University of Antwerp

# Big Five Personality Dimensions and Chronic Fatigue Syndrome

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# Thanks to

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# Case definition Chronic Fatigue Syndrome
# CDC - Fukuda et al. (1994)

- **Major Criteria**
  - **Clinically evaluated, unexplained chronic fatigue** lasting **6 months or more**, that:
    - Is **new or of definite onset** (i.e., not lifelong)
    - Results in a significant **reduction** in previous levels of **activity**
    - Is **not substantially alleviated** by rest
    - Is **not** due to any **ongoing exertion or other medical conditions** that could explain the fatigue.

- **Additional Symptoms (4 or more required for diagnosis, concurrent for at least 6 months):**
  - **Post-exertional malaise** lasting more than 24 hours
  - **Unrefreshing sleep**
  - Significant impairment in **short-term memory** or **concentration**
  - **Muscle pain**
  - **Multi-joint pain** without swelling or redness
  - **Headaches** of a new type, pattern, or severity
  - **Sore throat** that is frequent or recurring
  - **Tender cervical or axillary lymph nodes** (swollen glands)

- **Exclusion Criteria**
  - Fatigue or symptoms that are explained by another medical condition, such as: Unresolved medical conditions (e.g., hypothyroidism) and Mental health disorders (e.g., major depressive disorder with psychotic or melancholic features)

# Biopsychosociaalmodel

## Kwetsbaarheden
- Lichamelijke kwetsbaarheid
- Factoren prenataal/kindertijd/jeugd
- Persoonlijkheid
- Levensstijl

## Uitlokkende factoren
- Biologisch
- Psychisch
- Sociaal

Langdurig onevenwicht
draaglast-draagkracht
**=Chronische stress**

## Onderhoudende factoren
- Afnemen draagkracht – Deconditionering
- Belastend /vermijdend activiteitenpatroon
- Emotionele gevolgen
- Gevoel geen controle
- Weinig inzicht oorzakelijke factoren (somatische attributie)
- Focus op lichamelijke klachten
- Reacties van anderen (onbegrip)
- Persoonlijke onderhoudende factoren

**Klachten**

## Ontregelingen lichaam
- HPA-as (neuro-endocrien
- Autonoom Zenuwstelsel
- Immuniteit
- Spierstelsel
- Stofwisseling

# Five Factor Model of Personality


| Openness | Conscientious | Extraversion | Agreeable | Neuroticism |
|---|---|---|---|---|
| Inquisitiveness to inner and outer world, novelties and aesthetics | Goal-orientedness, self-discipline and organisation | Positive emotionality, energy and sociability | The tendency to altruism, trust and empathy | The propensity to experience distress and negative affect |

# Personality Dimensions in Chronic Fatigue Syndrome:

# An NEO-FFI-NL-based case-control study

Illegems Jela, Kampen Jarl, Glazemakers Inge, De Block Christophe, Verlinden Anke, Tjalma Wiebren, Macken Elisabeth, De Volder Ilse, Van Gastel Ann, Peeters Dirk, Van Den Eede Filip, Moorkens Greta

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# State of the art: Personality dimensions in CVS

**In general, FFM traits are predictive of health in general, allostatic load and fatigue**

- **Neuroticism ↑ : consistently linked to CFS, predictor for CFS**
- **Extraversion ↓ : reported by most studies, consequence of CFS?**
- **Openness : no differences described**
- **Agreeableness : 1 study described reduced agreeableness**
- **Conscientiousness : inconsistent findings**

**Described personality: trait of state?**

- **Prolonged illness**
- **Psychiatric comorbidity**

# Objective of the current study

- **Are there differences in personality dimensions between:**
  - CFS patients,
  - Healthy controls,
  - Patients with another somatic chronic illness,
  - Psychiatric outpatients and
  - Patients with sleep disorders?

- **Are there sex-specific differences?**
- **Are there personality differences between non-infectious and post-infectious CFS**

# Study design: semi-balanced case controle

## Clinical group

- 1130 CFS patients
- 90.9% women
- 22.1% Postinfectious CFS

## Comparison groups

- 4 groups

| Healthy control (n=313) | Somatic (n=271) | Psychiatric outpatient (n=155) | Sleep disorder (n=101) |
|---|---|---|---|
| •Adults accompanying patients<br>•Medical check-ups | •Diabetes type 1<br>•IBD<br>•Breast cancer<br>•Hematological disorders | •UZA Psychiatric Department<br>•AZ Voorkempen Psychiatric department | •UZA Psychiatric department |

# Method

- **Instrument:** NEO-Five-Factor-Invertory (NEO-FFI-NL)
- **Dependent variables:** Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness
- **Independent variable:** group
- **Statistical Analysis:**
  - ANOVA (multivariate)
  - 5 ANCOVAs (with confounders: Age, Sex)
  - Sensitivity analyses (to account for comorbid psychiatric or chronic somatic conditions)
- **Secondary analysis:** within CFS group
  - 5 ANCOVAs
  - Independent variable: triggering infection

