Life styles and cognitive aging

Chapter 10

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ABSTRACT

This study deals with social aspects of cognitive aging. In order to evaluate the variations in cognitive impairment between individuals, differences in life styles were studied. It appeared that life styles can only explain a small part of the diversity in mental capacity. Smoking was clearly related to memory capacities and memory strategies. This was not the case for alcohol consumption, sports, and leisure activities. The fact that, besides age, sex as well as level of education have an important role in differences in memory capacities and strategies suggests that future research should focus on status and positional roles as determinants of cognitive aging.

INTRODUCTION

This study focuses on the relationship between life styles and cognitive aging. We will explore whether cognitive aging is related to (a) health-related life styles such as smoking, drinking, and participation in sports, and (b) to leisure-related activities such as watching television or reading books and magazines. We call these activities life styles because they are part of the overall way of living, and refer to behavioural patterns related to values and attitudes of groups and individuals in response to their social, cultural, and economic environment (Abel, 1991).

Although life styles in modern society have been well investigated –this includes the domain of aging– their relationship with cognitive aging is rather unexplored. The majority of studies emphasize the biological effects of health related behaviours, such as drinking patterns and smoking behaviour. For instance, the effects of nicotine on human cognitive functioning have been examined in several studies. Improvement in attention, learning, reaction time, and problem solving have been reported. In particular, the positive effect of nicotine on Alzheimer's disease and Parkinson's disease has been studied frequently (Levin,

1992). However, due to methodological problems, some of the results are inconclusive (Le Houezec & Benowitz, 1991).
Alcohol consumption is related to a diminution of the function of tissues and organ systems, including the brain. In this respect, several studies have shown that alcohol consumption affects cognitive functioning negatively. Overall, these studies show that heavy drinking is related to impairments in cognitive functioning (Arbuckle, Chaickelson, & Gold, 1994; Hesselbrock, Weidenman, & Homer, 1985; Malloy, Noel, Rogers, Longabauch, & Beattie, 1989).
Growing evidence supports the view that physical activity and a good nutritional status are important determinants of physical and cognitive functioning (Rosenberg & Miller, 1992). Exercise appears to have many psychological benefits. Reviewing the literature, Thomas et al. concluded that the benefits of chronic exercise on cognitive functioning are modest, but probably responsible for several aspects of cognitive functioning (Thomas, Landers, Salazar, & Etnier, 1994). Moreover, regular exercise may reduce the loss of cognitive function seen in more elderly subjects. With regard to leisure activities, Houx (1991) found that poorly performing elderly subjects were over-represented among individuals who did not spend much time reading, playing sport, or doing puzzles.
The main question for this chapter is to what extent memory capacities and the use of memory strategies depend on (health) life styles? As the analyses will be explorative, no specific hypotheses will be formulated concerning the relationship between life styles and cognitive aging.

Research Model

Figure 10.1 presents the research model. In this model, memory capacity and memory strategies are the dependent variables. We expect that memory capacity and memory strategy will be negatively related. That is, persons with a lower memory capacity will be more in need of memory strategies.
We will explore, under the heading of life styles, whether general and health-related behaviours, such as smoking, drinking, sports participation, watching television, reading books, are related to memory capacity and to the use of memory strategies. In addition, several status and positional roles are incorporated in the model, namely, age, gender, and education.

We also expect that health status will be related to cognitive functioning. We postulate that cognitive aging is influenced by the overall functioning and psychological well-being of the individual. People who perceive their health more pessimistically or people who suffer from depression tend to score lower on cognitive performance. Therefore, perceived health and depression are included in the model.

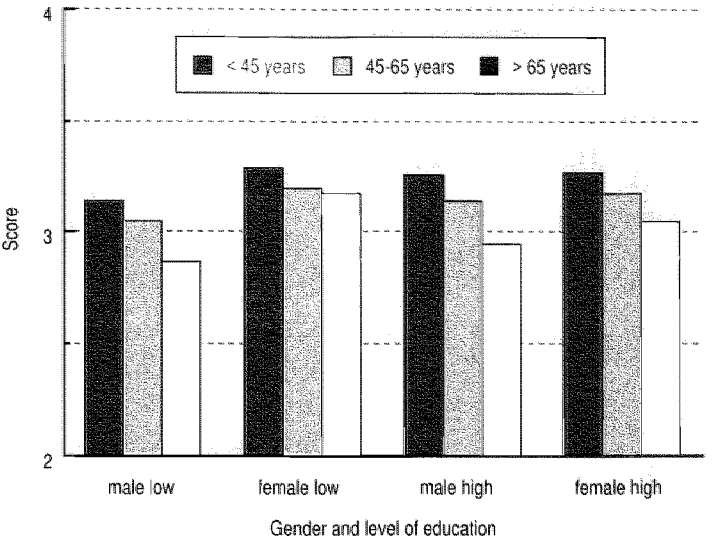

Fig. 10.1.
Research model: 1. age, gender, education; 2. smoking, drinking, activity level (watching television, reading books, participation in sports); 3. perceived health and depression; 4. capacity or beliefs regarding one's own capacity; 5. strategy, or knowledge and reported use of memory strategies of various types.

