Facing the challenge of rheumatoid arthritis
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Abstract
The aim of this exploratory study was to test the applicability of a model derived from the Theory of Planned Behavior on self-management. In this model social support from the partner, attitude and self-efficacy are determinants of intention, and intention and self-efficacy are determinants of self-management. We tested the model on rheumatoid arthritis patients who have a partner, using regression analyses and structural equation models. Partner support and attitude partly explained the variance in intention. Intention in turn partly explained the variance in self-management. Self-efficacy showed a tendency to positively affect intention and self-management. The present study provided moderate support for the use of the constructs and ideas derived from the Theory of Planned Behavior – attitude, social support, self-efficacy, and intention - in predicting and explaining self-management.
Introduction

Rheumatoid Arthritis is an auto-immune disease characterized by chronic inflammation of the joints, which results in most cases in damage and destruction of the joints. Rheumatoid arthritis has an unpredictable course: patients experience times of ‘flare-ups’ during which they suffer, alternated with times of remissions during which they seem to recover. Patients suffer from joint pain, stiffness and lack of energy. However, patients not only experience physical consequences but also secondary consequences of the disease, like depression, reduction of social activities, job loss and financial decline. At times these secondary consequences may react back on the disease process and may cause further deterioration. To control and counteract these kinds of vicious cycles patients will have to manage their disease and its consequences on a daily basis. The capability to cope with a disease and its consequences is often referred to as self-management.

Over the past 15 years, educational programs for people with rheumatoid arthritis have increasingly focused their attention on training of self-management strategies (1-3). The overall goals of such programs are to enhance patients’ knowledge about arthritis, improve their health behaviors and improve health outcomes. Along with these newly developed self-management programs research attention focused on identifying the determinants of self-management behavior. Several theoretical frameworks have been applied to understand self-management, such as the Social Cognitive Theory of Bandura (1;4;5) and the Stages of Change model (6). One of the leading theoretical models that explains influences on behavior is the Theory of Planned Behavior (7;8). This theory, as far as we know, has not yet been applied to self-management behavior of rheumatoid arthritis patients.

Following the Theory of Planned Behavior, we intend to contribute to the existing literature on determinants of self-management behavior. According to the Theory of Planned Behavior, the more one intends to engage in a behavior, the more likely the behavior is to occur. Thus the primary determinant of behavior is intention.

Ajzen (9) proposed three determinants of intention: attitude, subjective norm and perceived behavioral control. Attitude is conceptualized as the positive or negative evaluation of performing a specific behavior. In the meta-analysis of Hausenblas et al. (10) on the application of the Theory of Planned Behavior on exercise behavior a correlation between attitude and intention of .52 was found, whereas in the meta-analysis of Armitage and Conner (11) on the efficacy of the Theory of Planned Behavior on behavior in a broader sense an average correlation of .19 was found.
Subjective norm is the individual’s perception of social pressure to perform a specific behavior or not. In our theoretical framework we follow the lines of Courneya et al. (12), who argued that social support may be a more appropriate social influence than the concept ‘subjective norm’. To perform incomplete volitional behavior, social support would be helpful beyond knowing that others approve of the behavior. In other studies social support was also found to be important in performing health behaviors (13-15). For example, Glasgow et al. (15) reported that a low level of social support was one of the strongest barriers of effective diabetes self-management. In addition, social support is also conceived as a resource to enhance self-efficacy. Therefore, we will give social support a more prominent place in our model than the concept ‘subjective norm’. Patients may have different sources of social support at their disposal. Most commonly the partner is the one who is in closest contact with the patient and who offers emotional or instrumental support and companionship on a daily basis.

