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*Published in:*

The Journals of Gerontology. Series B: Psychological Sciences and Social Sciences

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*Document Version*

Publisher's PDF, also known as Version of record

*Publication date:*

2008

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Barbareschi, G., Sanderman, R., Kempen, G. I., & Ranchor, A. V. (2008). The Mediating Role of Perceived Control on the Relationship Between Socioeconomic Status and Functional Changes in Older Patients With Coronary Heart Disease. *The Journals of Gerontology. Series B: Psychological Sciences and Social Sciences*, 63(6), 353-361.

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# The Mediating Role of Perceived Control on the Relationship Between Socioeconomic Status and Functional Changes in Older Patients With Coronary Heart Disease

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**Using a prospective design, this study examines the mediating effect of perceived control in explaining the predictive role of socioeconomic status (SES) in long-term changes in functional status as a consequence of the occurrence of coronary heart disease (CHD). We followed 221 older CHD patients by using a community-based survey. We collected data on patients' functional status before the onset of disease and 1 year after the diagnosis. Multiple linear regressions show that SES predicts functional changes only in relation to physical functioning. Furthermore, self-efficacy, but not mastery, mediates the predictive role of SES in changes in physical functioning in CHD patients. Self-efficacy is the only aspect of control that mediates the relation between SES and changes in physical functioning. Our findings provide a basis for future interventions in disadvantaged groups of older persons and new theoretical models of recovery processes.**

**Key Words:** Socioeconomic status—Coronary heart disease—Functional status—Perceived control—Self-efficacy—Mastery—Aging.

CORONARY heart disease (CHD) has a severe impact on the well-being, functioning, and quality of life (QoL) of the persons affected with it (Brown et al., 1999; Jaarsma et al., 1999; Mayou, Blackwood, Bryant, & Garnham, 1991; Roebuck, Furze, & Thompson, 2001; Torres et al., 2004; van Jaarsveld, Sanderma, Miedema, Ranchor, & Kempen, 2001). In particular, the functional status of aged patients may be affected after the emergence of CHD (de Leon et al., 1998; Kempen, Ormel, Brilman, & Relyveld, 1997).

Socioeconomic status (SES) has been found to be an important element for predicting changes in functional status in the long term after the onset of CHD. There is evidence that the SES of CHD patients has a substantial impact on their level of disability and changes in functional status up to 1 year after the diagnosis (Barbareschi, Sanderma, Kempen, & Ranchor, in press; Clarke, Frasure-Smith, Lesperance, & Bourassa, 2000; Ickovics, Viscoli, & Horwitz, 1997). However, the role of psychological and behavioral factors in this relationship is not completely clear (Koster et al., 2005, 2006).

There are indications that psychosocial resources, such as social support, optimism, and perceived control, are involved in the relation between SES and health outcomes (Lachman & Weaver, 1998; Marmot, 2005; Mirowsky & Ross, 1998; Taylor & Seeman, 1999). In particular, low levels of perceived control are linked to a higher risk of CHD (Bosma et al., 1997; Bosma, Stansfeld, & Marmot, 1998) and greater impairment in functional status (Seeman & Lewis, 1995). Furthermore, different aspects of perceived control seem to be implicated in individual changes in functional status during the course of CHD. For instance, both mastery and self-efficacy predicted physical

decline in the short term after diagnosis (Kempen, Sanderma, Miedema, Meyboom-de Jong, & Ormel, 2000) and patients' functional status 6 and 12 months after the incidence of CHD (Rankin, 2002; Sullivan, LaCroix, Russo, & Katon, 1998; van Jaarsveld, Ranchor, Sanderma, Ormel, & Kempen, 2005). As a consequence, one or more characteristics of perceived control might underlie the impact of SES on functional trajectories after CHD in older persons (Taylor & Seeman, 1999).

Mastery is a subjective aspect of control concerning the extent to which people consider the events that occur in their life as being under their own control, as opposed to being fatalistic (Pearlin & Schooler, 1978). Mastery has been found to moderate chronically stressful features of the environment that have deleterious effects on self-regulatory activities. As a consequence, people high in mastery report more active self-regulatory behavior, which is linked to better health outcomes (Pham, Taylor, & Seeman, 2001). Self-efficacy, in contrast, has been defined as an agent-means construct of control and represents a person's conviction that outcomes can be influenced by his or her own behavior, which can produce a determined response (Bandura, 1977; Skinner, 1996). Mastery and self-efficacy may both be important for adjustment to CHD, but they cover different aspects of perceived control. The main distinction between the two constructs is that mastery pertains to a general feeling of being in control of the personal forces that influence the direction of one's life, whereas self-efficacy concerns the confidence people have in using specific skills in order to produce determined outcomes (Kempen et al., 2005). For example, a person with high mastery will be more likely to respond quickly and actively to any adversities, such as chronic

