

The characteristics of a potential goal threat predict attention and information-seeking in middle-aged and older adults

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Abstract The present experiment examined to what extent features of a potential goal threat and personal characteristics affect attention and information-seeking in 124 adults aged 50–70. We manipulated two characteristics of a potential decline in future health: the amount of control people have over preventing the threat (no-control versus control) and the amount of time left before the threat will occur (short-term versus long-term). As expected, a shorter period of time left resulted in more attention being paid to threat signals and also in more information being sought. Control did not influence attention, but did have an effect on information-seeking behavior. More control resulted in more time that was taken to seek information about the potential health threat and possible ways to prevent it. Aging anxiety was a predictor of attention, and age and education predictors of information-seeking. None of the other personal factors were found to be relevant.

Keywords Proactive coping · Experiment ·
Attentional bias · Information-seeking · Aging

Introduction

Since pursuing and achieving personal goals influence subjective well-being (Brunstein 1993; Diener et al. 1999; Rapkin and Fischer 1992), successfully managing goal

threats is an essential part of life. The processes through which people identify goal threats and cope with these threats have been mainly described from a reactive point of view. However, people may also be able to handle such potential future problems at an early stage and make efforts to prevent them or their consequences; in other words, they may be capable of engaging in proactive coping (Aspinwall 1997, 2005; Aspinwall and Taylor 1997).

The term proactive coping covers various strategies, of which attention and information-seeking are two of the most important. Effective proactive coping starts with recognizing future changes as potential threats that require action. In order to be able to detect potential stressors, people need to screen their environment for important information and direct their attention to warning cues that announce the possible emergence of a problem (Aspinwall 1997; Aspinwall and Taylor 1997). Once a future event has been detected and appraised as a problem, several activities may be employed which are aimed at attempting to prevent the threat or to offset its consequences. Paying attention to a potential stressor is not enough for effective proactive coping; attention has to lead to action in order to prevent a future problem. Aspinwall and Taylor (1997) suggest that proactive coping incorporates active, problem tackling strategies and consists of cognitive activities as well as behavioral actions, such as seeking more information about the future problem and the different options for dealing with it effectively.

Attention to the signals of a future threat and seeking more information about how to prevent this potential problem have scarcely been examined empirically. The aim of the present study is to examine them in detail and to examine the factors that influence attention and information-seeking. The transactional perspective of coping, originally proposed by Lazarus and Folkman (1984), states

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that the individual and the environment are both important in creating responses to (potential) threats. We will, therefore, examine to what extent features of a potential goal threat and individual characteristics play a role in directing people's attention to signals representing a potential threat and seeking more information about how to prevent or handle a potential stressor. Since middle-aged and older adults are likely to be confronted with many (age-related) future threats, we suggest that this age group is an interesting one in which to examine attentional and information-seeking processes. We will confront this group with an ecologically relevant issue, namely a potential future decline in health.

We expect that whether people direct their attention to signals of a future problem and whether they seek information about this problem will largely depend on the characteristics of the potential goal threat. One of the key aspects may be the amount of control an individual has over preventing a potential stressor. Many researchers have argued that control is essential for successful adjustment to stressors (e.g., Schulz and Heckhausen 1996; Shapiro et al. 1996; Taylor 1983). Moreover, research has demonstrated that people are more sensitive to danger signals when they have control over a stressor's negative consequences and see a possibility of avoiding the danger (Brandstädter et al. 2004). Sensitivity to negative stimuli is decreased when opportunities for preventing a stressful event are absent (Rothermund et al. 2002). Previous research has also shown that people who perceive high control over a situation will seek information, undertake preventive efforts, and persist in the face of failures (Skinner 1996). In line with these findings, we hypothesize that people who have more control over a potential, future problem will pay more attention to stimuli that represent this stressor and will be more involved in information-seeking activities in order to prevent the potential stressor.

