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Promoting well-being in frail elderly people

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Summary and discussion

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In this dissertation, it was investigated if well-being in frail elderly patients can be increased by means of increasing their Self-Management Ability (SMA). In Chapter 1, we explained that frail elderly people have suffered interacting losses in physical, social, and psychological domains of functioning. These losses lead to a decreased reserve capacity for dealing with new losses. As such, frail elderly people have a risk of declining well-being and of inadequate use of health care. Because well-being is regarded as the main criterion for successful aging, declining well-being is equated with unsuccessful aging [1]. To counteract or mitigate these negative consequences of frailty, an intervention was proposed to increase frail elderly people's adaptive abilities to realize well-being. Because no existing interventions were found to be fully suitable to tackle the problems, a new intervention was developed. It was developed on the basis of the theory of successful self-management of aging (SSMA theory) [2], which specifies which proactive processes need to be addressed to improve frail elderly people's adaptive capacity to realize well-being. These proactive processes are people's self-management abilities, or SMA. SSMA theory specifies that SMA consists of six abilities directed at substantive dimensions of well-being. The abilities are multifunctionality of resources, variety of resources, having a positive frame of mind, investment behavior, self-efficacy, and taking initiatives. The substantive dimensions pertain to physical and social well-being, specified by the Social Production Functions theory (SPF theory) [3,4] (see Chapter 1). Comfort and stimulation pertain to physical well-being, and affection, behavioral confirmation, and status pertain to social well-being.

The dissertation consists of two parts: 1) testing the expected relations between the main concepts, and 2) the design and test of an intervention to increase SMA and well-being. The main aim of the intervention was to increase the SMA of frail elderly patients in order to promote their well-being. The outcome 'use of care' was investigated in an exploratory way. Besides evaluating the intervention and its effectiveness, we also tested some important propositions of the SSMA theory. Moreover, we tested whether the concept of frailty better describes the process of 'aging', an increased risk of adverse outcomes due to losses in different domains of functioning, than does chronological age. A positive outcome would indicate that frailty is indeed a better selection criterion than age for interventions.

Below, we summarize and discuss the main results and their implications for each part of the dissertation. At the end of this last chapter, we present the implications of the results for the main research question of this dissertation: what can be done to promote sustainable well-being (successful aging) in frail elderly people?

9.1 Part I: Testing the SSMA theory: Relations between concepts and measurement

The relations between the main concepts predicted on the basis of the SSMA theory and the operationalization of these concepts were investigated in several studies with the aim of validating the assumptions and measurements used for the intervention. Three problems were addressed with regard to the main concepts:

- Can SMA be validly measured? (Chapter 2)
- How can those elderly people most at risk of adverse outcomes best be selected for an intervention? (Chapter 3)
- Do frailty, SMA, and well-being relate to each other in the way predicted by the SSMA theory? (Chapters 4 and 5)

To answer these questions, two studies were conducted: a cross-sectional study containing a pilot sample of 275 people aged 65 years and older, recruited from several clinical and non-clinical settings, and a longitudinal intervention study with a clinical sample of 99 moderately to severely frail people aged 65 years and older. Moreover, data were used from a cross-sectional study with a randomly drawn community sample of 1,338 people aged 65 years and older. This was possible because this study was based on the same theory.

9.1.1 Measurement of SMA (Chapter 2)

In two studies reported in Chapter 2, it was investigated whether self-management abilities in older people can be validly measured using self-report. The studies were carried out to design and test a self-report instrument, the SMAS-30, designed to measure the theory-driven conception of SMA. The SSMA theory [2] systematically linked the self-management abilities to the substantive dimensions of well-being [3]. The results show that the SMAS-30 measures SMA validly and reliably as an overall concept of adaptive abilities that are systematically linked to dimensions of well-being in adults aged 65 years and over. The analyses showed one well-fitting valid model that measured the 6 abilities and 5 dimensions of well-being as we used them to construct the scale. The different subscales of the scale revealed a profile of interrelated abilities.

All findings of the design study (pilot sample) regarding structure and validity were confirmed when the scale was tested in a large community sample. This indicates that the findings can be considered robust. In addition, the SMAS-30 showed good stability over a period of 16 weeks. Significant relations with partly overlapping constructs (general self-efficacy and mastery) provided evidence of the validity of the SMAS-30. Moreover, the SMAS-30 had its own unique predictive value for the positive dimension of well-being after these partly overlapping constructs had been controlled for. The SMAS-30 was also significantly related to age, frailty, health perceptions, and several different measures of well-being.

Regarding the subscales, we showed that they all contribute to the overall construct. The subscales are one-dimensional and internally consistent. Because the subscales are interrelated and contribute to the overall concept of SMA, they should preferably be analyzed in a multivariate way. The analyses in this dissertation using the separate subscales were not multivariate because of the small sample size and should, therefore, be regarded as exploratory. This caution is necessary also because the separate subscales have not yet been validated.

9.1.2 Selecting those elderly people most at risk: The concept of frailty (Chapter 3)

In the study reported in Chapter 3, it was investigated how those elderly people who would profit of a geriatric intervention or treatment can best be selected. That is, it was investigated how those elderly people who might be at high risk of adverse outcomes can best be identified. Though often used, chronological age seems not to be the best selection criterion because it is not the best predictor of adverse outcomes. The concept of frailty may tell us more about the process of *aging* – that is, the process of losses in different domains of functioning, a higher risk of chronic conditions, a higher mortality risk, and the like. Frailty, the risk of adverse outcomes due to losses in different domains of functioning, relates directly to these adverse processes. The results of the study in Chapter 3 show that frailty turned out to be a better selection variable than chronological age for the purpose of identifying those elderly people most at risk of adverse outcomes. When chronological age was used in the community sample to select people at risk of a decline in self-management abilities, both too many and too few people were selected. Moreover, frailty in the community study was related more strongly to low self-management abilities than was chronological age. Chronological age added little to the explained variance once frailty had been included. Using frailty to select older people at risk for interventions may, therefore, be a large improvement compared to selecting people using chronological age. Because the instrument used to measure frailty (the Groningen Frailty Indicator) is short and easy to use, selecting people using level of frailty seems a reasonable and manageable alternative to using chronological age.

9.1.3 Testing of the expected relations between frailty, SMA, and well-being (Chapters 4 and 5)

In the studies reported in Chapters 4 and 5, it was investigated whether frailty, SMA, and well-being relate to each other in the ways predicted by the SSMA theory. Because of the resource loss it implies, frailty was expected to lead to a decline in SMA and well-being, thereby identifying the elderly people most at risk of adverse outcomes (see Figure 1-2). The relationship between frailty and SMA was expected to be reciprocal, implying that SMA could retard frailty, too. Increased SMA (adaptive resources) was expected to lead to more overall well-being or to less decline in overall well-being, and to less psychological distress or to less increase in psychological distress. We expected that the relations of SMA and frailty with well-being would be both direct and mediated by each other. Frailty would lead directly to a decline in well-being and SMA

would directly increase well-being. In addition, we expected that SMA would contribute to well-being through its influence on frailty, thus, via the neutralization of losses. Thirdly, we expected that frailty would negatively influence well-being via its negative influence on SMA. It was also expected that the positive contribution of SMA to well-being would continue when frailty increased.