conditions, which could threaten his personal sense of control. In contrast, a person with high self-efficacy would probably target specific aspects of the disease in which he knows he can obtain positive results (such as exercising or changing eating habits in order to maintain a good physical condition). It is reasonable to expect that these constructs may have different impacts on the changes in functional status of aged CHD patients. Because self-efficacy has been found to be associated with health-improving behavior such as cessation of smoking (Meland, Maeland, & Laerum, 1999), adherence to medication (Gifford et al., 2000), and physical exercise (Lox & Freehill, 1999), it seems likely that in late adulthood self-efficacy has a bigger impact than mastery on physical health (Steunenbergh, Beekman, Deeg, Bremmer, & Kerckhof, 2007).

The positive relation between SES and perceived control is documented in the literature (Boardman & Robert, 2000; Ross & Sastry, 1999). There are two main explanations for this association. First, individuals with high SES have access to a larger pool of resources, which results in a wider range of daily activities. Consequently, people with high SES are more likely to engage in activities that increase their sense of personal control (Hughes & Demo, 1989). Second, social conflict and situational uncontrollability are more prevalent in a lower SES environment. Persons of lower SES are more exposed to uncontrollable situations or conflicting relationships, and consequently they report a reduced level of perceived control (Taylor & Seeman, 1999).

Previous research has shown a positive effect of mastery and self-efficacy on functional status after the incidence of CHD (Kempen et al., 2000; Rankin, 2002; Sullivan et al., 1998). Therefore, our hypothesis is that mastery and self-efficacy mediate the relation between SES and changes in functional status, providing independent contributions in specific domains (social, role, and physical functioning). More specifically we expect that, in older adults, self-efficacy will have a greater role than mastery in mediating the relation between SES and changes in physical functioning. In the present study we address this issue by applying a prospective design, including a premorbid measurement of functional status as a reference point for measuring the functional change in CHD patients.

## METHODS

The present study is part of the Groningen Longitudinal Aging Study (GLAS). The GLAS is a population-based prospective follow-up study of the determinants of health-related QoL of older people (Kempen, Ormel, et al., 1997).

This study was approved by the Medical Ethical Committee of the University Medical Center of Groningen.

### *Recruitment Procedures*

Some of us have been collecting and organizing available data for the present study since 1993 (T0). We recruited a total of 5,279 persons who were 57 years of age and older to participate in the baseline assessment. Details of the sampling procedure and the representativeness of the sample are given elsewhere (Kempen, Jellicic, & Ormel, 1997). Participants in the baseline sample were monitored for selected disease episodes by their general practitioners between 1993 and 1998. Four

weeks after the event, the patients were asked to participate in the follow-up assessment 12 months after the diagnosis.

### *Patients*

During the enrollment period, we recruited 494 patients. We collected data for two types of CHD: acute myocardial infarction and congestive heart failure, according to the criteria of the International Classification of Primary Care (Lamberts & Woods, 1987). We used an additional assessment, 2 months after the diagnosis, after the baseline to measure the severity of disease of the patients. Of the 494 identified patients, 74 died shortly after the diagnosis and 199 either refused to participate, were already part of another cohort study, died within 1 year of the diagnosis, or did not respond. The remaining 221 CHD patients completed the follow-up, and we included them in the study. We compared participants ( $n = 221$ ) with nonparticipants ( $n = 273$ ) at the premorbid stage. The two groups did not significantly differ for most of the measurements, except for the fact that participants were significantly younger (on average, 72.0 years vs 74.7 years;  $F = 14.1$ ,  $p < .001$ ) and reported higher levels of social functioning (on average, 74.4 vs 68.3;  $F = 5.7$ ,  $p < .05$ ).

### *Measures*

We collected data at both measurement points through semi-structured interviews and by means of self-report questionnaires.

*Socioeconomic status.*—We constructed a weighted sum index combining three major indicators of SES, namely educational level, income, and occupational prestige. We defined educational level as the highest level of basic education attained by the patients, with scores ranging from 1 (elementary school not completed) to 6 (higher education, second phase). The level of education of the patients was reported on the basis of the SOI-1978 (where SOI stands for *Standaard Onderwijs Indeling*; see Centraal Bureau voor de Statistiek, 1987), which is based on the International Standard Classification of Education (United Nations Educational, Scientific and Cultural Organization, 1976).

We measured the income of the patients as their net monthly household income. Patients who were married or unmarried but living with a partner were asked to state the monthly after-tax income both for themselves and for their partner. We converted this household income into an individual level on a scale with six equivalent categories, ranging from 522 euros per month or less (Category 1) up to 795 euros per month or more (Category 6).