# Demographic and Clinical Characteristics

| Variables | CFS (n = 1130) | Healthy control (n = 313) | Somatic (n = 271) | Psychiatric outpatient (n = 155) | Sleep disorder (n = 101) | Test statistics, p |
|---|---|---|---|---|---|---|
| | Mean (SD) or % | Mean (SD) or % | Mean (SD) or % | Mean (SD) or % | Mean (SD) or % | |
| **Average age (SD)** | 39.9 (8.68) | 46.6 (10.73) | 47.6 (12.81) | 44.4 (12.49) | 44.3 (12.44) | F(4,1954)=44.14, p<.001 |
| **Sex (female)** | 90.9% | 54.0% | 54.6% | 56.8% | 45.5% | χ2 (4)=360.25, p<.001 |
| **Marital status** | | | | | | χ2 (12)=78.69, p<.001 |
| *Single* | 25.6% | 9.0% | 18.8% | 23.9% | 17.8% | |
| *Married/cohabiting* | 65.2% | 86.5% | 69.7% | 65.8% | 70.3% | |
| *Living apart together* | 2.0% | 2.9% | 5.2% | 3.2% | 7.9% | |
| *Parental home* | 7.2% | 1.6% | 6.3% | 7.1% | 4.0% | |
| **Having children** | 68.3% | 58.8% | 56.8% | 49.7% | 49.5% | χ2 (4)=40.09, p<.001 |
| **Educational level** | | | | | | χ2 (16)=128.81, p<.001 |
| *Primary school* | 4.3% | 1.6% | 3.0% | 5.8% | 2.0% | |
| *Lower secondary school* | 19.1% | 8.0% | 15.1% | 12.3% | 14.9% | |
| *Upper secondary school* | 37.2% | 24.0% | 35.4% | 34.8% | 36.6% | |
| *Bachelor* | 29.8% | 37.7% | 22.9% | 25.8% | 25.7% | |
| *Master* | 9.6% | 28.8% | 23.6% | 21.3% | 20.8% | |
| **Work situation** | | | | | | χ2 (20)=614.56, p<.001 |
| *Paid work* | 25.6% | 92.3% | 58.1% | 43.9% | 74.3% | |
| *Partial sick leave* | 5.0% | 0.6% | 5.6% | 5.2% | 1.0% | |
| *Sick leave* | 58.3% | 0.6% | 17.4% | 38.7% | 12.9% | |
| *Unemployed-seeking work* | 3.3% | 0.6% | 2.2% | 3.9% | 2.0% | |
| *Unemployed-not seeking work* | 3.0% | 1.9% | 2.6% | 3.2% | 1.0% | |
| *Other* | 4.8% | 3.8% | 14.1% | 5.2% | 8.9% | |

| Variables | CFS ( | Healthy | Somatic | Psychiatric | Sleep | Test statistics, p |
|---|---|---|---|---|---|---|
| **CIS fatigue** | 51.2 (5.75) | 21.6 (10,00) | 31.7 (13.07) | 39.9 (12.86) | 38.7 (11.56) | F(4,1953)=150.34, p<.001 |
| **HADS depression** | 9.1 (3.97) | 3.0 (2.79) | 4.5 (3.37) | 9.1 (4.58) | 6.1 (3.99) | F(4,1958)=19.72, p<.001 |
| **HADS anxiety** | 9.5 (4.13) | 5.6 (3.51) | 6.7 (3.72) | 11.4 (4.48) | 8.0 (3.95) | F(4,1958)=4.69, p<.001 |
| **Age at early symptoms** | 34.4 (9.15) | - | - | - | - | - |
| **Age at somatic diagnosis** | 39.5 (8.67) | - | 31.6 (16.33) | - | - | t(1395)=11.06, p<.001 |
| **Current psychiatric (co)morbidity %** | 37 .2%[a] | 0.0%[b] (Excl. crit.) | 4.1%[b] | 100%[c] | 100%[c] | χ2 (4)=761.74, p<.001 |
| **1 disorder** | 29.1% | 0.0% | 4.1% | 58.9% | 100% | |
| **>1 disorder** | 8.1% | 0.0% | 0.0% | 41.9% | 0.0% | |
| **Depressive disorder** | 20.6% | 0.0% | 1.5% | 49.0% | 0.0% | |
| **Bipolar disorder** | 0.0% (Excl. crit.) | 0.0% | 0.0% | 3.2% | 0.0% | |
| **Anxiety disorder** | 19.7% | 0.0% | 0.0% | 26.5% | 0.0% | |
| **Adjustment disorder** | 2.4% | 0.0% | 0.0% | 1.9% | 0.0% | |
| **Somatoform disorder** | 2.0% | 0.0% | 0.0% | 12.9% | 0.0% | |
| **Eating disorder** | 0.5% | 0.0% | 0.0% | 2.6% | 0.0% | |
| **Sleep disorder** | NA | 0.0% | 0.4% | 18.7% | 100% | |
| **Substance-related disorder** | 0.0% | 0.0% | 0.0% | 5.8% | 0.0% | |
| **Developmental disorder** | NA | 0.0% | 0.4% | 8.4% | 0.0% | |
| **Psychotic disorder** | 0.0% | 0.0% | 0.0% | 1.9% | 0.0% | |
| **Dissociative disorder** | 0.0% | 0.0% | 0.0% | 1.3% | 0.0% | |
| **Personality disorder** | NA | 0.0% | 0.4% | 8.4% | 0.0% | |
| **Other** | 0.0% | 0.0% | 1.1% | 5.8% | 0.0% | |
| **Chronic Somatic (co)morbidity %** | 35.8%[d] | 0.0%[b] (Excl. crit.) | 100%[b] | 28.4%[b] | 17.8%[b] | χ2 (4) =663.37, p<.001 |