The results of the studies reported in Chapters 4 and 5 show that frailty, SMA, and well-being relate to each other in the ways predicted by the SSMA theory. The relations were strongly supported, because they were found in all samples. We found a reciprocal relation between SMA and frailty, indicating that high frailty may lead to lower SMA (see Chapter 3). In turn, people with higher SMA tend to be less frail than people with lower SMA (see Chapter 4). Therefore, it also seems likely that SMA can retard the development of frailty, because it helps people to manage the loss of direct resources. That is, a decline in direct resources (frailty) can lead to a decline in adaptive resources (SMA), but an increase in adaptive resources can also lead to an increase in direct resources.

We conclude that SMA (adaptive resources) predicts the positive dimension of well-being better and directly, whereas frailty predicts the negative dimension better and directly. These relations held cross-sectionally in all samples. The studies in Chapter 4 robustly showed that both frailty and SMA substantially relate to well-being in the expected ways. The loss of direct resources (frailty) is related to a lower level of some aspects of well-being, whereas the adaptive resources (SMA) are related to a higher level of well-being. These relations seem to be additive. The relations of SMA to positive indicators of well-being are stronger than to negative indicators of well-being, whereas the relations of frailty to negative indicators of well-being are stronger than to positive indicators of well-being. SMA and frailty relate about equally to life satisfaction, and directly. The relation of adaptive resources to well-being does not necessarily run via its influence on direct resources, but is also direct – that is, adaptive resources do have independent links to several indicators of well-being, especially positive indicators. By contrast, direct resources have not only a direct relation to well-being, but also an indirect one through their relation to adaptive resources.

The findings of the study in Chapter 5 show that these relations between frailty, SMA, and well-being also hold over a time interval in a sample of moderately to severely frail elderly people. From the findings of this study, we can conclude that SMA leads strongly and directly to higher overall well-being (positive well-being) (see Figure 9-1), and only indirectly reduces psychological distress (negative well-being) (see Figure 9-2). By contrast, frailty leads directly to higher psychological distress, and only indirectly reduces overall well-being.

The positive contribution of SMA to overall well-being remains when frailty increases. This implies that interventions aimed at increasing SMA, with the related aim of increasing positive well-being, are meaningful even when frailty is high. The cross-

sectional data of the studies in Chapter 4 showed that it was sensible to try to increase positive well-being through increasing SMA in frail elderly people. The findings of the study in Chapter 5 and of the intervention study (Chapter 7) confirm this finding.

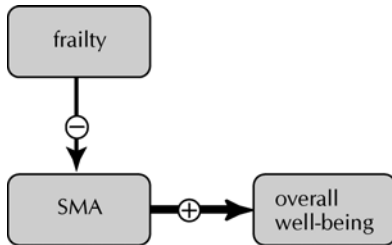


Figure 9-1. The relations between frailty, SMA, and overall well-being

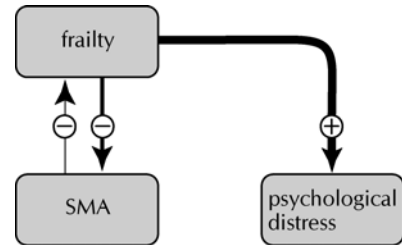


Figure 9-2. The relations between frailty, SMA, and psychological distress

9.1.4 Mastery, a loss-frame, and neuroticism and their relations to well-being in moderately to severely frail elderly people (Chapter 5)

In the study reported in Chapter 5, it was also investigated whether mastery, a loss-frame, and neuroticism had an influence on well-being. We expected that these other variables were likely to influence well-being and the relations between frailty, SMA, and well-being. The influence of mastery was thought to be comparable to the influence of SMA, because mastery and SMA are comparable concepts. However, it was hypothesized that SMA is a stronger and more precise predictor, because SMA refers to abilities systematically linked to the substantive dimensions of well-being (the universal goals for well-being) [3], whereas mastery is a more general capacity. In the same way as SMA, higher *mastery* was expected to lead to more well-being, directly and via frailty (see Figure 1-3). Moreover, frailty was expected to lead indirectly to a decline in well-being because it leads to a decline in mastery. Lastly, the positive contribution of mastery to well-being was expected to continue when frailty increased.

A *loss-frame*, contrary to a positive frame, is a cognitive frame in which people do not invest in the maintenance of resources, but focus on dealing with present losses. As it is opposite to a positive frame (an aspect of SMA), the influence of a loss-frame on well-being was expected to be opposite to that of SMA. We expected, therefore, that frailty (losses) would lead to lower well-being partly via a loss-frame, thus via the way in which these losses are ‘framed’ (see Figure 1-4).

We expected that *neuroticism* would have a negative influence on well-being, both directly because neuroticism is a generic risk factor for both psychological and somatic ill health, and indirectly because neuroticism leads to a lower level of SMA. We also expected that frailty in neurotic people would lead to lower well-being than would frailty in less neurotic people (see Figure 1-5).

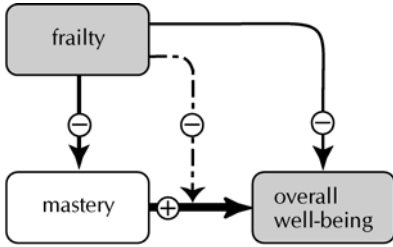


Figure 9-3. The relations between mastery, frailty, and overall well-being

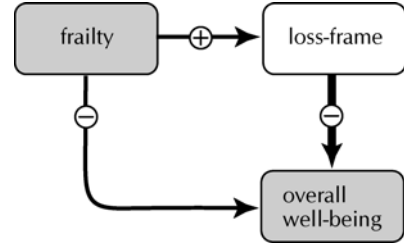


Figure 9-4. The relations between a loss-frame, frailty, and overall well-being

The results of the study in Chapter 5 show that both mastery and a loss-frame have influences on well-being that are comparable to the influence of (aspects of) SMA. Just as SMA does, mastery leads directly to higher overall well-being, and not via neutralizing losses (frailty) (see Figure 9-3). A higher sense of control over life is directly beneficial to positive well-being. The influence of frailty on overall well-being is partly via a negative influence on mastery. Moreover, the influence of frailty on overall well-being is partly directly and partly via a loss-frame (see Figure 9-4). That is, it is important for overall well-being how people frame the losses (frailty) they experience, just as SMA is important. The stronger the loss-frame, the lower the positive well-being. Though they have comparable influences, mastery and a loss-frame have a weaker influence than does SMA, as SMA explains more variance. The influence of mastery on well-being depends on the level of frailty. The findings of the study in Chapter 5 suggest that, with higher frailty, mastery is less beneficial to well-being.

The findings apply only to overall well-being. These variables had little impact on psychological distress.

The personality characteristic neuroticism is a strong and direct risk factor for both a decline in overall well-being and an increase in psychological distress. Neuroticism leads directly to lower overall well-being (see Figure 9-5) and more psychological distress (see Figure 9-5), and not via a hampering effect on adaptive abilities [see, e.g., 5-9]. Contrary to

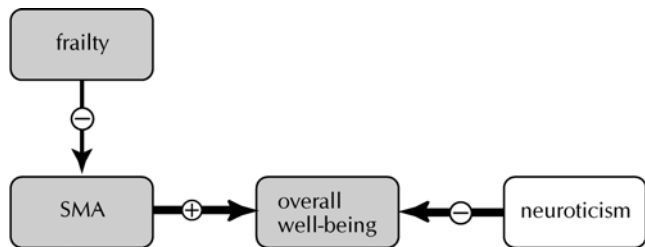


Figure 9-5. The relation of neuroticism with overall well-being

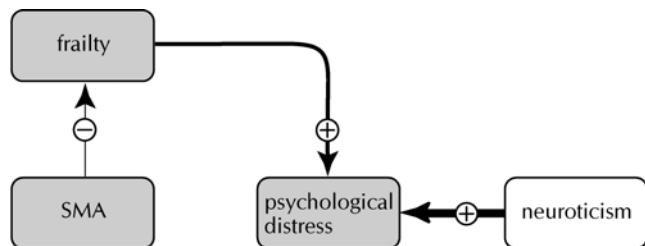


Figure 9-5. The relation of neuroticism with psychological distress

our expectations that were based on the findings of other research [e.g., 10,11], we found that neuroticism does not negatively affect the influence of frailty on well-being. Frailty leads to lower well-being, regardless of how neurotic people are. Being neurotic is an additive risk factor for lower well-being, besides frailty.