METHODS

Data were derived from the A_1 panel of the Maastricht Aging Study. The MAAS sample frame consisted of a registration network for family practices. In the first stage of the research 3,734 subjects were invited to participate in the study; 2,340 persons responded and were sent an extensive postal questionnaire. Of these, 2,043 people (55%), aged 28-85 years, completed the questionnaire.
The questionnaire contained items on demographic characteristics, biological life events, subjective health, physical and psychological fitness, subjective complaints or experienced change in memory and memory-related functions and psychosocial factors. Further details on subject inclusion procedure and data collection are described in Chapters 3 and 4.

Dependent variables

Memory capacity and strategy were measured with the Metamemory in Adulthood Questionnaire (MIA) developed by Dixon, Hultsch, and Hertzog (1988). The MIA requests subjects to rate on a 5-point Likert scale 108 statements describing their own memory functioning and their knowledge of general memory processes. For more detailed information on the MIA, see Chapter 7. The MIA is a multidimensional instrument consisting of seven subscales. Only two subscales were included in the model, namely, memory strategy and memory capacity. Strategy refers to the knowledge and reported use of memory strategies of various types with items like: "Do you keep a list or otherwise note important dates such as birthdays and anniversaries" and "When you are looking for

something you have recently misplaced, do you try to retrace your steps in order to locate it". Capacity concerns beliefs regarding one's own memory capacity with items such as: "I am good at remembering names" and "I am good at remembering the order that events occurred".

Independent variables

Health life styles. Respondents were asked whether they smoke tobacco (yes/no), consume alcohol (yes/no), and participate in sports (yes/no). Respondents were also asked how many hours they watch television and read books and magazines.

Status and positional roles. Status roles involve the social class expectations based upon the characteristics which individuals cannot easily influence, such as gender and age. Positional roles are expectations related to positions that can be acquired in social networks such as work and family. Only age, gender and level of education were used. Age was measured in years, ranging between 28 and 85. Gender was coded as '1' for male and '2' for female. Education was divided into seven categories, i.e., basic education, junior vocational training, junior secondary training, senior vocational training, senior secondary education/pre-university education, vocational colleges/university education, and the category 'other'.

Health status. Perceived health was measured with the mean score (range 1–5) for three questions, (a) "How do you perceive your health?", (b), How do you perceive your health in comparison with that of other people of your age?" and (c), "How do you perceive your health in comparison to one year ago?" Depression was measured with the depression subscale of the SCL-90 (see Section 4.1.2).

RESULTS

Descriptive analysis

As expected, human cognitive memory capacities are not static but tend to decline over the life span. Figure 10.2 clearly illustrates that memory capacity decreased with age. From Figure 10.2 it also can be seen that although there was an overall decrease in memory capacity, this was especially the case among men. Among lower educated men, the overall capacity scores were lowest of all age categories.

Table 10.1 presents zero-order correlations of all variables in the analysis. It appears that there was indeed a negative correlation between capacity and strategy ($p<.001$). Thus, people who reported having a high memory capacity used fewer strategies and memory aids. From Table 10.1, it also can be seen that there were positive correlations between capacity and both gender and education. Even stronger correlations were found be-

Table 10.1.
Zero-order correlation (Pearson's *r*) of all variables; $r \geq .06$ or $\leq -.06$ is significant at the $p=.05$ level; 2-tailed test, $n=1,819–2,043$.

		1	2	3	4	5	6	7	8	9	10	11	12
1	Age	—											
2	Sex	.01	—										
3	Education	−.33	−.12	—									
4	Depression	.06	.17	−.14	—								
5	Perceived	−.11	−.02	.18	−.37	—							
6	Smoking	−.12	−.08	-.05	.11	−.13	—						
7	Drinking	−.25	−.25	.25	−.11	.14	.07	—					
8	Sports	−.25	−.07	.22	−.07	.21	−.10	.18	—				
9	Watching TV	.22	.03	−.30	.08	−.14	.07	−.15	−.17	—			
10	Reading	.23	.02	.12	.00	.05	−.09	−.01	−.02	.11	—		
11	Capacity	−.16	.11	.07	−.15	.17	.05	.01	.02	−.05	.04	—	
12	Strategy	.05	.17	.12	.12	−.02	−.10	.00	.04	−.03	.06	.05	—