We derived occupational prestige by coding the last profession attained by the patient according to the classification of the Dutch Central Bureau for Statistics (Centraal Bureau voor de Statistiek, 1984). These nominal codes correspond with the International Standard Classification of Occupations (International Labor Office, 1990). We converted the occupational codes into prestige scores with an interval level of measurement ranging from 0 to 100 (Sixma & Ultee, 1984). According to Dahl (1991), the SES of the male partner for married, divorced, or widowed women is a more influential factor than the woman's own occupational score when researchers are studying health issues among women. Therefore, we used the information on the male partner for female patients who were living with their partner or were widowed or divorced.

We performed a principal component analysis (unrotated) to determine whether the three indicators all loaded on one factor, which turned out to be the case. The factor loadings of the three variables were high and comparable: 0.82 for educational level, 0.76 for income, and 0.77 for occupational prestige. We then multiplied the score for each variable with its factor loading and summed them up to a weighted index for SES. We replaced missing data for income ( $n = 26$ ) and occupational prestige ( $n = 14$ ) by the mean standardized income score or the mean standardized occupational prestige score calculated for participants with the corresponding value in educational level. The new variable ranged from  $-4.36$  to  $4.64$ . Because SES is preferentially treated as a categorical variable, we inspected the sample on the basis of educational level, income, and job prestige below and above the cutoff point ( $-0.047$ ) of the numerical variable. Of the patients below the cutoff point, 91% had a low educational level (from elementary school to vocational education, lower level), 64% had a small income (less than 658 euros per month) and 90.5% had low professional prestige (below 50 on the Sixma and Ultee scale). Conversely, 69% of those above the cutoff point had a high educational level (from advanced education, higher level to higher education, second phase), 91% had a high income (more than 658 euros per month) and 63% had high job prestige (scoring more than 50 on the Sixma and Ultee scale). According to the description already given, the median discriminates to a good approximation between patients of high and low education, income, and job prestige. Therefore, we used the median to recode the values of the numerical variable into low and high.

*Mastery and self-efficacy.*—We measured both mastery and self-efficacy during the baseline assessment. We used the Mastery Scale of Pearlin and Schooler (1978) to measure mastery, the extent to which people believe that their behavior matters for the events that occur in their environment. Scores on this 7-item scale range from 7 (low mastery) to 35 (high mastery; Cronbach's  $\alpha = 0.79$  in the GLAS baseline sample). One of the items is as follows: "Sometimes I feel that I am being pushed around life." General self-efficacy is the extent to which people believe that they can perform a certain behavior, and we measured this with Sherer's General Self-Efficacy Scale (Sherer et al., 1982). Scores on this 16-item can range from 16 (low self-efficacy) to 80 (high self-efficacy; Cronbach's  $\alpha = 0.84$  in the GLAS baseline sample). One of the items is as follows: "When trying to learn something new, I soon give up if I am not initially successful." The psychometric properties of the Dutch versions of the mastery and self-efficacy scales were approved in previous studies (Kempen, van Heuvelen, et al., 1999; Kempen, van Sonderen, & Ormel, 1999).

*Functional status.*—We quantified the participants' social, role, and physical functioning by using three subscales of the 20-item Short-Form Medical Outcomes Study (Stewart, Hays, & Ware, 1988). The Social Functioning subscale measures the extent to which health interferes with normal social activities such as having contacts and visiting friends (1 item). The Role Functioning subscale measures the extent to which health interferes with usual daily activities such as housework or the professional job (2 items; Cronbach's  $\alpha = 0.87$  in the GLAS baseline sample). The Physical Functioning

subscale provides a global indication of physical limitations in basic activities such as walking uphill or eating and dressing (6 items; Cronbach's  $\alpha = 0.79$  in the GLAS baseline sample). All three subscales range from 0 to 100, with higher scores indicating better functioning. The psychometric properties of the Dutch version of the 20-item Short-Form Medical Outcomes Study were approved in a previous study (Kempen, 1992).

*Covariates.*—We found gender, age, severity of the disease, and comorbidity to be related to CHD outcomes in the present data set as well as in other studies (Penninx et al., 2001; van Jaarsveld et al., 2005). We assessed disease severity according to the New York Heart Association (NYHA) classification 2 months after diagnosis. The NYHA classification indicates the severity of cardiac symptoms by documenting the level of complaints of breathlessness in relation to physical activities. It ranges from I (mild symptoms) to IV (severe symptoms; see Criteria Committee of the NYHA, 1964). Using a self-reported questionnaire, we assessed comorbidity at baseline according to the number of chronic conditions the participants had (van de Berg & van den Bos, 1989). Participants were asked whether they had suffered from one or more of 19 chronic medical conditions in the 12 months prior to their baseline interview.