Another valuable factor might be time. Carstensen and colleagues have argued that the perception of time is a relevant and unique concept (e.g., Carstensen et al. 1999), which may have important implications for motivational and attentional processes (see e.g., Fung and Carstensen 2004; Fung et al. 1999). In the present experiment, we are particularly interested in whether the amount of time left until a potential stressor is likely to fully reveal itself serves as an action trigger. Potential stressors that will manifest themselves in the near future may be perceived as more threatening and will therefore attract more attention than stressors that are not likely to occur for a long time. When time is constrained, the negative aspects of cues carry more weight (Sharma and McKenna 2001). As people have to sense at least a slight feeling of threat in order to start engaging in proactive coping (Ouweland et al., 2001, "Proactive adaptation to ageing: an exploratory focus

group study," unpublished manuscript), a stressor in the near future may trigger more information-seeking activities than a distant future stressor.

In addition, it is possible that long-term stressors are perceived in a more abstract way, which may decrease the need to act immediately. Researchers have proposed that distant future events are interpreted on a higher level, i.e. based on more central and abstract facets of the event, than events in the nearer future (Liberman and Trope 1998; Trope and Liberman 2000). As this results in a more simple and coherent picture of the future stressor (Trope and Liberman 2000), it may be more difficult for people to obtain a realistic and clear view of a distant future stressor and its likely development. Contrary to the actions necessary for stressors in the near future, actions associated with distant future stressors are mainly considered on a "why"-level instead of a "how"-level (Trope and Liberman 2000). For example, the actions associated with the prevention of a potential decline in health may be indicated as "wanting to continue doing what I like best" (why) when the decrease in health is not likely to occur for a long time, while when it concerns a more imminent threat the actions may be expressed as "exercising more and eating more healthy food" (how). Not thinking in terms of concrete actions may cause less effective or no behavioral efforts in order to attempt to prevent a distant potential stressor.

To sum up, we hypothesize that controllability and time until the manifestation of a stressor will affect attention and information-seeking; we predict that more control over the potential stressor's development as well as less time until it fully reveals itself will result in more attention being paid towards danger cues and the greatest amount of time spent on seeking information. Furthermore, we will examine whether an interaction effect exists. We expect that less time being left will lead to more attention and information-seeking, but only when more control is perceived.

Besides features of the potential threat, we also assume that several stable personal characteristics influence attention and information-seeking. First, individuals who are more anxious about aging may be more occupied with a probable problem related to aging and, therefore, they may naturally show more attention for cues related to their concern, a result found in many studies (for an overview, see Williams et al. 1996; Mogg et al. 2000). On the other hand, we expect that aging anxiety compromises effective information-seeking behavior, since it may result in more avoidant or defensive strategies (Aspinwall and Taylor 1997). A second candidate is subjective health; people who perceive their health as poor may be more occupied with a potential (further) decline in their health, the issue examined in this study, and they will, therefore, pay more attention to threat signals regarding their health. Thirdly, researchers have demonstrated that dispositional optimism,

in other words, people who hold positive beliefs about the future (Scheier et al. 1994) pay more attention to threatening information, especially if the information is relevant to their goals (Aspinwall and Brunhart 1996, 2000). Optimistic persons also have more favorable appraisals, which may result in a tendency to take action (Aspinwall and Taylor 1997). Finally, it has been suggested that having a future temporal orientation, i.e. being goal-directed and concerned with the future (Jones et al., 2005, “A temporal orientation scale: focusing attention on past, present and future,” unpublished manuscript), is an important resource for proactive coping activities. It may facilitate the process of directing one’s attention to the future stressor’s signals and recognizing it as a potential threat (Aspinwall and Taylor 1997) as well as engaging in activities of a preventive character (Rothspan and Read 1996), such as seeking information about how to deal with a potential future threat.

Method

Participants

Fifty percent of the participants were recruited via Dutch activity centers where people aged 50 years and older can take a course, such as computing, or engage in other activities, such as yoga or playing cards games. The other half of the sample was recruited from outside these centers in order to reduce selection bias. They were recruited through local newspaper advertisements and via leaflets. The inclusion-criteria were that the adults had to be between 50 and 70 years old, that they were fluent in Dutch, and that they had little or no difficulty recognizing colors. This resulted in a sample of 124 participants including 58 men (47%) and 66 women (53%). They ranged in age from 50 to 70 years ($M = 59.3$ years, $SD = 5.5$). With respect to marital status, 82% were married, 9% were divorced, 7% were widowed, and the remaining 2% had never been married. Nearly half of the participants had a paid job ($n = 61$).

