predicts that higher levels of vulnerability will induce a systematic positive bias in the processing of an action recommendation, resulting in increased persuasion, regardless of the quality of the arguments in this recommendation. These hypotheses were tested in three experimental studies (Chapter 3). In these studies, participants' vulnerability to a health risk and the severity of this risk were varied, followed by the presentation of an action recommendation, which was supported by either weak or strong arguments. The main dependent measures were attitudes, intentions and behavior with respect to the recommended action, and cognitive responses to this recommendation

All measures of persuasion were mainly affected by an individual's vulnerability to the health risk. When participants felt vulnerable to a health risk – whether manipulated or based on self-perception – they had higher intentions to participate in the recommended action, more often requested information about it, and more often subscribed it. No effects of the severity of the health risk or the quality of the arguments in the recommendation were observed on these measures whatsoever. The quality of the arguments was found to only affect the attitudes of people who did not feel vulnerable to the health risk (Study 3.1 and 3.2). Similarly, the severity of the consequences of the health risk only affected attitudes of people did not feel vulnerable to the health risk (Study 3.1. and 3.3).

Being vulnerable to a health risk also biased cognitive responses to the action recommendation in a positive direction. When individuals felt vulnerable to the health risk, they were more enthusiastic about the recommended action itself, regardless of the quality of the arguments in the action recommendation. In addition, high vulnerability participants were found to be less critical about the content of the persuasive message

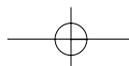


6 Summary

when it was supported by weak arguments, but also more positive when it contained strong arguments. Only positive – and not negative – thoughts mediated the effects of vulnerability on attitudes. Together, these findings strongly support the Stage model's hypothesis that increased vulnerability will lead to a motivated acceptance of a recommendation via biased systematic processing of the arguments in support for this recommendation.

Primary appraisal, secondary appraisal, and persuasion over time

In Chapter 4, it was examined in an experimental study whether the use of fear appeals induces lasting changes in attitudes, intentions, and behavior. The persistence of fear-induced persuasion has hardly ever been the topic of empirical studies. It was expected that persuasion would remain stable over time under conditions of low and high vulnerability. In addition, the relation between primary appraisal, secondary appraisal, and persuasion over time was examined. According to the Stage-model, negative biases in the primary appraisal process will not interfere with secondary appraisal or with persuasion, due to reality constraints. The hypotheses were tested in an experimental study in which vulnerability to a health risk and the quality of the arguments in a recommendation were manipulated. In addition, the timing of measurement of the dependent variables was varied. In one condition, the dependent variables were measured immediately after the presentation of the recommendation; in the other condition, these variables were measured after a filler-task that took about 15 minutes. To avoid an overly complex experimental design, it was decided to drop the manipulation of severity: instead, the consequences of the health risk were presented as severe to all participants. The main dependent variables were attitudes, intentions, behavior, and cognitive responses with respect to the recommendation. In addition, participants were asked to write down their cognitive responses

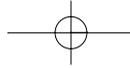


to the health threat, in order to gain more insight into the primary appraisal process.

In line with predictions, no significant decreases or increases in persuasion over time were observed: attitudes, intentions, and subscriptions with respect to the recommendation remained stable over time for both low and high vulnerability participants. These findings suggest that persuasion based on biased systematic processing strategies – observed under high vulnerability – will remain just as stable as persuasion based on ‘objective’ systematic processing strategies observed under conditions of low vulnerability. Furthermore, a negative bias in the processing of the threatening health information was observed under conditions of high vulnerability: participants who felt vulnerable to the health risk more often criticized the validity of the CSVI, the instrument allegedly measuring vulnerability to the health risk. In addition, a positive bias in the processing of the action recommendation was observed, although this bias was less pronounced as compared to the studies reported in Chapter 3. In line with the Stage model’s predictions, the observed negative bias in the primary appraisal process did not interfere with persuasion: participants’ defensive reactions to the health risk were unrelated to either the cognitive responses to the action recommendation or persuasion at both points in time.

Conclusions

The findings in this dissertation demonstrate that our understanding of the relation between fear appeals and persuasion is significantly increased by a study of the cognitive and affective processes underlying fear-induced persuasion. The Stage model that was introduced here is the first model of fear appeals to offer explicit hypotheses with respect to these underlying processes. The hypotheses were generally supported. Specifically, consistent empirical support was found for the Stage model’s assumption that higher

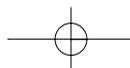


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levels of vulnerability to a health risk will induce a negative bias in the processing of fear appeals, and a positive bias in the processing of recommendations. These findings have important theoretical and practical implications.