a. Based on Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I/P, version 2.0) (van Groenestijn et al., 1999) only.
b. Based on self-report only.
c. Based on medical reports and self-report.
d. Based on medical reports confirming the CFS diagnosis, conditions not exclusionary to CFS diagnosis according to the Fukuda criteria (Fukuda et al., 1994).

# Results

## Between-group differences in personality dimensions before controlling for confounders

| NEO-FFI | CFS (n=1130) | Healthy control (n=313) | Somatic (n=271) | Psychiatric outpatient (n=155) | Sleep disorder (n=101) | Test Statistic | p | Eta$^2$ |
|---|---|---|---|---|---|---|---|---|
| | Mean (SD) | Mean (SD) | Mean (SD) | Mean (SD) | Mean (SD) | | | |
| **Neuroticism** | 40.1 (8.32) | 29.1 (7.90) | 32.9 (9.11) | 42.3 (9.61) | 35.0 (9.86) | F(4,1965) = 133.96 | <.001 | .214 |
| **Extraversion** | 35.6 (7.02) | 43.5 (6.32) | 40.2 (7.05) | 34.7 (7.51) | 38.7 (7.21) | F(4.1965) = 96.24 | <.001 | .164 |
| **Openness** | 38.0 (6.66) | 38.4 (6.07) | 37.30 (6.79) | 37.6 (7.29) | 37.5 (7.18) | F(4,1965) = 1.22 | .299 | .002 |
| **Agreeableness** | 46.4 (5.55) | 46.7 (5.29) | 45.3 (5.54) | 42.6 (6.55) | 44.2 (5.64) | F(4,1965) = 20.00 | <.001 | .039 |
| **Conscientiousness** | 43.7 (6.64) | 48.0 (5.62) | 46.7 (6.43) | 43.0 (7.69) | 44.7 (7.42) | F(4,1965) = 35.21 | <.001 | .067 |

# Results

## Post-hoc group differences for the estimated means of N, E, A, C

| Group (I) | Group (J) | NEO-FFI | Mean difference (I-J) | Std. Error | p[a] |
|---|---|---|---|---|---|
| **CFS** | Healthy control | Neuroticism | 9.2 | .58 | <.001 |
| | | Extraversion | -9.0 | .53 | <.001 |
| | | Agreeableness | -1.1 | .38 | .039 |
| | | Conscientiousness | -4.3 | .42 | <.001 |
| | Somatic | Neuroticism | 5.3 | .61 | <.001 |
| | | Extraversion | -5.7 | .55 | <.001 |
| | | Agreeableness | 0.3 | .40 | 1.000 |
| | | Conscientiousness | -3.0 | .45 | <.001 |
| | Psychiatric outpatient | Neuroticism | -3.6 | .75 | <.001 |
| | | Extraversion | -0.4 | .67 | 1.000 |
| | | Agreeableness | 2.9 | .49 | <.001 |
| | | Conscientiousness | 0.7 | .56 | 1.000 |
| | Sleep disorder | Neuroticism | 3.3 | .91 | .003 |
| | | Extraversion | -4.2 | .78 | <.001 |
| | | Agreeableness | 1.0 | .59 | .823 |
| | | Conscientiousness | -1.1 | .68 | 1.000 |

# Results

- **Neuroticism:**
  - Healthy < Somatic = Sleep disorder < CFS < Psychiatric
- **Extraversion:**
  - Healthy > Somatic = Sleep disorder > CFS = Psychiatric
- **Openness:** no group effect
- **Agreeableness:**
  - Healthy = CFS = Somatic (= Sleep disorder = Psychiatric)
  - Healthy > Sleep disorder = Psychiatric
  - Healthy = CFS = Somatic > Psychiatric
- **Conscientiousness:**
  - Healthy > Sleep disorder = Psychiatric = CFS
  - (Healthy =) Somatic > Psychiatric = CFS

# Sensitivity analyses

- CFS-only shows the same significant differences compared to the healthy control and somatic groups.
- Neuroticism: CFS+P > CFS-only = CFS+CS
- The sleep disorder group showed only slightly more extraversion compared to the CFS-only group.
- For CFS+P group no significant differences were found compared to the psychiatric group.
- Neuroticism as shared vulnerability for CFS and psychiatric patients?

