

**The relation between goal adjustment, goal disturbance, and mental well-being  
among persons with Multiple Sclerosis**

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## **Abstract**

*Objective.* This study investigated the role of goal adjustment, i.e., disengaging from blocked goals and reengaging into alternative goals, in mental well-being and goal disturbance in persons with Multiple Sclerosis (MS).

*Design.* A cross-sectional design was used with self-report data from questionnaires and Personal Project Analysis (PPA).

*Main outcome measures.* Dependent variables were mental well-being, indicated by depression/anxiety (HADS; Hospital Anxiety and Depression Scale) and mental functioning (SF-36; Short Form Health Survey), and goal disturbance, indicated by goal manageability and goal interference (PPA). Independent variables were patient-reported physical impairment (SF-36) and goal disengagement and reengagement (GAS; Goal Adjustment Scale).

*Results.* Higher goal reengagement was associated with better mental well-being, but unrelated to goal disturbance. Goal disengagement only showed a negative association with anxiety. High disengagement was associated with lower goal interference but only for those also scoring high on reengagement. Goal adjustment did not buffer the effects of physical impairment on mental well-being and goal disturbance. Contrary to expectations, higher goal reengagement increased the association between physical impairment and goal interference.

*Conclusion.* Although goal reengagement is associated with better mental well-being in persons with MS, it might also strengthen the perceived effect of physical impairment on goal interference.

## Introduction

Multiple sclerosis (MS) is one of the most common acquired neurological disease in young adults and is characterized by a range of aversive symptoms and physical impairment (Compston & Coles, 2008). Given its incurable and unpredictable character, MS is a huge burden on quality of life of patients (Benito-Leon, Morales, Rivera-Navarros, & Mitchell, 2003; Pakenham, 2006). Specifically, MS is typically associated with declines in well-being, as evidenced by high co-morbid depression and anxiety (Aikens, Fischer, Namey, & Rudick, 1997; Haussleiter, Brüne, & Juckel, 2009; Siegert & Abernathy, 2005). An essential determinant of people's sense of well-being is successful pursuit of personal goals (Carver & Scheier, 1990, 1998; Karoly, 1993). Goals can be understood as cognitive representations of desired states (outcomes, events, or processes) that drive human behaviour (Austin & Vancouver, 1996). MS is likely to interfere with progress toward personal goals (e.g., working for a promotion), and often additional health goals (e.g., adhering to a strict medication regime) are imposed which might interfere with other goals (Pakenham, 2007).

Nevertheless, some patients are more successful than others in adapting to MS, and it has been suggested that psychological factors might play a role in this (Dennison, Moss-Morris, & Chalder, 2009; Lester, Stepleman, & Hughes, 2007). One possible candidate is adaptive self-regulation, that is, being able to adjust goals in situations where these have become difficult to attain. It has been argued that goal adjustment might reduce the negative consequences resulting from goal disturbance (Brandstaedter & Renner, 1990; Rasmussen, Wrosch, Scheier, & Carver, 2006). Goal adjustment has been proposed to involve at least two processes: (1) *goal disengagement*, which refers to withdrawing effort and commitment from pursuing a

blocked goal, and (2) *goal reengagement*, which refers to identifying and starting commitment to alternative goals (Wrosch, Scheier, Miller, Schulz, & Carver, 2003). Goal disengagement may protect against the negative emotions resulting from repeated failure to make progress towards a goal. Goal reengagement, then, allows maintaining a sense of purpose in life. People, however, may strongly vary in their ability to adjust goals, and there is accumulating evidence that people who are better in goal disengagement and goal reengagement report better subjective well-being (Rasmussen et al., 2006). Wrosch et al. (2003) also proposed an interaction hypothesis and found indications that goal disengagement is particularly beneficial when it is accompanied with high levels of goal reengagement.

The evidence discussed above makes goal adjustment an interesting research area to help understanding adaptation to health threats (Van Damme, Crombez, Goubert, & Eccleston, 2009). The positive associations between goal adjustment and psychological well-being have been extensively documented in a diversity of health issues including cancer (Thompson, Stanton, & Bower, 2013; Zhu, Ranchor, van der Lee, Garssen, Sanderman, & Schroevers, 2015), arthritis (Arends, Bode, Taal, & Van de Laar, 2013), chronic pain (Schmitz, Saile, & Nilges, 1996), and myocardial infarction (Garnefski, Kraaij, Schroevers, Aarnink, van der Heijden, van Es, van Herpen, & Somsen, 2009). There is also evidence that goal adjustment buffers the negative impact of MS on well-being. More specific, in a study in patients with colorectal cancer, Janse, Sprangers, Ranchor, & Fleer (2016b) found that the effect of goal disturbance on well-being was less pronounced in those with higher goal disengagement. In contrast, the results of another study in breast cancer survivors (Castonguay, Wrosch, & Sabiston, 2017) indicated that rather goal reengagement protected against the adverse effects of negative affect. In line with the latter finding,

a prospective study in women with breast cancer (Mens & Scheier, 2016) showed that goal reengagement, but not goal disengagement, predicted changes in mental health over an 8-month period. Together, these studies indicate that goal adjustment is related with better well-being, and that higher goal disengagement and/or goal reengagement might protect mental well-being against the negative impact of goal disturbance.

There are not many studies that have investigated the role of goal adjustment in patient with MS. Recently, Van Damme, De Waegeneer, & Debruyne (2016) found that goal adjustment was associated with lower depression and anxiety, but no differentiation between goal disengagement and goal reengagement was made in that study. In another study (Neter, Litvak, & Miller, 2009), no evidence was found that stronger goal disengagement or reengagement were related to less distress in MS patients. However, these authors also examined the interaction between disengagement and reengagement (see Wrosch et al., 2003) and found that the most depressed patients were those with high scores on goal disengagement in combination with low scores on goal reengagement. In other words, goal disengagement may not be beneficial, and may even have negative effects, when it is not accompanied by reengagement in alternative goals. A limitation of the available studies in MS, though, is that goal adjustment was assessed using generic questionnaires with no reference to goal disturbance specifically related to illness. Goals disturbance may be experienced for various reasons, and general goal adjustment tendencies may not apply to the context of illness.