The distinction between the Theory of Planned Behavior and its predecessor, the Theory of Reasoned Action (8), is the addition of a third element, called Perceived Behavioral Control. Individuals who believe that they do not possess the internal and/or external resources to perform a specific behavior are unlikely to develop a strong intention to engage in it, even if they hold favorable attitudes towards it and expect that significant others would approve of performing this behavior. Besides a causal relation from perceived behavioral control to intention, Ajzen (9) proposed a direct relationship from Perceived Behavioral Control to behavior. In case a particular behavior is not completely under volitional control, individuals are more willing to exert additional effort to perform a particular behavior if they have high feelings of control. Ajzen (9) argued that perceived behavioral control is conceptually similar to self-efficacy. In our model we therefore chose self-efficacy as an indicator of perceived behavioral control. Self-efficacy can be defined as one’s belief that one can perform a specific behavior (4).

The above mentioned considerations led us to develop a model in which partner support, attitude and self-efficacy are determinants of intention, and intention and self-efficacy are determinants of self-management behavior. The aim of this study was to test the applicability of our theoretical model on self-management behavior. We tested our model on a sample of rheumatoid arthritis patients living with a partner.
Methods

Subjects

The present study is rooted in the framework of the international and longitudinal, multi-center, multi-disciplinary project ‘European Research on Incapacitating Diseases and Social Support’ (16). Four waves of data collection were carried out between 1990 en 1995 among five recent onset cohorts of rheumatoid arthritis patients recruited from 5 hospitals in the Netherlands. The present study is an extension of the EURIDISS project in the Netherlands and includes a fifth wave of data collection among the remaining same patients, which was carried out in the summer and autumn of 2003.

At the start of the study a number of inclusion and exclusion criteria have been formulated (16;17). These inclusion criteria were: aged 20 to 70, diagnosis of rheumatoid arthritis according to the 1987 revised American College of Rheumatology criteria (18), interval between inclusion in the study and time of diagnosis less than or equal to four years and willingness to sign a form of informed consent. The exclusion criteria were: existence of another physical disorder prior to the onset of rheumatoid arthritis, association with any other severe disease which might affect the autonomy of the patient, malignant rheumatoid arthritis with systemic vasculitis, very disabling rheumatoid arthritis, and any identified reason for being unavailable for follow-up.

According to these criteria patients were included in the study. The first wave of data collection (T1) started with 292 respondents. Eight years after the fourth wave of data collection (T4), the remaining 268 patients were sent a self-report questionnaire. In the fifth wave (eight years later) 50 patients had died, and 16 had moved away and 73 patients refused to participate. Consequently, 129 patients participated in the fifth wave of data collection (T5). The self-report questionnaire included a number of instruments that were also used in the previous waves of data collection. Additional instruments, assessing partner support, attitude, self-efficacy, intention and self-management, were only included in the questionnaire at T5. This part of the study is therefore cross-sectional.

For this paper we use a sub-sample of the T5-sample consisting of the 87 patients who were married or living with a partner. The sub-sample consisted of 26 (30%) men and 61 (70%) women. The mean educational level (according to the International Standard Classification of Education (19)) was 3.3 (sd = 1.0) indicating 9 to 10 years of formal education, and mean age at T5 was 61 years old (sd = 11.3).
Measures
In order to investigate the psychometric properties of our measures we performed Mokken Scale Analysis for Polytomous items ((20-22). Mokken Scale Analysis is a nonparametric probabilistic version of the deterministic Guttman scaling analysis. The advantage of Mokken Scale Analysis over factor and reliability analysis is that it takes the frequency distribution of the items into account. The advantage of the nonparametric over the parametric approach is its versatility in use with small numbers of items. Nonparametric tests are used to test the assumptions of monotone homogeneity and invariant item ordering. Scale values are the sum score of the responses to the items in the scale. Respondents who answer negatively to item i with a certain percentage of endorsement will have a greater probability to answer negatively to item j (which has a lower percentage of endorsement) as well. The extent to which this assumption is violated is tested with coefficients of homogeneity for each pair of items, each individual item, and the scale as a whole. The scalability coefficient H refers to the strength of the scale as a whole: .30 < H ≤ .40 is a weak scale, .40 < H ≤ .50 is a moderately strong scale and H ≥ .50 is a strong cumulative scale. The coefficient q refers to the reliability of the scale and is comparable to Cronbach’s alpha. The characteristics and psychometric properties of our measures are summarized in Table 1.1

