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# AGE AS FACTOR IN THE RELATION BETWEEN WORK AND MENTAL HEALTH: RESULTS OF THE LONGITUDINAL TAS SURVEY

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## Abstract

This chapter addresses the impact of the factor age in occupational health research, and examines whether relations between psychosocial work characteristics and indicators of mental health differ as a function of age. To test these relations we used data from a longitudinal study on the Dutch work situation, and included different age-related variables (as indicators of different operationalisations of the factor age). The relation between work and mental health was examined for three different age groups, namely for older workers (> 50 yrs old;  $N = 154$ ), young workers (< 35 yrs old;  $N = 99$ ), and middle-aged workers (35-50 yrs old;  $N = 327$ ). As relevant age-related variables to explain age-related effects in the relation between work and mental health we included company tenure, health status, and home situation. Multiple subgroup regression analyses revealed evidence for longitudinal effects of work characteristics on indicators of mental health (after controlling for the aforementioned age-related variables as potential moderators). We conclude that designing a challenging, but not too demanding, work environments is an important step in maintaining or improving the mental health of *all* age groups.

*Age does not depend upon years, but upon temperament and health.  
Some men are born old, and some never grow so.*

Tryon Edwards (American theologian, 1809 - 1894)

## 1 Introduction

### 1.1 Introduction

The baby boom generation (the cohort born in 1946-1964) constitutes a large and increasing percentage of the working population in most Western countries (Collins, 2003). The percentage of older workers in Europe will increase with 25.1% (approximately 13 million people) in the next 25 years, while the number of young workers will decrease with 20.1% (European Commission, 2005). Consequently, companies will have to rely more and more on the work of older people. Although this group of workers has attracted considerable research interest during the past decade, as yet their career development and well-being has not been studied extensively (Stroh & Greller, 1995; Warr, 2000). At the same time, the traditional safety net of funded (early) retirement is being withdrawn worldwide, and it currently appears that many, if not most, workers will not retire before the age of 65.

In this light it is important to note that the management of companies often holds negative stereotypes about older workers (Boerlijst & van der Heijden, 1999; Offerman & Gowing, 1990; Schruijer, 2006). For example, negative attitudes exist regarding the flexibility, adaptability to technology, motivation for learning or training, and well-being of older workers (Warr, 2000). Moreover, older workers themselves also report negative differential treatment in the work environment (Shore, Cleveland & Goldberg, 2003). According to Offerman and Gowing (1990), these stereotype ideas may stem less from current performance levels and more from fears of employers about the future prospects of older workers. Therefore, we need more (scientific) knowledge or results about the influence of age in work outcomes to diminish and preferably erase these negative stereotypes. What do we already know from earlier research on occupational health?

The factor “Age” has often played the role of covariate or confounder in occupational health research. As most publications do not present scores for different age groups (Griffiths, 1997; Warr, 1992), we lack information about the precise influence of this factor in the relationship between work and mental health. There are few theoretical frameworks for the study of aging, and researchers often seem to rely on overly simplistic ideas or models (Schaie, 1993). Many researchers control for age as an independent causal factor in their analyses, whereas age differences can often be explained by other variables, and should not be interpreted as a “causal” variable (Schaie, 1993). Reviews of the relation between age and organizationally relevant outcomes (e.g., Sterns & Miklos, 1995; Warr, 2001) have also suggested that chronological or calendar age often serves as a proxy measure for many age-related processes that may influence work outcomes directly or indirectly (Kanfer & Ackerman, 2004). However, few researchers have paid attention to possible underlying variables or processes that may help us understand and predict age-related differences in work outcomes (see Warr, 1992, for an exception). To address these unresolved issues, this chapter aims: i) to discuss different operationalisations of the factor age and ii) to examine the relation between work and indicators of mental health for different age groups using a longitudinal study design. We start with the operationalisation of Age; subsequently we discuss age-related effects in earlier occupational health research.

## ***1.2 The concept of age***

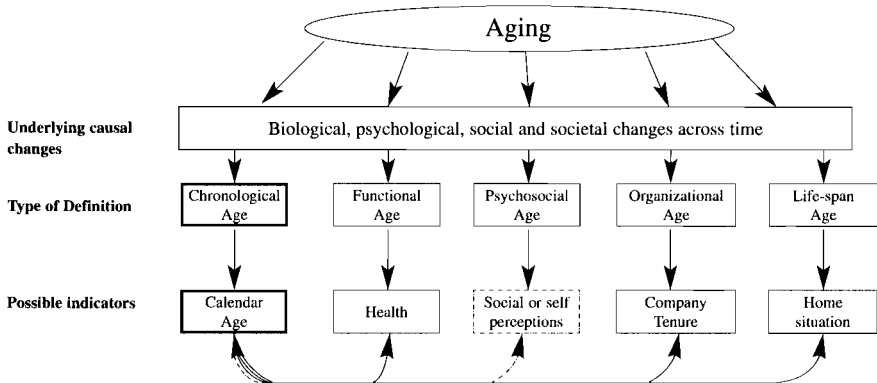
In a standard dictionary of contemporary English (Longman, 2003, p. 28) we find the following definitions for the concept “Age”, namely: “*the number of years someone has lived or something existed (How old)*”, “*one of the particular periods of someone’s life*” (such as old age, middle age, etc.), “*the state of being old*”, and “*a particular period of history*”. However, many researchers agree that aging is not simply an effect of time, as time does not directly measure the

changes we all experience (Arking, 1998). Age or aging can better be portrayed as a multi-dimensional process that is not easy to capture within one single definition, and refers to many changes in biological, psychological as well as social or even societal functioning across time (Birren & Birren, 1990; Jansen, 1993; Kanfer & Ackerman, 2004; Sterns & Miklos, 1995).

In line with this reasoning, Sterns and Doverspike (1989) distinguished among five different approaches to conceptualise and operationalise Aging of workers (cf. Figure 1), namely: the (i) chronological, (ii) performance-based or functional, (iii) psychosocial, (iv) organizational, and (v) life span approach. These approaches focus on different variables related to aging. The chronological approach is based on one's calendar age, whereas the performance-based or functional approach recognizes more individual variation in abilities and functioning at all ages. For example, indicators of the functional approach are health status and objective performance. The psychosocial approach is based on social or self perceptions of the "older worker", and may be measured as age perceptions of colleagues or employers. The organizational approach assumes that age and company tenure are related, and that effects of aging are often confounded by the effects of tenure, and vice versa. Finally, the life span approach emphasizes behavioural changes at any point in the life cycle. According to this approach many variables may impact the aging process, such as family or economic constraints (Sterns & Doverspike, 1989; Sterns & Miklos, 1995).