### Statistical Analyses

We performed bivariate correlation analyses to study associations between SES, mastery, and self-efficacy; social, role, and physical functioning (at the premorbid measurement and 1 year after the diagnosis); and gender, age, severity of the disease, and comorbidity. To examine whether mastery and self-efficacy mediate the relation between SES and changes in functional status, we conducted multiple linear regression analyses to test each component of the model according to the recommendations of Baron and Kenny (1986). We measured changes in functional status by introducing social, role, or physical functioning at 1 year after the diagnosis as a dependent variable and adjusting for the corresponding variable at the premorbid measurement. First, we verified that the effect of the independent variable (SES) on the dependent variable (changes in functional status) was significant. Then we checked that the path from SES to perceived control and from perceived control to changes in functional status was also significant. Once all these conditions had been satisfied, we could then verify the mediating effect of perceived control on the relation between SES and changes in functional status (Figure 1). If SES no longer has an effect on changes in functional status once perceived control has been added to the statistical model, then complete mediation has occurred. We entered mastery and self-efficacy in separate models as we intended to measure the independent contribution of the two constructs of perceived control. Finally, we verified any eventual mediating effect of mastery and self-efficacy between SES and outcome variables by using the Airoian version of the Sobel test suggested by Baron and Kenny.

The Sobel equation (subsequently reported here) uses the unstandardized regression coefficient for the association between the independent variable and the mediator,  $a$ , the unstandardized regression coefficient for the association



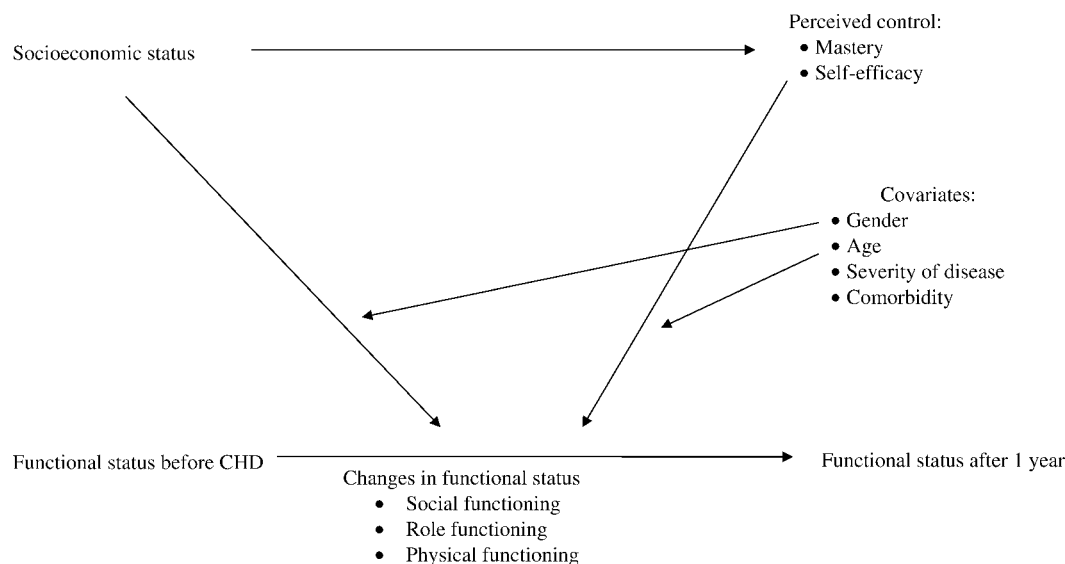


Figure 1. Impact of socioeconomic status on change in functional status after coronary heart disease (CHD) diagnosis: The mediation of mastery and self-efficacy.

between the mediator and the dependent variable, adjusted for the effect of the independent variable,  $b$ , and their corresponding standard errors,  $s_a$  and  $s_b$ :

$$z \text{ value} = ab / \sqrt{(b^2 s_a^2 + a^2 s_b^2 + s_a^2 s_b^2)}$$

We tested all the regression models for multicollinearity to check that the predictors were not too highly correlated with each other.

**RESULTS**

*Characteristics of the Patients*

Table 1 reports the characteristics of the participants. The total sample is almost equally distributed across genders and SES groups, with an average age of 72 years. Regarding changes in functional status, the patients reported more decrements in role and physical functioning. A closer inspection of the two SES groups shows a different composition with respect to gender: participants of the low-SES group are predominantly women, whereas the high-SES group is mostly composed of men. Furthermore, high-SES individuals are better off than low-SES individuals in terms of self-efficacy, and they suffered a smaller decline in role functioning.