9.1.5 Positive and negative dimensions of well-being (Chapters 4 and 5)

In our studies, both positive well-being and the absence of negative well-being were addressed. In many studies, only one dimension of well-being was used. Most research into proxies for frailty focused on the negative side of well-being [see, e.g., 12-17]. It may be questioned whether the absence of negative well-being (such as distress) does imply positive well-being and whether they are influenced by the same variables. Positive and negative affect, for example, have been shown to be unrelated [see, e.g., 18-20]. Therefore, it seemed warranted to consider both dimensions of subjective well-being [see, e.g., 20]. The results of the studies reported in Chapters 4 and 5 show that it is of great importance which dimension of well-being is regarded. Other researchers have also found that different variables relate to the positive and the negative dimension of well-being [see, e.g., 20-24]. This finding was confirmed in our studies.

The relations between SMA and well-being were strongest when positive indicators of well-being (positive affect and overall well-being) were used, whereas the relations between frailty and well-being were strongest when negative indicators of well-being (psychological distress and negative affect) were used. Life satisfaction had strong relationships with both SMA and frailty. The explained variances of all regression models in the study in Chapter 5 predicting overall well-being were high, indicating that our models predicted overall well-being in moderately to severely frail elderly patients well. By contrast, our models predicted psychological distress in moderately to severely frail elderly patients less well. In the studies in Chapter 4, the explained variances of the regression models predicting positive affect and overall well-being were highest, followed by the explained variances of the models predicting life satisfaction, and those predicting negative affect and psychological distress. It seems that most of our variables predicted positive well-being in moderately to severely frail elderly people well, and that they had the expected relations to most indicators of well-being in a community sample that also included non-frail elderly people. However, additional theorizing is required to capture relevant predictors for negative well-being in frail elderly people. From the start, SSMA theory emphasized positive well-being, also as an antidote to the prevailing stress on negative well-being. However, it turns out that in terms of SMA, additional adaptive resources may have to be found for lowering negative well-being. As we have mentioned, most studies of the influences of proxies for frailty, such as functional decline or illness, focus on the negative dimension of well-being. The relation of frailty to positive indicators of well-being has not been investigated frequently. In the present studies, it was shown that frailty also relates to positive well-being, to the largest extent indirectly. However, the findings of our studies also indicate that frailty has a greater and more direct influence on the negative dimension of well-being than on the positive dimension in the longer term. Therefore, in order to specify the negative influence of frailty, it may be reasonable to investigate

the negative dimension of well-being as well. However, negative well-being may be more related to personality factors (such as neuroticism) than positive well-being and hence less open to the influence of self-management abilities (see page 176).

9.1.6 Frailty and chronological age (Chapter 5)

The study in Chapter 5 provided additional evidence for the findings reported in Chapter 3 that frailty is a better selection variable than chronological age to identify those elderly people most at risk of adverse outcomes (see 9.1.2). Chronological age can be seen as a proxy for frailty (see Chapter 1). There is a significant but moderate relationship between age and frailty in the elderly population. The reserve capacity of resources that people have in several domains of functioning is likely to decrease with increasing age, as a result of *aging*. However, this process is not the same for all older people, indicating that chronological age does not tell us the whole story. Though they are related, frailty and chronological age are two different entities. In the clinical sample, age and frailty were almost not related at the baseline. The absence of a relationship between age and frailty can be expected in a clinical sample of patients selected on the basis of their level of frailty. At later measurement moments, frailty and age were positively related, which can be explained by the changes in frailty which occurred during the study. Constant and declining frailty scores caused a higher spread in the scores and made the sample more comparable to the community sample in which a moderate relation between age and frailty has been found. Frailty and age also had different predictive values for dimensions of well-being. Age influenced only the positive dimension of well-being (overall well-being) and not the negative dimension (psychological distress) in the clinical sample. Frailty, on the contrary, more strongly influenced the negative dimension of well-being than it did the positive dimension. Age is often used as a proxy for frailty, but our results show that this is not (always) a reasonable thing to do. Recently, Smith et al. [17] also concluded that the relations between age and well-being vary depending on whether life circumstances such as ill health are controlled for, and that age-related variance in subjective well-being can mostly be attributed to health factors. Isaacowitz and Smith [20] argue that if unique age effects on well-being are found, a study has not captured all age-related predictors. Age per se is not a predictor. As we have discussed in Chapter 5, findings about the relations between age and well-being are inconsistent (absence, decline, and improvement). This supports our statement that age is not the best predictor of adverse outcomes, but that frailty is a better predictor and, therefore, a better selection variable for interventions than age.

9.1.7 Discussion Part I

The results of the studies reported in Chapter 2 show that the SMAS-30 is a promising self-report questionnaire for measuring SMA in elderly people. The results of all studies reported here and of the study by Frieswijk et al. [25] show that this measurement instrument can be used successfully in older people with several levels of frailty. The

results provide some extra support for the validity of the scale. In addition, two other relatively new measurement scales were used (GFI and SPF-IL(s)). Our results provide some extra support for the validity of these scales too, by showing that they too can be used successfully in older people with several levels of frailty.

Most of our theoretical propositions predicted positive well-being in moderately to severely frail elderly people well, and the concepts had the expected relations to most indicators of well-being in the community and the pilot samples. However, other theorizing might be required to capture relevant predictors for negative well-being in moderately to severely frail elderly people. Moreover, an intervention that increases SMA is more likely to increase positive well-being than to reduce negative well-being. This is in agreement with the findings of our intervention study, where we found larger effects for overall well-being than for psychological distress (see Chapter 7).

Not only were the relations between frailty, SMA, and well-being discussed in Chapters 4 and 5 robust over three studies, but the explained variances of the different well-being measures were mostly moderate to large, and high compared to those found in other related research. The percentages of explained variance in well-being in our studies ranged from 4% to 58%. Such high explained variances make us confident that both the measurements and the investigated associations were reasonably valid. The practical implications of these studies seem to be clear. If SMA (adaptive resources) seems to delay the development of frailty (loss of direct resources) and positively relates to subjective well-being, even when people become frailer, interventions to counteract frailty and to contribute to well-being should focus on increasing SMA. Thus, the distinction between direct and adaptive resources specified by the SSMA theory gives us good guidelines for where to focus interventions for frail elderly people. In addition, the SSMA theory guides the intervention not towards a general capacity (such as mastery) but to self-management abilities that are explicitly related to the realization of general human goals (substantive dimensions of well-being).