# Secondary analyses

- **Female vs male personality in all groups:**
  - Neuroticism: women > men
  - Agreeableness: women > men
  - Conscientiousness: women = men

- **Only in CFS group: Extraversion in women > men**

- **Postinfectious CFS vs non-infectious CFS: no personality differences**

# Conclusion

- **CFS vs healthy controls and somatic group: higher N, lower E, lower C**
  - Differences cannot be attributed to psychiatric comorbidity.
- **CFS vs psychiatric outpatients: lower N, higher A**
  - CFS+P // psychiatric outpatients
- **CFS-only vs sleep disorder group: only slightly lower E**
  - Comparble personality profiles
- **Personality assessment may help identify individuals at risk of CFS.**
- **Interventions could target negative consequences of increased neuroticism and diminished extraversion/activity and conscientiousness**.

# *Predictive value of the Big Five Personality dimensions on the Short and Long-Term Outcomes of a Group Cognitive Behaviour Therapy Cohort in Chronic Fatigue Syndrome*

**Jela Illegems, Inge Glazemakers, Jarl Kampen, Greta Moorkens, Filip Van Den Eede**

# State of the art: Cognitive behaviour therapy for CFS

- Moderate effect-sizes for CBT in CFS
- Short-term: further improvement of outcome, maintained up to 2 years after treatment.
- Long-term: strong decline in fatigue.
- Known predictors: age, fatigue severity, more symptoms, low activity, depressive symptoms, avoidant and catastrophizing cognitions, affective inhibition

# Personality and CBT outcome in CFS

- Neuroticism: Positive association found with mental quality of life only

# Objective of the current study

- To assess the predictive value of FFM personality dimensions on the response of adult CFS sufferers to a dedicated GCBT program for CFS

- To assess the necessity of a more personalized and differential treatment approach and to improve the outcomes of CBT for CFS.

