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Predictors of Self-efficacy and Mastery

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Introduction

Sense of competence and well-being are intertwined: we feel secure and content if we are in control of our lives, and vice versa. This everyday phenomenon has its scientific background in the concepts of self-efficacy and mastery. Bandura (1977, 1986) refers to self-efficacy as the conviction that one can successfully effectuate the behaviour required to produce a given outcome. Self-efficacy expectations act as a cognitive control system affecting the probability of learning new or changing old behaviours. Mastery is defined as the extent to which individuals consider that they are in control of their own lives, in contrast to being victims of fate (Pearlin and Schooler 1978). A strong sense of mastery also implies an internal locus of control.

Self-efficacy and mastery are somewhat related concepts, as they both refer to a feeling of competence. Mastery, however, pertains to a general feeling of being in control, having the power to use personal resources in order to influence the outcomes of life, whereas self-efficacy concerns the perceived ability of doing what needs to be done in order to achieve a desired goal. The two may not always run parallel; it is possible for an individual to feel in control of life in general, but not feel able to do all the shopping that is necessary for the preparation of everyday meals. Moreover, domain-specific expectations of self-efficacy, e.g. perceived abilities to perform household activities, may be generalized to global expectations which are the result of an individual's past experiences with success and failure in a variety of situations that are projected onto new situations. The global expectations affect the initiation of new behavior, the amount of effort expended, and the persistence with which one faces adversities.

People with a strong sense of mastery (internal locus of control) and those with positive expectations of self-efficacy have been found to be happier and less depressed than people with a low sense of mastery (i.e. external control) or a low sense of self-efficacy (Flammer 1995, Smits et al. 1995). To date, no clear evidence for a causal relationship between mastery and self-efficacy on the one hand, and depres-

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sion on the other hand exists. A strong sense of mastery and self-efficacy may operate as a protective factor from becoming depressed but it is also plausible that changes in mood affect mastery and self-efficacy beliefs.

Similarly, the relationship between mastery, self-efficacy and physical and cognitive functioning deserves attention. Theoretically, it is plausible that beliefs in personal control are negatively affected when impaired physical health limits this control over life and actions. Indeed, such an association has been addressed in a number of studies. Mirowsky (1995) demonstrated that people with physical impairments have a relatively external locus of control, and Hancock et al. (1993) showed a comparable association in individuals with spinal cord injury. Cognitive decline can be found in many elderly people, and this may also affect mastery and self-efficacy in a negative way. Winocur et al. (1987) and Lachman and Leff (1989) found such a relationship with regard to intelligence.

Associations of personal control and self-efficacy with sex and education have been demonstrated in previous studies. A high level of education is associated with strong (internal) personal control and self-efficacy (Ross and Wu 1995, Lachman and Leff 1989, Mirowsky 1995). Women have also been shown to have a more external locus of control and lower self-efficacy (Pankow 1995, Nunn 1994, Gatz and Karel 1993). Here too, however, the empirical data do not provide evidence of a causal relationship.

Older people often have a more external locus of control than younger people (Yee 1987, Aldwyn 1991, Mirowsky 1995). Some studies, however, reported mixed results (Houts and Warland 1989). Longitudinal studies, in particular, have suggested that this age-effect could be a cohort-effect because older generations have been brought up with a stronger respect for authority than younger generations (Lachman and Leff 1989, Gatz and Karel 1993).

Although mastery and self-efficacy are often thought to be malleable, as a result of differences in circumstances or changes accompanying aging, they are often also regarded as stable characteristics. In the latter case, the relationship between independent variables, such as cognitive and physical functioning, may be moderated by different levels of mastery and self-efficacy (Van den Heuvel et al. 1996). These different perspectives on mastery and self-efficacy may have important practical consequences. A trait-approach emphasizes the role of both constructs as explanatory and predictive, while malleability also emphasizes the possibility of therapeutical actions.

The objective of the present study was therefore to investigate the stability of mastery and self-efficacy between the first and the second cycle of LASA. Also studied was the association between potential predictors (age, education, sex, emotional, cognitive and physical functioning) at the baseline measurement (T_1) with mastery and self-efficacy at the follow-up measurement (T_2). The impact of any of the pre-

dictors mentioned above may be confounded by the impact of one of the other predictors. For example, the external locus of control of older people could be due to impaired health, rather than to age itself. Therefore, the independent predictive ability of the predictors was studied.

Method

2204 respondents completed the main interview in the second measurement cycle, producing data on the dependent variables of mastery and self-efficacy. Item nonresponse resulted in complete data on 1895 respondents for the analyses on the prediction of mastery and 1909 respondents for the analyses on perceived self-efficacy.

Measurement instruments

General self-efficacy was measured by means of the Perceived Self-efficacy Scale (PSS), which is based on 17 items of the General Self-efficacy Scale (Sherer et al. 1982). The items reflect three domains related to the concept of general self-efficacy: the ability to initiate behaviour (e.g., 'If something looks too complicated, I will not even bother to try it'), to invest effort (e.g. 'If I can't do a job the first time, I keep trying until I can'), and to persevere in the face of misfortune (e.g. 'When unexpected problems occur, I don't handle them very well'). On the basis of a pilot study among older people in the Netherlands (Bosscher, Laurijssen and De Boer 1992) certain items were excluded in order to obtain a short efficient measurement instrument based on 12 items.