*Relationship Between SES, Perceived Control, Functional Status, and the Covariates*

The input for the regression model consisted of the correlation matrix presented in Table 2. All the independent variables, including SES, mastery, and self-efficacy, are significantly correlated with social functioning, role functioning, and physical functioning 1 year after the diagnosis and with the premorbid levels of social and physical functioning. In contrast, SES and self-efficacy were not significantly correlated with premorbid role functioning. We found particularly strong positive correlations between premorbid social functioning, role

functioning, and physical functioning and their corresponding functioning 1 year after the diagnosis ( $.43 \leq r \leq .60$ ;  $p < .001$ ), showing that the premorbid level of functioning might be the strongest predictor of the postmorbid outcome. Finally, mastery ( $r = .25$ ;  $p < .01$ ) and self-efficacy ( $r = .31$ ;  $p < .001$ ) were both positively correlated with SES.

*The Contribution of Mastery and Self-Efficacy as Mediators in the Relationship Between SES and Functional Status*

First, we performed a series of regression analyses to assess whether SES predicted changes in social, role, and physical functioning once the other variables had been entered into the model. SES significantly predicted changes in physical

Table 1. Demographic Variables and Characteristics for the Whole Sample and Low- and High-SES Groups

Variable or Characteristic	M (SD)		
	Total	Low SES	High SES
Age in years	72.0 (7.7)	72.9 (7.9)	71.0 (7.4)
Change in social functioning	-10.6 (29.9)	-10.3 (32.8)	-11.0 (26.2)
Change in role functioning	-20.2 (48.0)	-24.3 (47.5)	-15.3 (48.4)
Change in physical functioning	-19.5 (26.1)	-20 (27.0)	-19.0 (25.1)
Comorbidity	1.6 (1.4)	1.8 (1.5)	1.3 (1.3)
Severity of the disease	2.2 (1.0)	2.4 (1.0)	2.1 (1.0)
NYHA class			
Mastery	23.7 (4.8)	22.5 (4.5)	25.0 (4.9)
Self-efficacy	58.2 (11.5)	54.9 (11.4)	62.1 (10.3)

Note: SES = socioeconomic status; NYHA = New York Heart Association. For the groups, the total is  $N = 221$ , with 114 men and 107 women (51.6% and 48.4%, respectively); for the low-SES group,  $n = 119$  (53.8%); for the high-SES group,  $n = 102$  (46.2%). For men, 48 were low SES and 66 were high (40.3% and 64.7%, respectively); for women, 71 were low SES and 36 were high (59.7% and 35.3%, respectively). Information for gender, age, comorbidity, mastery, and self-efficacy were collected at the premorbid assessment. Severity of the disease was measured at the moment of the diagnosis. Changes in social, role, and physical functioning were measured by difference scores between the second assessment (1 year after the diagnosis) and first (premorbid) assessment.

Table 2. Correlations Between SES, Functional Status, Perceived Control, and Covariates

	1	2	3	4	5	6	7	8	9	10	11	12
1. Age												
2. Gender	0.21**											
3. Disease Severity	0.08	0.14*										
4. Comorbidity	0.10	0.16*	0.28***									
5. Premorbid SF	-0.22**	-0.30***	-0.27***	-0.40***								
6. Premorbid RF	-0.21**	-0.23**	-0.26***	-0.35***	—							
7. Premorbid PF	-0.32***	-0.31***	-0.32***	-0.43***	—	—						
8. SF after 1 year	-0.34***	-0.34***	-0.35***	-0.36***	0.46***	—	—					
9. RF after 1 year	-0.32***	-0.34***	-0.30***	-0.28***	—	0.43***	—	—				
10. PF after 1 year	-0.40***	-0.41***	-0.43***	-0.34***	—	—	0.60***	—	—			
11. Mastery	-0.22**	-0.18**	-0.15*	-0.20**	0.42***	0.33***	0.33***	0.34***	0.29***	0.33***		
12. Self-efficacy	-0.20**	-0.19**	-0.13	-0.10	0.26***	0.07	0.22**	0.25***	0.35***	0.32***	0.51***	
13. SES	-0.12	-0.24***	-0.15*	-0.17*	0.22**	0.14	0.31***	0.22**	0.27***	0.33***	0.25***	0.31***

Notes: SES = socioeconomic status; SF = social functioning; RF = role functioning; PF = physical functioning.  
 \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

functioning ( $\beta = 0.11, p < .05$ ) but not in social or role functioning (Table 3). We therefore excluded social and role functioning from the following analyses.