Self-management. Self-management activities were assessed by adapted versions of the scales ‘physical activities’, ‘cognitive symptom management’ and ‘communication with physician’ developed by Lorig et al. (23) and translated in Dutch by Taal et al. (24;25). Patients were asked how often they performed physical activities such as stretching exercises, walking and biking on a 5- point scale running from (1) not at all to (5) more than 3 hrs per week. Five of the six ‘physical activities’ items formed a weak scale (H = .33 and q = .68). The item about swimming was excluded, which could be explained by the fact that facilities like swimming pools are not available for every patient. The higher the score on the physical self-management scale, the more a respondent participated in physical activities.

‘Cognitive self-management’ consisted of four items, for example ‘When you are feeling pain, how often do you try to enlighten your pain by thinking about something else?’ and ‘When you’re feeling depressed due to your disease, how often do you try to continue most of your normal daily activities as much as possible?’. The items were scored on a 5-point scale ranging from (1) never to (5) always. The item about taking the disease into account in one’s nourishment

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1 Further details on all measurement instruments and Mokken Scale Analysis are available through direct communication with the authors.
was excluded since the items about nourishment were dropped throughout all the scales (see below). The three other cognitive self-management items formed a rather weak scale (H = .28 and ρ = .50). A higher score on this scale indicates higher cognitive self-management.

Patients were asked about the communication with their physician: ‘When you visit your doctor or other health professional for your disease, how often do you ask questions about the things you want to know?’ and ‘When your doctor prescribes you a medicine, how often do you ask for the purpose and the side effects of the medicine?’. The items were scored on a 5-point scale ranging from (1) never to (5) always and formed a cumulative scale with H = .54 and ρ = .69. A higher score on this scale indicates higher self-management in communication with the doctor.

Two considerations should be taken into account. First, the content of the answer categories of the physical activities items are different from those of the cognitive self-management and communication items. Secondly, combining the cognitive self-management and communication scales showed several scalability violations, which may indicate that the scales measure two different concepts. Patients with high cognitive self-management may nevertheless score low on communicating with their doctor, against the assumption of the scaling method. The Mokken Scale Analysis showed that only a total self-management scale could be formed from the physical activities and communication subscales. In this paper we will perform our analyses with these three separate forms of self-management as well as with the total self-management scale (which only consisted of the physical activities and communication items).

*Intention.* Intention to perform self-management behavior was assessed by 7 items and scored on a continuous scale from 0 to 100. An example of an item: ‘On a scale from 0% to 100% how likely is it that you will try to prevent depressive feelings by maintain doing your daily activities?’. This type of assessment of intention is commonly used in Theory of Planned Behavior research (12;26;27). Since the items are scored on a continuous 100-point scale and Mokken Scale Analysis can only handle 10 categories, the items had to be recoded in order to perform Mokken Scale analysis. The items were recoded in 10 categories with uniform distribution. Mokken analysis showed that 6 of the 7 items formed a moderately strong scale (H-coefficient = .42 and ρ = .80). The item about nourishment was excluded from the scale. A higher score indicates a higher intention to perform self-management behavior.
Table 1. Potential range, actual range, means, sd and reliability of all measures.