Participants volunteered without receiving any reimbursement. They had the choice of taking part in the experiment at home, at the university or at the activity centre. On average, the duration of the experiment was 30 min.

Procedure

Participants were told that the aim of the research was to examine middle-aged and older adults’ goals and plans for the future. They were seated in front of a computer screen and asked to respond to the questions that appeared on the screen. A pilot study amongst ten individuals aged 50–70 (50% female) showed that people in this age group were

able to use the keyboard for all parts of the experiment. The experiment started with measuring socio-demographic variables, such as age, gender, marital status and educational level, followed by the assessment of the personal factors that will be described later. Next, participants were asked to define their personal goals. They were asked to take some time to think about their goals for the future and to answer the question “What would you like or hope to achieve, maintain or resolve in the following years?” They were asked to write down their goals with a minimum of one goal and a maximum of ten goals.

Next, the participants were given some information about goal attainment, which was the starting point of the manipulation. At this stage, every participant was given the same information: “*Sometimes you will succeed and sometimes you won’t succeed in achieving your goals. Quite recently, researchers examined the circumstances under which people have difficulties achieving their goals. It appears that older people with poor health find this rather difficult.*” This information was followed by a manipulation of the potential goal threat, which differed in the four experimental groups that participants were randomly assigned to. The experiment ended with the measurement of the dependent variables, namely attention and seeking information. After the experiment, participants were thanked and thoroughly debriefed.

Manipulation of goal threat

A potential decline in health was chosen as a future threat to personal goals. It was manipulated in relation to two features: time until manifestation and control over the potential stressor. Both characteristics had two possible values: short-term versus long-term and no-control versus control, respectively. This means that the experiment employed a two-by-two-design. The manipulation consisted of a written statement about health and the chance of continuing to achieve personal goals in old age. Previous research by the authors has demonstrated that vignettes are a useful and appropriate way to trigger proactive coping; they may induce a feeling of threat and people are able to imagine them well (Ouweland et al. 2006). Before the start of the experiment, a pilot study amongst ten people aged 50–70 (50% female) was conducted to check the manipulation, which was found to be effective.

With respect to Time, participants were either informed that many older people suffer from poor health at an advanced age or that they already suffer from it relatively early on in old age. In line with Aspinwall and Taylor’s (1997) proposition that proactive coping is directed at probable stressors which will occur at an unspecified time or may not take place at all, the exact onset of a decline in health was left open to the participants’ own interpretation.

As such, proactive coping differs from anticipatory coping, which implies preparing for future events that are certain to occur (Aspinwall and Taylor 1997). Control was manipulated by the statement that in general either one's genes or one's own behavior is responsible for a decrease in health. A full description of the four conditions can be found in Appendix A.

Attention

In relation to attention, we developed a version of the emotional Stroop task, which measures attentional bias towards threat related stimuli (e.g., Williams et al. 1996), using E-prime software 1.1 (Schneider et al. 2002). Those individuals who exhibit a high level of preoccupation with a particular problem have greater difficulty in ignoring signals associated with their concern in comparison with neutral cues.

Participants were asked to indicate as quickly and as accurately as possible in which color the stimulus words were written while ignoring the meaning of the word, by pressing one of the four colored buttons (red, yellow, green and blue) on a keyboard. In this study, the emotional Stroop task had the following sequence: (1) practice block, (2) neutral word block, and (3) negative word block. Following Waters et al. (2003) in using the emotional Stroop task in a non-clinical population, we decided to employ a blocked design with a fixed order of neutral stimuli preceding negative stimuli in order to avoid carry-over effects as much as possible (see also McKenna and Sharma 2004; Rohsenow and Niaura 1999).

First of all, the participants responded to ten practice stimuli, which were presented four times, once in each of the four colors. These stimuli, which included repeated letter strings written in capital syllables (e.g., XXXX and AAA), were presented randomly until the participant pressed a button. If the participant did not respond, the stimulus was removed after 3,500 ms. Each response was followed by written feedback (Correct!, Wrong! or Too late!) presented for 1,000 ms on the screen. After a delay of 400 ms the next stimulus was presented.