The present study aimed to tackle this limitation in two ways. First, to investigate goal disturbance specifically related to MS, we conducted a semi-structured interview based on the 'Personal Project Analysis' procedure (PPA, Little,

1983). Similar approaches have been adopted in studies on chronic pain (Ciere, Visser, Lebbink, Sanderman, & Fleer, 2016; Crombez, Lauwerier, Goubert, & Van Damme, 2016). Here, individuals with MS were required to generate three goals (one of which being an MS-related goal), and to rate these goals on various goal appraisal dimensions. We specifically focused on difficulty in goal progress, attainability of goals, and perceived control over goal pursuit, which all have been shown to load on a factor labelled *goal manageability* (Little & Coulombe, 2015). Furthermore, we examined *goal interference*, referring to the extent to which pursuit of an MS goal interferes with the pursuit of other goals. People typically experience lower well-being when they perceive their goals as less manageable (Little & Coulombe, 2015) and when encountering high goal interference (Riediger & Freund, 2004). Second, to investigate goal adjustment in MS patients, we used the Goal Disengagement and Goal Reengagement scales (Wrosch et al., 2003), but modified the instructions by asking to apply the items to goal disturbance specifically resulting from their illness.

We tested several hypotheses. First, based on goal adjustment theories (Brandstaedter & Renner, 1990; Rasmussen et al., 2006; Wrosch et al., 2003), we hypothesized both goal disengagement and goal reengagement to be negatively related to depression, anxiety and goal interference, and positively with mental functioning and goal manageability. Second, based on the findings of Neter et al. (2009), we tested the hypothesis that low goal disengagement combined with low goal reengagement would be associated with more depression, and also examined effects on anxiety, mental functioning, goal manageability, and goal interference. Third, in line with goal adjustment theory (Wrosch et al., 2003), and findings by Janse et al. (2016b) and Castonguay et al. (2017) in cancer patients, we hypothesized that

goal adjustment would buffer the adverse effects of physical impairment on mental well-being.

## **Materials and methods**

### *Sample and procedure*

Participants were recruited from a specialized care center in a Neurology Unit of an academic hospital, during three periods of four months over three consecutive years (2013-2015). Inclusion criteria were: (a) a clinically confirmed MS diagnosis, (b) age between 18 and 65 years, and (c) sufficient proficiency in Dutch. Exclusion criteria were: (a) MS relapse at the time of attending the clinic, (b) other neurological disorders, (c) severe psychiatric disorders, and (d) cognitive limitations hindering participation. Eligible patients were informed about the study by the treating neurologist during routine clinic visits. Ninety-seven eligible patients agreed to participate in the study (mean age = 44 years,  $SD = 12$ ; 67% females). Immediately following their consultation, they were accompanied by a research assistant to a separate room. The study was explained to the patient and an informed consent was obtained. Next, patients completed a package of questionnaires (see materials). If necessary, the research assistant helped with the questionnaires. Finally, a semi-structured interview was conducted based upon PPA (see materials). However, in 3 patients no interview could be conducted because of time constraints. Most participants (80%) were diagnosed with RRMS (Relapsing Remitting MS). The remaining patients were either diagnosed with SPMS (Secondary Progressive MS; 10%) or PPMS (Primary Progressive MS; 10%). Mean illness duration was 11.5 years ( $SD = 9.5$ ; range: 4 months - 44 years). About half of the patients (52%) followed higher education. More than half of the patients were working (59%), and a

substantial part of the sample was living from disability allowance (21%). Most patients (81%) were married or co-habiting.

The study protocol was approved by the local Committee of Medical Ethics. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000.

### *Materials*

**Expanded Disability Status Scale.** As a clinician-reported index of physical impairment, we used the Expanded Disability Status Scale (EDSS; Kurtzke, 1983). This instrument is widely used by neurologists and investigators in MS to measure the disease progression. It concerns a 20-step ordinal scale, which ranges from 0 (normal) to 10 (death due to MS). It is graded according to the findings of a standard neurologic examination. This results in eight functional systems: pyramidal, cerebellar, sensory, brainstem, bowel and bladder, visual, cerebral and other. We used the total score across the 8 domains. The EDSS score, as well as the type of MS, were retrieved from patients' records.

**Short Form-36.** Self-reported patient functioning was assessed with the Dutch version of the Short Form-36 (SF-36; Ware, 1992). The SF-36 is considered to be a generic measure of health status as experienced by patients and consists of 36 items divided into 8 subscales (physical functioning, role limitations due to physical problems, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems, and mental health). Scores were recorded so that they had a range between 0 and 100. Two summary scores are typically used as indicators of physical functioning and mental functioning. Cronbach's  $\alpha$  in this study was 0.81 for physical functioning and 0.82 for mental functioning domain scores.



Hospital Anxiety and Depression Scale. Anxiety and depression were assessed by means of the Dutch version of the Hospital Anxiety and Depression Scale (HADS; Zigmund, 1983; Spinhoven, Ormel, Sloekers, Kempen, & Van Hemert, 1997). The HADS consists of 14 items to be rated on a 4-point likert scale, according to the degree to which they have been experienced during the last week. It is divided into a depression subscale (seven items, e.g. “do you take as much interest in things as you used to?”), and an anxiety subscale (seven items, e.g. “do you feel tense and wound up?”). Higher scores indicate greater levels of depressive and anxious symptoms. The HADS has been developed to screen for anxiety disorders and depression among patients with a medical condition (Bjelland, Dahl, Haug, & Neckelmann, 2002). The validity of the HADS has been demonstrated in the MS population (Honarmand & Feinstein, 2009). Cronbach’s  $\alpha$  in this study was 0.76 for the anxiety scale and 0.74 for the depression scale.