In the second series of regressions, we separately regressed the mediating variables (mastery and self-efficacy) onto the independent variable (SES), demonstrating a significant effect of SES on both variables (Table 4).

In the third series of regressions, we separately regressed the change in physical functioning onto the two mediating variables (mastery and self-efficacy). We found a significant relationship only for self-efficacy ( $\beta = 0.12, p < .05$ ; see Table 5). We therefore excluded mastery from the following analysis, as it did not show any effect on the dependent variable.

Finally, we included both self-efficacy and physical functioning to determine whether the mediator explains the relationship (Table 6). Inclusion of the self-efficacy variable caused a substantial decrease in the size of the effect of SES on the change in physical functioning, together with a loss of statistical significance. This result indicates a complete mediation of self-efficacy in the relationship between SES and the change in physical functioning, accounting for 55% of the explained variance in the present study. We checked this last result by performing a Sobel test, which confirmed the mediating effect of self-efficacy presented in the previous analysis ( $z = 1.99, p < .05$ ).

For all models, we checked the variance inflation factor as an index of possible multicollinearity. The highest variance inflation factor value reported in the present study is 1.6,

which indicates that the correlation between the predictor variables was not too high.

**DISCUSSION**

In this prospective study we intended to investigate the mediating effect of mastery and self-efficacy in the relation between SES and functional status in middle-aged and older CHD patients. The results showed that self-efficacy, but not mastery, mediated the relation between SES and changes in physical functioning from the premorbid measurement to 1 year after diagnosis.

In the light of these results, we discuss three major issues. First, we found the mediating effect of self-efficacy only in relation to changes in physical functioning, not in social or role functioning. Table 2 reveals a stronger correlation between SES and physical functioning than between SES and any of the other dependent variables. It is already known that CHD has a particularly profound impact on physical functioning, which is more extended than on any other domains of QoL (Failde & Soto, 2006; van Jaarsveld et al., 2001). Moreover, it has been discussed that SES has a substantial influence on physical recovery (Clarke et al., 2000; Ickovics et al., 1997; Rankin, 2002). In conclusion, physical functioning is the element of functional status that is principally compromised by the impact of CHD and, at the same time, the domain that is more affected by differences in SES.

Table 3. Regression Analyses of SES on Changes in Functional Status 1 Year After Diagnosis

Predictors	Social Functioning			Role Functioning			Physical Functioning		
	B (SE)	$\beta$	R <sup>2</sup>	B (SE)	$\beta$	R <sup>2</sup>	B (SE)	$\beta$	R <sup>2</sup>
Gender	-7.49 (3.55)	-0.13*		-15.4 (5.56)	-0.17**		-9.75 (3.06)	-0.17**	
Age	-0.85 (0.22)	-0.23***		-1.15 (0.35)	-0.20**		-0.83 (0.19)	-0.22***	
Disease severity	-5.72 (1.70)	-0.20**		-6.56 (2.71)	-0.15*		-7.23 (1.49)	-0.25***	
Comorbidity	-2.98 (1.27)	-0.14*		-3.05 (2.00)	-0.01		-1.18 (1.13)	-0.06	
PLF	0.27 (0.07)	0.26***		0.25 (0.06)	0.25***		0.33 (0.06)	0.33***	
SES	2.51 (3.43)	0.04	0.37	9.23 (5.42)	0.10	0.33	6.24 (3.01)	0.11*	0.52

Notes: SES = socioeconomic status; PLF = premorbid level of functioning.  
 \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

Table 4. Regression Analyses of SES on Mastery and Self-Efficacy

Predictors	Mastery			Self-Efficacy		
	<i>B</i> ( <i>SE</i> )	$\beta$	<i>R</i> <sup>2</sup>	<i>B</i> ( <i>SE</i> )	$\beta$	<i>R</i> <sup>2</sup>
SES	2.45 (0.64)	0.25***	0.06	7.22 (1.49)	0.31***	0.10

Notes: SES = socioeconomic status.

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

Second, the last part of our model investigated the mediating role of mastery and self-efficacy, taking into account the previous prediction. Our results showed that self-efficacy explained part of the relation between SES and the change in physical functioning 1 year after the diagnosis, whereas mastery did not. The influence of self-efficacy on physical functioning in the adaptation to CHD has already been shown in previous research (Arnold et al., 2005; van Jaarsveld et al., 2005). Hence the present results corroborate previous findings and show the importance of self-efficacy when we evaluate the impact of CHD by SES.