The distinction between younger and older employees is often based on the respondent's chronological or calendar age. The term "older worker" may refer to workers from age 40 to 75, depending on the purpose of the organisation as well as the needs of the worker (Collins, 2003; Stein & Rocco, 2001). Although the cut-off point between young and older workers is not fixed, throughout this paper we use the most employed threshold of 50 years to refer to older employees versus younger or middle-aged workers (cf. Stroh & Greller, 1995; Warr, 2000). More specifically, we examine whether older workers (> 50 years) differ significantly from young (< 35 years) and middle-aged workers (35-50 years) regarding the relation between work and mental health. In line with the organizational, performance-based and life-span approach to the study of aging, we also recognize that, independently of calendar age, individuals may vary in their competencies and their motives, and that company tenure, health status and home characteristics may be important explanatory variables in understanding the impact of aging in work outcomes. Consequently, we also include the influence of these age-related variables in our analyses. Before addressing the specific questions of this chapter, we first summarize key findings from earlier studies regarding age-related effects in work and mental health.

**Figure 1.** Representation of possible definitions of the concept "Aging" and indicators examined in this chapter



Note. refers to possible interrelations between different indicators, : indicates dominant approach or operationalisation in analyses, : indicator not included in our analyses

### 1.3 Age, work and mental health

For several decades the Demand-Control-Support model (DCS model; Johnson & Hall, 1988; Karasek & Theorell, 1990) has been one of the dominant work stress models in the field of occupational health psychology. According to the model, employees working in high strain jobs (i.e. jobs characterized by high job demands, low job control and low social support) will experience a higher than average number of health problems over time (e.g. high blood pressure, low mental health) than workers in other jobs. This strain or "iso-strain" hypothesis has been tested extensively (Belkić, Schnall, Landsbergis & Baker, 2004; de Lange, Taris, Kompier, Houtman, & Bongers, 2003; van der Doef & Maes, 1999 for reviews). De Lange et al. (2003), showed that of the 45 longitudinal studies included in their review on the Demand-Control-(Support) model, 41 studies (91%) controlled for age, gender and other demographic variables. None of these studies provided clear arguments why or how age would affect the relation between psychosocial work characteristics and mental health. Consequently, we must examine other related studies for more clues concerning the effects of age in the relation between work and mental health.

*Age and work.* To date, few published studies explicitly examine age differences in vocational interests, values or the importance of various job dimensions such as task complexity, autonomy and variety (Kanfer & Ackerman, 2004). Furthermore, the available literature presents somewhat mixed results. For example, Streufert, Pogashi, Piasecki, and Post (1990) have shown that older managers are less flexible in using different decision making strategies compared to younger workers, but that their decisions were not less effective. Furthermore,

Ryff and Baltes (1976) have suggested that as workers become older they tend to depreciate instrumental values (such as financial security), and to appreciate “terminal” values (such as opportunities for growth) more strongly. Philips, Barrett and Rush (1978) have also shown that older workers preferred more responsibility, interesting work, and attention demands, whereas younger workers preferred autonomy and social responsibilities. However, more recent work by Warr (1992, 1997, 2000, 2001) revealed that age is positively associated with increased preferences for physical security, salary and opportunities for skill utilization, and negatively associated with the importance of high job demands, job variety, feedback, and provision of external goal assignments. According to Warr (2000), older workers are likely to have different job concerns than younger ones, due to their changed family position, experience, and perceptions of themselves at different stages in the life course. Lord (2004) found that the primary reasons older workers remain active in the workforce is that they enjoy working and take pride in what they do, derive satisfaction from using their skills to benefit the organization, gain a sense of accomplishment from the job and enjoy the opportunity to be creative. In other words, these studies suggest that different age groups may value different job aspects.

Kanfer and Ackerman (2004) hypothesize that the age-related impact of work on well-being may also be explained by the type of demands. As there is some evidence for a gradual decline in fluid (as well as increase in crystallized) intellectual abilities over the life span, job demands that involve substantial fluid intellectual attention may be more difficult to complete for older compared to younger workers (Kanfer & Ackerman, 2004). However, few studies have explicitly addressed the effects of changes in fluid or crystallized intellectual abilities or complexity of job demands on outcomes like mental health. Thus, job complexity may an important work characteristic to examine in relation to effects for different age groups. However, considering the limited empirical research, it is too early to formulate specific hypotheses regarding age differences in work characteristics (like job demands, job control, et cetera) or values.

*Age and mental health.* There is accumulating evidence for age differences in occupational or mental health. Rather than presenting a comprehensive review of all relevant studies published, we will highlight some important exemplary studies here. Many studies have shown that older workers report more job satisfaction compared to their younger colleagues (Clark et al., 1996; Rhodes, 1983; Warr, 1992). Warr (1992; 1997) has also found evidence for U-shaped curvilinear relations between age and occupational well-being. Conversely, Siu, Spector, Cooper and Donald (2001) found no significant relations between age and job satisfaction, although there was a positive relation between age and a general mental well-being measure. They reported relatively high correlations for this relation, compared to correlations typically found in western studies, of .25 to .32 between age and well-being. Their results also showed that older managers reported fewer sources of stress, more problem-focused coping methods, and a

more internal locus of control. The authors argue that these results may be due to the fact that older people are more accepted in Chinese companies and that this acceptance may reduce stressors perceived by older workers, thus resulting in less strain. Other indicators of mental health examined in relation to age are mental resiliency and burnout. Earlier research has revealed that the physical as well as mental resiliency of older workers is lower compared to younger workers (Alkjaer, Pilegaard, Bakke, & Jensen, 2005). However, other studies have shown consistent negative relations between burnout and age (Schaufeli & Enzmann, 1998). Burnout is more often observed among younger employees at the beginning of their careers, indicating that experience may be an important buffer in the development of burnout. In sum, we may conclude from the aforementioned studies that chronological age is significantly associated with indicators of mental health, but these studies do not provide information about the specific dynamics between age, work and mental health.

