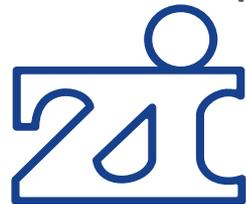


# Neurobiologische Hintergründe von selbstverletzendem Verhalten

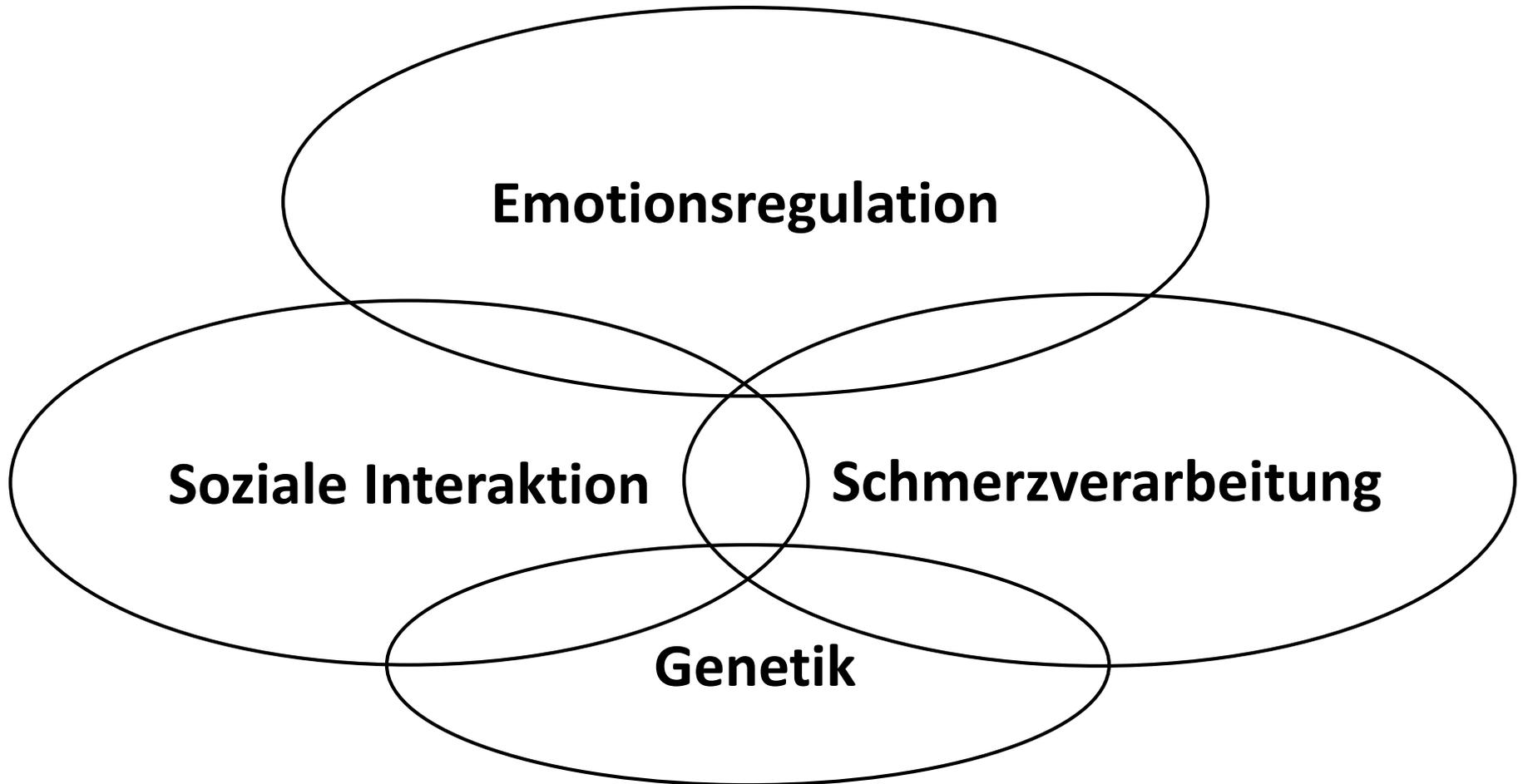
Christian Schmahl

Klinik für Psychosomatik und  
Psychotherapeutische Medizin

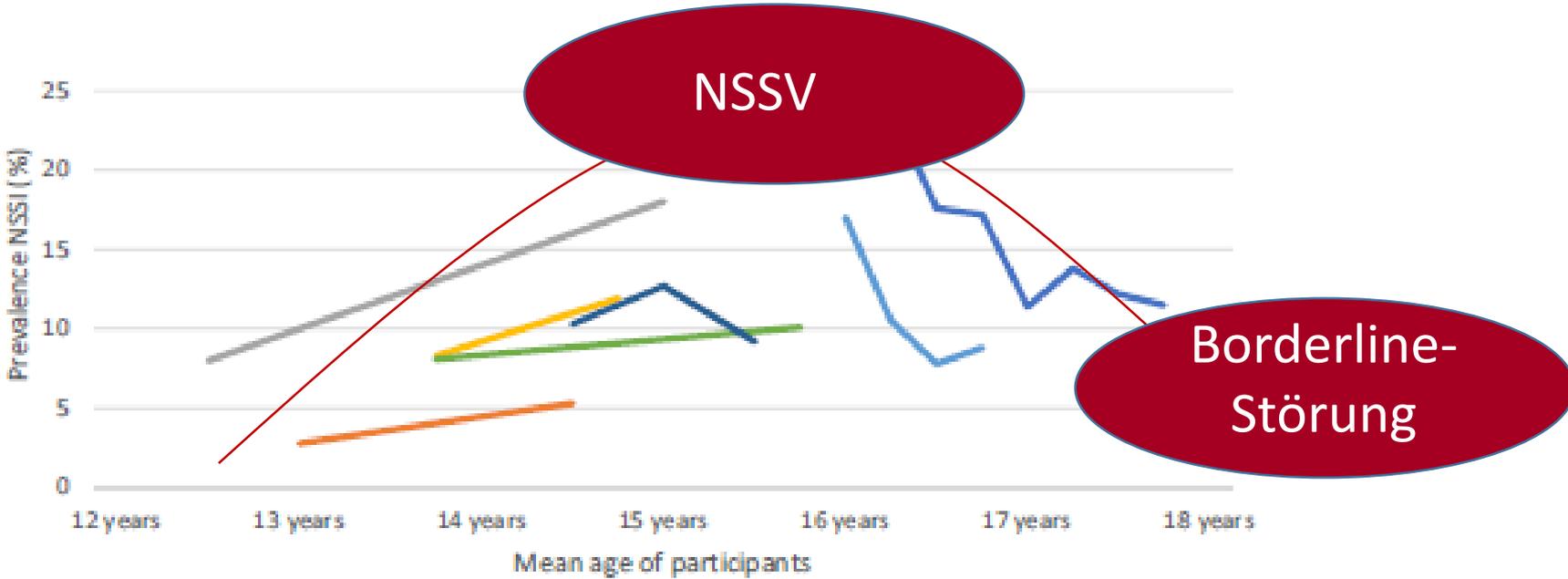


Zentralinstitut für  
Seelische Gesundheit

Landesstiftung  
des öffentlichen Rechts

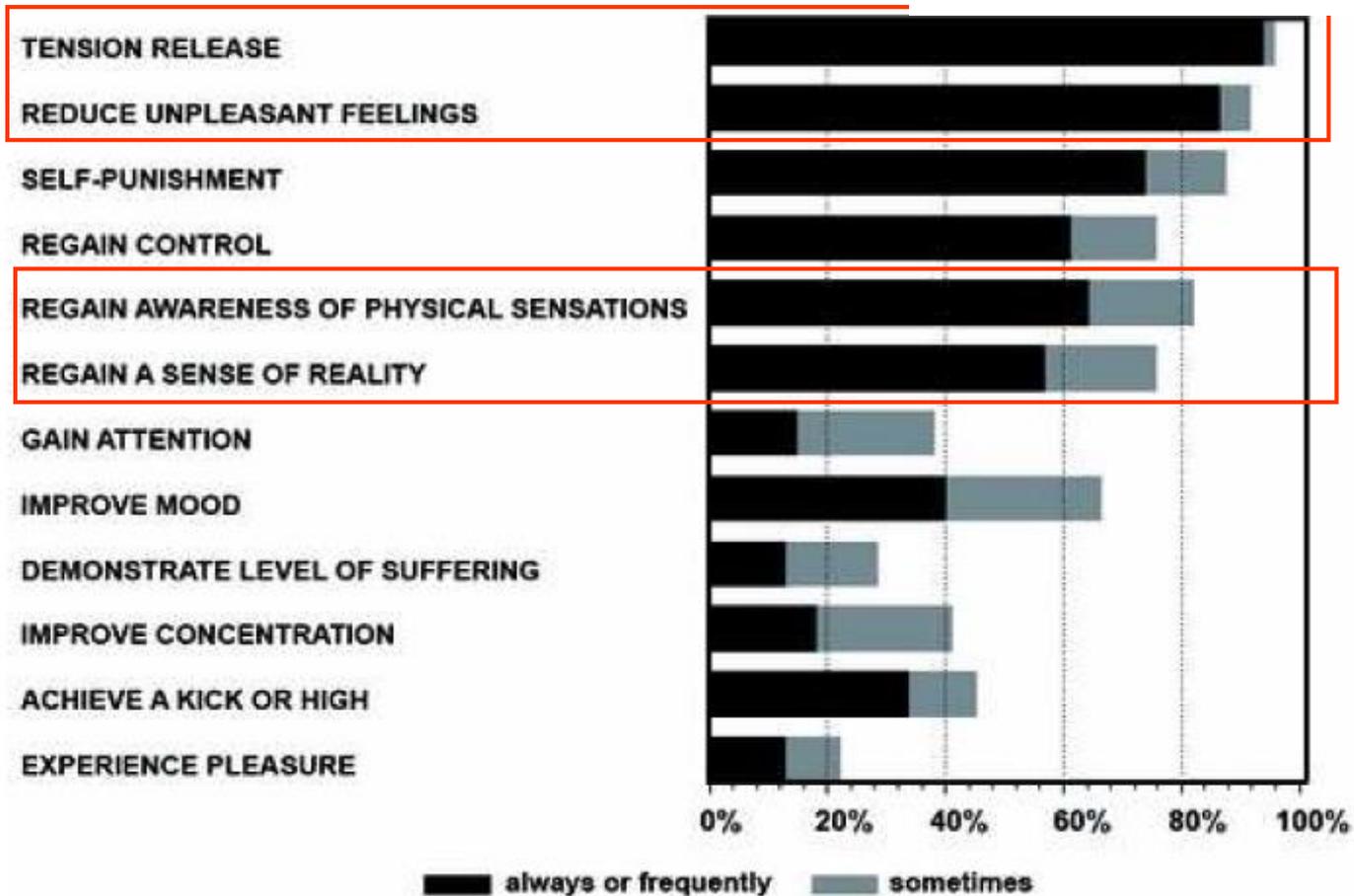