Negative stimuli included words that reflect the negative side of aging with respect to declining health and an increasing number of complaints. Neutral stimuli were matched with the negative stimuli for word length and frequency of use in the Dutch language (see Appendix B for the stimuli used in this experiment). Each word was written in capital syllables and was presented four times, once in each of the four colors. They were presented randomly and care was taken to ensure that the same stimulus and the same color did not appear in two subsequent trials. The response was not followed by feedback and after a delay of 500 ms the next stimulus was presented.

Reaction times (RT) in trials with incorrect responses were ignored while calculating the emotional Stroop effect. In order to reduce the impact of outliers, several measures were taken. Firstly, RTs less than 100 ms were discarded. In addition, RTs 2.5 standard deviations from the participant's mean score were removed. A difference score was computed between the mean RTs over the words of the neutral block and the mean RTs over the negative words.

Reliability was determined by computing mean difference scores on even trials and odd trials for each participant, correlating these means, and applying the Spearman–Brown formula to assess the split-half reliability (Waters et al. 2003). Reliability was modest ($r = .49$), which is typical for difference scores (Parrott 1991).

Seeking information

With respect to information-seeking, we provided participants with accurate and readable information that is relevant to the prevention of a potential decline in health. After finishing the Stroop task, participants were asked to read as much information as they wished about aging and health and otherwise to finish this part of the experiment by pressing a button on the keyboard. We adapted informative material available on the internet and presented it on the computer screen without potentially distracting pictures or figures. Material included correct and easy to read information about nutrition and specific needs for older people, exercise at older age, and ventilation of the home. Participants were able to read any information they desired. They were allowed to ignore it as well, but they were not able to do something else instead of reading. Information-seeking was indicated by the time spent on reading, recorded by the computer. Previous research has shown that time is a robust instrument for measuring readiness to confront possible failure to achieve goals (De Ridder et al. 2007) as well as reading information about potential threats (Aspinwall and Brunhart 1996). Time spent on seeking more information appeared variable enough to be influenced by independent variables despite potential individual differences in reading rate. Reading time in this experiment is regarded as the willingness to learn more about the potential goal threat and the ways to prevent it.

Personal factors

In addition to the background variables age, gender and educational level, subjective health was assessed as well as three other personal characteristics, namely aging anxiety, dispositional optimism, and future temporal orientation. Firstly, *Subjective Health* was assessed with the general health perception subscale of the RAND-36 (for a translation in Dutch, see Van der Zee and Sanderman 1993).

This subscale ($\alpha = .64$) consisted of five items on a 5-point Likert scale. The Aging Anxiety Scale (Lynch 2000; $\alpha = .74$) was used to assess *Aging Anxiety*. This scale consisted of seven items on a 5-point Likert scale and included items, such as “The older I become, the more anxious I am about the future” and “I worry that people will have to make decisions for me when I am older”. A higher score indicates that an individual is more occupied with aging and has more concerns or fears about getting older. Furthermore, *Dispositional Optimism* was measured with the Revised Life Orientation Test (LOT-R; $\alpha = .73$) developed by Scheier et al. (1994). Finally, in order to assess *Future Temporal Orientation* the Future Subscale ($\alpha = .63$) of the Temporal Orientation Scale (Jones et al., 2005, “A temporal orientation scale: focusing attention on past, present and future,” unpublished manuscript) was used, which consisted of five items measured on a 5-point Likert scale. Sample items are “When I want to get something done, I make step by step plans and think about how to complete each step” and “I am able to resist temptation when there is work to be done”. People with a future temporal orientation are goal-directed and concerned with the future.

Statistical analyses

Two separate two-way analyses of variance using SPSS 14.0 tested the main effects and the interaction effect of time until manifestation (long-term versus short-term) and controllability (no-control versus control) on attention on the one hand and seeking information on the other hand. Personal variables that associated significantly with the dependent variable (see Table 2) were included in the analysis as covariates. Covariates were tested for the assumption of linearity with the dependent variable. Assumptions of normality were tested within each

experimental group for each dependent variable separately and outliers were removed.