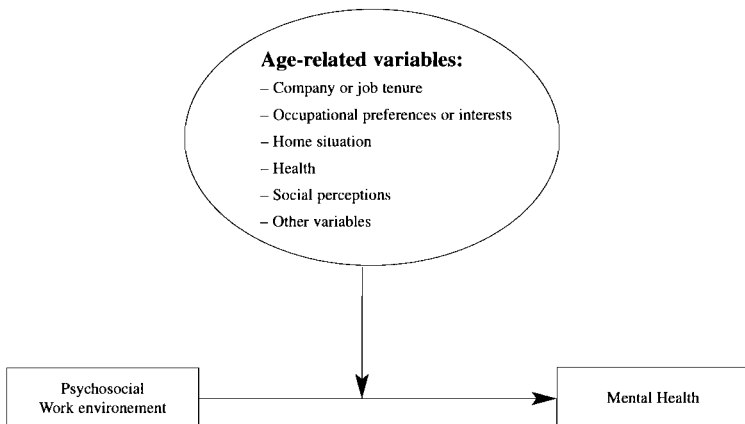
*Age, work and mental health.* Few studies have been published that examine the dynamics between work, mental health and age-related variables. A rare example is the study of Warr (1992), who examined whether the associations between age and occupational well-being (measured as job anxiety-contentment and job depression-enthusiasm) could be accounted for by 13 factors (e.g., job position, job characteristics such as decision latitude and job demands, work values, demographic factors and family life cycle), and found, besides the influence of age, consistent significant effects of job characteristics, work values, and demographics in explaining occupational well-being. Another example is the study of Kamal, Oswald and Warr (1995), who reported a significant positive relation between age and job satisfaction that could fully be explained by differences in job and personal factors. Nolen-Hoeksema and Ahrens (2002) examined the influence of age in the relation between work and depressive symptoms, and found that a low-quality work environment was more strongly related to depressive symptoms among middle-aged (45-55 years) workers compared to young workers (25-35 years). Life span developmental theory proposes that mental health at any given period in the adult life span will be more strongly associated with concerns related to important issues of that period, and that events that are not expected or normative (e.g., death of a young worker, colleague or friend) for a particular period in the life span will have greater impact on worker mental health compared to individuals for whom these events are to be expected or normative (cf. Nolen-Hoeksema & Ahrens, 2002). Nonetheless, we do not know whether these assumptions also apply to the influence of job characteristics on mental health. According to Nolen-Hoeksema et al. (2002), expectations about being satisfactorily employed are likely to vary across the life span, and thus violations may have greater impact on mental health in some age groups compared to others. For example, older workers who are working in dissatisfying or stressful work environments may see fewer opportunities to transfer to another job compared to younger workers, as they are often perceived



as more expensive workers or too old to obtain the education needed for the new tasks. This situation may result in lower control to change the current dissatisfying job position and in a greater negative impact on mental health.

In contrast to this view, Baltes and Carstensen (1996) suggest that workers may be better in maintaining and improving their psychological well-being in later life due to better coping methods or better work adjustment. Clark, Oswald and Warr (1996) have suggested that non-job factors of life stage and personal circumstances (such as maturity or experience) may be important variables in explaining mental health. Hansson, De Koekkoek, Neece and Patterson (1997) argue that the relation between age and occupational well-being reflects the fit between a worker’s changing abilities and the demands of the job. If the demands are not overtaxing and fit the abilities of an older worker, age may not have a significant impact on occupational well-being. On the other hand, if the abilities and coping methods do not compensate the demands of one’s job, worker mental health may indeed be threatened (Warr, 1994). In sum, these results suggest that not aging itself moderates the relation between work and mental health, but rather that age-related variables (like job tenure, health status, occupational preferences or vocational interests, home situation etc.) are important moderators of the relation between work and mental health (cf. Figure 2).

**Figure 2.** Possible age-related moderators in the relation between work and mental health



### 1.4 Research questions

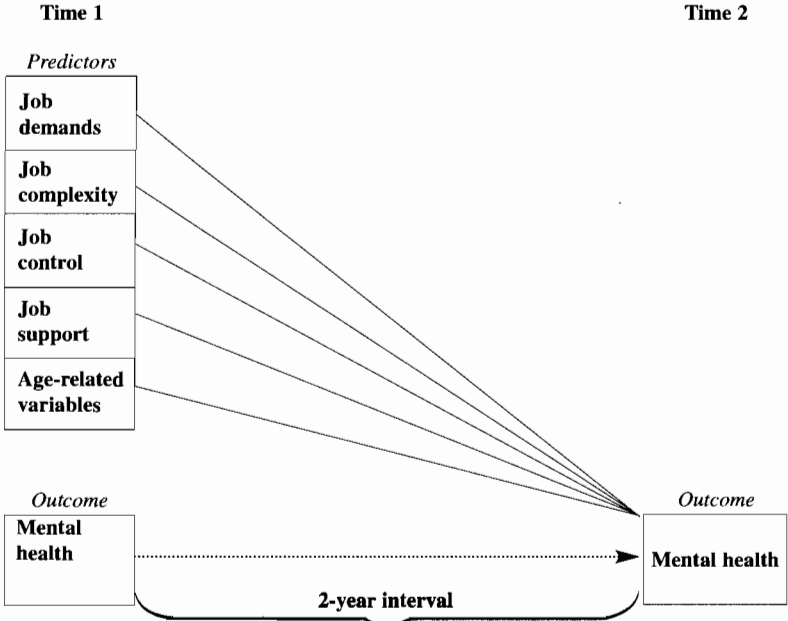
Whereas earlier research examining age-related effects in work and indicators of mental health has provided some evidence for such effects, as yet it is unknown whether and how age affects the across-time development of these relations. Moreover, an important limitation of the aforementioned studies is that they are mostly based on cross-sectional designs, meaning that they cannot examine age differences in the development of occupational well-being across time (Hansson et al., 1997). We aim to

overcome these limitations by i) examining the dynamics between age, work and mental health using a two-wave prospective study, and ii) by examining the question whether the development of the relation between work and occupational well-being differs for older (> 50 years) versus young (< 35 years) and middle-aged workers (35-50 years). More specifically, we address the following questions:

1. Do young, middle-aged and older workers differ from each other in the type of work they do, their level of education, company tenure, home situation, (non) work values, health status, attitudes regarding company policies?
2. Do older, middle-aged, and young workers differ regarding their scores on psychosocial work characteristics and indicators of mental health on Time 1 and 2?
3. Do the age groups report differences in the cross-lagged relations between work characteristics and mental health?
4. To which degree do home situation, company tenure, and health account for the effects found for these different age groups?

Figure 3 presents our tentative model to be tested across the three different age groups.

**Figure 3.** Research model to be tested across the different age groups



NB. Mental health= job/, company satisfaction; Job control= skill discretion, decision authority, social support=social support of supervisor and colleagues. Age-related variables= Company tenure, Health status=perceived health status and self-reported sickness absence frequency, and Home situation.

—————> : Indicates auto-correlations between mental health measures;

.....> : Indicates longitudinal effect of Time 1 variables on Time 2 mental health across time.

Covariates gender and educational level are not portrayed in Figure.

## 2 Method

### 2.1 Sample

The current study was conducted within the framework of the 2-wave prospective TAS Survey (TNO work Situation Survey) of Dutch employees (cf. Beckers, van der Linden, Smulders, Kompier, van Veldhoven, & van Yperen, 2004; Smulders, Andries, & Otten, 2001). This study is based on a random sample of 1299 employees, drawn from the total Dutch workforce. The analyses reported in this paper are based on 686 (53% follow-up response) workers that responded on both waves (i.e., 2002, 2004). Blue-collar as well as white-collar jobs and different occupations were selected. Unfortunately, the TAS sample did show some significant selection effects as relatively few younger employees (< 35 years), female, and relatively more higher educated workers were overrepresented relative to the general Dutch working population.