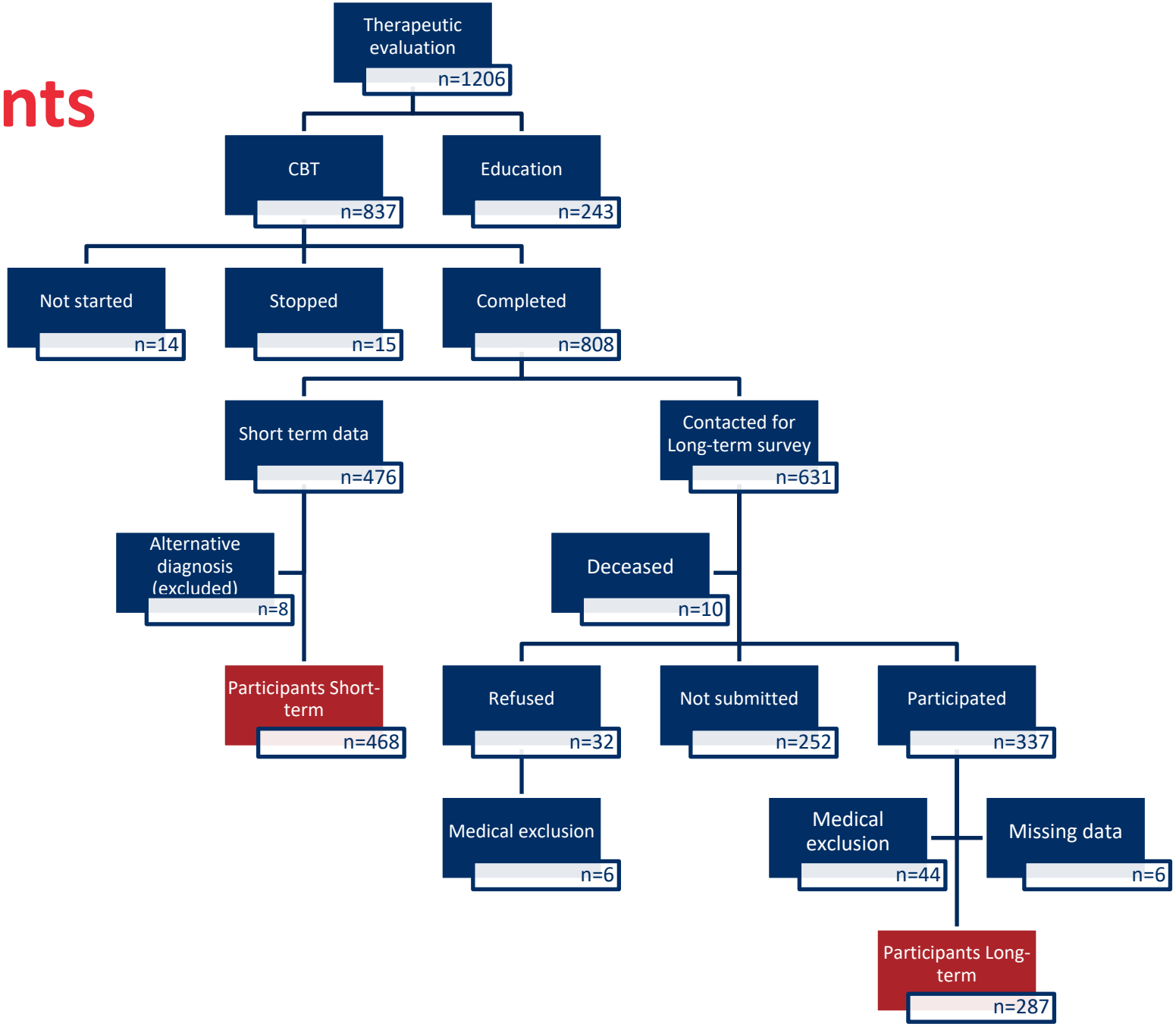
# Study design: single cohort study

- **590 CFS patients (University Reference Centre for CFS Antwerp)**
- **Structured CBT programme (9-12 months)**
  - 12 sessions in group
  - 3 individual sessions


8-18 years post-GCBT

- **Independent variable:**
  - NEO Five-Factor Inventory (NEO-FFI-NL): baseline only
- **Dependent variables:**
  - Checklist Individual Strenght (CIS; fatigue severity)
  - Medical Outcomes Short Form 36 Health Status Survey (SF-36; physical functioning)
  - Symptom Checklist-90 (SCL-90; total score), not assessed at long term FU

# Participants




**N=590**

# Method

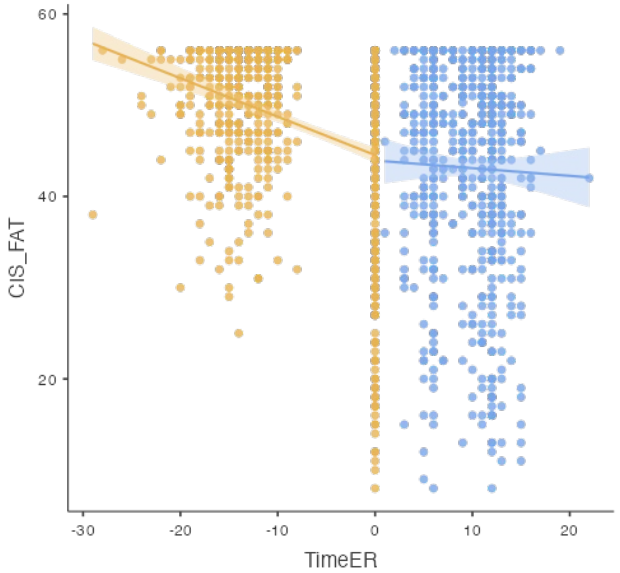
- **Statistical analysis**
  - Linear Mixed models (time series cross-sectional data)
    - Outcome variables:
      - CIS-fatigue
      - SF-36-physical functioning
      - SCL-90-total
    - Effects:
      - Fixed Intercept
      - Random Intercept
      - Residual
        - Fixed Time Intervention (Baseline-Post GCBT)
          - Fixed Time (all timepoints)
            - Random Time
              - 1 personality dimension (N, E, O, A, C)
                - 2 Interaction effects Personality*Time
    - Short term and long term separately

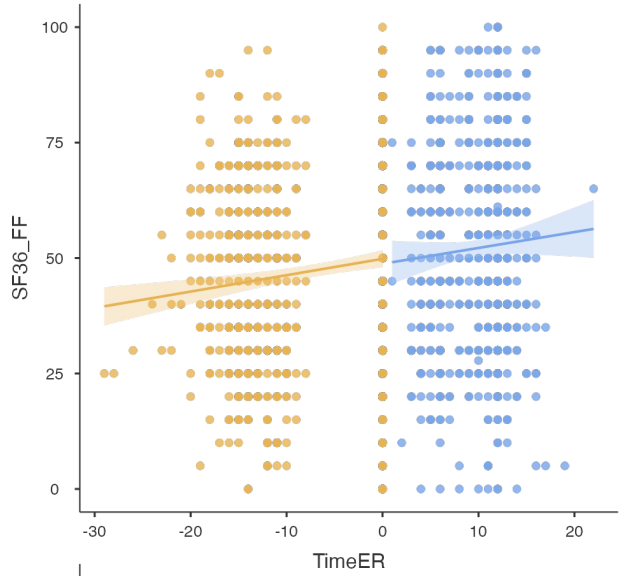
# Baseline demographic and clinical characteristics (N=590)