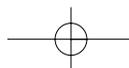
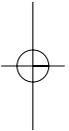
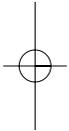
An implication of the current findings is that the emphasizing of an individual's vulnerability to a health risk will not induce an 'objective' processing of action recommendations, as was assumed by the classical theories of fear appeals, but rather a motivation to see the bright side to these recommendations. These findings offer a possible explanation for the observed inconsistencies in fear appeal literature. The typically observed main effects of fear on persuasion, as well as the lack of empirical support for interactions between fear and efficacy expectations are problematic for the classical fear appeal theories. However, both findings are consistent with the Stage model's predictions. According to this model, higher levels of vulnerability will induce defense motivation, which will eventually lead to a main effect of 'fear' (i.e. vulnerability) on persuasion. Moreover, it can be argued that a defense motivated individual will be motivated to see the bright side to efficacy-expectations presented in a recommendation, in a similar way s/he will be motivated to see the bright side to the quality of the arguments in a recommendation. Thus, variations in the efficacy of a recommendation are most likely to affect persuasion when an individual is accuracy motivated, i.e. when an individual does not feel vulnerable to the presented health risk.

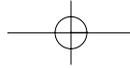
It is also evident from the findings in this dissertation that negative defensive responses to threatening health messages need not necessarily lead to decreased persuasion. It has generally been assumed that defensive reactions to threatening information are something that should be prevented, and that only 'objective' acceptance of the information in a fear appeal will ensure increases in persuasion. The current findings demonstrate that this assumption is not valid: fear appeals can induce persuasion even if people react to the health risk with minimizing responses.





Finally, the results of this dissertation have clear practical implications. It was demonstrated that health education campaigns should aim at conveying people's vulnerability to a health risk, and not at emphasizing the severity of this risk. Quite often, health educators try to 'shock people into persuasion' by presenting vivid, scary material that shows the severity of the consequences of a certain health risk. It is unlikely that these campaigns lead to anything else than aversion. A successful health education campaign should thus include vulnerability-information by e.g. providing information on the high prevalence of this health risk among the target audience, or by exemplifying that 'this may happen to you'.

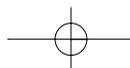


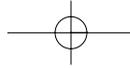


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In dit proefschrift werd onderzocht hoe het gebruik van angstaanjagende boodschappen – of angstcommunicaties – in gezondheidsvoorlichting overtuigingsprocessen beïnvloedt. Met angstcommunicaties worden hier voorlichtingsboodschappen bedoeld waarin gebruik gemaakt wordt van angstaanjagende gezondheidsinformatie om mensen aan te zetten om ongezonde gewoonten af te zweren en gezonde aanbevelingen over te nemen. Uit het veelvuldig gebruik van angst in voorlichtingscampagnes zou men gemakkelijk kunnen concluderen dat angstcommunicaties een goede strategie zijn om mensen te overtuigen. Aangezien het merendeel van de empirische studies naar de effecten van angstcommunicaties heeft gevonden dat meer angst leidt tot meer overtuiging lijkt het erop dat deze conclusie gerechtvaardigd is. Echter, de talloze studies op het gebied van angstcommunicaties hebben een belangrijke vraag onbeantwoord gelaten, namelijk hoe dit effect tot stand komt. Alhoewel er in de loop der jaren verschillende theorieën zijn ontwikkeld op dit gebied, bieden de empirische bevindingen maar gedeeltelijke ondersteuning voor de verschillende theoretische aannamen op het gebied van angstcommunicaties (Hoofdstuk 1).

Een mogelijke verklaring voor het gebrek aan inzicht in de relatie tussen angstcommunicaties en overtuiging is het feit dat de klassieke theorieën op dit gebied zich met name gericht hebben op de effecten van angst op overtuigingsmaten zoals attitudes en intenties ten aanzien van een aanbeveling, en niet op de processen die ten grondslag liggen aan deze effecten. Het doel van dit proefschrift was om meer inzicht te krijgen in deze onderliggende processen. Vanuit een informatieverwerkingsperspectief werd gekeken wanneer, en hoe, mensen de angstaanjagende informatie in een angstcommunicatie verwerken alsmede wanneer, en hoe, mensen de geruststellende informatie in een aanbeveling verwerken. Aangezien deze processen nog nauwelijks onderzocht zijn, zijn verschillende belangrijke vragen onbeantwoord gebleven. Bijvoorbeeld, de klassieke theorieën over angstcommunicaties delen de aanname dat mensen in het algemeen gemotiveerd zullen