Although the findings of the different studies are promising, there are some limitations to these studies. An aspect of the SMAS-30 that may need to be considered is the character of the 'positive frame' subscale. This subscale is less interrelated with the other adaptive abilities than each of the other subscales, showing that this self-management ability may have been slightly different from the others (more cognitive and not specifically tied to the well-being dimensions). 'Positive frame' was not really measured using the SMAS-30 as it is conceptualized in the SSMA theory. In the SMAS-30, positive frame was operationalized in terms of cognitive coping strategies, such as downward comparison, and optimism. This is not exactly what is specified in the SSMA theory. The scale was conceptualized in this way, however, because applying the ability 'having a positive frame of mind' to the substantive dimensions of well-being (as was done for the other abilities) led to hypothetical questions about well-being, and answering these questions would have been too difficult. The 'positive frame' subscale seemed to measure a trait rather than a learnable ability. A second point deserving further research is the low 'social desirability' of items referring to status. Those items may, especially in interview situations, result in many missing

answers when respondents refuse to answer those questions (in the first study in Chapter 2, the percentage of missing answers to the status items in interviews was about 18). As a third point, it is necessary to investigate the validity of the separate subscales.

Another limitation concerns the composition of the samples and some non-response bias that may have occurred. It is possible that the frailest people did not return the questionnaire in the community study. This may have caused an under-representation of severely frail respondents. In the community sample, few people were very frail, which implies that the results do not automatically apply to very frail older people. Further research should also focus on developing additional self-management abilities that foster well-being in very frail older people. In addition, the findings of the study in Chapter 5 came from a small sample and should, therefore, be tested again in a larger sample to be able to generalize the findings to elderly people in general. However, the comparable findings of the studies in Chapter 4 indicate that we were on the right track in identifying relevant influences on well-being.

Other limitations concern the methods of analysis. Firstly, though the dependent variables were specified in the investigated models, in reality, it is unknown which of the variables is the dependent one. All causal influences could be reversed, and it is possible that there were feedback mechanisms from the dependent variables (well-being) to the predictors as well. However, because the data did not allow the test of a structural model with feedback loops (i.e., the sample was too small to use this kind of model), we chose to use regression analysis, which forced us to specify the dependent variables. In choosing the dependent variables, we followed the SSMA theory and the relations expected on the basis of this theory.

Secondly, the regression analyses did not give us information about fluctuations in time or about longitudinal prediction. To investigate the relations between the variables longitudinally, it is necessary to model the fluctuations in time of both dependent variables and predictors, as well as to take their interdependence into account. An appropriate method of doing this is to use a multivariate multilevel model which allows longitudinal measurements within individuals to be considered [26,27]. Such a model would also be able to incorporate the mentioned feedback mechanisms.

A limitation that concerns all studies may be that three of the used measurement scales (GFI, SMAS-30, and SPF-IL(s)), although extensively tested, are relatively new. Both GFI and SMA were developed and tested for older people (see also Chapter 2). Although the SPF-IL(s) has been tested extensively [28], it has not been tested specifically in an older population. As we mentioned before, our studies have shown that these instruments can be used in older people with several levels of frailty.

Another possible cause of concern is the high correlation between SMA and overall well-being (.70 to .80). Because of this high correlation, it could be argued that the two concepts are the same and must, therefore, be strongly related, which could cause the high explained variances in the models including both overall well-being and SMA.

However, the item content of the questionnaires used to measure SMA and overall well-being shows that this is not likely. Moreover, the concepts seem to cover different aspects of the theoretical sequence. SMA covers the behavioral mechanism, whilst overall well-being covers the outcome of this mechanism and the satisfaction with this outcome. This makes us confident that we measured two different concepts and that the high correlation is a sign that SMA is very important for overall well-being.

In the study in Chapter 5, it was found that, with higher frailty, mastery is less beneficial to well-being. A possible explanation for the decreasing positive effect of mastery with increasing well-being is that having a high sense of mastery in the face of many losses (high frailty) may no longer be beneficial. People with a high sense of mastery may find it difficult to let things go and accept the losses, which are to a large extent uncontrollable. Research has shown that it can be maladaptive to perceive control when control is not possible [e.g., 29-34]. When frailty is high, it might even be more adaptive to have a lower sense of mastery. In this way, people can better accept the losses (uncontrollable events) that happen and flexibly readjust their goals in such a way that they become more realistic and more beneficial to their well-being [31]. This flexible adjustment of goals is specified in SMA as being a strategy beneficial to well-being. The tendency of people with high feelings of control not to flexibly adjust their goals [31] again underscores the difference between mastery and SMA in their relations to goals. High mastery may make people strive for unattainable goals, whereas SMA explicitly makes people strive for realistic goals that are beneficial to their well-being.

Neuroticism is a risk factor for all kinds of adversity, such as declining well-being. In addition, the stable trait of neuroticism is strongly related to psychological distress [see also, e.g., 35-37]. This could imply that psychological distress has a trait component as well, or is a stable tendency to react in a certain way to stressors [e.g., 38]. The reverse could also be true; namely, that neuroticism indicates a person's stable or characteristic level of psychological distress [39]. High correlations between neuroticism and distress could be caused by the fact that both scales measure stable levels of distress [39]. There are reasons to believe that the questionnaire we used to measure psychological distress (GHQ) measured not only fluctuations in state but also, to some or a large extent, a tendency to report mental distress [e.g., 39,40]. It is possible that the measurement of negative well-being in these studies was inadequate because, as measured, it is difficult to influence. We cannot exclude the possibility that we measured some kind of trait distress as well. To distinguish the trait component of psychological distress and to investigate to what extent psychological distress can be influenced, latent state-trait models could be used, which apply structural equation modeling [e.g., 39,41-43]. Using such a model, it can also be determined what is measured using a particular scale: a trait, a state, or both [43]. It is likely that the predictive models of Chapter 5 would be better able to show what influences psychological distress when people with high levels of neuroticism are excluded from the sample or when the trait component of distress is distinguished and removed using a state-trait model. It is also likely that, in this way, the influences on positive and negative well-being would converge more. Because of the small sample size, it was not possible to test this.

9.2 Part II: The design and test of an intervention for increasing SMA and well-being in frail elderly people

Part II addresses the main research question of the dissertation: can SMA in frail elderly people be increased by means of an intervention and does this lead to increased well-being? The problem was addressed by examining a clinical sample of moderately to severely frail elderly patients recruited from some wards of the University Hospital Groningen (hospital patients) and from a Family Practitioner's practice (FP's patients).

9.2.1 Main effects of the intervention (Chapter 7)

In the study reported in Chapter 7, the effects of the SMA intervention on overall SMA, separate self-management abilities, and well-being were investigated. Frail elderly people are at risk of declining well-being. We expected that the decline could be prevented or reduced by increasing people's adaptive abilities (SMA) to adequately manage remaining direct resources. We expected that the SMA intervention would increase overall SMA both in the short term (directly after the intervention) and in the longer term (4 months after the intervention). All self-management abilities were expected to increase due to the intervention, because they are related and contribute to overall SMA. We also expected that the SMA intervention would increase overall well-being and decrease psychological distress, and that these changes in well-being would be caused by an increase in SMA. Lastly, frailty was expected to be related to inadequate use of care, and increased SMA was expected to be related to increased variance in the use of care. That is, increased SMA could be related to either more or less use of care, depending on people's situations. Those in need of more care would get more care when their SMA increased, and those in need of less care would reduce their use of care when their SMA increased. Because there is no standard for 'adequate' care, we could not test the assumption about the relations between frailty, SMA, and the inadequate use of care other than indirectly through the variance of care. The expectations about the use of care were explorative.