Results

Table 1 shows some characteristics of the total sample as well as the experimental groups. Moreover, it displays the mean scores on the personal factors. No differences were found between the four experimental groups ($n1 = n2 = n3 = n4 = 31$) with respect to age ($p = .54$), educational level ($p = .59$), and job status ($p = .99$). With respect to gender, a significant difference was found ($\chi^2 = 8.4$, $df = 3$, $p = .04$). Although the long-term/no-control group (LTNC) and the long-term/control group (LTC) included nearly as many men as women, the short-term/no-control group (STNC) had twice as many men as women while this proportion was the opposite in the short-term/control group (STC). Therefore, gender was included in all analyses as a control variable.

No significant differences were found between the four experimental groups with regard to subjective health and the three other personal factors (range ps : .34–.79). On average, participants rated their health as moderate, they experienced low to moderate aging anxiety, and they had moderate to high scores on future temporal orientation and dispositional optimism.

Table 2, which shows the Pearson correlations between all relevant variables, demonstrates that only aging anxiety correlated significantly and negatively with attention. Unexpectedly, participants who were more anxious about aging showed a smaller attentional bias. Age and educational level were significantly related to information-seeking. Being older and having a lower educational level was associated with more time being spent on seeking information. Contrary to our predictions, none of the other

Table 1 Characteristics of the total sample ($N = 124$) and the experimental groups ($n = 31$ for each group): Mean (SD)

	Possible range	Total sample	Group 1 LTNC	Group 2 LTC	Group 3 STNC	Group 4 STC
<i>Background factors</i>						
Age	50–70	59.3 (5.5)	59.4 (5.1)	58.8 (5.9)	60.5 (5.9)	58.6 (5.2)
Education	1–10	5.9 (2.4)	6.1 (2.4)	5.5 (2.5)	6.3 (2.5)	6.0 (2.5)
Male/Female	1–2	58/66	13/18	14/17	21/10	10/21
Paid job: yes/no	1–2	61/63	15/16	15/16	16/15	15/16
<i>Personal factors</i>						
Subjective health	0–100	66.4 (14.0)	65.8 (12.3)	66.5 (15.6)	63.2 (15.1)	70.0 (12.7)
Future orientation	5–25	16.7 (2.9)	16.8 (3.1)	16.6 (2.8)	17.1 (2.9)	16.3 (2.9)
Optimism	6–30	23.4 (3.0)	23.8 (2.7)	23.5 (3.3)	22.6 (2.8)	23.7 (3.2)
Aging anxiety	7–35	15.2 (4.4)	15.4 (4.8)	15.0 (4.5)	15.6 (4.3)	14.6 (3.9)

Note: LTNC, long-term and no control; LTC, long-term and control; STNC, short-term and no control; STC, short-term and control

personal characteristics showed a significant association with attention or information-seeking.

Attention

Most participants made few mistakes on the emotional Stroop task. On average, 1–1.5% of the responses were incorrect. In addition, few outliers (2.5 SD from personal mean score) and RTs below 100 ms had to be removed; on average 1–2 scores per person (2.5–5.0%) were discarded.

Table 3 displays the results of the dependent variables. While testing normality for the variable attention within each experimental group separately, it appeared that three outliers (2.5 SD from group mean score) had to be removed, which resulted in a final sample of 121 people for the analysis regarding attention. Two variables, namely aging anxiety and gender, were included as covariates. The analysis of variance showed that Time had a significant main effect on attention, $F(1, 115) = 4.89, p < .05$. As expected, we found that people who were confronted with a potential goal threat that will probably manifest itself in the short term responded more slowly to stimuli representing that stressor (see Fig. 1). The main effect of Control was

not significant, $F(1, 115) = .11, ns$. Contrary to our hypothesis, attention towards negative stimuli is not affected by the amount of control people had over a potential decline in health. Neither did we find an interaction effect of Time \times Control, $F(1, 115) = .15, ns$.

Aging anxiety appeared to be significantly associated with attention, $F(1, 115) = 4.45, p < .05$, but in the opposite direction than expected. Individuals who were more anxious about aging paid less attention to stimuli representing the difficult part of aging. Results remained unchanged after controlling for gender, $F(1, 115) = .50, ns$.