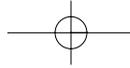




zijn om de aanbeveling die volgt op angstcommunicaties systematisch te verwerken, i.e. te lezen en erover na te denken. Deze aanname is echter nog nooit getoetst. Daarnaast is er nauwelijks aandacht besteed aan de vraag of mensen de informatie in een angstcommunicatie op eenzelfde manier zullen verwerken als de informatie in een aanbeveling. Deze vraag is belangrijk, te meer daar een angstboodschap bedreigende informatie bevat, en een aanbeveling juist informatie bevat die deze dreiging weg zou kunnen nemen. Men zou zich derhalve kunnen afvragen of het wel redelijk is om aan te nemen dat mensen beide boodschappen op een 'objectieve' manier zullen verwerken. In deze dissertatie werd getracht deze vragen te beantwoorden door middel van de presentatie van een nieuw stadia-model van angstcommunicaties.

Het Stadia-model van angstcommunicaties, dat gebaseerd is op dual-process theorieën van overtuiging (Chaiken, 1980; Petty & Cacioppo, 1986), stelt dat het van belang is om een onderscheid te maken tussen een angstcommunicatie en de daarop volgende aanbeveling, aangezien deze boodschappen een tegengestelde valentie hebben. Daarnaast wordt gesteld dat men binnen een angstcommunicatie onderscheid dient te maken tussen het benadrukken van iemands kwetsbaarheid voor een bepaald gezondheidsrisico en de ernst van dit risico. Volgens het Stadia-model kunnen angstcommunicaties zowel een effect hebben op de mate van informatieverwerking als op de richting van informatieverwerking. Dit zal met name het geval zijn wanneer iemands kwetsbaarheid voor een gezondheidsrisico benadrukt wordt.

Volgens het stadia-model van angstcommunicaties is angst-geïnduceerde overtuiging gebaseerd op twee stadia van waarneming, namelijk de (primaire) waarneming van de dreiging beschreven in de angstcommunicatie, en de (secundaire) waarneming van potentiële oplossingen voor deze dreiging zoals beschreven in de aanbeveling. Wanneer een individu zich kwetsbaar acht voor het beschreven risico in het primaire waarnemingsproces, zal een defensieve



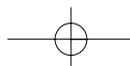
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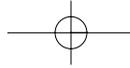
motivatie optreden, leidend tot een systematische negatieve vertekening in de verwerking van de angstcommunicatie. Deze negatieve vertekening zal tot uiting komen in een zeer kritische verwerking van de boodschap en pogingen om de dreiging te 'minimaliseren'.

Echter, ook vertekende verwerkingsprocessen zijn gehouden aan 'reality constraints', d.w.z. ook vertekeningen kunnen maar tot op zekere hoogte optreden, omdat ze gebonden zijn aan de realiteit van de boodschap (Kunda, 1990). Derhalve zal een individu uiteindelijk de informatie in de angstcommunicatie moeten accepteren (op voorwaarde, natuurlijk, dat deze realistische informatie bevat) en defensief gemotiveerd blijven bij het verwerken van een aanbeveling (secundaire waarneming). Echter, aangezien een aanbeveling preferentie-consistente informatie bevat in de vorm van een potentiële oplossing voor het gezondheidsrisico, wordt verwacht dat deze verwerkt zal worden met een positieve vertekening. Deze positieve vertekening zal tot uiting komen in een minder kritische verwerking van de aanbeveling en in pogingen om de aanbeveling te 'maximaliseren'. Concluderend wordt verwacht dat onder defensieve motivatie een positieve vertekening optreedt in de verwerking van een aanbeveling, leidend tot meer overtuiging, onafhankelijk van de kwaliteit van de argumenten in een boodschap.

Negatieve vertekeningen in de verwerking van angstboodschappen

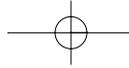
Alhoewel recente studies hebben aangetoond dat mensen defensief kunnen reageren op bedreigende gezondheidsinformatie, hebben deze studies niet alle vragen beantwoord. Het doel van het experiment dat beschreven werd in Hoofdstuk 2 was een antwoord te vinden op de volgende vragen: (1) Wat is de invloed van variaties in kwetsbaarheid en ernst op de verwerking van bedreigende gezondheidsinformatie?, en (2) zijn verschillen in de verwerking





van informatie met verschillende niveau's van dreiging te wijten aan verschillen in de mate van verwerking, verschillen in de richting van verwerking, of aan beide? In Experiment 2.1 werd de kwetsbaarheid van proefpersonen voor een gezondheidsrisico gemanipuleerd, waarna zij 2 ernstige en 2 minder ernstige boodschappen te lezen kregen over de negatieve gevolgen van dit gezondheidsrisico. Elk van deze boodschappen bevatte opzettelijke methodologische fouten, om proefpersonen de mogelijkheid te bieden de gezondheidsboodschappen te bekritisieren. Aan proefpersonen werd gevraagd op te schrijven wat zij zich konden herinneren over de verschillende boodschappen, alsmede hun persoonlijke gedachten over deze boodschappen. Deze gedachten werden vervolgens gecategoriseerd en apart geanalyseerd.