<table>
<thead>
<tr>
<th></th>
<th>potential range</th>
<th>actual range</th>
<th>mean</th>
<th>sd</th>
<th>reliability</th>
<th>H-coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partner Support</td>
<td>4-16</td>
<td>4-14</td>
<td>8.2</td>
<td>2.6</td>
<td>.70</td>
<td>.43</td>
</tr>
<tr>
<td>Attitude</td>
<td>6-30</td>
<td>7-30</td>
<td>24.2</td>
<td>4.3</td>
<td>.76</td>
<td>.38</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>7-35</td>
<td>8-35</td>
<td>27.9</td>
<td>5.4</td>
<td>.80</td>
<td>.40</td>
</tr>
<tr>
<td>Intention</td>
<td>0-600</td>
<td>83-600</td>
<td>397.7</td>
<td>114.7</td>
<td>.80</td>
<td>.42</td>
</tr>
<tr>
<td>Physical activities</td>
<td>5-25</td>
<td>5-21</td>
<td>9.3</td>
<td>3.6</td>
<td>.68</td>
<td>.33</td>
</tr>
<tr>
<td>Cognitive self-management</td>
<td>3-15</td>
<td>4-15</td>
<td>11.7</td>
<td>2.0</td>
<td>.50</td>
<td>.28</td>
</tr>
<tr>
<td>Communication</td>
<td>2-10</td>
<td>2-10</td>
<td>7.8</td>
<td>2.1</td>
<td>.69</td>
<td>.54</td>
</tr>
<tr>
<td>Total self-management</td>
<td>7-35</td>
<td>7-31</td>
<td>17.2</td>
<td>4.5</td>
<td>.68</td>
<td>.28</td>
</tr>
</tbody>
</table>

**Perceived Partner Support for Self-management.** Patients were asked to answer 7 items about the amount of support their partner provided with regard to self-management. The items are scored on a 4-point scale ranging from (1) none at all to (5) very much. The items reflect the overall amount of support the respondents reported to receive from their partner, for example ‘Does it ever happen to you that your partner stimulates you in seeking distraction if you are in pain because of your disease?’. Four of the seven items formed a Mokken scale: $H = .43$ and $q = .70$. Again the item about nourishment was one of the items excluded from the scale. The higher the score on this measure, the more support from the partner was reported.

**Attitude.** Attitude was measured with 7 items with regard to self-management which patients had to rate on a 5-point scale ranging from (1) totally disagree to (5) totally agree. An item example is: ‘To prevent depressive feelings it is important to maintain your daily activities as much as possible’. Mokken Scale analysis showed that 6 of the 7 items formed a weak cumulative scale ($H = .38$ and $q = .76$). Again the item about nourishment was excluded from the scale. A higher score on the attitude measure indicates a more positive attitude towards self-management behavior.

**Self-Efficacy Scale.** Self-efficacy was assessed by 9 items on a five-point scale measuring self-efficacy to manage the symptoms of rheumatoid arthritis. These items are adapted versions of the older scales developed by Lorig et al. (23;28). An item example is: ‘I am confident that I can solve problems due to my disease myself (or perhaps by asking help from others)’. Mokken Scale
analysis showed that two items had to be excluded from the analysis. As with the other instruments the item about nourishment was excluded from the scale. The 7 items left formed a Mokken scale with $H = .40$ and $q = .80$. The higher the score on the self-efficacy scale the more self-efficacy a patient reported.

Analysis
Descriptive statistics and zero-order correlations were calculated to assess the strength of the relationships between all independent and dependent variables. The theoretical model was investigated using hierarchical regression analyses and structural equation modeling. We first performed hierarchical regression analyses. The order of variables entered into the model was determined by our theoretical model. First, partner support was assumed to have a positive effect on intention, attitude and self-efficacy and was therefore entered first. Secondly, attitude and self-efficacy were assumed to affect intention and to be related to each other. Thirdly, intention was assumed to affect self-management. In step 1 of the analysis with intention as dependent variable partner support was entered, in step 2 attitude and in step 3 self-efficacy. In step 1 of the analysis with the three forms of self-management as dependent variables a fourth step with intention was added.