At each wave the respondents completed a self-administered questionnaire, tapping concepts such as general working conditions, changes in the workplace, psychosocial work characteristics, work satisfaction, mental well-being, and background factors. The data in this study are based on the annual questionnaires measuring psychosocial variables, evaluations of company policies regarding salary, education etc., and indicators of well-being. To ensure valid and reliable results regarding the effects of exposure to psychosocial work characteristics, employees who held a temporary type of contract were excluded, meaning that 97 of the 686 respondents were excluded. After listwise deletion of missing values, the sample included 589 employees (67% male; average age at baseline was 43.8 years,  $SD = 8.9$ ; average number of years of employment in company was 13.8 years,  $SD = 10.2$ ).

### 2.2 Measures

#### *Psychosocial work characteristics*

The current study included four indicators of psychosocial work characteristics, namely: job demands, job complexity, job control, and social support. *Job demands* were measured using a four-item Dutch version of Karasek's (1985) Job Content Questionnaire (e.g., "My job requires that I work very fast", 1 = "never", 4 = "always"). The reliability (Cronbach's alpha) of this scale varied from .84 to .84 across occasions.

*Job complexity* was measured using a five-item scale (Houtman, Goudswaard, Dhondt, Van der Grinten, Hildebrandt, & Kompier, 1995; Houtman, Goudswaard, Dhondt, Van der Grinten, Hildebrandt, & Van der Poel, 1998; e.g., "Does your job require long periods of intense concentration?", 1 = "never", 4 = "always"). The reliability (Cronbach's alpha) of this scale varied from .78 to .78 across occasions.

Consistent with Karasek's (1985) conceptualization, *job control* was measured by *skill discretion* and *decision authority*. *Skill discretion* was measured

using a four-item scale (e.g., "My job requires that I learn new things", 1 = "never", 4 = "always"), and *decision authority* was also measured using a four-item scale (e.g., "My job allows me to take many decisions on my own", 1 = "never", 4 = "always"). The reliabilities for the scale skill discretion ranged from .70 to .73, and for the scale decision authority from .85 to .86 across occasions.

*Social support* was measured by two scales measuring social support from supervisor versus colleagues. *Social support from supervisors* was measured using a four-item Dutch version of Karasek's (1985) Job Content Questionnaire (e.g., "My supervisor pays attention to what I say, 1 = "totally disagree", 5 = "totally agree"). The reliability (Cronbach's alpha) of this scale varied from .83 to .84 across occasions. *Social support from colleagues* was measured using a four-item Dutch version of Karasek's (1985) Job Content Questionnaire (e.g., "My supervisor pays attention to what I say", 1 = "totally disagree", 5 = "totally agree"). The reliability (Cronbach's alpha) of this scale varied from .71 to .77 across occasions.

### *Mental health*

The current study included two indicators of occupational well-being, namely Company satisfaction and Emotional exhaustion (1) *Company satisfaction* was measured by three items (e.g., "I feel completely at home within this company", 1 = "totally disagree", 5 = "totally agree"). The reliability varied from .82 to .75 across occasions. (2) *Emotional exhaustion* was measured by a 7-item subscale of the Maslach Burnout inventory (Schaufeli & Van Dierendonck, 1993, e.g., "I feel emotionally drained from my work", 1 = "never", 7 = "every day"). The reliability varied from .90 to .91.

### **2.3 Age-related variables**

As potentially important age-related variables, we controlled in our explanatory analyses for company tenure (number of years worked in the company), health status (measured as sickness absence frequency and self-reported health status), and home situation (response categories were 1 = "married or living together without children", 2 = "married or living together with children", 3 = "single parent", and 4 = "single"). For research question 1, we also looked at the differences between the age groups in whether they were (un)satisfied with company promotion and salary, sick leave and work incapacitation policy (response categories varied from 1 = "very dissatisfied" to 5 = "very satisfied"). We also looked at questions measuring the importance of work and work-related aspects (such as job security, variation in tasks), and also importance of having a family (response categories varied from 1 = "not very important" to 4 = "very important"). Furthermore, we looked at the differences in job security ("is your job security good"; response categories were 1 = "yes" and 2 = "no"), and in participation in training or education during the past 2 years (1 = "yes", 2 = "no").

Gender and education were also used as covariates in the analysis, because these variables are often related to the outcome variables employed in this study. Failing to control for these variables may result in bias in the effects of other variables (e.g., Karasek & Theorell, 1990; Schnall, Landsbergis, & Baker, 1994).

### 3 Results

#### 3.1 Descriptive analysis

Correlational analyses were conducted to obtain more insight into the data. Tables 1 and 2 present the correlations between the different measures for the different age groups. The correlations among the measures were in the expected direction. For instance, no or very weak correlations were found for the associations among job demands, skill discretion and job autonomy, whereas significant negative correlations were found for the relation between emotional exhaustion and company satisfaction. Auto-correlations between the research variables (not always presented in Tables 1 and 2) were acceptable and ranged from  $r = .24$  (for Time 1-2 company satisfaction for young workers) to  $r = .70$  (for Time 1-2 emotional exhaustion for older workers).

Table 1. Correlations between research variables for young workers (< 35 years; N=84 after listwise deletion)

Time 1 Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1 Company tenure	-															
2 Gender <sup>a</sup>	.12	-														
3 Education <sup>b</sup>	-.09	.09	-													
4 Home situation <sup>c</sup>	-.03	.12	.06	-												
5 Job demands	-.14	.09	.15	.03	-											
6 Job complexity	-.03	.05	.23**	-.16	.44**	-										
7 Skill discretion	-.24*	.01	-.05	-.15	.19	.46**	-									
8 Job autonomy	-.08	-.06	.00	.01	.00	.02	.09	-								
9 Social support colleagues	-.12	.06	-.07	.20	-.25*	-.17	.07	-.17	-							
10 Social support supervisor	-.09	-.04	-.13	.06	-.19	.02	.21*	-.03	.17	-						
11 Perceived health status	.21*	-.01	-.04	-.13	.03	-.01	-.14	.00	-.25*	-.14	-					
12 Sickness absence frequency	-.04	.08	.15	-.10	-.07	.04	.00	-.18	-.03	-.01	.13	-				
13 Company satisfaction	-.08	.02	-.02	.04	-.20*	-.01	.18	.10	.30**	.27**	-.15	-.03	-			
14 Emotional exhaustion	-.08	-.02	.09	.06	.38**	.17	-.02	-.10	-.21*	-.11	.39**	.08	.01	-		
<b>Time 2 Variables</b>																
15 Company satisfaction	.09	.02	-.09	-.03	-.23*	-.04	.11	.13	-.04	-.04	-.01	-.03	.24**	-.25**	-	
16 Emotional exhaustion	-.20	.02	.07	.15	.27**	.14	-.11	.10	-.06	.03	.17	-.05	-.33**	.54**	-.09	-

Note. \*: significant  $p < .05$ ; \*\* significant  $p < .01$ .

a Gender: 1 = male, 2 = female, b Education = 1: no education, 2: primary education, 3: Lower vocational education, 4: Middle vocational training, 5: Higher vocational or Bsc level training, 6: University or Msc degree; Home situation= 1: married or living together without children, 2: married or living together with children, 3: single parent, 4: single