Uit de resultaten bleek dat proefpersonen een betere herinnering hadden van de methodologische fouten in de ernstige boodschappen dan van de fouten in de minder ernstige boodschappen. Ook werd de relatie tussen het gezondheidsrisico en daadwerkelijke gezondheidsklachten vaker verworpen naarmate deze gezondheidsklachten als ernstiger waren beschreven. Verder bleken proefpersonen meer kritische gedachten te hebben over de ernstige dan over de minder ernstige boodschappen. Echter, dit laatste effect verdween wanneer gecontroleerd werd voor herinnering. Deze bevindingen tonen aan dat mensen gezondheidsboodschappen systematischer en kritischer verwerken naarmate de gevolgen van een gezondheidsrisico als ernstiger worden beschreven. Proefpersonen in de hoge kwetsbaarheidsconditie bleken een enigszins betere herinnering te hebben van de algemene informatie – maar niet van de fouten – in de gezondheidsboodschappen dan proefpersonen die zich niet kwetsbaar achtten voor het gezondheidsrisico. Daarnaast bleken proefpersonen in de hoge kwetsbaarheidsconditie alle boodschappen negatiever te evalueren dan proefpersonen in de lage kwetsbaarheidsconditie, onafhankelijk van herinnering, en onafhankelijk van de ernst van de boodschappen. De negatievere evaluatie van alle gezondheidsboodschappen



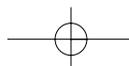
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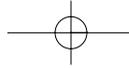
in de hoge kwetsbaarheidsconditie was niet te wijten aan een meer systematische verwerking in deze conditie, vergeleken met proefpersonen in de lage kwetsbaarheidsconditie. Derhalve suggereren deze bevindingen dat een hoge kwetsbaarheid voor een gezondheidsrisico een vertekening in de verwerking van angstboodschappen induceert, leidend tot een negatievere evaluatie van deze boodschappen.

Positieve vertekeningen in de verwerking van aanbevelingen

Het Stadia-model van angstcommunicaties stelt dat een hoge kwetsbaarheid voor een gezondheidsrisico zal leiden tot een systematische positieve vertekening in de verwerking van een aanbeveling, en derhalve tot meer overtuiging, ongeacht de kwaliteit van de argumenten in deze aanbeveling. Deze hypothese werd getoetst in 3 experimentele studies (Hoofdstuk 3). In deze studies werden de kwetsbaarheid voor en de ernst van een gezondheidsrisico gevarieerd, gevolgd door een aanbeveling die werd ondersteund met zwakke dan wel sterke argumenten. De belangrijkste afhankelijke variabelen waren attitudes, intenties en gedrag ten aanzien van de aanbeveling en cognitieve responsen over deze aanbeveling.

De resultaten van deze studies bieden sterke ondersteuning voor de positieve verwerkingshypothese. De maten van overtuiging werden hoofdzakelijk beïnvloed door de kwetsbaarheid voor het gezondheidsrisico, ongeacht het feit of deze variabele gemanipuleerd was of gebaseerd op de eigen inschatting van proefpersonen. In de conditie van hoge kwetsbaarheid werden positievere attitudes, hogere intenties, meer aanvragen voor informatie over de aanbeveling en meer inschrijvingen voor deze aanbeveling geconstateerd dan in de conditie van lage kwetsbaarheid, ongeacht de kwaliteit van de argumenten en ongeacht de ernst van het gezondheidsrisico. De manipulaties van ernst en argument kwaliteit bleken alleen een effect te hebben op de attitudes van proefpersonen in de lage



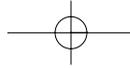


kwetsbaarheidsconditie. Deze bevindingen zijn consistent met de hypothese dat hogere niveau's van kwetsbaarheid leiden tot een gemotiveerde acceptatie van een aanbeveling.