Seeking information

In this second analysis of variance, the control variable gender and the personal factors age and education were included as covariates. Seven outliers (2.5 SD from group mean score) were removed, which resulted in a final sample of 117 participants for this analysis. The ANOVA analysis demonstrated a significant main effect of Time for information-seeking, $F(1, 111) = 9.17, p < .01$, indicating that, as expected, people who did face a potential goal

Table 2 Zero-order correlations between the variables ($N = 124$)

	ESE	IS	1	2	3	4	5	6
1. Age	-.03	.29**	-					
2. Gender ^a	.00	.16	-.09	-				
3. Education	-.07	-.36**	-.12	-.28**	-			
4. Subjective health	-.11	-.03	-.27**	-.09	.22*	-		
5. Future orientation	-.06	-.01	.11	-.24**	.21*	.00	-	
6. Optimism	-.00	-.05	-.16	-.18	.25**	.48**	.29**	-
7. Aging anxiety	-.18*	.08	.06	.34**	-.21*	-.48**	-.18*	-.55**

Note: ESE, emotional Stroop effect (attention); IS, information-seeking

^a Gender: male = 1 and female = 2

* $p < .05$; ** $p < .01$

Table 3 Means (M) and standard deviations (SD) of the dependent variables ($N = 124$)

	LTNC		LTC		STNC		STC	
	M	SD	M	SD	M	SD	M	SD
Attention ^a								
Neutral stimuli	979	239	1010	255	982	198	992	156
Negative stimuli	959	217	1005	232	1001	237	1023	176
ESE	-20	84	-5	86	19	97	31	84
Information seeking ^b	0.98	0.59	1.09	0.58	1.15	0.60	1.51	0.79

Note: LTNC, long-term and no control; LTC, long-term and control; STNC, short-term and no control; STC, short-term and control; ESE, emotional Stroop effect

^a Reaction time was measured in milliseconds (ms)

^b Reading time was measured in minutes (min)

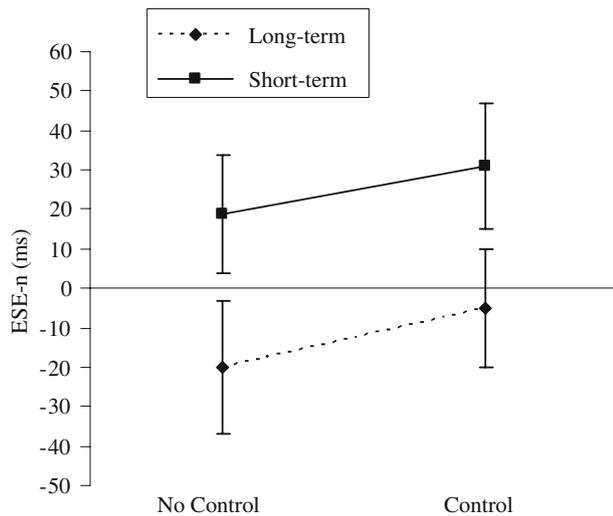


Fig. 1 The effect of control on the emotional Stroop effect (in ms) towards negative stimuli for the short-term group (solid line) and the long-term group (dashed line) separately

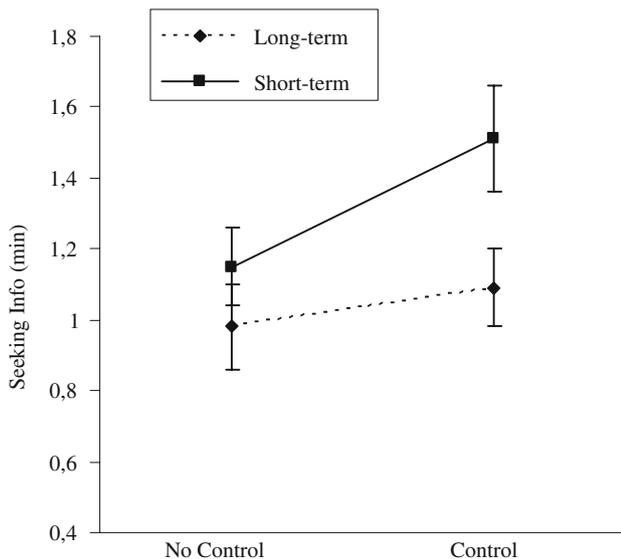


Fig. 2 The effect of control on the amount of time spend on seeking information (in minutes) for the long-term group (dashed line) and the short-term group (solid line) separately

threat in the short-term spent more time seeking information about ways to prevent the threat (see Fig. 2). Moreover, the main effect of Control on information-seeking was also significant, $F(1, 111) = 4.64, p < .05$. In line with our hypothesis, people who were confronted with a potential threat that is controllable spent more time on information seeking behavior. The interaction effect of Time \times Control was not significant, $F(1, 111) = 1.42, ns$.