Because the differences between the populations from which the patients were recruited concealed the effects of the intervention, the populations were analyzed separately. The intervention had the expected effects in the hospital patients in our sample. The results of the study in Chapter 7 show that the intervention increased overall SMA in hospital patients both in the short term (6 weeks) and in the longer term (4 months). It appears possible to provide frail elderly patients with a repertoire of proactive behaviors and cognitions to sustain well-being. Additional support for our results is given by the study by Frieswijk et al. [25], who found similar results using SMA bibliotherapy in a sample of slightly to moderately frail elderly people. Our intervention was a modest form of training – that is, it was relatively short and not intensive (see Chapter 6). That such a modest form of training yielded positive effects shows that there is much potential to improve self-management abilities, provided the training is more intensive or longer, perhaps with a follow-up.

The results of the study reported in Chapter 7 also indicate that the intervention had some effect on the separate self-management abilities. ‘Variety’ and ‘taking initiatives’ were increased most by the intervention, though most of the other abilities showed indications of increase as well. ‘Multifunctionality’ was not influenced at all. Our findings imply that an ability such as ‘taking care of variety’ can apparently be influenced easily, whereas abilities such as ‘multifunctionality’ or ‘positive frame’ are more difficult to change. Because ‘positive frame’ seemed to be more trait-like than the other abilities (also in the way it was measured), it is not surprising that it changed little. In the bibliotherapy study by Frieswijk et al. [25], a comparable result was found. The findings about the separate abilities should be regarded as exploratory, because of the interrelated status of the subscales (see 9.1.1).

The intervention also increased overall well-being, both in the short term and in the longer term. In addition, there is an indication that the SMA intervention led to a decrease in psychological distress, both in the short term and in the longer term. There are indications that the increase in well-being was caused by an increase in SMA, but because of the small group sizes, this effect could not be tested rigorously. The SMA intervention appeared to influence overall well-being more than psychological distress. In the study by Frieswijk et al. [25], it was also found that overall well-being was influenced more by SMA bibliotherapy than was psychological distress.

Frailty was related to more use of care in several domains. Against our expectation, increased SMA did not lead to increased variance in the use of care. Actually, the use of care changed little between the baseline and the second post-measurement, as did its variance. Moreover, there were no clear differences between conditions in these changes, neither for the total sample nor for the populations separately.

9.2.2 Other effects of the intervention (Chapter 7)

Because SMA is a relatively new concept, in the study reported in Chapter 7, we also investigated the effects of the SMA intervention on a related but better-known concept: mastery. Through increased SMA, people may feel more in control of their lives – that is, they may have a higher sense of mastery. We expected that the SMA intervention would also increase mastery. However, mastery is a much more general capacity than SMA, because it is not systematically linked to substantive dimensions of well-being. Therefore, it might be less sensitive to the intervention. For this reason, we expected to find more change in SMA than in mastery.

In the study in Chapter 7, it was also investigated whether level of frailty, a loss-frame, and neuroticism would modify the effect of the intervention on SMA (see Figure 1-6). Because the sample covered a large range of frailty, we explored whether the intervention would have differential effects within this range. In addition, we expected that the intervention would have less influence on SMA when patients had a stronger loss-frame, because it could be more difficult to convince them to invest in the

maintenance of resources and to have them switch to a more positive frame. Lastly, we expected that the intervention would have less effect when patients were more neurotic.

The results show that mastery was indeed influenced less by the SMA intervention than was overall SMA. Only in the longer term was there a slight indication of improvement of mastery in the hospital patients who received the intervention. Apparently, the SMA intervention was better able to influence specific behaviors directed at well-being, such as SMA, than a more general capacity such as mastery. This is likely because the intervention focused directly on the specific self-management abilities and less on mastery. Increased SMA does not necessarily imply an increased general feeling of control.

The results show that a loss-frame and neuroticism are hardly or not related to changes in self-management abilities. There was not enough evidence to conclude that these variables modified the effects of the intervention on SMA. We cannot conclude that the intervention had less effect on SMA for

patients with a stronger loss-frame or for patients who were more neurotic. Because level of frailty was also hardly related to changes in SMA, we cannot conclude that the intervention worked best for patients in a certain range of frailty. However, we found indications that the level of frailty is important for the effectiveness of the intervention (see Figure 9-6). The intervention seemed to work better for patients with a level of frailty above 5, especially for Family Practitioner's (FP's) patients. When only the FP's patients with a frailty score of above 5 were included in the comparison, the intervention group seemed to improve more on overall SMA than the control group.

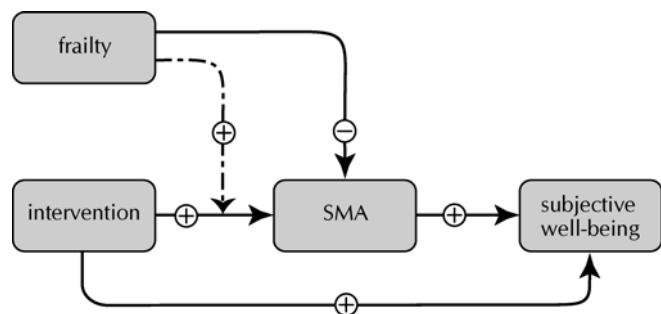


Figure 9-6. *The influence of frailty on the effect of the intervention on SMA*

9.2.3 Process evaluation of the intervention (Chapter 8)

In Chapter 8, the patients' and trainers' experiences with the intervention are described. On the basis of these experiences, we created a profile of the 'ideal patient' for the intervention and recommended some selection criteria. In addition, we presented a profile of the 'ideal trainer' and recommended some changes to the intervention.

Chapter 8 shows that all intervention patients had pleasant experiences of the SMA intervention, although less than half of them had the feeling that they benefited from the intervention. There were relations between how much people felt they benefited from the intervention and the improvements they showed on the measures. When asked which aspects of the intervention benefited them most, patients mentioned specific self-management abilities, but also many general aspects of interventions, such as support or someone to talk to. The intervention seemed to work best when patients were intrinsically motivated and were capable to consider their possibilities, restrictions, and main problems. We supposed that frail elderly patients who voluntarily participated in our intervention would automatically be intrinsically motivated to change things in their current situations, because of their frailty. However, being frail did not always imply that patients experienced problems and wanted to change something. In addition, some patients already had a high level of SMA, leaving little for the intervention to improve. Patients also have to be willing to (partly) change their way of living. The intervention seemed to work best for patients with a GFI score of above 5, especially for the FP's patients. Next to the level of frailty, the characteristics of the patients' restrictions were important. A high sickness impact due to the severity of chronic conditions is contraindicative for a successful intervention. Patients with such a high sickness impact are not physically able to improve their self-management and the intervention could frustrate them. The conditions for improvement have to be present. Patients also need a certain minimum level of mobility (i.e., their mobility should not be completely restricted). We believe that a too high level of frailty is not suitable either. Though the positive relation of SMA to subjective well-being did not diminish with increasing frailty (Chapters 4 and 5), we do not think that the results of the intervention would be as strong for people who are very frail, because of their diminished capacity to take advantage of the intervention. There would be too few conditions for improvement. Moreover, many very frail people were excluded from the study for reasons relating to their high level of frailty (e.g., severe illness, short life expectancy), which indicates that the intervention is not suitable for such people. In line with the reasoning of Smith et al. [17], we argue that adaptive abilities can no longer compensate for losses when losses in all domains of functioning accumulate past a critical threshold and there are no conditions for improvement left.