Meer gedetailleerd bewijs voor de positieve verwerkingshypothese werd gevonden in de cognitieve responsen van proefpersonen ten aanzien van de aanbeveling. Wanneer men zich kwetsbaar achtte voor het gezondheidssrisico was men positiever over het aanbevolen gedrag, ongeacht de kwaliteit van de argumenten in de aanbeveling. Daarnaast bleken proefpersonen in de hoge kwetsbaarheidsconditie zich minder kritisch uit te laten over een zwak beargumenteerde aanbeveling, maar juist positievere gedachten te hebben over een sterk beargumenteerde aanbeveling. Samen bieden de bevindingen in de verschillende experimenten sterke ondersteuning voor de aanname dat hoge niveau's van kwetsbaarheid leiden tot een systematische positieve vertekening in de verwerking van een aanbeveling, en dus tot meer overtuiging, ongeacht de kwaliteit van de argumenten ter ondersteuning van deze aanbeveling.

Angstcommunicaties en de persistentie van overtuiging

In Hoofdstuk 4 werd in een experimentele studie onderzocht of het gebruik van angstcommunicaties leidt tot blijvende veranderingen in attitudes, intenties en gedrag, of slechts tijdelijke veranderingen in overtuiging induceert. Deze vraag is nog nauwelijks onderzocht. Verwacht werd dat zowel onder condities van lage als onder condities van hoge kwetsbaarheid overtuiging stabiel zou blijven over tijd. Daarnaast werd in deze studie onderzocht wat de relatie is tussen primaire en secundaire waarderingsprocessen, en overtuiging over tijd. Volgens het Stadia-model van angstcommunicaties zullen negatieve vertekeningen in het primaire waarderingsprocessen niet interfereren met secundaire waarderingsprocessen, of met overtuiging, vanwege het feit dat mensen gebonden zijn aan realiteitsbeperkingen. Deze hypothese werd

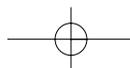


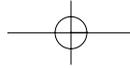
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getoetst in een experiment waarin zowel de kwetsbaarheid voor een gezondheidsrisico als de kwaliteit van de argumenten in een aanbeveling gemanipuleerd werden. Daarnaast werd de timing van de nameting gevarieerd: in de ene conditie werd de nameting direct na de aanbeveling afgenomen, in de andere conditie werd deze pas afgenomen na een filler-taak van ongeveer 15 minuten. Ter voorkoming van een te complex design werd de ernst van de gevolgen van het gezondheidsrisico niet gevarieerd; in alle condities werden deze gevolgen beschreven als ernstig. De belangrijkste afhankelijke variabelen waren attitudes, intenties, en gedrag en cognitieve responsen ten aanzien van de aanbeveling. Daarnaast werd een cognitieve responstaak over het gezondheidsrisico toegevoegd om inzicht te krijgen in het primaire waarderingsproces.

Overeenkomstig de verwachtingen bleken de overtuigingsmaten geen significante toe of afnames over tijd te vertonen: de attitudes, intenties en inschrijvingen voor de aanbeveling van zowel mensen in de lage als in de hoge kwetsbaarheidscondities bleven onveranderd over tijd. Deze bevindingen suggereren dat zowel overtuiging gebaseerd op vertekende systematische verwerking, geobserveerd onder hoge kwetsbaarheid, als overtuiging gebaseerd op 'objectieve' systematische verwerking van een aanbeveling, geobserveerd onder condities van lage kwetsbaarheid, redelijk stabiel zal blijven over tijd.

Onder condities van hoge kwetsbaarheid werd, zoals verwacht, een negatieve vertekening in de verwerking van de angstcommunicatie geobserveerd: personen die zich kwetsbaar achtten voor het gezondheidsrisico zetten vaker kanttekeningen bij de betrouwbaarheid van de CSVI, het instrument waarvan gezegd werd dat het kwetsbaarheid voor het gezondheidsrisico zou meten. In de hoge kwetsbaarheidsconditie werd eveneens een positieve vertekening in de verwerking van de aanbeveling geconstateerd, zij het minder geprononceerd als in de studies gerapporteerd in Hoofdstuk 3. Overeenkomstig de verwachtingen van het Stadia-model bleek de negatieve



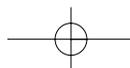


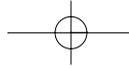
vertekening niet te interfereren met overtuiging: defensieve reacties op het gezondheidsrisico waren noch gerelateerd aan de cognitieve responsen op de aanbeveling, noch aan overtuiging.

Conclusies

De bevindingen in deze dissertatie tonen aan dat ons inzicht in relatie tussen angstcommunicaties en overtuiging aanzienlijk vergroot wordt door het bestuderen van de affectieve en cognitieve processen die ten grondslag liggen aan angst-geïnduceerde overtuiging. Het Stadia-model dat hier geïntroduceerd werd is het eerste model van angstcommunicaties met expliciete hypothesen over deze onderliggende processen. Deze hypothesen werden grotendeels bevestigd. Er werd steun gevonden voor de assumptie dat een hoge kwetsbaarheid voor een gezondheidsrisico leidt tot een systematische negatieve vertekening in de verwerking van angstcommunicaties, alsmede tot een systematische positieve vertekening in de verwerking van een aanbeveling. Deze bevindingen hebben belangrijke theoretische en praktische implicaties.