Age, $F(1, 111) = 10.41, p < .01$, and education, $F(1, 111) = 12.34, p < .01$, had a significant influence on information-seeking. Older individuals spent more time seeking information about how to prevent a goal threat

associated with aging. On the other hand, people with a higher educational level spent less time on this activity. Results remained after controlling for gender, $F(1, 111) = .23, ns$.

Discussion

The present experiment is the first to have examined whether two features of a potential, future problem, namely the amount of time left before the potential threat would occur and the amount of control people have over preventing the future threat, affect attention and information-seeking in middle-aged and older adults. We believe they are an excellent sample in which to examine these processes, since they are regularly confronted with (age-related) future threats that are likely, but not yet certain to occur. Results of the present experiment suggest that time until a potential goal threat will manifest itself influences the amount of attention being paid to signals that indicate the coming of the stressor as well as information-seeking about how to prevent the probable threat. When a potential threat is likely to reveal itself in the short term, individuals paid more attention to danger cues and spent more time seeking information in comparison with when a potential threat would not reveal itself for a long time. Interestingly, control over the situation did only have an impact on information-seeking and not on attention. More control resulted in more information being sought about the potential stressor and the ways to prevent it.

The effect of time on both attention and information-seeking may be explained by the idea that a potential stressor that is expected to occur in the short term is perceived as more threatening than a stressor that is expected to take place in the more distant future. Researchers have found that a future event and its consequences are indeed evaluated as less negative over time, particularly when the stressor is interpreted on a lower level in terms of the specific actions needed to handle the future stressor and the effects the stressor may have on personal goals (Liberman and Trope 1998; Trope and Liberman 2000). Future research may clarify whether the long-term groups indeed regarded a potential decline in health as less negative than the short-term groups and whether the experimental groups differed in their construal of the stressor.

Contrary to our hypothesis, we did not find an effect of control on attention. This does not corroborate with previous research, which has demonstrated that people who have more control over a situation or an event are more likely to direct their attention to threat signals (Brandstadter et al. 2004; Rothermund et al. 2002). However, their research designs differed from the one presented in

this article. Firstly, the participants in our study were exposed to a future decline in health, which is an ecologically relevant issue, but also an issue over which people may feel that they have relatively less control whereas the participants in the high control groups of previous experiments often had complete control over a situation and their responses. A second, more important difference is that previous research has mainly focused on attention to stressors that have already been experienced. It is possible that having control has an opposite effect on attention for a future problem that is likely, but not yet certain to occur. When such a potential problem is perceived as highly controllable, it might be that it is experienced as less of a threat, manifested in a lower attentional bias on the emotional Stroop task. This potentially important difference in the impact of control on attention to problems already experienced and attention to future problems is worth investigating in future research.

As predicted, we did find a significant effect of control on information-seeking. It appeared that more control resulted in more information being sought about how to prevent the future problem. This finding does corroborate with the result that has been put forward by Carver et al. (2000) that, in order to be able to undertake effective measures, it is important to have the confidence that desired outcomes will be achieved. Control only has an effect when positive results are expected. So, it is possible that only middle-aged and older people who were informed to have control over their future health believe that trying to change a potential decline in health will be successful and they may, therefore, think that it is worth seek further information about how to prevent a potential decline in health.