The patients found the content of the intervention clear and not too difficult. The most appealing themes were 'thoughts that hinder initiative', 'positive thinking', 'taking initiative', and 'investment'. However, the assignments did not appeal to most patients and the trainers thought that the style of the intervention did not match the patients as regards the assignments. Offering all modules to all patients was also not successful. Many of the modules were superfluous for patients who had relatively few problems, concentrated in the themes of a few modules. Simply confirming what patients already knew, or did, was not felt to be of much value. On the basis of these findings, we recommend that the intervention is restructured such that patients receive only those modules that they need. Moreover, it may be useful to change or remove some topics, and to remove many assignments. In this restructured form, the intervention could benefit even more people.

On the basis of the experiences of the trainers, the following characteristics of the trainer were recommended as relevant to the successful administration of the intervention. The trainer should be a person who is not too young and who is skilled and experienced in working with this group of elderly patients and in working with this kind of intervention. Moreover, it should be a person whose medical background is sufficient to understand patients' somatic problems and their consequences for their daily living and psychological condition. In addition, the trainer needs to be emphatic, flexible, patient, and stimulating; to acknowledge patients' own wishes and ideas; and to be able to quickly identify patients' core problems.

9.2.4 Discussion Part II

Concerning our questions whether self-management abilities and well-being can be increased, we conclude that there are indications that the intervention increased overall SMA, some separate self-management abilities, and well-being in the hospital patients in our sample. It appears possible to provide frail elderly patients with a repertoire of behaviors and cognitions to sustain well-being. The results can be generalized to frail elderly hospital patients in general. Our results are comparable to those of Frieswijk et al. [25], who found similar results using bibliotherapy in slightly to moderately frail elderly people. The SSMA theory was a fruitful basis to develop the intervention. The adaptive strategies specified by the theory are the right strategies to increase frail elderly patients' capacity to realize well-being. In addition, the specific direction of the abilities towards the substantive dimensions of well-being specified by the SPF theory made the strategies clearly applicable and useful in realizing well-being. The theoretical distinction between direct and adaptive resources and the direction of the abilities towards dimensions of well-being thus led to the construction of useful guidelines for developing an intervention to increase well-being in frail elderly people.

The effects of the intervention in hospital patients seem relatively small, which could be due to a lack of power. Because the populations had to be analyzed separately, the subgroups were very small. Though we used analytic techniques especially suited to small samples, the power may still have been low. This implies that the absence of significant effects may be due to Type II error. However, computing effect sizes and comparing them to those found in other studies, as is often done in intervention studies, was not considered to be a good strategy because effect sizes are dependent on the variance in a sample and are, therefore, difficult to compare over studies [44,45]. Therefore, the effect size is not informative. Greenland [44] argues that use of effect sizes should be avoided always. It is better to be able to determine whether the change that was found is clinically relevant. Clinical relevance is different from effect size, because the effect size does not show how important the change over time is [46]. It is difficult to determine what a clinically relevant change is when using scales such as those used here. To get an indication of the clinical relevance of our results, we used a characteristic of the measurement scale which was found to relate to clinical relevance in several studies: the standard error of measurement (SEM) [47-49]. The SEM depends on the reliability of the measurement scale and the variance in the baseline sample. A change of one SEM or larger was found to relate to clinical

relevance [47-49]. When we used the one SEM criterion in our sample, it appeared that the longer-term changes in SMA, although small, may still be considered clinically relevant. When the most important outcome, well-being, was considered using the one SEM criterion, the changes in well-being that we found could be considered clinically relevant. Given the modest form of the training, this can be regarded as a promising result.

Some remarks on the intervention study need to be made. Not all self-management abilities appeared to contribute equally to the effects. However, it is difficult to specify how much each ability contributed because of the interrelated character of the different abilities. Because the separate subscales have not yet been validated, results about them are only exploratory. This prevents us from making firm statements about the separate self-management abilities.

Many of the baseline scores for SMA and for some of the separate abilities were quite high, which implies that there was a ceiling effect in some cases or that regression to the mean could have led to a decline in post-measurement. Because of the small group sizes, we could not exclude those patients with high SMA scores from our analyses. Therefore, their high scores (and consequently the absence of improvements) could have distorted or even hidden the effects of the intervention.

In FP's patients, the experiment showed strange results. The intervention had no clear-cut effects on the main outcomes. An important reason for this could be the FP's patients' motivation to participate. We believe that many FP's patients participated only because their FP asked them to. Therefore, their motivation to take part may have been mainly extrinsic ('to please the doctor'), and less intrinsic (because they had the feeling they could benefit from the study). As a consequence, their motivation to change may have been low or even absent. We did not anticipate motivational effects, even though it is a well-known phenomenon in intervention studies and therapy that interventions will be successful only if people are ready and willing to change [e.g., 50-55]. Our findings taught us that it is important to take motivation into account. The lack of intrinsic motivation may also have been partly due to a low level of frailty in FP's patients. At the second post-measurement, about 30% of the FP's patients had a frailty score which was lower than the cut-off score for inclusion in the study. With such a low level of frailty, patients may not feel the need to change anything.

Another reason for the absence of effects of the intervention in FP's patients might be that they came from a specific region [e.g., 56,57]. This region has a low socioeconomic status and many people live isolated. The intervention may not have been tailored enough to the beliefs, needs, or expectations of the FP's patients [see, e.g., 58,59]. The intervention might have had more effect in this region if it had been more 'culturally adapted' to the common customs of the specific region (for instance, by changing some expressions or examples).

Our findings can, therefore, be generalized to moderately to severely frail elderly hospital patients, but not to FP's patients. Our FP's patients were, moreover, a specific group, because they were recruited through one FP's practice in a specific region. Therefore, they cannot be considered representative of FP's patients in general.

9.3 Overall conclusions

We conclude that selecting those elderly people most at risk of adverse outcomes on the basis of level of frailty is a great improvement on selecting them on the basis of chronological age, as is often done. In agreement with existing intervention studies that focus on themes such as self-management and well-being, we have shown that both adaptive abilities and well-being can be increased in frail elderly hospital patients. Contrary to many existing interventions, we addressed elderly people who were frail; thus, who suffer from a mix of complex and interacting problems. The results of the study show that it is possible to address this group of elderly people with a complex mixture of problems (frailty). Moreover, this diverse group of people benefited from a general intervention that did not focus on the consequences of specific diseases, but on elderly people's general capacity for realizing well-being. In contrast to many existing interventions for elderly people that focus on providing more care or on coping with losses, the adaptive capacity of frail elderly people for realizing well-being was called upon. This was done by addressing not only cognitive strategies but also active behavioral processes. Thus, instead of solely providing more care, empowering frail elderly people appears to be a promising additional way of increasing their well-being. The intervention increased overall well-being, which includes physical, social, and psychological well-being. Many existing interventions for frail elderly people focus on health and health-related domains, and pay little attention to social and psychological well-being directly. Here, we have shown that it is beneficial to focus directly on social and psychological well-being.

Furthermore, in contrast to many existing interventions, we were able to give our intervention a clear theoretical basis that connected the problem, the working mechanism, and the outcomes. Using the theoretical basis provided by the SSMA theory and the SPF theory, which was linked to the problem and the outcomes, we were able to design an intervention that increased the theoretical mechanism (SMA) and thereby appeared to lead to the expected outcome (increased well-being). The SSMA theory thus was a fruitful basis for designing the intervention and tackling the problem of declining well-being in frail elderly people. The intervention designed on the basis of this theory is a valuable addition to traditional health care. The theoretical distinction between direct and adaptive resources made by the SSMA theory is useful because it gives good and effective guidelines for where to focus interventions for frail elderly people. The adaptive resources (abilities) are of much relevance to frail elderly people, who are confronted with many losses in direct resources and, therefore, at risk of declining well-being. The SMA-intervention increases people's adaptive resources, and in this way they are better able to cope with the loss of direct resources indicated

by their frailty. The increased adaptive resources lead to higher well-being. A second fruitful aspect of the SSMA theory is the systematic link of SMA (adaptive abilities) to substantive dimensions of well-being specified by the SPF theory. Because the self-management abilities are specifically directed at these dimensions of well-being, the realization of which is the criterion for 'success' in aging, the criterion for success is integrated in the theoretical model, making it possible to measure successful aging and to give concrete guidelines how to improve successful aging.