Een implicatie van de huidige bevindingen is dat het benadrukken van iemands kwetsbaarheid voor een gezondheidsrisico in een angstcommunicatie niet zal leiden tot een 'objectieve' verwerking van een aanbeveling, zoals algemeen werd aangenomen in klassieke theorieën op dit gebied, maar tot een motivatie om aanbevelingen in een positief licht te zien. Deze bevindingen bieden een mogelijke verklaring voor de inconsistente bevindingen in eerder onderzoek naar angstcommunicaties. De doorgaans geconstateerde hoofdeffecten van angst/dreiging op overtuiging, en het gebrek aan empirische steun voor interacties tussen angst en effectiviteitsverwachtingen waren problematisch voor de klassieke theorieën. Echter, beide bevindingen zijn in overeenstemming met het Stadia-model van angstcommunicaties. Immers, hogere niveau's van kwetsbaarheid zullen leiden tot een



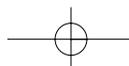


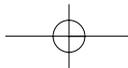
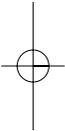
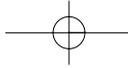
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defensieve motivatie, en dientengevolge tot een hoofdeffect van 'angst' (i.e. kwetsbaarheid) op overtuiging. Bovendien kan worden aangenomen dat een defensief gemotiveerd individu geneigd zal zijn om de effectiviteitsverwachtingen in een aanbeveling - overeenkomstig argument kwaliteit- in een positief licht te zien. Derhalve kan verwacht worden dat variaties in effectiviteitsverwachtingen alleen dan een effect zullen hebben op overtuiging wanneer men niet defensief gemotiveerd is, dit wil zeggen wanneer men zich niet kwetsbaar acht voor het gepresenteerde gezondheidsrisico.

In deze dissertatie is eveneens gebleken dat negatieve defensieve reacties op angstcommunicaties niet noodzakelijkerwijs nadelige effecten op overtuiging zullen hebben. Algemeen werd aangenomen dat negatieve defensieve reacties op bedreigende informatie moesten worden voorkomen, en dat een 'objectieve' acceptatie van de informatie in een angstcommunicatie nodig was om overtuiging te bewerkstelligen. Deze aanname is onjuist gebleken: angstcommunicaties kunnen leiden tot overtuiging ondanks 'minimaliserende' defensieve reacties op deze boodschappen.

De bevindingen in deze dissertatie hebben ook duidelijke praktische implicaties. Ze suggereren dat voorlichtingscampagnes zich vooral zouden moeten richten op het overbrengen van iemands kwetsbaarheid voor een gezondheidsrisico, en niet op het benadrukken van de ernstige gevolgen van dit risico. Vaak wordt in voorlichtingscampagnes getracht mensen te overtuigen door ze te shockeren, bijvoorbeeld door het gebruik van angstaanjagend beeldmateriaal waarin de ernst van de consequenties van een bepaald gedrag tot in detail getoond wordt. Het is onwaarschijnlijk dat dergelijke boodschappen zullen overtuigen. Een effectieve voorlichtingscampagne dient ten minste informatie over kwetsbaarheid te bevatten, bijvoorbeeld door te laten zien dat 'dit iedereen kan overkomen'.





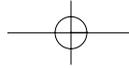
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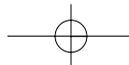
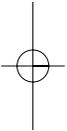
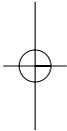
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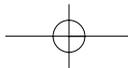
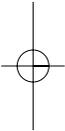
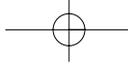


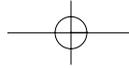
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Appendix 1

Assessment of recall of threatening health messages in Experiment 2.1

In Experiment 2.1, participants' recall of the four health messages presented was assessed after they had read all these messages. Participants were asked to answer, for each health message, one general recall-question and one question with the respect to the methodological weaknesses included in the message. An introduction was given before these questions, to make sure that participants knew which health message was meant. The introductions and specific questions for each message are reported below.

Recall health message 1

In the longitudinal study which was conducted at the Universities of Chicago and Maryland by Benson, Rogers, and Evans (1998) it was examined whether the CSVI-scores of three age-groups (25-35 years, 36-55 years, and 56 years and above) were related to health complaints.

(General recall)

Was there a relation between stress vulnerability and health complaints for the different age-groups? Elaborate.