Goal disengagement and goal reengagement. Goal adjustment tendencies were assessed by a slightly modified Dutch version of the Goal Adjustment Scale (GAS; Wrosch et al., 2003). The GAS consists of 10 items developed to measure goal disengagement (4 items; e.g., “It’s easy for me to reduce my effort toward the goal”) and goal reengagement (6 items; e.g., “I seek other meaningful goals”). All items were scored on a 5-point Likert scale. Both subscales have shown satisfactory reliabilities (Wrosch et al., 2003). For this study, the instructions were adapted so patients would rate the items in the context of goal disturbance by MS. They now read “In life, you cannot always reach what you want. A chronic disease can make it difficult to reach important goals. We are interested in how you usually react when this happens to you. Please indicate the extent to which you agree or disagree with each of the following statements”. Each of the statements was preceded by “If my

condition makes it difficult to attain an important goal in my life, ...". Cronbach's  $\alpha$  was 0.63 for disengagement 0.89 for reengagement. Given the suboptimal internal consistency, we checked if omitting items correlating low with the other items or the total subscale score, would increase it. However, no substantial improvement was found, so we proceeded with the full-item version.

Other questionnaires. There was also a questionnaire on medication adherence, but these data were for other purposes and therefore are not reported in this manuscript.

Personal Project Analysis (PPA). This is a flexible instrument to elicit personal goals and to assess a variety of goal appraisal dimensions (Little, 1983, 1998). We conducted a semi-structured interview in which we followed 3 steps.

The first step was goal elicitation. We asked participants to report ten current personal goals that they expected to be important in the nearby future. Clarification, prompts and feedback were provided, so that all goals were formulated with a similar level of concreteness. Goals were written down on separate post-its by the researcher. Next, patients were asked to select the three most important goals, and they were instructed that one of these had to be related to their MS. The non-selected goals were not further considered. They were asked to classify their goals in one of the following categories: work/education, health, relations with others, leisure, daily tasks, and personal growth. The researcher provided a large piece of paper containing circles representing each category, and patients were asked to place each post-it in the corresponding category. Examples of elicited goals are provided in Table 1.

INSERT TABLE 1

In the second step, participants were asked to rate the selected goals on a range of goal appraisal dimensions, based upon original PPA descriptions (Little, 1983, 1998), including: (1) Difficulty (“To what extent do you find it difficult to achieve this goal?”); (2) Visibility (“To what extent do people in your environment know about this goal?”); (3) Control (“To what extent do you feel in control of this goal?”); (4) Time (“To what extent you have sufficient time to pursue this goal?”); (5) Attainability (“To what extent do you think this goal is attainable?”); (6) Self-identity (“To what extent this goal says something about who you are?”). (7) Autonomy (“To what extent is it your own choice to pursue this goal?”); (8) Social support (“To what extent do you feel supported by others in pursuing this goal?”). Each appraisal had to be rated on an 11-point Likert scale, ranging from -5 (not at all) to +5 (completely). The scales were visualized on paper, so that patients only had to place the post-its on the corresponding point of the scale. These dimensions have been shown to robustly load on the following 3 cognitive themes: ‘meaning’, ‘manageability’, and ‘connection’ (Little & Coulombe, 2015). For the purpose of this study, we focus only on goal manageability, which is typically represented by the dimensions of difficulty, control, and attainability. We will specifically focus on manageability of the non-MS goals.

In the third step, we assessed facilitating and inhibiting effects among the MS-related goal (e.g., goal C) and other goals (e.g., goals A and B), as well as goal necessity, using a similar rating scale and procedure as described above. More specific, using a cross-impact matrix, participants scored the extent to which the MS goal interfered with the two other goals (e.g., “To what extent does the pursuit of goal C have a negative influence on the pursuit of goal A/B?”), the extent to which the MS goal facilitated the other goals (e.g., “To what extent does goal C have a positive influence on the pursuit of goal A/B?”), and the extent to which pursuit of the MS goal

was considered as necessary to attain the other goals (e.g., “To what extent is goal C necessary for the pursuit of goal A/B?”). For the purpose of this study we focus only on goal interference.

#### *Data-analysis strategy*

All data analyses were conducted using the Statistical Package for Social Sciences (SPSS 25.0).

First, we present descriptive statistics of health status (EDSS and SF-36), and depression and anxiety (HADS), goal manageability (PPA), goal interference (PPA), goal disengagement and reengagement (GAS). To obtain an index of goal manageability, we calculated the mean of the scores on the goal appraisal dimensions 'difficulty', 'control', and 'attainability'. As we were not interested in possible differences between the two non-MS goals, we averaged the ratings of the two non-MS goals for all further statistical analyses (for a similar approach see Crombez et al., 2016). Also, correlations between these variables were calculated.

To test the hypotheses, five sets of hierarchical regression analyses were conducted separately with indicators of mental well-being (depression, anxiety, mental functioning) as well as goal disturbance (goal manageability, goal interference) as dependent variables. In the first step, we included self-reported physical impairment (SF-36). Clinician-reported physical impairment and sociodemographic variables were not included as they showed no significant correlations with both independent and dependent variables. In step 2, goal disengagement and reengagement were included to test hypothesis 1. In step 3, we added interactions between both goal disengagement and goal reengagement (hypothesis 2), as well as between both goal adjustment tendencies and physical impairment to test the hypothesized moderation effects (hypothesis 3). Variables

used in the interaction terms were centered. In case of significant interaction effects, these were followed up by the post-hoc probing procedure described by Aiken and West (1991).