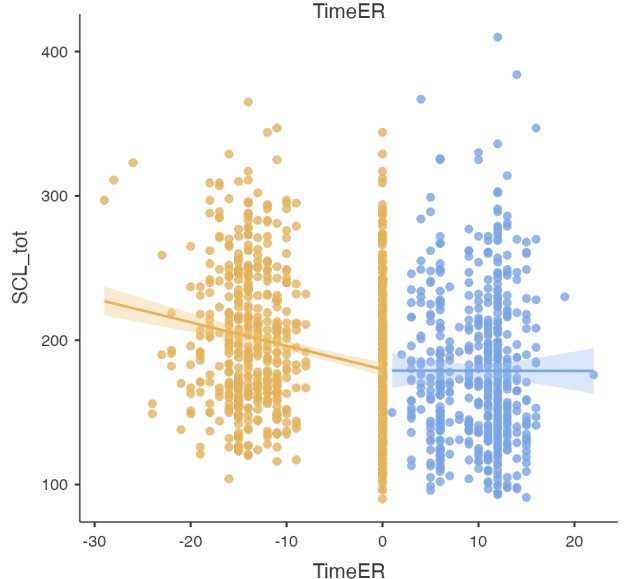
| | N (%) or mean (SD) |
|---|---|
| **Age in years** | 40.3 (8.29) |
| **Female** | 535 (90.7%) |
| **Marital status** | |
| Single | 137 (23.2%) |
| Married/cohabiting | 404 (68.5%) |
| Living apart together | 15 (2.5%) |
| Parental home | 34 (5.8%) |
| **Having children** | 404 (68.5%) |
| **Divorced** | 185 (31.4%) |
| **Educational level** | |
| Primary school | 20 (3.4%) |
| Lower secondary school | 98 (16.6%) |
| Upper secondary school | 217 (36.8%) |
| Bachelor | 190 (32.2%) |
| Master | 65 (11%) |

| | N (%) or mean (SD) |
|---|---|
| **Work situation** | |
| Paid work | 153 (25.9%) |
| Partial sick leave | 36 (6.1%) |
| Sick leave | 358 (60.7%) |
| Unemployed-seeking work | 8 (1.4%) |
| Unemployed-not seeking work | 3 (0.5%) |
| Other | 32 (5.4%) |
| **Fibromyalgia** | 130 (22.0%) |
| **Psychiatric comorbidity** | 218 (36.9%) |
| **Personality dimensions** | |
| NEO-FFI-N | 39.5 (8.33) |
| NEO-FFI-E | 36.0 (7.02) |
| NEO-FFI-O | 38.0 (6.59) |
| NEO-FFI-A | 47.1 (5.00) |
| NEO-FFI-C | 44.0 (6.58) |

# Results (preliminary): Short term effects




Descriptives

| | Timepoint | CIS_FAT | SF36_FF | SCL_tot |
|---|---|---|---|---|
| N | 1 | 461 | 461 | 461 |
| | 2 | 431 | 438 | 394 |
| | 3 | 237 | 236 | 187 |
| | 4 | 388 | 395 | 366 |
| Missing | 1 | 5 | 5 | 5 |
| | 2 | 9 | 2 | 46 |
| | 3 | 0 | 1 | 50 |
| | 4 | 9 | 2 | 31 |
| Mean | 1 | 50.7 | 44.5 | 203 |
| | 2 | 44.2 | 50.2 | 179 |
| | 3 | 43.7 | 51.0 | 179 |
| | 4 | 42.7 | 52.8 | 179 |
| Standard deviation | 1 | 5.98 | 19.2 | 48.5 |
| | 2 | 11.0 | 20.9 | 46.5 |
| | 3 | 10.9 | 21.1 | 49.1 |
| | 4 | 11.9 | 22.4 | 52.7 |

# Results (preliminary): CIS-FAT

| Effects (Fixed/Random) | AIC | BIC | $R^2m$ | $R^2c$ | ICC | Parameter estimate b (SE) | df | p-value | SD | Variance |
|---|---|---|---|---|---|---|---|---|---|---|
| F Intercept | | | | | | 45.37 (2.483) | 473 | <0.001 | | |
| F Time Intervention | | | | | | -0.30 (0.066) | 1101 | <0.001 | | |
| F Time | | | | | | -0.135 (0.043) | 1107 | 0.002 | | |
| F NFFI-N | | | | | | 0.13 (0.043) | 462 | 0.003 | | |
| F Age Pre | | | | | | -0.15 (0.044) | 465 | <0.001 | | |
| R Intercept | | | | | 0.426 | | | | 6.44 | 41.5 |
| Residual | 10986 | 11042 | 0.123 | 0.496 | | | | | 7.48 | 55.9 |

**NFFI-N**

| Effects (Fixed/Random) | AIC | BIC | $R^2m$ | $R^2c$ | ICC | Parameter estimate b (SE) | df | p-value | SD | Variance |
|---|---|---|---|---|---|---|---|---|---|---|
| F Intercept | | | | | | 50.32(1.838) | 490 | <0.001 | | |
| F Time Intervention | | | | | | -0.30 (0.066) | 1102 | <0.001 | | |
| F Time | | | | | | -0.14 (0.042) | 1108 | 0.001 | | |
| F age Pre | | | | | | -0.15 (0.044) | 468 | <0.001 | | |
| R Intercept | | | | | 0.433 | | | | 6.53 | 42.6 |
| Residual | 10992 | 11038 | 0.112 | 0.496 | | | | | 7.47 | 55.9 |