(Recall of methodological weaknesses)

Can we generalize the findings of this research? Why?

Recall health message 2

In the study of Evans et al. (1997) conducted at the Chicago General Hospital it was examined whether men with and without a heart condition differed in stress vulnerability, and in other factors that be related to health.

(General recall)

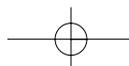
Was there a difference in CSVI-score between the men with and without a heart condition? Elaborate.

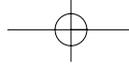
(Recall of methodological weaknesses)

Were there any effects observed of lifestyle that could have affected the health of these men? Elaborate.

Recall health message 3

In the research reported by Brewster et al. (1997), conducted between 1992-1996, the health of a stress-risk group (moderately to very vulnerable to stress) was compared





to that of a control group (somewhat or moderately vulnerable to stress) on the OMSQ-checklist and from medical files.

(General recall)

Were there any differences in health between the high-riskgroup and the control-group?

Elaborate.

(Recall of methodological weaknesses)

What differences were there between the high-riskgroup and the control-group with respect to medical files?

Recall health message 4

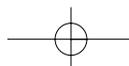
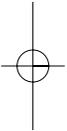
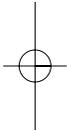
In the research conducted by Van Diem, Schwartz en Evenhaus (1997) the CSVI-scores of different patient-groups (stomach ulcer, brain infarction) was compared to that of a control group.

(General recall)

Were there any differences in CSVI-scores of the different patient groups and that of the control group? Elaborate.

(Recall of methodological weaknesses)

Can you remember any specifics about the control group in this research? Elaborate.



Appendix 2

Results of Experiment 4.1 on entire sample (N= 126)

Manipulation checks

Because there was no delay in measurement of the manipulation checks, 2 (vulnerability) x 2 (argument quality) analyses of variance were conducted. An ANOVA on the manipulation check of perceived vulnerability revealed a main effect of vulnerability, $F(1,122) = 4.85$, $p < .05$. Vulnerability was perceived as higher under conditions of high vulnerability ($M=3.43$) rather than low vulnerability ($M=2.92$). No further effects were found. An ANOVA on the manipulation check of perceived argument quality revealed that the quality of the arguments in the persuasive message was perceived as higher in the strong arguments condition ($M_{strong} = 4.72$) than in the weak arguments condition ($M_{weak} = 3.95$), $F(1,122) = 12.78$, $p < .001$. In addition, an interaction between vulnerability and argument quality was found on the measure of perceived argument quality, $F(1,122) = 4.89$, $p < .05$. Simple effects analyses revealed that subjects differentiated between strong and weak arguments only under conditions of low vulnerability, $F(1,123) = 16.57$, $p < .001$. See Table 1. No further effects were found.

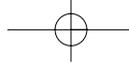
Table 1: Means on manipulation check of argument quality as a function of vulnerability and argument quality

	weak arguments	strong arguments
Low vulnerability	3,77	5,01
High vulnerability	4,13	4,42

Dependent measures

Persuasion

Attitude. A 2 x 2 x 2 ANOVA was conducted on subjects' attitude toward the stress management training. A marginally significant main effect of argument quality was observed, $F(1,118) = 3.08$, $p < .10$; when the recommendation contained strong arguments, the attitude toward the training was more favorable ($M=4.64$) than when weak arguments were used ($M=4.35$). In addition, a marginally significant interaction between vulnerability and argument quality was found, $F(1,118) = 3.75$, $p < .06$. Simple effects analyses revealed that argument quality had an effect on subjects' attitude toward the training only under



conditions of low vulnerability, $F(1,123) = 6.43$, $p < .05$. See Table 2.

Table 2: Means on attitude toward recommended action as a function of relevance and argument quality

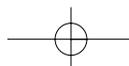
	weak arguments	strong arguments
Low vulnerability	4,22	4,85
High vulnerability	4,47	4,43

Intention. A 2 x 2 x 2 ANOVA on subjects' intention to participate in a stress management training again revealed a marginally significant effect of argument quality $F(1,118) = 3.04$, $p < .10$; the intention to participate in the training was higher with strong arguments ($M = 4.63$) than with weak arguments ($M = 4.35$). In addition, a marginally significant interaction between vulnerability and timing of measurement was observed, $F(1,118) = 3.29$, $p < .08$. No significant simple effects were observed, suggesting that overall, the intention decreased with time under conditions of low vulnerability, but increased with time when vulnerability was high. See Table 3.