**Table 2.** Correlations between research variables for middle aged workers in upper diagonal (35-50 years; N =274 after listwise deletion), and for older workers in lower diagonal (>50 years; N=125 after listwise deletion)

Time 1 Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1 Company tenure	-	-.13*	-.13*	-.03	.05	-.04	-.03	-.04	-.02	-.09	-.01	-.13*	-.03	-.04	.04	-.09
2 Gender <sup>a</sup>	-.30**	-	.20**	.18**	-.03	.03	-.01	.02	.16**	.05	.01	.12	.08	-.03	.05	-.01
3 Education <sup>b</sup>	-.02	.07	-	.08	.02	.14**	.12*	.14**	.03	.03	-.14	.01	.06	.03	.13*	.08
4 Home situation <sup>c</sup>	-.26	.55**	.14	-	.04	-.01	-.06	-.04	.07	-.05	.07	.21**	-.02	.10	-.05	.10
5 Job demands	.08	.11	.05	-.05	-	.30**	.09	-.09	-.09	-.14*	.12*	.00	-.13*	.32**	-.10	.29**
6 Job complexity	.00	-.02	.18*	-.07	.38**	-	.35**	.10	.03	.05	-.05	-.01	.13*	.04	.08	.08
7 Skill discretion	.16	-.11	.09	-.03	.12	.37**	-	.22**	.15**	.23**	-.18**	-.09	.22**	-.12*	.23**	-.07
8 Job autonomy	.06	-.01	.02	-.02	.03	-.01	.12	-	.05	.20**	-.21**	-.13*	.21**	-.23**	.12*	-.11*
9 Social support colleagues	-.09	.09	.02	.08	.11	.20*	.16*	-.01	-	.27**	-.09	-.03	.18**	-.19**	.21**	-.13*
10 Social support supervisor	-.13	-.07	.12	-.01	-.05	-.03	.18*	.04	.17*	-	-.16**	-.11	.34**	-.22**	.27**	-.10
11 Perceived health status	-.06	-.01	-.05	.07	-.02	-.00	.05	-.17*	-.07	-.11	-	.28**	-.32**	.39**	-.19**	.29**
12 Sickness absence frequency	-.08	.04	.03	.12	-.03	.00	-.04	-.09	-.06	-.00	.23**	-	-.12*	.25**	-.11*	.27**
13 Company satisfaction	-.04	-.01	.04	-.10	.15	.19*	.12	.11	.15	.40**	-.19*	-.04	-	.32**	.54**	-.37**
14 Emotional exhaustion	.04	.16*	-.07	.08	.21**	.05	-.01	-.05	-.00	-.18*	.44**	.24**	-.15**	-	-.32**	.70**
<b>Time 2 Variables</b>																
15 Company satisfaction	-.01	.08	-.02	.02	.03	.12	.20*	-.02	.17*	.27**	-.10	-.05	.25**	-.15**	-	-.37**
16 Emotional exhaustion	-.03	-.04	-.02	.01	.12	.15	.00	-.07	-.10	-.28**	.41**	.17*	-.32**	.69**	-.34**	-

Note. \*: significant  $p < .05$ ; \*\* significant  $p < .01$ . a Gender: 1= male , 2 = female, b Education = 1: no education, 2: primary education, 3: Lower vocational education, 4: Middle vocational training, 5: Higher vocational or Bsc level training, 6: University or Msc degree; c Home situation = 1: married or living together without children, 2: married or living together with children, 3: single parent, 4: single

*Question 1: Do young, middle-aged and older workers differ from each other in the type of work, level of education, company tenure, home situation, (non) work values, health status, attitudes regarding company policies?* Table 1 presents the percentages or mean values of the age-related variables for young, middle-aged versus older workers. The age groups did not report significant differences in their perceived health status, level of education, supervisory position (although middle-aged workers reported relatively more often that they held supervisory positions), satisfaction with company promotion and salary, and sick leave or work incapacitation policies. Moreover, they reported the same (high) level of job security and seemed to have participated equally in training in the past 12 months. However, the age groups did report significant differences in company tenure,  $F(2, 571) = 107.91, p < .001$ , gender,  $F(2, 577) = 11.79, p < .001$ , sickness absence frequency,  $F(2, 567) = 2.09, p < .05$ , home situation,  $F(2, 576) = 5.38, p < .01$ , importance of work,  $F(2, 565) = 11.08, p < .001$ , importance of family,  $F(2, 564) = 5.03, p < .01$ , importance of carrying responsibility,  $F(2, 565) = 5.61, p < .01$ , and importance of opportunities for learning and personal development,  $F(2, 571) = 5.00, p < .01$ .

**Table 3.** Demographic characteristics, information about the type of work, (non) work values, and evaluation of company policy of the different age groups (Percentage or Means and standard deviation between brackets)

Variables	Young <35 year N=99	Middle-aged 35-50 year N=327	Old >50 year N=154
Calendar Age*	30.2 (3.2)	42.7 (4.3)	54.8 (2.6)
Company tenure*	5.2 (3.6)	12.77 (8.5)	21.3 (11.0)
% Male*	47.5%	68.2%	75.0%
% Perceived Health status (low to poor health):	5.1%	9.8%	14.9%
Sickness absence frequency*	1.69 (2.48)	1.04 (1.16)	.88 (1.38)
% Level of education:			
1: no education	0%	0.3%	0.6%
2: primary education	0%	1.2%	3.2%
3: Lower vocational education	6.1%	18.7%	22.1%
4: Middle vocational training	55.6%	32.1%	33.8%
5: Higher vocational or Bsc level training	32.2%	37.9%	32.5%
6: University or Msc degree	6.1%	9.8%	7.8%
% Supervisory position	22.2%	49.6%	31.2%
% Home situation*:			
1: married or living together without children	22.2%	15%	46.1%
2: married or living together with children	45.5%	67%	28.6%
3: single parent	2.0%	3.7%	5.8%
4: single	30.3%	14.1%	19.5%
% Importance of (4= very important):			
-work *	-24.2%	-25.7%	-45.5%
-family *	-67.7%	-75.5%	-65.6%
-leisure time	-46.5%	-41.9%	-37.0%
-interesting work	-59.6%	-52.6%	-55.2%
-carrying responsibility *	-25.3%	-32.1%	-42.2%
-achieving a goal	-43.3%	-44.6%	-42.9%
-learning or growth possibilities *	-37.4%	-24.5%	-20.8%
-job security	-47.5%	-46.8.9%	-51.9%
-good colleagues-	65.7%	-67.0%	-59.1%
-good supervision	-63.3%	-61.5%	-61.7%
-independence	-49.5%	-50.5%	-53.2%
-good rewards	-47.5%	-40.1%	-48.7%
-promotion possibilities	-21.2%	-15.0%	-14.9%
-variation in tasks	-60.6%	-52.9%	-50.0%
-satisfactory working time schedules	-41.4%	-40.7%	-39.0%
% Satisfaction with company promotion and salary policy (4-5: (very) satisfied)	46.4%	50.8%	51.4%
% Satisfaction with company sick leave and work incapacity policy (4-5: (very) satisfied)	55.5%	53.3%	52.3%
% Job security (yes)	96%	91.9%	87.7%
% Participated in training or education past 12 months (yes)	54.5%	64.8%	57.1%

Note: \*= Significant Univariate F-tests: Age F (2, 577) = 1310.06, p<.001; Company tenure F (2, 571) = 107.91, p<.001; Gender F (2, 577) = 11.79, p<.001; Importance of work F(2, 565) = 11.08, p<.001; Importance of family F(2, 564) = 5.03, p<.01; Importance of carrying responsibility F(2, 565) = 5.61, p<.01; Importance of learning or growth possibilities F(2, 571) = 5.00, p<.01; Home situation F(2, 576) = 5.38, p<.01; Sickness absence frequency F(2, 567) = 2.09, p<.05.