We elaborated our analyses by testing our model with structural equation modeling using LISREL 8.2 (29). A number of indices of model fit will be shown in the results section. The lower the $\chi^2$ goodness-of-fit value and the higher the $p$-value the better the model fits the data. A value below .05 on the Root Means Square Error of Approximation (RMSEA) indicates a good fit. Values on Expected Cross Validation Index (ECVI) that are lower than the ECVI value for the saturated model (in which the number of parameters is equal to the number of nonredundant elements in the covariance matrix) indicate a good fit.

Results
Apart from the psychometric properties of our instruments, discussed before, also the mean values and standard deviations of partner support, attitude, self-efficacy, intention and all three forms of self-management are shown in Table 1. Table 2 presents zero-order correlations between all variables of our model.
Table 2. Zero-order correlations for model variables.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Partner Support</td>
<td>.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Attitude</td>
<td>.06</td>
<td>.58**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Self-efficacy</td>
<td>.25*</td>
<td>.41**</td>
<td>.38**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Intention</td>
<td>.08</td>
<td>.25*</td>
<td>.31**</td>
<td>.34**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Physical activities</td>
<td>.05</td>
<td>.16</td>
<td>-.05</td>
<td>.12</td>
<td>.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Cognitive self-management</td>
<td>.19*</td>
<td>.29*</td>
<td>.36**</td>
<td>.47**</td>
<td>.20*</td>
<td>.09</td>
<td></td>
</tr>
<tr>
<td>7. Communication</td>
<td>.15</td>
<td>.33**</td>
<td>.42**</td>
<td>.49**</td>
<td>.89**</td>
<td>.05</td>
<td>.62**</td>
</tr>
<tr>
<td>8. Total self-management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. * p < .05; ** p < .01 (1-tailed)

As appears from Table 2, most model variables, discussed in the previous section, correlate significantly with each other. Cognitive self-management was not significantly related to any of the variables. Also between partner support on the one hand and attitude, self-efficacy, physical activities, cognitive self-management and total self-management on the other hand no significant correlations were found.

The theoretical model was tested using hierarchical regression analyses. Since cognitive self-management did not correlate significantly with one or more of the model variables, no regression analysis was done with cognitive self-management as dependent variable.

**Intention.** The regression with intention as dependent variable (see Table 3) showed that partner support accounted for 6% of the variance in step 1, attitude accounted for 15% of the variance in step 2 and self-efficacy explained an additional 3% of the variance in intention in step 3. Partner support and attitude had significant standardized regression coefficients of respectively .21 and .27 in the final model. Self-efficacy, however, was found to be a borderline significant predictor of intention (β = .21 and p = .08). Total explained variance of intention was 24%.

**Physical self-management.** The regression with physical activities as dependent variable (Table 4) showed that in line with the non-significant correlation, partner support was not a significant predictor of physical self-management. In step 2 attitude was a significant predictor, but became
Table 3. Hierarchical regression analysis of Theory of Planned Behavior variables on intention.

<table>
<thead>
<tr>
<th></th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>β</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Partner Support</td>
<td>.25*</td>
<td>.22*</td>
<td>.21*</td>
</tr>
<tr>
<td>2. Attitude</td>
<td>.39**</td>
<td></td>
<td>.27*</td>
</tr>
<tr>
<td>3. Self-efficacy</td>
<td></td>
<td></td>
<td>.21</td>
</tr>
</tbody>
</table>

Δ R² | .15 | .03 |
R²  | .06 | .21 | .24 |
F   | 5.43* | 11.46** | 8.89** |

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

non-significant following the introduction of self-efficacy in step 3. Self-efficacy was a borderline significant (p = .06) predictor in step 3. In the final model intention was the only significant predictor with a standardized regression coefficient of .26. Total explained variance in physical self-management was 16%.

*Communication.* The regression with communication as dependent variable (Table 4) showed that partner support was a borderline significant predictor in step 1. In step 2 attitude was a significant predictor, but became non-significant in step 3 following the introduction of self-efficacy. Self-efficacy had a significant regression coefficient in step 3. In the final model self-efficacy was borderline significant (β = .22 and p = .07) and intention was significant (β = .37). Total explained variance in communication was 27%.