Table 3: Means on intention to participate in recommended action as a function of vulnerability, timing and argument quality

Low vulnerability	Time 1	Time 2
Weak arguments	3,02	3,08
Strong arguments	4,25	3,45
High vulnerability	Time 1	Time 2
Weak arguments	3,16	3,81
Strong arguments	3,34	3,85

Behavior. The effects of the independent variables on the behavioral measures were tested with logistic regression analyses. An interaction between vulnerability and argument quality was observed, $Wald(1) = 4.18$, $p < .05$. When vulnerability was low, more requests for information were made when the recommendation contained strong rather



Appendix 2

than weak arguments. When vulnerability was high, no significant differentiation between strong and weak arguments was observed. Furthermore, a marginally significant interaction between vulnerability and timing of measurement was found, $Wald(1) = 3.09, p < .08$. When vulnerability was low, the amount of requests for information decreased over time; in contrast, when vulnerability was high, the requests for information increased over time. See Table 4.

Table 4: Relative amount of requests for information about the recommended action as a function of vulnerability, timing and argument quality

Low vulnerability	Time 1	Time 2
Weak arguments	60%	56,3%
Strong arguments	86,7%	68,8%
High vulnerability	Time 1	Time 2
Weak arguments	62,5%	75%
Strong arguments	41,2%	66,7%

On subjects' actual subscription to the stress management training, a main effect of vulnerability was found, $Wald(1) \beta = 4.42, p < .05$, indicating that the percentage of subscriptions was higher when vulnerability was high (37,5%) rather than low (27,4%). No further main effects or interactions were found.

Finally, correlational analyses revealed that all persuasion measures were significantly interrelated. The attitude toward the training was significantly related to the intention to participate in a training ($r = .48, p < .001$), the request for information ($r = .31, p < .001$) and subscriptions to the training ($r = .22, p < .05$). The intention was significantly related to the request for information ($r = .66, p < .001$) and subscriptions to the training ($r = .61, p < .001$), and the two behavioral measures of request for information and subscriptions were significantly interrelated as well ($r = .41, p < .001$).

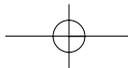
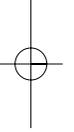
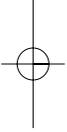
Processing measures

Thought-listing

Because there was no delay in measurement of the cognitive responses, all categories were analyzed using 2 (vulnerability) x 2 (argument quality) ANOVA's. With respect to

cognitive responses to the health threat, an interaction between vulnerability and argument quality was observed on vulnerability thoughts, $F(1,122) = 12.31$, $p < .001$. Simple effects analysis revealed that high vulnerability participants listed more positive thoughts concerning their vulnerability to stress when the recommendation was supported by weak ($M = .41$) rather than strong arguments ($M = .04$), $F(1,123) = 6.08$, $p < .05$ (range is -2 to 2). Under conditions of low vulnerability, a reverse effect was observed, with more positive vulnerability-thoughts listed when the recommendation was supported by strong ($M = .32$) rather than weak arguments ($M = -.10$). No further effects were found. On thoughts questioning the validity of the CSVI, a marginally significant main effect of vulnerability was observed, $F(1,122) = 3.12$, $p < .10$; more doubts were raised about the validity of the CSVI when vulnerability was high ($M = .27$) rather than low ($M = .13$) (means range from 0 – 2). No further effects were found.

With respect to positive thoughts about the action recommendation, no effects of vulnerability or argument quality were found (means range from 0 – 4). Regarding negative thoughts about the action recommendation, a main effect of argument quality was observed, $F(1,122) = 15.91$, $p < .001$; more negative thoughts were listed when the recommendation contained weak ($M = .99$) rather than strong arguments ($M = .41$) (means range from 0 – 3). This main effect was qualified, however, by an interaction between vulnerability and argument quality, $F(1,122) = 12.66$, $p < .001$. Simple effects analyses revealed that when vulnerability was low, more negative thoughts were listed for weak ($M = 1.32$) than for strong arguments ($M = .23$) (means range from 0 – 3). This effect was not observed under conditions of high vulnerability.





Curriculum Vitae

Enny Das was born on **June 16th, 1967** in Knegsel, the Netherlands.

She completed her secondary education (Athenaeum) in 1986.

Between 1986 and 1989 she studied economics and linguistics in Rotterdam. In 1989, she graduated and went on to study Psychology, with a major in Social Psychology, at the University of Amsterdam. In 1994, she graduated.

Between 1994 and 1997, she traveled and worked in marketing research, after which she started working as a Ph.D. student at the department of Social and Organizational Psychology of Utrecht University (1997-2001). The present dissertation is the result of that work, conducted at the Research School for Psychology and Health. Enny is currently working as an Assistant Professor at the department of Communication and Innovation Studies of Wageningen University.