Post hoc Tukey's least significant difference (LSD) test revealed the following interesting differences among the age groups: young workers reported a significantly higher sickness absence frequency compared to middle-aged and older workers. Furthermore, young workers differed significantly concerning their home situation compared to middle-aged and older workers; as may be expected, they were more often single. Older workers reported a higher importance of work and carrying responsibilities compared to the other age groups, young workers valued learning or growth possibilities higher compared to older workers, and middle-aged workers reported a higher importance of family compared to young workers. In sum, the age groups do reveal significant differences in important age-related variables. However, contrary to earlier research, the older workers were relatively *positive* regarding their training possibilities, educational background, health status, and company policies.

*Question 2: Do older, middle-aged, and young workers differ regarding their scores on psychosocial work characteristics and indicators of mental health?* Before examining the cross-lagged relations between the psychosocial work characteristics and indicators of mental health, we first examine the scores on the research variables across the age groups. Table 4 presents the results of several analyses of variance (ANOVAs). Table 4 shows only significant differences for Time 1 job complexity,  $F(2, 573) = 3.82, p < .05$ , and Time 2 job complexity,  $F(2, 576) = 4.00, p < .05$ . Older workers report significantly higher job complexity compared to the other age groups. In other words, the age groups work in similar psychosocial work environments, and report (on average) similar levels of job demands, skill discretion, job autonomy and social support. Furthermore, they do not report significant differences in these work characteristics across time. Nevertheless, to examine whether the age groups experience the same effects of these psychosocial work characteristics on their mental health across time, we must first test our research model (presented in Figure 3) across the age groups.

**Table 4.** Comparison of mean scores on psychosocial work characteristics and indicators of mental health across the age groups (standard deviation between brackets)

<b>Research Variables</b>	<b>Young M (SD)</b>	<b>Middle aged M(SD)</b>	<b>Old M(SD)</b>
<i>Time 1 variables</i>			
T1 Job demands	2.61 (.67)	2.68 (.65)	2.78 (.69)
T1 Job complexity*	2.92 (.67)	3.02 (.56)	3.13 (.57)
T1 Skill discretion	2.91 (.63)	3.00 (.59)	3.07 (.64)
T1 Autonomy	3.00 (.69)	3.02 (.67)	3.07 (.72)
T1 Social support from colleagues	3.28 (.55)	3.31 (.53)	3.22 (.48)
T1 Social support from supervisor	2.95 (.62)	2.93 (.66)	2.81 (.64)
T1 Company satisfaction	3.68 (.76)	3.79 (.76)	3.77 (.70)
T1 Emotional exhaustion	2.56 (1.18)	2.67 (1.36)	2.68 (1.54)



<b>Research Variables</b>	<b>Young M (SD)</b>	<b>Middle aged M(SD)</b>	<b>Old M(SD)</b>
Time 2 variables			
T2 Job demands	2.60 (.65)	2.60 (.46)	2.60 (.47)
T2 Job complexity*	2.95 (.68)	2.99 (.54)	3.13 (.55)
T2 Skill discretion	2.91 (.66)	2.97 (.57)	3.01 (.54)
T2 Autonomy	3.04 (.67)	3.01 (.68)	2.99 (.77)
T2 Social support from colleagues	3.31 (.51)	3.33 (.52)	3.24 (.54)
T2 Social support from supervisor	2.85 (.71)	2.87 (.66)	2.83 (.66)
T2 Company satisfaction	3.71 (.64)	3.73 (.74)	3.85 (.69)
T2 Emotional exhaustion	2.65 (1.36)	2.60 (1.40)	2.47 (1.50)

Note \*= Univariate F significant; Time 1 Job complexity  $F(2, 573) = 3.82, p < .05$ ; Time 2 Job complexity  $F(2, 576) = 4.00, p < .05$ ; Manova repeated measurements revealed no significant effects for the Group x Time interaction.

### 3.2 Explanatory analysis

*Question 3: Do the age groups report differences in the cross-lagged relations between work characteristics and mental health?* To learn more about the factor age in the relation between work and mental health, we conducted several stepwise regression analyses, comparing the scores of the overall group with the results of the different age groups. We introduced the following blocks of variables in the different steps of the analyses: in the first step the baseline mental health measure, in the second step the job characteristics, in the third step the demographics (education and gender), and in the final step the age-related variables (home situation, sickness absence frequency, perceived health status, and company tenure). For the overall group, we also included a second step with age and age squared to examine possible curvilinear effects of age (cf. Warr, 1992). Tables 5 and 6 present the results of these regression analyses for emotional exhaustion and company satisfaction.

**Table 5.** Hierarchical multiple (stepwise) regression analyses for outcome Time 2 Emotional exhaustion (overall group versus results of age groups)

<i>Overall group</i>		
<b>Time 1 Variables</b>	<b><math>\beta</math>-values</b>	<b>R<sup>2</sup> (R<sup>2</sup> change)</b>
Model 1:		
Time 1 Emotional exhaustion	.67***	.45 (.45)***
Model 5:		
-Time 1 Emotional exhaustion	.63***	.48 (.01)*
Age		
-Age	-.11	
-Age squared	.12	