## **Results**

### *Descriptive statistics*

Means and standard deviations of all study variables, as well as correlations, are shown in Table 2. Mean EDSS score was low, suggesting that this sample was, on average, only mildly disabled. We briefly summarize relevant correlations between independent and dependent variables. EDSS score was not significantly associated with depression, anxiety, mental functioning, goal manageability, or goal interference. Self-reported physical functioning was significantly associated with clinician-reported physical impairment, and with depression, anxiety, mental functioning, and goal interference (but not goal manageability). Goal disengagement showed a negative correlation with anxiety and a positive correlation with mental functioning but did not significantly correlate with depression. Goal reengagement was significantly negatively associated with depression as well as anxiety and was positively associated with mental functioning. Neither disengagement or reengagement were significantly related with goal manageability or goal interference. There were also interesting associations between the two sets of dependent variables. Goal manageability was negatively associated with both depression and anxiety, and positively related to mental functioning. Goal interference was positively associated with both depression and anxiety, and negatively related to mental functioning.

INSERT TABLE 2

### *Hypotheses testing*

In the set of regressions on mental well-being (depression, anxiety, mental functioning; see Table 3), we found that adding goal adjustment factors significantly added to the explained variance beyond patient-reported physical impairment. For anxiety, both goal disengagement and goal reengagement showed significant negative effects, whereas for depression, only reengagement had a significant negative effect. For mental functioning, reengagement but not disengagement had a significant positive effect. Including the interaction terms did not further improve the explanatory value of the model.

#### INSERT TABLE 3

In the set of regressions on goal disturbance (goal manageability, goal interference; see Table 4), we found that adding goal adjustment factors did not significantly add to the explained variance beyond patient-reported physical impairment. However, for goal interference (but not goal manageability) the interaction terms significantly improved the explanatory value of the model. Specifically, the physical impairment by reengagement interaction was significant, and the disengagement by reengagement interaction showed a (non-significant) trend.

#### INSERT TABLE 4

To follow up on the significant interaction between reengagement and physical impairment, the post-hoc probing procedure described by Aiken and West (1991) and Holmbeck (2002) was followed. Slopes for the association between physical impairment and goal interference were calculated separately for high versus low levels of reengagement. The results are shown in Figure 1. The slope was not significant for lower levels of reengagement ( $\beta = .028$ ), but it was significantly *negative* for high levels of disengagement ( $\beta = -.105$ ,  $p < .05$ ). These findings

suggest that, contrary to what was expected, increasing physical impairment has a more *negative* impact on goal interference in those patients with a tendency to display *higher* reengagement responses.

A similar procedure was used for the significant interaction between disengagement and reengagement. Slopes for the association between disengagement and goal interference were calculated separately for high versus low levels of reengagement. The results are shown in Figure 2. The slope was not significant for lower levels of reengagement ( $\beta = .135$ ), but it was significantly *negative* ( $\beta = -.344$ ,  $p < .05$ ) for high levels of reengagement. The findings suggest that goal interference is lowest when both goal disengagement and goal reengagement are high.

INSERT FIGURE 1

## **Discussion**

This study aimed to investigate the role of goal adjustment in mental well-being and perceived goal disturbance in individuals with multiple sclerosis (MS). While goal adjustment and mental well-being were assessed using questionnaires, goal disturbance was examined by means of Personal Project Analysis (PPA), requiring participants to reflect over current goals. In sum, our findings showed that, overall, higher goal adjustment (especially reengagement) was associated with better mental well-being, but not less goal disturbance. Furthermore, interaction effects between disengagement and reengagement on mental well-being could not be established. Finally, we did not find evidence that goal adjustment buffered against the negative effects of physical impairment, and there was even a counter-intuitive effect suggesting that the association between patient-reported physical impairment

and goal interference was more pronounced in those scoring high on reengagement. We now discuss these findings more in detail.

The hypothesis that higher goal adjustment would be associated with better mental well-being and less goal disturbance was only partially supported. In line with goal adjustment theory (Brandstaedter & Renner, 1990; Rasmussen et al., 2006; Wrosch et al., 2003) goal reengagement was negatively associated with depression and anxiety, and positively with mental functioning, after controlling for physical impairment. However, higher goal disengagement was only associated with less anxiety. The results extend the findings of a previous study in MS patients (Van Damme et al., 2016), which demonstrated beneficial effects of flexible goal adjustment on some indicators of mental well-being in 2 ways. First, our instructions for the Goal Adjustment Scale required patients to reflect on goal disturbance specifically related to their illness, which was not the case in that previous study. Second, because that study did not differentiate between goal disengagement and reengagement, the current study adds that the ability to reengage, that is, to identify and commit to new goals, might actually be more important than the ability to disengage from blocked goals. This is in line with findings in other chronically ill populations, showing beneficial effects of reengagement but not disengagement (Garnefski et al., 2009; Zhu et al., 2015), although there are also studies reporting significant effects of both (Arends et al., 2013; Thompson et al., 2013).

The unique contributions of goal disengagement and goal reengagement remain unclear and seem to vary across studies and populations. One might also expect interaction effects between goal disengagement and reengagement. More specific, Wrosch et al. (2003) proposed that goal disengagement would be particularly beneficial when it is accompanied with high levels of goal reengagement.



This idea has been investigated in MS patients by Neter et al. (2009), who found an interaction effect on depression, indicating that high goal disengagement combined with low goal reengagement was associated with more depression, whereas no effects on anxiety were found. In the present study, we were unable to find any significant disengagement by reengagement interaction for indicators of mental well-being. Possibly, our research design and assessment of goal disengagement and reengagement did not fully capture the dynamics of goal adjustment in the context of chronic illness. Goal adjustment is a highly dynamic process, that may quickly change. So, there is a need for small time windows that capture the dynamics. An opportunity may be diary research, in which patients reflect upon goal identification, pursuit, and adaptation, on a daily basis. It is worth mentioning, though, that there was a trend for a disengagement by reengagement interaction in the regression on goal interference, suggesting that goal interference is lowest when both goal disengagement and goal reengagement are high. Given that this was only an effect at trend level, this should be interpreted with caution, and follow-up studies should further explore this. Moreover, it should be noted that neither disengagement or reengagement were significant main predictors of goal interference nor goal manageability. This is surprising, as one might expect that patients better in goal adjustment would experience less goal disturbance. Again, it is possible that with this specific design, the highly dynamic process that is goal adjustment was not fully captured. As discussed above, more sophisticated methods may be required to allow for this.