Third, the fact that only self-efficacy and not mastery showed a mediating effect in the relation between SES and changes in physical functioning requires some clarification. To do that, we should consider the specific attributes of the two variables. As we mentioned before, mastery can be considered a more comprehensive concept of control and may improve coping behaviors, resulting in beneficial coping with distress during the adjustment to CHD (Pearlin & Schooler, 1978; van Jaarsveld et al., 2005). In contrast, self-efficacy is considered a cognitive control system that influences the likelihood of performing learned behaviors (Bandura, 1977; Bandura, 1982; Skinner, 1996). More specifically, it is related to the ability to anticipate and influence the outcomes of a familiar behavior. Therefore, self-efficacy becomes particularly important for maintaining a good level of physical functioning after CHD, because it promotes and regulates recovery-related behaviors such as adherence to treatments, dieting, and rehabilitative exercise (Bastone & Kerns, 1995; Jeng & Braun, 1997; McCann et al., 1995). In short, mastery represents the perception of general control over the patient's life, whereas self-efficacy is an aspect of perceived control that is regulated by the actual effectiveness of specific behaviors. In conclusion, CHD patients with high SES might be more confident of being able to accomplish specific tasks (i.e., have more self-efficacy) that ameliorate their physical condition in the long run.

Table 5. Regression Analysis of Mastery and Self-Efficacy on Physical Functioning Change After 1 Year

Predictors	Mastery			Self-Efficacy		
	<i>B</i> ( <i>SE</i> )	$\beta$	<i>R</i> <sup>2</sup>	<i>B</i> ( <i>SE</i> )	$\beta$	<i>R</i> <sup>2</sup>
Gender	-11.14 (3.03)	-0.19***		-10.68 (3.02)	-0.18**	
Age	-0.75 (0.20)	-0.20***		-0.73 (0.19)	-0.19***	
Disease severity	-7.23 (1.50)	-0.25***		-7.13 (1.49)	-0.25***	
Comorbidity	-1.17 (1.12)	-0.06		-1.21 (1.11)	-0.06	
PLF	0.35 (0.06)	0.35***		0.35 (0.06)	0.35***	
Mastery	0.51 (0.31)	0.08	0.53			
Self-efficacy				0.30 (0.13)	0.12*	0.54

Notes: PLF = premorbid level of functioning.

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

Table 6. Mediating Effect of Self-Efficacy on the Relationship Between SES and Physical Functioning Change After 1 Year

Predictors	<i>B</i> ( <i>SE</i> )	$\beta$	<i>R</i> <sup>2</sup>
Gender	-9.97 (3.04)	-0.17**	
Age	-0.74 (0.19)	-0.20***	
Disease severity	-7.07 (1.48)	-0.25***	
Comorbidity	-1.10 (1.11)	-0.05	
PLF	0.34 (0.06)	0.34***	
Self-efficacy	0.29 (0.13)	0.12*	
SES	4.90 (3.05)	0.08	0.55

Notes: PLF = premorbid level of functioning; SES = socioeconomic status.

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

Until now we have considered the different functional domains separately. It might be worthwhile to verify whether mastery and self-efficacy have a mediating effect on functional status in general. To do so we performed a factor analysis, which revealed that the three functional domains could be combined in a single factor (functional status). We replicated the mediation analysis, using functional status as the dependent variable. The new model showed that SES predicted change in functional status ( $\beta = 0.10$ , *p* < .05). Similar to the previous results, self-efficacy ( $\beta = 0.16$ , *p* < .01) but not mastery absorbed the effect of SES, providing a complete mediation effect. It is important to investigate the mediating effect of self-efficacy on functional status in general; however, to tailor future interventions it is essential to identify in detail the specific domain in which such mediation takes place.

Further discussion on the aging-related issues is necessary. Although there is evidence pointing to a progressive decrease in perceived control in older age groups over a long period of time (Mirowsky, 1995), we cannot generalize this notion because there are contrasting opinions in relation to the specific facet of control under consideration. For instance, mastery in older people is not simply determined by the response to a current condition, such as CHD or functional impairment, but is rooted in their early life perceptions and responses to challenging events. Past circumstances forge older people's understanding that they, despite their present situation, are (or are not) in control of their own trajectory in life. Such a general sense of control over life is typical of late adulthood and is known as life-course mastery (Pearlin, Nguyen, Schieman, & Milkie, 2007). Conversely, constructs of control related to specific domains, such as self-efficacy, are tied to the outcomes in specific areas, such as physical functioning, and are more likely to follow the decline usually perceived in such domains in later life (Lachman & Leff, 1989). The fact that changes in self-efficacy and physical functioning are strongly interrelated, as a result of the aging process, could partially explain why self-efficacy mediates the changes in physical functioning in our sample.