<b>Time 1 Variables</b>	<b>β-values</b>	<b>R<sup>2</sup> (R<sup>2</sup> change)</b>
<i>Job characteristics</i>		
-Job demands	.05	
-Skill discretion	-.05	
-Job autonomy	.04	
-Job complexity	.05	
-Social support supervisor	.01	
-Social support colleagues	-.00	
<i>Demographics:</i>		
-Education	.07*	
-Gender	-.05	
<i>Age-related variables:</i>		
-Home situation	.03	
-Sickness absence frequency	-.01	
-Perceived health status	.06	
-Company tenure	-.09*	
<b><i>Subgroup older workers</i></b>		
<b>Time 1 Variables</b>	<b>β-values</b>	<b>R<sup>2</sup> (R<sup>2</sup> change)</b>
Model 1:		
Time 1 Emotional exhaustion	.67***	.44 (.44)***
Model 4:		
-Time 1 Emotional exhaustion	.63***	.57 (.13)*
<i>Job characteristics</i>		
-Job demands	-.02	
-Skill discretion	-.02	
-Job autonomy	-.02	
-Job complexity	.12	
-Social support supervisor	-.17*	
-Social support colleagues	-.12*	
<i>Demographics:</i>		
-Education	.05	
-Gender	-.26**	
<i>Age-related variables:</i>		
-Home situation	.04	
-Sickness absence frequency	-.03	
-Perceived health status	.11	
-Company tenure	-.16*	
<b><i>Subgroup middle-aged workers</i></b>		
<b>Time 1 Variables</b>	<b>β-values</b>	<b>R<sup>2</sup> (R<sup>2</sup> change)</b>
Model 1:		
Time 1 Emotional exhaustion	.71***	.31 (.31)***
Model 4:		
-Time 1 Emotional exhaustion	.66***	.54 (.04)*

<i>Subgroup middle-aged workers</i>		
<b>Time 1 Variables</b>	<b>β-values</b>	<b>R<sup>2</sup> (R<sup>2</sup> change)</b>
<i>Job characteristics</i>		
-Job demands	.11*	
-Skill discretion	-.01	
-Job autonomy	.06	
-Job complexity	-.00	
-Social support supervisor	.08	
-Social support colleagues	.01	
<i>Demographics:</i>		
-Education	.08	
-Gender	.00	
<i>Age-related variables:</i>		
-Home situation	.00	
-Sickness absence frequency	.10*	
-Perceived health status	.03	
-Company tenure	-.04	

<i>Subgroup young workers</i>		
<b>Time 1 Variables</b>	<b>β-values</b>	<b>R<sup>2</sup> (R<sup>2</sup> change)</b>
Model 1:		
Time 1 Emotional exhaustion	.56***	.31 (.31)***

Note.: only significant models are presented; \*\*\* p<.001; \*\* p<.01; \* p<.05

**Table 6.** Hierarchical multiple (stepwise) regression analyses for outcome Time 2 Company satisfaction (overall group versus results of age groups)

<i>Overall group</i>		
<b>Time 1 Variables</b>	<b>β-values</b>	<b>R<sup>2</sup> (R<sup>2</sup> change)</b>
Model 1:		
Time 1 Company satisfaction	.42***	.18 (.18)***
Model 3:		
-Time 1 Company satisfaction	.36***	.21 (.03)**
<i>Age</i>		
-Age	-.21	
-Age squared	.27	
<i>Job characteristics</i>		
-Job demands	-.07	
-Skill discretion	.13**	
-Job autonomy	-.00	
-Job complexity	.00	
-Social support supervisor	.06	
-Social support colleagues	.04	
<i>Subgroup older workers</i>		
<b>Time 1 Variables</b>	<b>β-values</b>	<b>R<sup>2</sup> (R<sup>2</sup> change)</b>
Model 1:		
Time 1 Company satisfaction	.26**	.07 (.07)***

<i>Subgroup middle-aged workers</i>		
<b>Time 1 Variables</b>	<b><math>\beta</math>-values</b>	<b>R<sup>2</sup> (R<sup>2</sup> change)</b>
Model 1:		
Time 1 Company satisfaction	.56***	.31 (.31)***
Model 4:		
-Time 1 Company satisfaction	.50***	.36 (.05)*
<i>Job characteristics</i>		
-Job demands	-.03	
-Skill discretion	.08	
-Job autonomy	-.04	
-Job complexity	-.01	
-Social support supervisor	.07	
-Social support colleagues	.10	
<i>Demographics:</i>		
-Education	.13*	
-Gender	.02	
<i>Age-related variables:</i>		
-Home situation	-.05	
-Sickness absence frequency	.02	
-Perceived health status	.01	
-Company tenure	.11*	
<i>Subgroup young workers</i>		
<b>Time 1 Variables</b>	<b><math>\beta</math>-values</b>	<b>R<sup>2</sup> (R<sup>2</sup> change)</b>
Model 1:		
-Time 1 Company satisfaction	.26*	.07 (.07)*
Model 2:		
-Time 1 Company satisfaction	.26*	.21 (.14)*
<i>Job characteristics</i>		
-Job demands	-.33**	
-Skill discretion	.18	
-Job autonomy	.06	
-Job complexity	-.01	
-Social support supervisor	-.18	
-Social support colleagues	-.19	

Note.: only significant models are presented; \*\*\*  $p < .001$ ; \*\*  $p < .01$ ; \*  $p < .05$

Our overall group analyses showed no significant effects of age or age squared in predicting emotional exhaustion and company satisfaction across time. However, our subgroup analyses did reveal interesting differences. Table 5 shows that changes in emotional exhaustion across time could be predicted for older workers by low social support provided by supervisors ( $\beta = -.17, p < .05$ ) and colleagues ( $\beta = -.12; p < .05$ ), gender ( $\beta = -.16; p < .05$ ; older females report relatively more emotional exhaustion across time), and company tenure (more years of experience in the company on Time 1 was associated with more emotional exhaustion across time). On the other hand, middle-aged workers reported

significant effects of job demands ( $\beta = .11$ ;  $p < .05$ ), and sickness absence frequency ( $\beta = .10$ ;  $p < .05$ ) in predicting emotional exhaustion across time, whereas young workers reported only an effect of the baseline measure. Table 6 shows that changes in company satisfaction from Time 1 to Time 2 could only be predicted by the baseline company satisfaction measure in the subgroup of older workers, but more effects were found for the other age groups. The middle-aged workers reported significant effects of education ( $\beta = .17$ ;  $p < .05$ ; more education was associated with more company satisfaction across time), and company tenure ( $\beta = .11$ ;  $p < .05$ ; having more years of experience was associated with higher company satisfaction across time). Finally, the young workers showed strong negative effects of job demands ( $\beta = -.33$ ;  $p < .05$ ) in predicting change in company satisfaction. We may conclude from these results that the age groups do reveal differences in the cross-lagged effects between work characteristics and mental health.

*Question 4: To which degree do home situation, company tenure, and health status account for the effects found for these different age groups?* Tables 5 and 6 show mixed results for the age-related variables as we do not find consistent effects of these variables across the age groups, and they can often be better understood as an independent variable (next to the influence of demographics and work characteristics) instead of as a moderator in the relation between work and mental health (as postulated in Figure 2). Nevertheless, company tenure is an important variable in predicting emotional exhaustion for older workers and in predicting company satisfaction for middle-aged workers, whereas sickness absence frequency among middle-aged workers is important in predicting emotional exhaustion.