We also examined if high goal disengagement and reengagement would buffer the adverse effects of physical impairment, as would be expected from goal adjustment theory (Brandtstädter & Renner, 1990; Rasmussen et al., 2006; Wrosch

et al., 2003, 2007). There is some evidence that goal adjustment tendencies might buffer the negative impact of cancer on well-being, with either goal disengagement (Janse et al., 2016b) or goal reengagement (Castonguay et al., 2017; Mens & Scheier, 2016) emerging as a significant moderator. We were unable to find evidence for such a protective role of goal adjustment in MS patients. Counter to expectations, we found that the association between patient-reported physical impairment and goal interference was *more* pronounced in those scoring *high* on goal reengagement. In other words, lower physical functioning was associated with more goal interference only when levels of goal reengagement were high. Inspection of the post-hoc probing testing indicates that goal interference was lowest for high reengaging patients with high levels of physical functioning, and highest for high reengaging patients with low levels of physical functioning. We may speculate that MS patients who have a strong tendency to identify and commit to new goals, but who experience substantial levels of physical impairment, will be confronted more often with goal interference. Obviously, more studies are needed to confirm this effect and to further examine this possible interpretation, as well as the implications for mental well-being. In the present study, a similar pattern of results was not found for mental well-being variables.

Nevertheless, goal disturbance has been argued to be associated with declines in well-being (Carver & Scheier, 1990, 1998; Karoly, 1993). Indeed, it is well documented that the experience of goal interference negatively affects mental well-being (Riediger & Freund, 2004), and here we showed for the first time in MS patients that higher goal interference by MS-related goals was associated with more depression and anxiety, and with lower mental functioning. Furthermore, our results add to the idea that "manageability" of goals is an important predictor of well-being

(Little & Coulombe, 2015), and demonstrated for the first time that low goal manageability was associated with more depression and anxiety, and with lower mental functioning, in people with MS. These findings indicate that it is important to assess how MS patients appraise their goals, and that this may provide valuable information for clinical practice.

A number of aspects regarding this study need further discussion. First, our sample may not be representative for the MS population. Patients were recruited by the treating neurologist in a specialized care center. Our sample was, on average, only mildly disabled, and many patients had MS for quite a long time. This may suggest that the majority of our sample has adapted rather well to the disease. It is possible that the impact of goal disturbance is particularly strong in the early stages of the disease, and that goal adjustment tendencies are better predictors of well-being in these stages. It would be interesting for future studies to use a prospective design with individuals in the early stage of MS (Dennison, Moss-Morris, Silber, Galea, & Chalder, 2010; Janse, Ranchor, Smink, Sprangers, & Fleer, 2016a).

Second, because the findings are based on cross-sectional data, we cannot infer causality. Longitudinal studies are needed to determine how MS complaints and diagnosis affect goal appraisals, how patients manage goal disturbances, and how this affects wellbeing (Arends, Bode, Taal, & Van de Laar, 2016). Such studies are also essential before one can start providing recommendations for implementing goal management strategies in clinical treatment (Moss-Morris, Dennison, Landau, Yardley, Silber, & Chalder, 2013; Nordin & Rorsman, 2012).

Third, we used an illness-specific version of the Goal Adjustment Scale, which contained the same items, but with a modified instruction. Patients were asked to think about goals that are affected by their illness. We have no information about the

validity of this version but found that the internal consistency of the disengagement scale was rather low (.63), which may have masked potential associations. This is not in line with the other study using this instrument in MS patients (Neter et al., 2009), in which reliability was satisfactory ( $> .80$ ). However, it has been reported that internal consistency of the goal disengagement subscale strongly varies across samples and is generally lower than that of the reengagement scale (Neter & Goren, 2017; Thompson et al., 2013). As suggested by these authors, we attempted to increase internal consistency by excluding items correlating low with other disengagement items, but this did not make much of a difference. This casts some doubt on whether disengagement was reliably assessed, and we recommend more psychometric work to solve this issue.

Forth, a remarkable finding from the correlation analyses is that patient-reported (SF-36 physical functioning domain score), but not clinician-reported physical impairment (EDSS), was significantly associated with the mental well-being outcomes (depression, anxiety, mental functioning). This may indicate same-source bias (patient versus clinician) or common-method variance (self-report versus observation).

Fifth, we might have to consider alternative ways to assess goal adjustment, not only in terms of general tendencies or dispositions, but also in terms of specific strategies that people may be using. Thompson et al. (2013) assessed situational goal adjustment in cancer patients using semi-structured interviews. Other researchers used a similar approach but proposed to identify up to 6 strategies related to goal adjustment: continue to pursue disturbed goals, scaling back goals in the same life domain, scaling up goals in the same life domain, reprioritize goals, giving up effort but remaining committed, and give up goals (Janse et al., 2016a). It

would be interesting to apply such methodological and conceptual innovations in the context of MS.

Sixth, although the goals reported by MS patients appeared to be similar as those typically found in the general population (Little, 1983), an in-depth analysis of goal content was beyond the scope of this study. It is, however, possible that effects vary depending on specific goals. By not considering differences within MS goals, as well as by averaging ratings on two non-MS goals meaningful variance may have been lost. An important challenge for future studies is to further refine goal assessment procedures allowing more in-depth analyses.

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### **References**

- Aiken, L.S., & West, S.G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.
- Aikens, J. E., Fischer, J. S., Namey, M., & Rudick, R. A. (1997). A replicated prospective investigation of life stress, coping, and depressive symptoms in multiple sclerosis. *Journal of Behavioral Medicine, 20*, 433-445.
- Arends, R.Y., Bode, C., Taal, E., & Van de Laar, M.A. (2013). The role of goal management for successful adaptation to arthritis. *Patient Education and Counseling, 93*, 130-138.