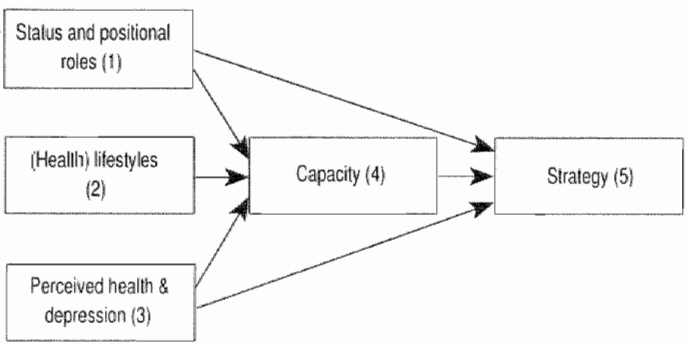

Fig. 10.2.
Capacity by gender and education: mean score for different age groups.

tween gender and level of education and strategy. The direction of these correlations suggests that women and higher educated people have more memory capacity but also use more memory strategies. Concerning life styles, only smoking, watching television, and reading were related to one or both dependent variables. People with lower memory capacity scores smoked slightly more, and watched television more often. People who used memory strategies smoked and read more often.

Regression analyses

Exploratory regression analyses were conducted to examine whether life style variables were related to problems with memory capacity and

Table 10.2.
Regression analysis on MIA; capacity (Pearson's zero-order correlations *r*, standardized regression coefficients *Beta*, proportion of explained variance in the final model R^2).

	Capacity			
	Men (n=824, R^2=.08)		Women (n=932, R^2=.07)	
	r	*Beta*	*r*	*Beta*
Age	−.21	−.17**	−.12	−.10**
Education	.12	.04	.04	−.02
Depression	−.17	−.12**	-.19	−.16**
Perceived health	.16	.09*	.17	.12**
Smoking	.04	.07*	.07	.09**
Watching television	−.12	−.03	.00	.02

Note. *p<.05; **p<.01.

Table 10.3.
Regression analysis on MIA: strategy (Pearson's zero-order correlations *r*, standardized regression coefficients *Beta*, proportion of explained variance in the final model R^2).

	Strategy			
	Men (n=824, R^2=.06)		Women (n=932, R^2=.12)	
	r	*Beta*	*r*	*Beta*
Age	.06	.09*	.04	.06
Education	.17	.22**	.13	.15**
Depression	.10	.11**	.09	.08*
Perceived health	−.01	.02	−.01	.03
Smoking	−.07	−.05	−.10	−.07*
Watching television	.00	.03	−.07	−.03
Capacity	−.09	−.08*	−.29	−.27**

Note. *p<.05; **p<.01.

memory strategies to deal with these, as measured by the MIA. Separate analyses were run for men and women. In the regression analysis all variables were entered in one single step. In the first analysis, memory capacity was the dependent variable with life styles, positional characteristics, and subjective health status as independent variables. In the second analysis, with memory strategies as dependent variable, memory capacity was added as independent variable. Only life styles that were significantly related to memory capacity were introduced in the analyses. The results are shown in Table 10.2 and 10.3.

Table 10.2 reveals that the age effect on memory capacity was stronger for men than for women. While age was the strongest predictor in men, this was not the case for women. The study shows that life styles only had modest effects on memory capacity. Only smoking was significantly

related to the dependent variable. It appeared that subjects who were not depressed, and who had a positive health status had more memory capacity.

Table 10.3 shows that only in women was smoking negatively related to memory strategy. Other variables were more important. In both men and women the level of education and depression were positively related to memory strategies. Most interesting, however, is the finding that capacity is the main predictor in women, but not in men. In men, the level of education was more important.

DISCUSSION

In this study, the relevance of (health) life styles to the explanation of mental memory capacity and strategies is explored. In accordance with the results of previous studies, we found only modest relationships between (health) life styles and cognitive memory capacity and strategies. In the regression analysis, smoking was significantly related to the dependent variables. Therefore, the conclusion is that (health) life styles can only explain a very small part of differences in mental capacity and strategy.

Other predictors were more important. The analysis revealed that some status and positional roles significantly correlated with memory capacity. Women tended to judge their capacity higher than men, although one can question whether this is caused by the nature of some items of the MIA. Some items may be more applicable to women. For instance items like: "I am good at remembering birthdays" and "I am good at remembering things like recipes" may be answered positively by more women than by men.

It is noteworthy that memory capacity was higher in younger men and women, and in people with a positive health status. This suggests that people who are in better physical and mental condition for their age, health status, and mood tend to judge their memory capacity higher than other individuals do.

Another interesting observation was that the relationship between memory capacity and memory strategies were different for men and women. In women, memory capacity was the strongest predictor of memory strategy. In men it seems that the level of education was more important. This might suggest that in women knowledge and use of memory strategies could be more a result of declining cognitive memory capacities than in men, while in men memory strategies primarily tend to depend more on their level of education. If this is the case, further analysis of the social determinants of memory differences between men and women is a necessary next step in research.

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