Note that the positive and negative dimensions of well-being were not improved equally. Our findings confirm that the SSMA theory is better applicable to positive well-being than to negative well-being. Moreover, our findings indicate that positive and negative well-being are two different entities, rather than two sides of the same coin. To understand negative well-being (psychological distress) in frail elderly people, and to tackle psychological distress, it is necessary to develop additional theory and to reconsider the measurement of negative well-being.

Though the intervention had positive effects on the two main outcomes (SMA and well-being), as expected, it was difficult to influence the third outcome, use of care. Before an intervention can influence this outcome, a standard for 'adequate care' must be developed. In addition, Lorig and Holman [60] recently argued that tailored interventions are seldom linked to changes in health care utilization. Apparently, use of care cannot be influenced easily or in a clear-cut way. Interventions to change the use of care in frail elderly people have to focus on aspects other than those we focused on, obviously.

9.4 Practical implications

We recommend implementing the SMA intervention in transmural care for frail elderly hospital patients. The intervention can be administered by nurse practitioners, and can be integrated in their current practice. In its restructured form and with the right selection of patients, we believe this is feasible. The current study has shown that the intervention was effective for frail elderly hospital patients, and yielded clinically relevant effects. This effectiveness could be increased by restructuring the intervention and by adjusting the selection of patients.

When selecting frail elderly patients for this kind of intervention in the future, their motivation needs to be taken into account explicitly. In addition, the threshold value of frailty should be changed. That is, only people with a GFI score of above 5 should be selected, but they should not be severely frail (a score of above 12). Though SMA and frailty were not investigated in very frail older people in the pilot, the community, or the clinical sample, do we not think that our intervention is suitable for very frail older people. However, we recommend not selecting only on the basis of the level of frailty. The specific restrictions that patients have should also be taken into account, because

the sickness impact due to the severity of some chronic conditions may be a contraindication for the intervention. Lastly, patients should also be selected on the basis of their level of SMA.

We recommend carrying out studies to investigate the efficacy of the SMA intervention when it is implemented in transmural care. It may also be necessary to develop standards for clinically relevant change of the used measurement scales.

9.5 Implications for future research

It may be necessary in the future to focus on developing models that can better measure and explain the negative dimension of well-being. Because the condition of frailty is strongly related to negative well-being, this is an important point to consider. If negative well-being can be influenced, this may lead to the development of interventions that are more suitable for tackling negative well-being.

Well-being must be considered multidimensionally. For specifying relations with well-being, or for designing interventions with the aim of increasing well-being, it does not suffice just to measure 'well-being' or to take one of the well-being indicators. It has to be specified beforehand which relations and effects are expected for which dimension of well-being.

Another point for future research is the development of a standard to judge *inadequate* use of care in frail elderly people and interventions to change use of care when it is inadequate.

Lastly, future research should validate the separate subscales of the SMAS-30 and reconsider some subscales and items. Aspects of the scale that may need to be considered are the 'positive frame' subscale and the 'multifunctionality' subscale. Another point deserving attention in further research is the low 'social desirability' of the items referring to status.

9.6 References

1. Steverink N, Lindenberg S, Ormel J. Towards understanding successful ageing: patterned change in resources and goals. *Ageing and Society*. 1998;18:441-467.
2. Steverink N, Lindenberg S, Slaets JPJ. How to understand and improve successful self-management of aging. *Manuscript submitted for publication*. 2003.
3. Lindenberg S. Continuities in the theory of social production functions. In: Ganzeboom H, Lindenberg S, eds. *Verklarende Sociologie [Explanatory Sociology]*. Amsterdam, The Netherlands: Thesis Publishers; 1996:169-184.
4. Ormel J, Lindenberg S, Steverink N, Verbrugge LM. Subjective well-being and social production functions. *Social Indicators Research*. 1999;46:61-90.
5. Carver CS, Scheier MF. Stress, coping, and self-regulatory processes. In: Pervin LA, John OP, eds. *Handbook of Personality: Theory and Research*. New York, NY: The Guilford Press; 1999:553-575.
6. Krol B, van Sonderen E, Sanderman R, et al. The relationship between personality, social support and psychological wellbeing in patients with rheumatoid arthritis. In: Krol B. *Quality of Life in Rheumatoid Arthritis Patients: the Relation Between Personality, Social Support and Depression [dissertation]*. Groningen, The Netherlands: University of Groningen; 1996: 135-148.
7. Boland A, Cappeliez P. Optimism and neuroticism as predictors of coping and adaptation in older women. *Personality and Individual Differences*. 1997;22:909-919.
8. Hills P, Argyle M. Emotional stability as a major dimension of happiness. *Personality and Individual Differences*. 2001;31:1357-1364.
9. Bolger N, Schilling EA. Personality and the problems of everyday life: the role of neuroticism in exposure and reactivity to daily stressors. *J Pers*. 1991;59:355-386.
10. Oldehinkel AJ, Bouhuys AL, Brilman EI, Ormel J. Functional disability and neuroticism as predictors of late-life depression. *Am J Geriatr Psychiatry*. 2001;9:241-248.
11. Evers AWM, Kraaimaat FW, Geenen R, Jacobs JWG, Bijlsma JWJ. Long-term predictors of anxiety and depressed mood in early rheumatoid arthritis: a 3 and 5 year follow-up. *J Rheumatol*. 2002;29:2327-2336.
12. Holman HR, Lorig KR. Overcoming barriers to successful aging. Self-management of osteoarthritis. *West J Med*. 1997;167:265-268.
13. Schulz R, Williamson GM. Psychosocial and behavioral dimensions of physical frailty. *J Gerontol*. 1993;48(Special Issue):39-43.
14. Penninx BWJH, Beekman ATF, Ormel J, et al. Psychological status among elderly people with chronic diseases: does type of disease play a part? *J Psychosom Res*. 1996;40:521-534.
15. Dyeson TB. A structural equation model of the relationship between dependency, burden self-image, and depression among chronically-ill elders. *Dissertation-Abstracts-International-Section-A: Humanities and Social Sciences*. 1998;58(8-A):3307.
16. Parmelee PA, Lawton MP, Katz IR. The structure of depression among elderly institution residents: affective and somatic correlates of physical frailty. *J Gerontol A Biol Sci Med Sci*. 1998;53:M155-M162.
17. Smith J, Borchelt M, Maier H, Jopp D. Health and well-being in the young old and oldest old. *Journal of Social Issues*. 2002;58:715-732.
18. Myers DG, Diener E. Who is happy? *Psychol Sci*. 1995;6:10-19.