Of the personal factors examined in this study, only aging anxiety associated significantly with attention. Unexpectedly, people who were more anxious about aging paid less attention to future threat-related signals. It seems that, when they are anxious about issues related to the aging process, individuals tend to ignore signals that might confirm their anxiety. Previous research has shown that in older age, people avoid attending to negative information (e.g., Charles et al. 2003; Mather and Carstensen 2003). Our study suggests that this might especially be true for adults who are more anxious about a specific issue. Regarding information-seeking, being older and having a lower educational level resulted in seeking more information about ways how to prevent a future problem. None of the other personal factors appeared to have a major influence on attention or information-seeking, which is not in accordance with previous studies that showed an important role of personal variables for coping. Of course, this discrepancy in results might be due to differences in design. Although our study had several strengths—we

experimentally examined proactive coping rather than reactive coping in another population than a homogeneous sample of highly educated college students using a real-life stressor—this may also have limited the possibilities of directly comparing the results with other studies. Another possible explanation for the finding that personal characteristics were found to be less important than expected is that the middle-aged and older adults in this study had on average many personal resources, which may have made them a rather homogeneous sample. A third explanation may be that personal characteristics have less influence on attention and information-seeking processes in relation to a future problem than the future threat features itself. It may be interesting for future research to further examine the relative impact of both threat characteristics and personal factors on attention and information-seeking processes.

With respect to the emotional Stroop task, there may be alternative explanations for the effects we found. Since we presented the neutral words before the negative words, participants may have responded more slowly to these words because of tiredness. There is, however, a reason why fatigue is not likely to explain the findings. If fatigue would have played a role, effects should have been found in all experimental groups, because they had to respond to the same amount of stimuli. However, we did only observe effects in the groups that were confronted with a potential health threat that was likely to reveal itself in the short term. Another possible explanation is that responding to the negative cues might have caused small changes in mood (Richards et al. 1992) or rumination over previous words (Foa et al. 1991; Holle et al. 1997), which distracts the individual. The mood and rumination effects, however, should have lasted for several minutes and should have been present in all experimental groups. Our experiment showed that the latter was not the case.

To conclude, the present experiment demonstrated that characteristics of a potential, future threat were important in explaining to extent to which people directed their attention towards signals indicating the arrival of the future problem and to what extent they sought more information about the problem in order to prevent it or its consequences. Although some personal characteristics, such as age, education and aging anxiety, were important as well, attention and information-seeking among middle-aged and older adults in reaction to a potential health threat were mainly influenced by two environmental factors, namely the amount of control people have over preventing the potential threat and the amount of time left before the threat would occur.

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Appendix A

The following four manipulations were used in this experiment.

Long-term and no control (group 1)

Research has also shown the following. Many older people are only suffering from poor health at an advanced age. So, it is possible that you too will not be healthy at that age. Then, it is likely that you will no longer be able to achieve your goals.

Whether you will be healthy or not at that age will mainly depend on your genes. So, you won't be able to do much about it.

Long-term and control (group 2)

Research has also shown the following. Many older people are only suffering from poor health at an advanced age. So, it is possible that you too will not be healthy at that age. Then, it is likely that you will no longer be able to achieve your goals.

Whether you will be healthy or not at that age will mainly depend on your own actions. So, you will be able to do something about it.

Short-term and no control (group 3)

Research has also shown the following. Many older people are already suffering from poor health at a relatively young age. So, it is possible that you too will not be healthy at that age. Then, it is likely that you will no longer be able to achieve your goals.

Whether you will be healthy or not at that age will mainly depend on your genes. So, you won't be able to do much about it.

Short-term and control (group 4)

Research has also shown the following. Many older people are already suffering from poor health at a relatively young age. So, it is possible that you too will not be healthy at that age. Then, it is likely that you will no longer be able to achieve your goals.

Whether you will be healthy or not at that age will mainly depend on your own actions. So, you will be able to do something about it.

Appendix B

The stimuli presented in the table below were used in the emotional Stroop task; matched neutral words are left next to the negative words (with a translation in English).

Neutral stimuli	Negative stimuli
ELK (each)	OUD (old)
SMAL (narrow)	STIJF (stiff)
LIJN (line)	MOE (tired)
DIEP (deep)	ZIEK (ill)
KETEL (boiler)	KWAAL (complaint)
BRINK (farmyard)	BROOS (frail)
ZOAL (\approx kind of things)	ZWAK (weak)
OOSTKUST (east coast)	ONGEZOND (unhealthy)
TRAM (tram)	TRAAG (slow)
PAK (suit)	PIJN (pain)

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