Mastery was measured by means of an abbreviated 5-item version of the Pearlin Mastery Scale (PMS) and concerns the extent to which individuals consider themselves to be in control of their own lives, in contrast to being victims of fate (Pearlin and Schooler 1978).

In both the PSS and the PMS, response categories range from 1 (totally disagree) to 5 (totally agree). In both scales, high scores reflect a strong feeling of self-efficacy or internal locus of control.

Depression was measured according to the Center of Epidemiologic Studies-Depression scale ([CES-D] Radloff 1977, Beekman et al. 1994). The scores range from 0 to 60, higher scores indicating more depressive symptoms during the previous week.

Information-processing speed reflects the speed with which the brain can process small units of information, which is assumed to underly most or all aspects of cognitive functions. (Information-) processing speed was measured by means of the Coding Task (Savage 1984). The respondent is asked to name the correct characters

that should be placed in the boxes on a page in front of him/her. An example of character combinations is given at the top of the page. This task has to be performed three times, every trial lasting one minute, during which the respondent is asked to work as quickly and accurately as possible. The score of the first trial is used in order to limit the loss of cases. The three trials have very high intercorrelations and higher scores reflect greater information-processing speed.

Physical health was measured by asking the respondents wether they had any of the following diseases: cardiac disease, peripheral atherosclerosis of the abdominal aorta or the arteries of the lower limb, stroke, diabetes mellitus, lung disease (asthma or chronic obstructive pulmonay disease), cancer, and arthritis (osteoarthritis or rheumatoid arthritis). In addition, the respondents were asked whether they had any other chronic diseases, and, if so, to indicate which disease. With the latter information a category of 'other major diseases' was computed. The number of chronic diseases was calculated by summing up all the specific diseases reported to be present, resulting in scores ranging from 0 to 7.

Age on the day of the baseline interview was taken as a chronological age-measurement.

Education was measured by asking for the highest level of education completed by the respondent.

Statistical analyses

Differences in means on the PSS and PMS for respondents who were lost between T_1 and T_2 and for those who remained were analyzed by analysis of variance. Regression analysis was performed to predict self-efficacy and mastery in the second measurement. Predictor variables were selected on the basis of correlation between predictors at T_1 and the scores for self-efficacy and mastery at T_2. Mastery and self-efficacy at T_2 were separately regressed on the predictor variables after accounting for baseline (T_1) scores on mastery and self-efficacy. In order to determine the importance of the contribution of the predictor variables, stepwise procedures were followed.

Results

Respondent loss between T_1 and T_2 on PSS and PMS was significantly associated with sex (more men), higher age, a lower level of education, lower T_1 scores on self-efficacy, more depression, more functional limitations and lower information-processing speed. Therefore, respondents at T_2 had higher levels of functioning at T_1 than the drop-outs. The absolute difference in mean mastery and self-efficacy scores

at T_1 between those who remained and those who were lost at T_2 was small (mastery: 17.4 versus 16.7; self-efficacy: (42.1 versus 41.0). Therefore, it was concluded that respondent loss at T_2 does not compromise the validity of the findings in the present study.

Table 5.7 shows the means and standard deviations of the PSS and PMS at T_1 and T_2 and of the predictor variables at T_1. The mean scores on the PSS and PMS do not change significantly between T_1 and T_2. Furthermore, self-efficacy scores at T_1 and T_2 have a correlation of 0.67, and those for mastery 0.51. Although these associations are relatively strong, less than 50% of common variance is involved. This makes it likely that predictor variables may account for more variance in the T_2 scores for mastery and self-efficacy.

Table 5.7
Means, standard deviations and range of dependent (mastery and self-efficacy at T_2) and independent variables (all at T_1)

	M (sd)	Range
Mastery (T_2)	17.4 (3.3)	5–25
Self-efficacy (T_2)	42.1 (5.3)	20–60
Mastery (T_1)	17.5 (3.2)	5–25
Self-efficacy (T_1)	42.2 (5.2)	23–59
Depression	7.2 (7.3)	0–54
Processing speed	23.4 (7.4)	1–45
# Chronic diseases	1.3 (1.1)	0–7
Age	68.7 (8.4)	54.8–85.6
Education	3.6 (2.0)	1–9

T_1 = baseline, T_2 = follow-up

Correlations between the predictor variables and mastery and self-efficacy are modest (Table 5.8). More internal locus of control and stronger beliefs of self-efficacy are associated with younger age, a higher level of education, higher information-processing speed, less depression and a lower of number of chronic conditions. Furthermore, sex differences were found, women having lower scores for mastery, $F(1,1893) = 22.63$, $p < 0.001$, and self-efficacy, $F(1,1907) = 37.99$ $p < 0.001$, than men. The similar pattern found for the associations between predictors and mastery and self-efficacy is not surprising, because mastery and self-efficacy intercorrelate positively ($r = 0.50$ at T_1 and $r = 0.52$ at T_2).