- Arends, R.Y., Bode, C., Taal, E., & Van de Laar, M.A. (2016). The longitudinal relation between patterns of goal management and psychological health in people with arthritis: The need for adaptive flexibility. *British Journal of Health Psychology, 21*, 469 - 489.
- Austin J.T., & Vancouver, J.B. (1996). Goal constructs in psychology: structure, process, and content. *Psychological Bulletin, 120*(3), 338-375.  
doi:10.1037//0033-2909.120.3.338
- Benito-Leon, J., Morales, J.M., Rivera-Navarros, j., & Mitchell, A. J. (2003). A review about the impact of multiple sclerosis on health-related quality of life. *Disability and Rehabilitation, 25*, 1291-1303.
- Bjelland, I., Dahl, A. A., Haug, T. T., & Neckelmann, D. (2002). The validity of the Hospital Anxiety and Depression Scale: An updates review. *Journal of Psychosomatic research, 52*, 69-77.
- Brandtstädter, J., & Renner, G. (1990). Tenacious Goal Pursuit and Flexible Goal Adjustment: Explication and Age-related analysis of Assimilative and Accommodative Strategies of Coping. *Psychology and Aging, 5*, 58-67.
- Carver, C.S. & Scheier, M.F. (1990). Origins and functions of positive and negative affect: A control-process view. *Psychological Review, 97*, 19-35.
- Carver, C.S. & Scheier, M.F. (1998). *On the self-regulation of behavior*. New York, Cambridge University Press.
- Castonguay, A.L., Wrosch, C., & Sabiston, C.M. (2017). The roles of negative affect and goal adjustment capacities in breast cancer survivors: Associations with physical activity and diurnal cortisol secretion. *Health Psychology, 36*, 320-331.

- Ciere, Y., Visser, A., Lebbink, J., Sanderman, R., & Fler, J. (2016). Impaired mood in headache clinic patients: Associations with the perceived hindrance and attainability of personal goals. *Headache*, 56, 1022-1032.
- Compston, A., & Coles, A. (2008). Multiple Sclerosis. *Lancet*, 372, 1502-1517.
- Crombez, G., Lauwerier, E., Goubert, L., & Van Damme, S. (2016). Goal pursuit in individuals with chronic pain: A personal project analysis. *Frontiers in Psychology*, 7, 966.
- Dennison, L., Moss-Morris, R., & Chalder, T. (2009). A review of psychological correlates of adjustment in patients with multiple sclerosis. *Clinical Psychology Review*, 29, 141-153.
- Dennison, L., Moss-Morris, R., Silber, E., Galea, I., & Chalder, T. (2010). Cognitive and behavioral correlates of different domains of psychological adjustment in early-stage multiple sclerosis. *Journal of Psychosomatic Research*, 69, 353-361.
- Garnefski, N., Kraaij, V., Schroevers, M.J., Aarnink, J., van der Heijden, D.J., van Es, S.M., van Herpen, M., & Somsen, G.A. (2009). Cognitive coping and goal adjustment after first-time myocardial infarction: Relationships with symptoms of depression.
- Hausleiter, I.S., Brüne, M., & Juckel, G. (2009). Psychopathology in Multiple Sclerosis: Diagnosis, prevalence and treatment. *Therapeutic Advances in Neurological Disorders*, 2, 13-29.
- Honarmand, K., & Feinstein, A. (2009). Validation of the Hospital Anxiety and Depression scale for use with multiple sclerosis patients. *Multiple Sclerosis*, 15, 1581-1624.

- Janse, M., Ranchor, A. V., Smink, A., Sprangers, M. A. G., & Fleer, J. (2016a). People with cancer use goal adjustment strategies in the first 6 months after diagnosis and tell us how. *British Journal of Health Psychology, 21*, 268-284.
- Janse, M., Sprangers, M.A.G., Ranchor, A.V., & Fleer, J. (2016b). Long-term effects of goal disturbance and adjustment on well-being in cancer patients. *Quality of Life Research, 25*, 1017-1027.
- Karoly, P. (1993). Mechanisms of self-regulation: A systems view. *Annual Review of Psychology, 44*, 23–52.
- Kurtzke, J. (1983). Rating neurological impairment in multiple sclerosis, an expanded disability status scale. *Neurology, 33*, 1444-1452.
- Lester, K., Stepleman, L., & Hughes, M. (2007). The association of illness severity, self-reported cognitive impairment, and perceived illness management with depression and anxiety in a multiple sclerosis clinic population. *Journal of Behavioral Medicine, 30*, 177-186.
- Little, B.R. (1983). Personal projects: A rationale and method for investigation. *Environment and Behavior, 15*, 273–309. doi:10.1177/0013916583153002
- Little, B.R. (1998). Personal project pursuit: Dimensions and dynamics of personal meaning. In P.T.P. Wong, & P.S. Fry PS (Eds.). *The human quest for meaning: A handbook of psychological research and clinical applications* (pp. 193-212). Mahwah, NJ: Lawrence Erlbaum Associates.
- Little, B. R., & Coulombe, S. (2015). *Personal projects analysis*. In International Encyclopedia of the Social and Behavioral Sciences (2nd edition). Oxford, UK: Elsevier.