*Total self-management.* The regression with total self-management as dependent variable (Table 4) showed that in line with the non-significant correlation, partner support was not a significant predictor. In step 2 attitude was a significant predictor, but not anymore in step 3 following the introduction of self-efficacy. In step 3 self-efficacy was a significant predictor. In the final model self-efficacy and intention were significant predictors (respectively β = .26 and β = .37). Total explained variance in total self-management was 31%.
Table 4. Final models of the hierarchical regression analyses of Theory of Planned Behavior variables on physical activities, communication and total self-management.

<table>
<thead>
<tr>
<th></th>
<th>Physical activities</th>
<th>Communication</th>
<th>Total self-management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta$</td>
<td>$\beta$</td>
<td>$\beta$</td>
</tr>
<tr>
<td></td>
<td>Step 1</td>
<td>Step 2</td>
<td>Step 3</td>
</tr>
<tr>
<td>1. Partner Support</td>
<td>.08</td>
<td>.06</td>
<td>.06</td>
</tr>
<tr>
<td>2. Attitude</td>
<td>.24*</td>
<td>.10</td>
<td>.03</td>
</tr>
<tr>
<td>3. Self-efficacy</td>
<td>.25</td>
<td>.20</td>
<td></td>
</tr>
<tr>
<td>4. Intention</td>
<td>.26*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta R^2$</td>
<td>.06</td>
<td>.04</td>
<td>.05</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.01</td>
<td>.07</td>
<td>.11</td>
</tr>
<tr>
<td>F</td>
<td>.54</td>
<td>2.93</td>
<td>3.28*</td>
</tr>
</tbody>
</table>

Note. * $p < .05$ **$p < .01$. 

Chapter 6
Structural equation model

The results of the structural equation modeling were similar to the regression results. To give a brief overview only the results of the analysis with total self-management as dependent variable will be discussed (see Figure 1). The model had a $\chi^2$ of .25, the p-value was .88, RMSEA was .00 and ECVI was lower than the ECVI value for the saturated model (.34 < .36), these values all indicate a good fit. Partner support and attitude had significant effects on intention with path coefficients of respectively .21 and .27. The path coefficient of self-efficacy to intention was .21 but not significant. Furthermore, intention had a significant effect on self-management with a path coefficient of .39 and self-efficacy had a significant effect on self-management with a path coefficient of .27.

![Figure 1. Structural equation model.](image)

Discussion

In our study we tested the applicability of the Theory of Planned Behavior on three types of self-management and on total self-management. Our exploratory results provided support for the proposed relationships in our theoretical model. Intention partly determined self-management behavior. Apparently, intention to perform self-management is likely to result in actual performance of self-management behavior. In our study the correlations between intention and physical self-management and communication are comparable to correlations found in several meta-analyses (11;30;31).

Following the Theory of Planned behavior we expected self-efficacy to be an important predictor of intention and of self-management. The regression coefficients of self-efficacy were lower than found in other studies (11) and not significant. The non-significance of the
coefficients can partly be due to the small sample size of our study and is partly due to a mediating effect of attitude. Self-efficacy correlated highly with attitude. Several meta-analyses (11;32;33) provided evidence for the importance of perceived behavioral control or self-efficacy in predicting intention and behavior. However, the strength of these effects is assumed to be dependent on the type of behavior under consideration and type of situation (9).

Several studies underline the importance of self-efficacy in the process of managing the disease and its consequences (28;34-37). The patients in our sample had rheumatoid arthritis for on average 14 years, over the years they may have learned their psychosocial and physical boundaries in performing self-management activities. Their perception of control over behavior, i.e. self-efficacy, may have become more realistic and reached an equal level as the actual control patients had. Since actual control is not so amenable, having a positive attitude and thinking that self-management still has benefits is more important for these older patient than experiencing high or low levels of self-efficacy. Whether or not self-management still has benefits for patients of high age and long disease duration may be largely determined by the clinical status and progression of the disease, which is not under complete control of the patient him/herself. Furthermore, age, individual development and societal factors may foster this shift from attaching weight to internal control beliefs as self-efficacy to more external control factors.