19. Reich JW, Zautra AJ, Potter PT. Cognitive structure and the independence of positive and negative affect. *Journal of Social and Clinical Psychology*. 2001;20:99-115.
20. Isaacowitz DM, Smith J. Positive and negative affect in very old age. *J Gerontol B Psychol Sci Soc Sci*. 58:P143-P152.
21. Smits CHM, Deeg DJ, Bosscher RJ. Well-being and control in older persons: the prediction of well-being from control measures. *Int J Aging Hum Dev*. 1995;40:237-251.
22. Dulin PL, Hill RD. Relationships between altruistic activity and positive and negative affect among low-income older adult service providers. *Aging Ment Health*. 2003;7:294-299.
23. Ben-Zur H. Coping, affect and aging: the roles of mastery and self-esteem. *Personality and Individual Differences*. 2002;32:357-372.
24. Patrick JH, Cottrell LE, Barnes KA. Gender, emotional support, and well-being among the rural elderly. *Sex-Roles*. 2001;45:15-29.
25. Frieswijk N, Steverink N, Buunk AP, Slaets JPJ. The effectiveness of a bibliotherapy in increasing the self-management ability of slightly to moderately frail elderly persons. *Manuscript submitted for publication*. 2003.
26. Snijders T, Bosker R. Multivariate multilevel models. In: Snijders T, Bosker R, eds. *Multilevel Analysis: an Introduction to Basic and Advanced Multilevel Modeling*. London, England: Sage Publications Ltd.; 1999:200-206.
27. Hox JJ. Multilevel analyses of grouped and longitudinal data. In: Little TD, Schnabel KU, Baumert J, eds. *Modeling Longitudinal and Multilevel Data*. Mahwah, NJ: Erlbaum; 2000:15-32.
28. Nieboer AP, Lindenberg S, Boomsma A, Van Bruggen AC. *Dimensions of well-being and their measurement: the SPF-IL Scale*. Groningen, The Netherlands: Interuniversity Center of Social Sciences and Methodology, 2002.
29. Thompson SC, Spacapan S. Perceptions of control in vulnerable populations. *Journal of Social Issues*. 1991;47:1-21.
30. Rodin J. Control by any other name: definitions, concepts, and processes. In: Rodin J, Schooler C, Schaie KW, eds. *Self-Directedness: Cause and Effects Throughout the Life Course*. Hillsdale, NJ: Erlbaum; 1990:1-17.
31. Brandtstädter J, Renner G. Tenacious goal pursuit and flexible goal adjustment: explication and age-related analysis of assimilative and accommodative strategies of coping. *Psychol Aging*. 1990;5:58-67.
32. Taylor SE, Helgeson VS, Reed GM, Skokan LA. Self-generated feelings of control and adjustment to physical illness. *Journal of Social Issues*. 1991;47:91-109.
33. Folkman S. Personal control and stress and coping processes: a theoretical analysis. *J Pers Soc Psychol*. 1984;46:839-852.
34. Zuckerman M, Knee CR, Kieffer SC, Rawsthorne L, Bruce LM. Beliefs in realistic and unrealistic control: assessment and implications. *J Pers*. 1996;64:435-464.
35. BenDebba M, Torgerson WS, Long DM. Personality traits, pain duration and severity, functional impairment, and psychological distress in patients with persistent low back pain. *Pain*. 1997;72:115-125.
36. Cramer D. Psychological distress and neuroticism: a two-wave panel study. *Br J Med Psychol*. 1994;67:333-342.
37. Ranchor AV, Sanderman R, Steptoe A, Wardle J, Miedema I, Ormel J. Pre-morbid predictors of psychological adjustment to cancer. *Qual Life Res*. 2002;11:101-113.

38. Felsten G. Minor stressors and depressed mood: reactivity is more strongly correlated than total stress. *Stress and Health*. 2002;18:75-81.
39. Duncan-Jones P, Fergusson DM, Ormel J, Horwood LJ. A model of stability and change in minor psychiatric symptoms: results from three longitudinal studies. *Psychol Med*. 1990;Mono Suppl 18:iii-28.
40. Layton C. Note on test-retest characteristics of the general health questionnaire. *Percept Mot Skills*. 1986;62:221-222.
41. Ormel J, Wohlfarth T. How neuroticism, long-term difficulties, and life situation change influence psychological distress: a longitudinal model. *J Pers Soc Psychol*. 1991;60:744-755.
42. Jackson KM, Sher KJ. Alcohol use disorder and psychological distress: a prospective state-trait analysis. *J Abnorm Psychol*. 2003;112:599-613.
43. Steyer R, Schmitt M, Eid M. Latent state-trait theory and research in personality and individual differences. *European Journal of Personality*. 1999;13:389-408.
44. Greenland S. Meta-analysis. In: Rothman KJ, Greenland S, eds. *Modern Epidemiology*. 2nd ed. Philadelphia, PA: Lippincott-Raven Publishers; 1998:643-673.
45. Rosnow RL, Rosenthal R. Effect sizes for experimenting psychologists. *Can J Exp Psychol*. 2003;57:221-237.
46. Middel B, Stewart R, Bouma J, Sonderen E van, Heuvel W van de. How to validate clinically important change in health-related functional status. Is the magnitude of the effect size consistently related to magnitude of change as indicated by a global question rating? *J Eval Clin Pract*. 2001;7:399-410.
47. Wyrwich KW, Tierney WM, Wolinsky FD. Further evidence supporting an SEM-based criterion for identifying meaningful intra-individual changes in health-related quality of life. *J Clin Epidemiol*. 1999;52:861-873.
48. Wyrwich KW, Tierney WM, Wolinsky FD. Using the standard error of measurement to identify important changes on the Asthma Quality of Life Questionnaire. *Qual Life Res*. 2002;11:1-7.
49. Wyrwich KW, Nienaber NA, Tierney WM, Wolinsky FD. Linking clinical relevance and statistical significance in evaluating intra-individual changes in health-related quality of life. *Med Care*. 1999;37:469-478.
50. Solomon DH, Warsi A, Brown-Stevenson T, et al. Does self-management education benefit all populations with arthritis? A randomized controlled trial in a primary care physician network. *J Rheumatol* 2002;29:362-368.
51. Keefe FJ, Lefebvre JC, Kerns RD, et al. Understanding the adoption of arthritis self-management: stages of change profiles among arthritis patients. *Pain*. 2000;87:303-313.
52. Culos-Reed SN, Rejeski WJ, McAuley E, Ockene JK, Roter DL. Predictors of adherence to behavior change interventions in the elderly. *Control Clin Trials*. 2000;21:200S-205S.
53. Dijkstra A, Vlaeyen JWS, Rijnen H, Nielson W. Readiness to adopt the self-management approach to cope with chronic pain in fibromyalgic patients. *Pain*. 2001;90:37-45.
54. Zimmerman GL, Olsen CG, Bosworth MF. A 'stages of change' approach to helping patients change behavior. *Am Fam Physician*. 2000;61:1409-1416.
55. Litt MD, Kleppinger A, Judge JO. Initiation and maintenance of exercise behavior in older women: predictors from the social learning model. *J Behav Med*. 2002;25:83-97.
56. Broer J. *Regionale sterftepatronen in Groningen 1988-1993*. Groningen, The Netherlands: GGD Groningen Stad en Ommeland; 1996.

57. Niessen WJM. *Ingeslapen? Een onderzoek naar het gebruik van benzodiazepines in Oost-Groningen*. Winschoten, The Netherlands: GGD Oost-Groningen; 1996.
58. Chao D, Foy CG, Farmer D. Exercise adherence among older adults: challenges and strategies. *Control Clin Trials*. 2000;21:212S-217S.
59. Sumartojo E. When tuberculosis treatment fails. A social behavioral account of patient adherence. *Am Rev Respir Dis*. 1993;147:1311-1320.
60. Lorig KR, Holman HR. Self-management education: history, definition, outcomes, and mechanisms. *Ann Behav Med*. 2003;26:1-7.