- Mens, M.G., & Scheier, M.F. (2016). The benefits of goal adjustment capacities for well-being among women with breast cancer: Potential mechanisms of action. *Journal of Personality, 84*, 777-788.
- Moss-Morris, R., Dennison, L., Landau, S., Yardley, L., Silber, E., & Chalder, T. (2013). A randomized controlled trial of cognitive behavioral therapy (CBT) for adjusting to multiple sclerosis (the saMS trial): Does CBT work and for whom does it work? *Journal of Consulting and Clinical Psychology, 81*, 251-262.
- Neter, E., & Goren, S. (2017). Infertility centrality in the woman's identity and goal adjustment predict psychological adjustment among women in ongoing fertility treatments. *International Journal of Behavioral Medicine, 24*, 880-892.
- Neter, E., Litvak, A., & Miller, A. (2009). Goal disengagement and goal reengagement among multiple sclerosis patients: relationship to well-being and illness representation. *Psychology and Health, 24*, 175-186.
- Nordin, L., & Rorsman, I. (2012). Cognitive-behavioural therapy in multiple sclerosis: A randomized controlled pilot study of acceptance and commitment therapy. *Journal of Rehabilitation Medicine, 44*, 87-90.
- Pakenham, K. I. (2006). Investigation of the coping antecedents to positive outcomes and distress in multiple sclerosis (MS). *Psychology and health, 21*, 633-649.
- Pakenham, K.I. (2007). Making sense of Multiple Sclerosis. *Rehabilitaiton Psychology, 52*, 380-389.
- Rasmussen, H. N., Wrosch, C., Scheier, M. F., & Carver, C. S. (2006). Self-Regulation Processes and Health: The importance of optimism and goal adjustment. *Journal of Personality, 74*, 1721-1746.
- Riediger, M., & Freund, A.M. (2004). Interference and facilitation among personal goals: Differential associations with subjective well-being and persistent goal

- pursuit. *Personality and Social Psychology Bulletin*, 30, 1511-1523.  
doi:10.1177/0146167204271184
- Siebert, R., & Abernethy, D. (2005). Depression in multiple sclerosis: a review. *Journal of Neurology, Neurosurgery & Psychiatry*, 76, 469-475.
- Spinhoven, P., Ormel, J., Sloekers, P., Kempen, G. S., & Van Hemert, A. (1997). A validation study of the Hospital Anxiety and Depression Scale (HADS) in different groups of Dutch subjects. *Psychological Medicine*, 27, 363-370.
- Thompson, E., Stanton, A.L., & Bower, J.E. (2013). Situational and dispositional goal adjustment in the context of metastatic cancer. *Journal of Personality*, 81, 441-451.
- Van Damme, S., Crombez, G., Goubert, L., & Eccleston, C. (2009). Current issues and new directions in Psychology and Health: The costs and benefits of self-regulation - a call for experimental research. *Psychology and Health*, 24, 367-371.
- Van Damme, S., De Waegeneer, A., & Debruyne, J. (2016). Do flexible goal adjustment and acceptance help preserve quality of life in patients with Multiple Sclerosis? *International Journal of Behavioral Medicine*, 23, 333-339.
- Ware, J. S. (1992). The MOS 36 Item Short Form Health Survey (SF36). Conceptual framework and item selection. *Medical Care*, 30, 473-83.
- Wrosch, C., Miller, G. E., Scheier, M. F., & Brun de Pontet, S. (2007). Giving up unattainable goals: Benefits for Health? *Personality and Social Psychology Bulletin*, 33, 251-265.
- Wrosch, C., Scherier, M. F., Miller, G. E., Schulz, R., & Carver, C. S. (2003). Adaptive Self-Regulation of Unattainable Goals: Goal Disengagement, Goal

reengagement and Subjective Wellbeing. *Personality and Social Psychology Bulletin*, 29, 1494-1508.

Zhu, L., Ranchor, A.V., van der Lee, M., Garssen, B., Sanderman, R., & Schroevers, M. (2015). The role of goal adjustment in symptoms of depression, anxiety and fatigue in cancer patients receiving psychosocial care: A longitudinal study. *Psychology and Health*, 30, 268-283.

Zigmond, A. S. (1983). The hospital anxiety and Depression scale. *Acta Psychiatrica Scandinavica*, 67, 361-370.

## **Figure legends**

Figure 1. Graphic representation of moderation effects on goal interference. Panel A shows the moderation of goal reengagement in the association between physical functioning and goal interference. Panel B shows the interaction between goal disengagement and goal reengagement.