**NFFI-E**
**NFFI-O**
**NFFI-A**
**NFFI-C**

**Improvement of fatigue during and after GCBT.**
**Only a main effect for Neuroticism.**
**No interaction effects with Time.**

# Results (preliminary): SF-36 Physical Functioning

NFFI-N

| Effects (Fixed/Random) | AIC | BIC | $R^2m$ | $R^2c$ | ICC | Parameter estimate b (SE) | df | p-value | SD | Variance |
|---|---|---|---|---|---|---|---|---|---|---|
| F Intercept | | | | | | 59.44 (3.897) | 465 | <0.001 | | |
| F Time | | | | | | 0.34 (0.040) | 425 | <0.001 | | |
| F NFFI-N | | | | | | -0.26 (0.097) | 462 | 0.008 | | |
| R Intercept | | | | | 0.706 | | | | 16.91 | 285.96 |
| R Time | | | | | | | | | 0.58 | 0.34 |
| Residual | 12937 | 12980 | 0.036 | 0.739 | | | | | 10.91 | 118.99 |

NFFI-E
NFFI-O
NFFI-A
NFFI-C

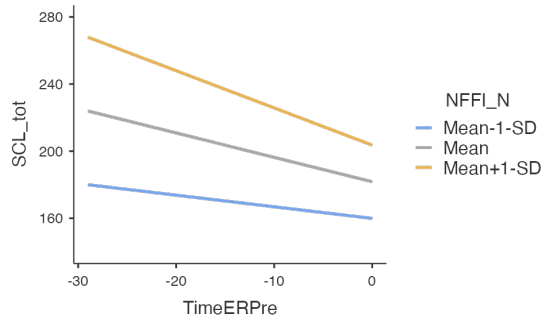
| Effects (Fixed/Random) | AIC | BIC | $R^2m$ | $R^2c$ | ICC | Parameter estimate b (SE) | df | p-value | SD | Variance |
|---|---|---|---|---|---|---|---|---|---|---|
| F Intercept | | | | | | 49.34 (.843) | 462 | <0.001 | | |
| F Time | | | | | | 0.34 (0.040) | 425 | <0.001 | | |
| R Intercept | | | | | 0.711 | | | | 17.09 | 291.92 |
| R Time | | | | | | | | | 0.58 | 0.34 |
| Residual | 12942 | 12977 | 0.026 | 0.740 | | | | | 10.90 | 118.86 |

**During and after GCBT similar (small) improvement of physical functioning.**
**Only a main effect for Neuroticism.**
**No interaction effects with Time.**

# Results (preliminary): SCL-90-Total

| Effects (Fixed/Random) | AIC | BIC | $R^2m$ | $R^2c$ | ICC | Parameter estimate b (SE) | df | p-value | SD | Variance |
|---|---|---|---|---|---|---|---|---|---|---|
| F Intercept | | | | | | 72.72 (8.700) | 554 | <0.001 | | |
| F Time Intervention | | | | | | 2.14 (.061) | 843 | <0.001 | | |
| F Time | | | | | | -0.11 (.157) | 959 | 0.502 | | |
| F NFFI-N | | | | | | 2.63 (.221) | 555 | <0.001 | | |
| F Psychiatry | | | | | | 12.13 (3.140) | 465 | <0.001 | | |
| F Time Intervention *NFFI-N | | | | | | -0.09 (.014) | 719 | <0.001 | | |
| R Intercept | | | | | 0.655 | | | | 31.59 | 998.13 |
| R Time | | | | | | | | | 1.15 | 1.33 |
| Residual | 13890 | 13948 | 0.356 | 0.794 | | | | | 22.92 | 525.30 |

**NFFI-N**




| Effects (Fixed/Random) | AIC | BIC | $R^2m$ | $R^2c$ | ICC | Parameter estimate b (SE) | df | p-value | SD | Variance |
|---|---|---|---|---|---|---|---|---|---|---|
| F Intercept | | | | | | 252.83 (18.642) | 467 | <0.001 | | |
| F Time Intervention | | | | | | -1.5 (.227) | 672 | <0.001 | | |
| F Time | | | | | | -0.10 (.160) | 953 | 0.522 | | |
| F NFFI-A | | | | | | -1.73 (.389) | 463 | <0.001 | | |
| F Psychiatry | | | | | | 24.21 (3.924) | 463 | <0.001 | | |
| R Intercept | | | | | 0.740 | | | | 39.08 | 1527.52 |
| R Time | | | | | | | | | 1.23 | 1.52 |
| Residual | 14162 | 14206 | 0.139 | 0.792 | | | | | 23.14 | 535.43 |