Table 5.8
Correlations of predictor variables with mastery and self-efficacy

Variables at T_1	Mastery (T_2)	Self-efficacy (T_2)
Mastery	0.51	
Self-efficacy		0.66
Depression	–0.33	–0.25
Processing speed	0.19	0.26
# Chronic diseases	–0.16	–0.11
Age	–0.20	–0.19
Education	0.09	0.20

All correlations significant at $p < 0.001$
T_1 = baseline, T_2 = follow-up

Tables 5.9 and 5.10 show the results of the regression analyses. T_1 scores on mastery and self-efficacy contribute most to the prediction of the T_2 scores. 26% of the variance in mastery at T_2 and 44% in self-efficacy at T_2 is explained by their T_1 scores. This implies a greater stability for self-efficacy than for mastery. The contribution of the other predictor variables differs for both variables. Strong mastery beliefs at T_2 are predicted by younger age, less depression, fewer chronic diseases, higher information-processing speed and male gender (in that order). However, they all explain

Table 5.9
Stepwise multiple regression analyses (standardized regression coefficients Beta and cumulative percentage explained variance) with mastery (T_2) as dependent variable

Variables at T_1	Beta	Cumulative percentage explained variance
Mastery	0.43***	26.2
Age	–0.08***	27.6
Depression	–0.10***	28.7
# Chronic diseases	–0.05**	29.1
Processing speed	–0.05*	29.3
Sex	–0.04*	29.5

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$
T_1 = baseline, T_2 = follow-up

only very little additional variance (1.3% or less for all variable). Together with mastery at T_1, they explain 29.5% of the variance. Stronger beliefs of self-efficacy at T_2 are predicted by higher information-processing speed, male gender, younger age and a higher level of education, in this order. Again, as for mastery, the amount of additional variance explained is low (1.4% or less for each variable). Together with self-efficacy on T_1, 46% of the variance on T_2 is explained.

Table 5.10
Stepwise multiple regression analyses (standardized regression coefficients Beta and cumulative percentage explained variance) with self-efficacy (T_2) as dependent variable (n=1909)

Variables at T_1	Beta	Cumulative percentage explained variance
Self-efficacy	0.62***	44.1
Processing speed	0.08***	45.4
Sex	–0.04**	45.7
Age	–0.05*	45.8
Education	0.04*	46.0

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$
T_1 = baseline, T_2 = follow-up

Discussion

The results of the present study suggest that mastery and general beliefs of self-efficacy of persons between 55 and 85 years of age are fairly stable, mastery being the most variable of the two. Although the concepts are related, they seem to be sensitive to the impact of different factors: variance in mastery at follow-up that is not explained by mastery at baseline is more related to depression and physical problems, while variance in self-efficacy at follow-up that is not explained by self-efficacy at baseline seems to be somewhat more related to cognitive performance. However, the very small amount of additional variance that is explained by the predictor variables makes the interpretation of these differences hazardous. The marginal role of the predictor variables in explaining the changes that occur for the surviving respondents between T_1 and T_2 in mastery and self-efficacy after controlling for baseline scores, should not lead to faulty conclusions regarding the relationship between these variables and mastery. In agreement with other studies, the present

study also found significant associations between mastery and self-efficacy, respectively and depression, processing speed, number of chronic conditions, education, sex and age. In order to gain more insight into the dynamics of changes in self-efficacy beliefs and mastery, more attention needs to be paid to those respondents who show appreciable gains or losses in mastery and/or self-efficacy, compared to those who remain stable. Depending on the nature of the variables that are associated with these changes, interventions might be considered that would either strengthen positive changes or diminish or even reverse negative changes.

The measurement of cognitive and physical functioning in the present study was based on the use of rather objective measurement instruments. Physical functioning was measured on the basis of the number of chronic diseases, which is a fairly crude index. Cognitive functioning was measured by means of a processing speed task. Objective functioning, however, is not the single factor to determine any outcome, be it well-being, utilization of services, mortality or otherwise. Subjective functioning may be just as important. Whether the outcomes with regard to self-efficacy and mastery remain the same when more subjective measurements of physical and cognitive functioning are used, such as asking respondents how they perceive their own physical health and cognitive functioning, is a matter for further investigation. It could be hypothesized that these subjective measurements will explain more of the psychological processes underlying personality characteristics such as mastery and self-efficacy, and vice versa. Mastery and self-efficacy may be influential factors that have an impact on these outcomes through their mediating or moderating effects. For example, if the association between a physical health factor and depression disappears when mastery is taken into account, mastery is considered to have a mediating effect. Similarly, if the association between physical health differs between elderly people with low and high self-efficacy, self-efficacy is considered to act as a moderator. These effects deserve explicit attention from multi-disciplinary researchers in the field of aging.

The present results suggest both stability and change in the area of perceived competence in aging adults. While different processes appear to be related to changes in mastery and changes in self-efficacy, their contribution in explaining these changes seems to be modest after controlling for baseline measurements.

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