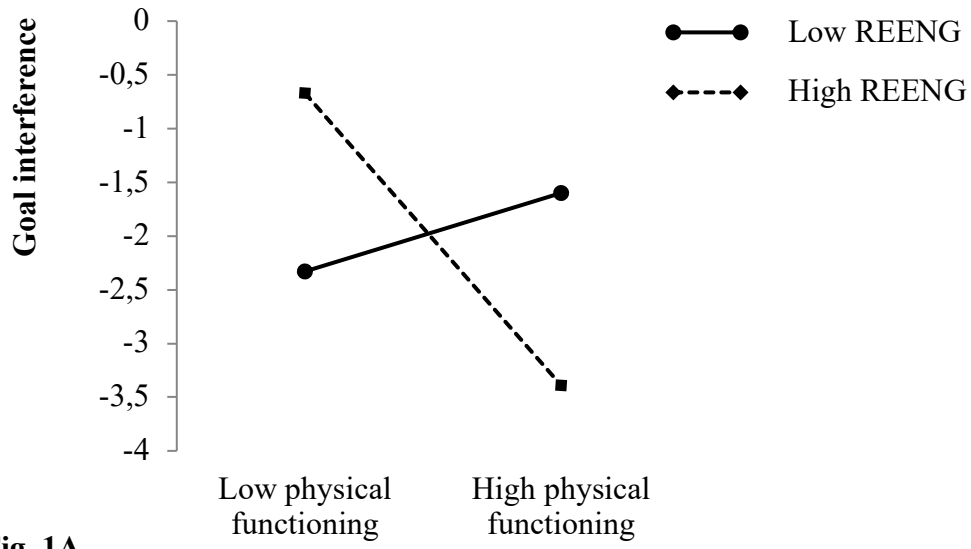


Fig. 1A

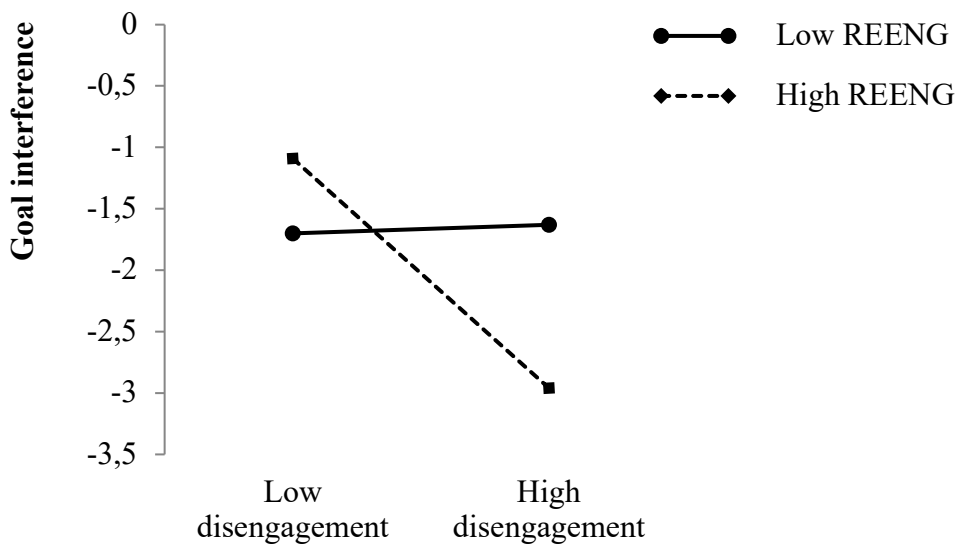


Fig. 1B

*Table 1. examples of elicited goals per category.*

Goal categories	Examples of elicited goals
Work/education	Finding a new job Completing my education
Health/MS	Sufficiently exercising Monitoring medication
Relations with others	Maintaining relationship with partner Keeping in touch with friends
Leisure	Planning a holiday Restarting my hobbies
Daily tasks	Keeping up with householding Being available for the children
Personal growth	Learn to be happy with what I still can Becoming more assertive

Table 2. Means (M) and standard deviations (SD) of study variables, and their intercorrelations

	M(SD)	1	2	3	4	5	6	7	8	9
1. HADS-D	3.90 (3.32)	-								
2. HADS-A	5.64 (3.52)	.60 <sup>c</sup>	-							
3. Goal manageability	1.68 (0.91)	-.31 <sup>b</sup>	-.36 <sup>c</sup>	-						
4. Goal interference	-1.97 (2.99)	.21 <sup>a</sup>	.27 <sup>a</sup>	-.25 <sup>a</sup>	-					
5. SF-36 Mental	50.89 (8.65)	-.68 <sup>c</sup>	-.73 <sup>c</sup>	.29 <sup>b</sup>	-.29 <sup>b</sup>	-				
6. SF-36 Physical	57.53 (12.93)	-.45 <sup>c</sup>	-.24 <sup>a</sup>	.07	-.24 <sup>a</sup>	.59 <sup>c</sup>	-			
7. EDSS	2.42 (1.90)	.16	-.17	.13	.02	-.16	-.62 <sup>c</sup>	-		
8. Goal disengagement	10.84 (2.71)	-.14	-.30 <sup>b</sup>	.17	-.12	.25 <sup>a</sup>	.17	-.01	-	
9. Goal reengagement	21.65 (4.00)	-.28 <sup>b</sup>	-.26 <sup>a</sup>	.11	-.03	.23 <sup>a</sup>	.05	-.04	.24 <sup>a</sup>	-

<sup>a</sup>  $p < .05$ ; <sup>b</sup>  $p < .01$ ; <sup>c</sup>  $p < .001$

(HADS-D = depression; HADS-A = anxiety; EDSS = Expanded Disability Status Scale; SF-36 Physical = physical functioning; SF-36 Mental = mental functioning)

Table 3. Hierarchical linear regressions on mental wellbeing. Separate regressions for depression, anxiety, and mental functioning are presented. All  $\beta$  values are standardized and taken from the final model.

Predictors	Depression		Anxiety		Mental functioning	
	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$
1. <i>Physical impairment</i>	.20 <sup>c</sup>		.06 <sup>a</sup>		.35 <sup>c</sup>	
Physical functioning (SF-36)		-.47 <sup>c</sup>		-.19 <sup>(*)</sup>		.55 <sup>c</sup>
2. <i>Goal adjustment</i>	.07 <sup>a</sup>		.11 <sup>b</sup>		.05 <sup>a</sup>	
Disengagement		.03		-.22 <sup>a</sup>		.12
Reengagement		-.30 <sup>b</sup>		-.22 <sup>a</sup>		.18 <sup>a</sup>
3. <i>Interactions</i>	.03		.02		.01	
Disengagement x Reengagement		-.14		-.05		-.00
Disengagement x Physical functioning		-.03		.06		-.02
Reengagement x Physical functioning		.14		-.10		.11
<i>Total R<sup>2</sup> (adjusted)</i>	.24 <sup>c</sup>		.13 <sup>b</sup>		.37 <sup>c</sup>	

<sup>a</sup>  $p < .05$ ; <sup>b</sup>  $p < .01$ ; <sup>c</sup>  $p < .001$  (<sup>\*</sup>  $p < .10$ )



Table 4. Hierarchical linear regressions on goal disturbance. Separate regressions for goal manageability and goal interference are presented. All  $\beta$  values are standardized and taken from the final model.

Predictors	Goal manageability		Goal interference	
	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$
1. <i>Physical impairment</i>	.00		.05 <sup>a</sup>	
Physical functioning (SF-36)		-.04		-.19(*)
3. <i>Goal adjustment</i>	.02		.00	
Disengagement		.04		-.06
Reengagement		.16		-.04
4. <i>Interactions</i>	.03		.11 <sup>a</sup>	
Disengagement x Reengagement		.05		-.21(*)
Disengagement x Physical functioning		-.03		.08
Reengagement x Physical functioning		.15		-.23 <sup>a</sup>
<i>Total R<sup>2</sup> (adjusted)</i>	-.02		.11 <sup>a</sup>	

<sup>a</sup>  $p < .05$ ; <sup>b</sup>  $p < .01$ ; <sup>c</sup>  $p < .001$  (\*  $p < .10$ )