**NFFI-A**

NFFI-E

NFFI-O

NFFI-C

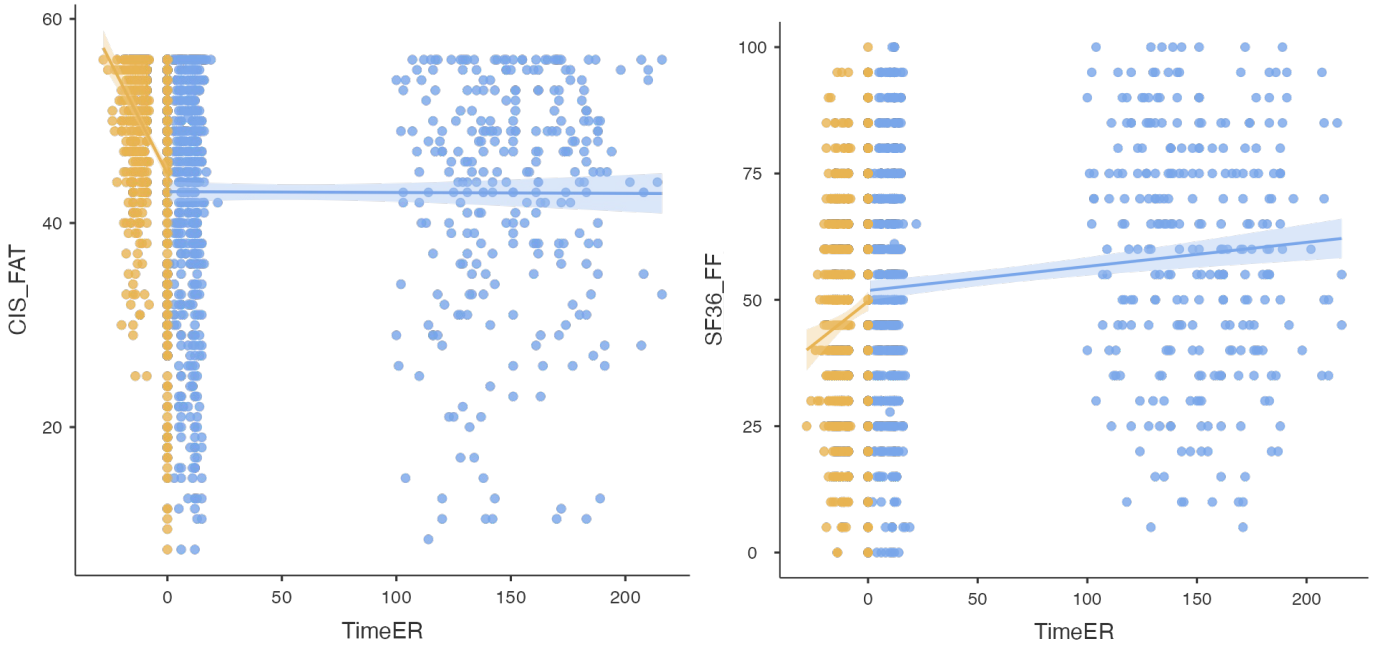
**Only significant improvement of psychological symptoms immediately after GCBT.**

**Main effect of all personality dimensions.**

**Only an interaction effect for Neuroticism with Time Intervention.**

**In a multivariate model, only the effects of neuroticism and agreeableness remain significant.**

# Results (preliminary): Long term effects (8-18 years)




Descriptives

| | Timepoint | CIS_FAT | SF36_FF | SCL_tot |
|---|---|---|---|---|
| N | 1 | 539 | 540 | 540 |
| | 2 | 405 | 412 | 371 |
| | 3 | 220 | 219 | 173 |
| | 4 | 364 | 370 | 343 |
| | 5 | 281 | 280 | 0 |
| Missing | 1 | 6 | 5 | 5 |
| | 2 | 9 | 2 | 43 |
| | 3 | 0 | 1 | 47 |
| | 4 | 8 | 2 | 29 |
| | 5 | 6 | 7 | 287 |
| Mean | 1 | 51.0 | 44.8 | 203 |
| | 2 | 44.2 | 50.2 | 180 |
| | 3 | 43.7 | 50.8 | 180 |
| | 4 | 42.8 | 52.8 | 178 |
| | 5 | 42.8 | 59.5 | NaN |
| Standard deviation | 1 | 5.83 | 19.6 | 47.8 |
| | 2 | 11.0 | 20.9 | 46.8 |
| | 3 | 10.7 | 21.3 | 49.7 |
| | 4 | 11.8 | 22.4 | 52.6 |
| | 5 | 11.3 | 23.5 | NaN |

## CIS-FAT and SF-36-PF:

- Only a main effect for neuroticism.
- No interaction effects with time.

Subjectief hersteld: 18.8%

Subj. + CIS-FAT<35 + SF-36-FF>80: 10.4%

# Conclusions

- Fatigue severity and physical functioning improve during and after GCBT.
- Psychological symptoms diminish during GCBT.
- The achieved levels are maintained 8-18 years after GCBT.

- Fatigue severity and physical functioning in CFS are only associated with neuroticism.
- Personality does not predict improvement in fatigue and physical functioning after GCBT and should be no exclusion criterion.
- Patients high in neuroticism tend to improve more on psychological distress.


Thanks for listening!
Questions?