In accordance with the assumptions and findings of Courneya et al. (12) our findings confirm our expectation that patients are influenced by perceived support for self-management of their partner when forming self-management intentions independent of attitude and self-efficacy. The mechanism behind this might be twofold, because receiving support from one’s partner also gives an indication of his or her subjective norm.

A recent development in self-management programs is the participation of partners of patients. Although our results showed that support of the partner indeed led to higher intentions to perform self-management behavior, the effects of participation of significant others, including the partner are not consistent. A few studies (38;39) showed that participation of significant others in a program did not add beneficial effects for the patients. A recent study of Riemsma et al. (40) even showed that participation of a significant other can have negative effects on the patient. Social support experienced as social control does not enhance the outcomes of the patients. On the contrary, too much social support or ‘preferential treatment’ (41) may lead to an increase in dependency and inactivity of the patient, resulting in the long-run in worse health outcomes. Riemsma et al. (40) suggested that this negative effect was due to the fact that
significant others were not trained in skills to assist and reinforce patients in their coping behavior. We agree that participation of partners or significant others in self-management programs may only be effective if partners are taught how to assist and offer support to patients in an appropriate way. Appropriate support from the partner may stimulate forming positive intentions and may ultimately result in improvements in self-management.

Study limitations
Several drawbacks of the study should be taken into consideration. First, the cross-sectional design has consequences for drawing conclusions about causality of the effects. Secondly, behavior was not measured by observation but by self-report of the patient and no time lag between the measurement of intention and behavior was taken. Thirdly, our results are not generalizable beyond rheumatoid arthritis patients. Other populations need to be examined to determine if the results also apply to other populations. In addition, our sample was fairly old in comparison with samples used in other studies. In younger samples the predictive power of the determinants of intention and self-management may be different. Fourthly, support was only assessed from the partner, which limits the opportunity for drawing generalizations to patients living without a partner. It is not unlikely that patients are most influenced by the cumulative effect of different social resources. Including different social resources may provide additional knowledge on how to stimulate patients to form a more positive intention to perform self-management. A last limitation is that our sample size was relatively small. Our sample size at T5 was fairly reduced compared to that of the first four measurement points. This has had consequences for the estimation of the parameters and may jeopardize the generalizability.

Future research
Firstly, in order to test theoretical models and evaluate intervention programs, future studies should focus on developing more valid and reliable measurement instruments for self-management. Although we used items from existing scales, the items formed weak to moderate scales and the three subscales did not form a unidimensional measurement instrument. Secondly, potential barriers and moderator variables that are related to self-management levels, for instance the effect of anxiety, depression, self-rated health and personality variables on self-management behavior, should be examined and determined. Finally, more knowledge on the temporal aspects of intentions and self-management is needed. Especially for interventions it would be interesting
to know whether intentions are stable over time, or unstable due to changes in attitude, social support or self-efficacy.

Conclusion
The present exploratory study has provided moderate support for the use of the constructs and ideas derived from the Theory of Planned Behavior – attitude, social support, self-efficacy, and intention - in predicting and explaining self-management behavior. The results indicated that partner support along with attitude partly explained the variance in intention. Intention in turn partly explained the variance in physical self-management and communication. Insights in the Theory of Planned Behavior could help rehabilitation professionals to understand the key elements or barriers associated with initiating and maintaining self-management behavior and to identify effective targets of interventions. Changes in self-management behavior as a result of interventions may then be better evaluated and understood with these insights and contribute to a better biopsychosocial functioning of the patient.
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