## **4 Discussion**

### **4.1 Summary**

This chapter attempted to shed more light on the factor Age in the relation between work and mental health in the context of a two-phase study among 589 Dutch workers. Considering the paucity of (longitudinal) research that explicitly addresses Age as a factor, we first discussed the operationalisation of the factor age, and provided a graphical overview of possible operationalisations and indicators (see Figure 1) that can be used to measure effects of age in the relation between work and health. From these different operationalisations, we distinguished important age-related variables (like company tenure, health status and home situation) that can influence or even explain the relation between work and mental health across different age groups. In our explanatory analyses, we examined the cross-lagged relations between psychosocial work characteristics and indicators of mental health for young (< 35 years), middle-aged (35-50 years), versus older workers (> 50 years), and also included the aforementioned age-related variables.

We first wanted to know whether the age groups differed in the type of work, level of education, company tenure, home situation, (non) work values, health status, attitudes regarding company policies, and also in their psychosocial work characteristics and mental health complaints (*questions 1 and 2*). The results revealed that young workers differed significantly concerning their home situation compared to middle-aged and older workers; as may be expected, they were more often single. Older workers reported a higher importance of work and carrying responsibilities compared to the other age groups, young workers valued learning or growth possibilities higher compared to older workers, and middle-aged workers reported a higher importance of family compared to young workers. Moreover, our results revealed that, contrary to earlier research, the older workers were relatively *positive* regarding their training possibilities, educational background, health status, and company policies. The age groups worked in similar psychosocial work environments, and reported (on average) similar levels of job demands, skill discretion, job autonomy and social support. Only older workers reported significantly higher job complexity compared to the other age groups.

Nevertheless, to examine whether the age groups experienced the same effects of these psychosocial work characteristics on their mental health across time, we tested our research model (presented in Figure 3) for the overall group versus the age groups (*question 3*). Our overall group analyses revealed no significant effects of the variables age, age squared, and of the job characteristics job demands, job autonomy, job complexity, and social support of colleagues and supervisors. Only a significant effect of skill discretion was found in explaining company satisfaction. We may conclude from this first step in our analyses that calendar age did not moderate the relation between work and mental health. However, we also wanted to examine whether subgroup analyses revealed the same results. In our age group explanatory analyses we did find significant differences in the cross-lagged effects of the job characteristics in explaining mental health. In line with the strain-hypothesis of the Demand-Control-Support model (cf. De Lange et al., 2003), we found significant positive effects of job demands in predicting change in emotional exhaustion for middle-aged worker, whereas significant negative effects of job demands were found in predicting change in company satisfaction of young workers. Moreover, negative main effects of social support of colleagues and supervisors were found on emotional exhaustion of older workers. In the overall group analyses, these age group specific effects remained undetected as they cancelled each other out at the aggregated level (or in the continuous calendar age measure). We have tried to explain these age group specific differences on the basis of the aforementioned age-related variables (*Question 4*), but did not find consistent evidence. Although company tenure seemed to be an important variable in explaining emotional exhaustion as well as company satisfaction, this variable did not moderate the effect of work characteristics on health.

## ***4.2 Study limitations***

Before discussing the implications of our findings, we must address the most important limitations of our study. First, the findings reported in this study are entirely based on self-reports and may therefore be subject to biases, e.g. due to personality traits such as negative affectivity (Frese & Zapf, 1988). A second limitation follows from the longitudinal design of this study. Although longitudinal data are potentially much better suited for studying causal processes than cross-sectional data (Taris, 2000), whether this benefit is fully consumed depends on the degree to which the time lag between waves suits the process and etiology of the relationship between the research variables under study (De Lange, Taris, Kompier, Houtman, & Bongers, 2004; Rogosa, 1988). We have employed a time lag of two years, but this time lag may be too long or too short in revealing the true dynamics between aging, work and mental health. Smaller time lags may reveal larger effects of the psychosocial work characteristics and age-related variables in explaining mental health (cf. De Lange et al., 2004). Moreover, when differences are found between age groups, it is difficult to decide whether these differences are determined by age-related variables or ‘cohort’ effects (the result of common experiences peculiar to a particular historical period in which workers were born) (Charness, 1985; Kanfer & Ackerman, 2004). Historical differences in the experiences of different cohorts may explain the differences found across age groups (Folkman, Lazarus, Pimley, & Novacek, 1987), but we were unable to examine the exact influence of such cohort effects.

Another related limitation is that our selection of older, versus young and middle-aged workers may have been biased. For example, we only selected workers in tenured-term positions and relatively stable work environments (implying a restriction of range in the work characteristics), relatively few younger workers, and relatively more higher educated workers compared to the general Dutch labour market. Furthermore, our subgroups did not report severe mental health complaints (“healthy (older) worker” effect), and, we have therefore examined relatively healthy workers in relatively stable work environments. As a result of this restriction-of-range, we may have underestimated the true causal effects between the DC/S dimensions and mental health. Future research should therefore also examine effects of being exposed to more changing work environments such as fixed-term positions, and if possible also examine workers with more severe mental health complaints. In spite of these important limitations, we feel that the present study does have both important practical and scientific implications

## ***4.3 Theoretical implications and recommendations:***

This study is one of the first longitudinal studies to examine age-related differences in the cross-lagged relation between work and occupational health. It is too early to draw any firm conclusions, but the results show that aging in

occupational health research is an important, and also difficult area of research. Our results have provided evidence for complex interactions between age, work and mental health that could not be explained by the influence of our included age-related variables (e.g., company tenure or home situation). Researchers should therefore be cautious in using the factor Age as a potential confounder in the relation between work and mental health, as one should be aware that controlling for this index variable may result in controlling for different underlying processes. As Charness noted (1985, p. xvii): *“it stands for a host of determining variables that have not been successfully identified”*. Interdisciplinary research may therefore be needed to fully understand the dynamics between age, work and mental health. Future occupational health research should also include different operationalisations of age, and pay more attention to the conceptual development and measurement of these different operationalisations (like life-span or functional age). Including other age-related variables as occupational preferences, social- and self perceptions or objective performance may be helpful in explaining potential differences across the age groups. Moreover, a meta analysis of earlier studies examining the influence of age in relation to well-being or work is still lacking and is needed to examine actual effect sizes of age effects in earlier occupational health research.

#### ***4.4 Practical implications and recommendations:***

The different cross-lagged effects of work on mental health across the age groups, has shown that work-related interventions (such as decreasing worker job demands) may not be effective in preventing all types of mental health complaints. Increasing social support of colleagues as well as supervisors may (especially) be important in preventing emotional exhaustion for older workers, whereas decreasing job demands may be important in preventing emotional exhaustion for middle-aged workers and job dissatisfaction for young workers. However, the results found do not imply that age-specific interventions are needed to improve or maintain the mental health of workers. Instead, we think that our results show that designing a challenging, but not too demanding, work environment is important in maintaining or improving the mental health of *all* workers (Folkman et al., 1987; Offerman & Gowing, 1990). As Hansson et al. (1997, p. 202) already noted: *“important also are the nature of one’s occupation and industry and a realistic assessment of the demands or risks inherent in continuing to work in a particular environment as one ages.”*



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