# Fatigue, Cognition and Personality in patients with relapsing-remitting multiple sclerosis – a longitudinal study

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## ▪ Aim of study

(1) To define the factors that contribute to fatigue in MS. (2) To assess how clinical, behavioral and cognitive variables are influenced by fatigue during the evolution of the disease (3) To elucidate whether and how fatigue and personality do correlate

## ▪ Methods

### Study Design:

Monitoring of clinical, behavioral, neuropsychological and personality-related variables in MS-patients with (MS-F) and without MS-associated fatigue (MS-NF) in the course of the disease. Inclusion criteria: 18-50 yr., RRMS/McDonald, EDSS 0-3,5, interferon beta-1b therapy for more than 3 months and no longer than 2 years, no medication compromising cognition.

### Study Cohort:

At baseline, 102 RRMS patients and 30 matched controls, and at follow-up (after 2 yr., FU24) 78 patients (31m, 47f, mean 37.3 yr) and 25 controls (9m, 16f, mean 35.9 yr) were tested. Stratification of the RRMS-patients to 2 groups was done by the "Würzburger Erschöpfungsinventar in MS" (WEIMuS):

► RRMS group with MS-associated fatigue (MS-F; N=54)
► RRMS group without MS-associated fatigue (MS-NF; N=24)

### Data profile:

- **Clinical and behavioral domain:** neurological status, EDSS, MSFC, subjectively rated symptoms, fatigue (WEIMuS), IQ (MWT-B), quality of life (FAMS), ADS scale (depression) and Epworth Sleepiness Scale (ESS).
- **Neuropsychology:** TAP attention battery comprising the domains alertness, divided attention, mental flexibility, executive control, sustained attention, and working memory, visual and verbal memory (VVM), self-perception of cognitive and attentional dysfunction (FEDA) and working memory (PASAT).
- **Disease Coping: as** assessed by the patient (FKV-SE).
- **Personality Profile:** Freiburger Personality Inventory (FPI-R).

## ▪ Results

Behavioral data: After 24 months observation (FU24), a moderate increase of fatigue in MS-F was noted, whereas the fatigue score remained stable in MS-NF. EDSS, ESS and depression (ADS) scores astonishingly remained stable at a subclinical level in both groups (ref.Table 1). Significant group differences are consistently shown for the WEIMuS and the ADS (higher scores in MS-F). Ref. Table 1.
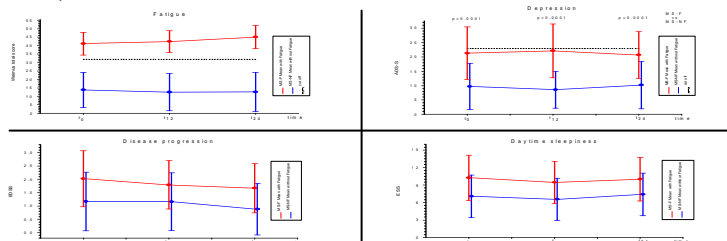


Table 1: Behavioral parameters in the evolution of the disease: T0, baseline; T12, analysis after 12 months; T24, analysis after 24 months; Cutoff, threshold of clinical manifestation

The objective neuropsychological parameters did not show any significant group or time differences between MS-F and MS-NF, and they were not relevantly influenced by fatigue. In contrast, there was a significantly negative influence of fatigue on the self-assessment of distraction, tiredness and slowing during cognitive processing and practical activities (FEDA). Ref. Table 2.

| MS-F vs. MS-NF | | | | |
|---|---|---|---|---|
| FEDA | | Gruppeneffekt | | Zeiteffekt |
| | | T0 | T24 | T0  T24 |
| FEDA-EV | | 0.0037 | 0.0773 | 0.0001 |
| FEDA-A | | 0.0150 | 0.0634 | 0.0024 |
| FEDA-AV | | n.s. | n.s. | n.s. |

Table 2: Significant group differences in fatigued (MS-F) vs.non- fatigued MS patients (MS-NF) concerning the self-assessment of distraction, tired-ness and slowing during cognitive processing (AV), practical activities (EV) and strenous activities (A)

The personality profile as assessed by the Freiburger Personality Inventory (FPI) showed highly significant differences between MS-F and MS-NF in various domains. On the other hand, there was no difference in the disease-coping (FKV). The important discriminating items of the FPI are specified in Table 3.

| MS-F vs. MS-NF | | |
|---|---|---|
| Freiburg Personality Inventory (FPI-R) | Group effect | |
| | T0 | T24 |
| FPI-R1: life satisfaction | 0.00040 | 0.00126 |
| FPI-R2: social orientation | n.s. | n.s. |
| FPI-R3: performance orientation | n.s. | 0.030 |
| FPI-R4: inhibition | 0.01962 | 0.01961 |
| FPI-R5: excitability | 0.01637 | 0.05342 |
| FPI-R6: aggression | 0.01865 | n.s. |
| FPI-R7: strain | 0.00032 | 0.00000 |
| FPI-R8: somatic distress | 0.00025 | 0.00493 |
| FPI-9: health worries | n.s. | n.s. |
| FPI-10: social desirability | 0.01976 | n.s. |
| FPI-11: extraversion | n.s. | 0.09181 |
| FPI-12: emotionality (neuroticism) | 0.00017 | 0.00139 |

Table 3: Highly significant group differences in fatigued (MS-F) vs. non-fatigued MS patients (MS-NF) concerning various domains of FPI-R

The fabric of conditions causing fatigue proved to be complex on further statistical testing. Significant factors influencing fatigue were: depression (p<.0001), several personality domains i.e. performance orientation (p<0.01), strain (p<0.01) and open mindedness (p<0.03), aspects of the disease coping, esp. active disease coping (p<0.007) and progression of the disease, i.e. EDSS (p<0.0004), but not disease duration. Tables.4a-c, 5a-c, 6a-c



Table 4a  Table 4b  Table 4c
Table 5a  Table 5b  Table 5c
Table 6a  Table 6b  Table 6c
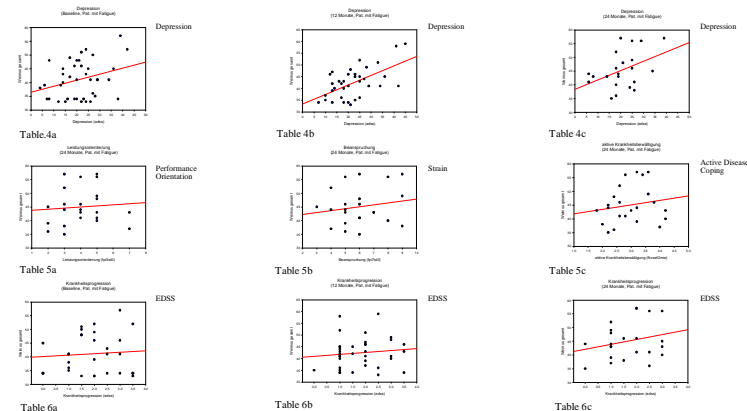
## ▪ Conclusion

(1) The results show that fatigue in early MS is influenced by personality traits, disease coping, depression and clinical status. Fatigue appears early in the evolution of the disease, further progression of deficit is not occurring in the early phase.
(2) Trait and state-factors interact as constitutive elements of fatigue. A maladaptive personality structure has to be postulated.
(3) Fatigue doesn't impair the objective cognitive performance of patients but the self-perception of deficits.