There are three additional issues we would like to consider. First is the role of covariates and the premorbid level of functioning. Despite the fact that, in our sample, SES inequalities are more pronounced in relation to changes in role functioning compared with physical functioning (Table 1), such discrepancy was not revealed by our analysis once we included the selected covariates (Table 3). As suggested by other research, the confounding effects of age, gender, severity of the disease, and comorbidity have substantially contributed to these

outcomes (van Jaarsveld et al., 2002). Therefore, we tested the effect of SES on changes in functional status, excluding the confounders from the regression model. As a result, in the unadjusted model, SES was a better predictor of differences in role functioning ( $\beta = 0.20$ ,  $p < .01$ ) than in physical functioning ( $\beta = 0.16$ ,  $p < .01$ ). This means that differences in age, gender, severity of the disease, and comorbidity between the patients of the two socioeconomic groups are directly accountable for changes in role functioning rather than SES itself. Gender is particularly important in relation to incidence and mortality in CHD patients: Men are more at risk of developing CHD (Weidner, 2000) and male CHD patients show worse survival rates than women do (van Jaarsveld et al., 2006). Furthermore, in our sample there were considerably more women than men with low SES and fewer women than men with high SES. The percentage of women and men in the sample of participants (Table 1) is very close to that observed in the original sample of CHD patients at the time of the diagnosis (42.5% of men and 57.5% of women in the low-SES group; 68.1% of men and 31.9% of women in the high-SES group). As we can also see in Table 2, there is a negative correlation between gender and SES (fewer women in the high-SES group) and between gender and physical functioning (women are associated with lower physical functioning pre-morbidly and after the CHD). This picture suggests that, in the present sample, socioeconomic inequalities in physical functioning are more pronounced for women than for men. However, this observation remains speculative, because findings related to gender differences in SES health inequalities are still rather inconsistent and are likely to vary between different life stages (Matthews, Manor, & Power, 1999; Wu et al., 2003). In addition to gender, pre- and post-CHD levels of functioning were strongly associated, suggesting that the pre-morbid level has a large influence on functional trajectories after CHD has emerged. This is probably due to a cumulative effect: Patients who were already more impaired in their functional status before the CHD event report an even more aggravated situation afterward. Also concerning the other covariates included in our study, there is not enough evidence for conclusive explanations over the interrelation between SES and age or clinical variables (severity of disease and comorbidity) in CHD. More light should be shed on this topic in further study.

A second point regards the attrition of the original sample. In our analysis we were able to compare the patients who took part in the study with the ones who dropped out over time. However, the present data set did not include any variable that allowed us to distinguish between subgroups of nonparticipants on the basis of the specific reasons for exclusion. Therefore, we were not able to investigate in more detail the differences in SES, perceived control, or functional status among the group of participants and the patients who died between the first and second assessment, refused to participate in the follow-up, or did not respond. Because high mortality rates, poor health, low perceived control, and reduced participation in medical screenings are generally associated with low SES, future research on socioeconomic disparities in health should include a more comprehensive analysis of the role of these factors on the sample selection process.

Another issue concerns the interval between the baseline assessment and the diagnosis. A longer period of time between

the diagnosis and the first assessment could result in a greater change in functional status in patients who entered the follow-up several months later than those who were registered shortly after the baseline. This is of particular concern in an older sample of participants, in whom a decrease in functional status might be seen as a consequence of aging. However, we calculated the mean time between baseline and diagnosis for both socioeconomic groups and found no statistically significant difference between them (25.5 months for the low-SES group and 27.8 months for the high one).

To conclude, our prospective study demonstrates the existence of a positive relation between SES and physical functioning (i.e., lower SES implies worse functioning) 1 year after the incidence of CHD in late-middle-aged and older adults. In addition, it shows that this relationship is mediated by a specific aspect of control, namely self-efficacy. The main strength of our study is the inclusion of a baseline measurement that took place before CHD emerged, which allowed us to consider the functional change in our sample to its full extent, as a comprehensive estimate of the consequences of the disease.

The results of the present study are potentially an important reference for caregivers, who intend to empower specific aspects of control, such as self-efficacy, in order to ameliorate the unfavorable situation of disadvantaged groups facing CHD. Because self-efficacy is less strictly reliant than mastery on previous life experiences, it can be improved in order to promote a sense of control on specific domains among aged patients (Lachman, 2006).

#### ACKNOWLEDGMENTS

The research reported in this article was part of the Groningen Longitudinal Aging Study. That study and its substudies are financially supported by the Dutch government (through NESTOR), the University of Groningen, the Faculty of Medical Sciences in Groningen, the Dutch Cancer Society (KWF Kankerbestrijding), and the Netherlands Organisation for Scientific Research (NWO).

We thank Dr Tim Fawcett for his comments on the text.

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Received October 10, 2007

Accepted April 24, 2008

Decision Editor: Karen Hooker, PhD