# Selbstverletzungen in der Adoleszenz



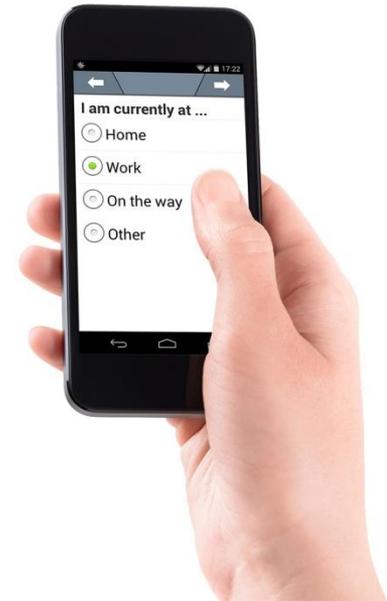
- Wan et al., 2014 [18]
- Hankin & Abela, 2011 [26]
- Barrocas et al., 2014 [21]
- You et al., 2014 [20]
- Baetens et al., 2014 [28]
- Hasking et al., 2013 [29]; Tatnell et al., 2014 [35]
- Voon et al., 2014 [30]

# Motive für Selbstverletzungen bei der BPS



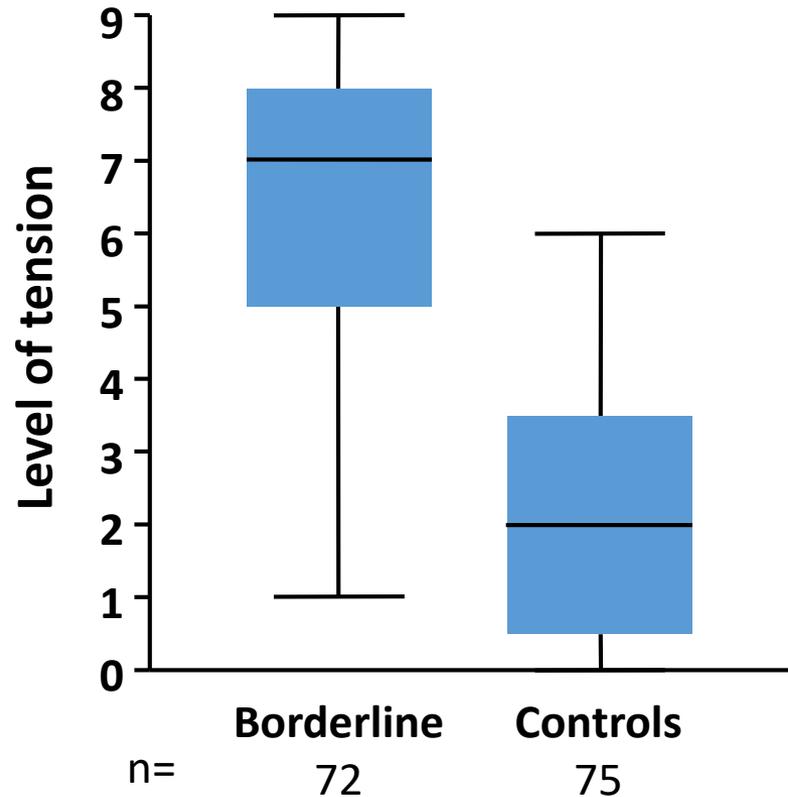
# Erfassung von psychometrischen und physiologischen Echtzeitdaten

- **Ecological Momentary Assessment (EMA)**
  - Real life und real time - Daten
  - Kein recall bias
  - Tracking von fluktuierenden Variablen (z.B. Emotionen, Hormone)
- Z.B. App-basierte Interventionen, daily diary
- Verschiedene Formen des Assessments:
  - Random prompts
  - Event based prompts
  - Mixed design

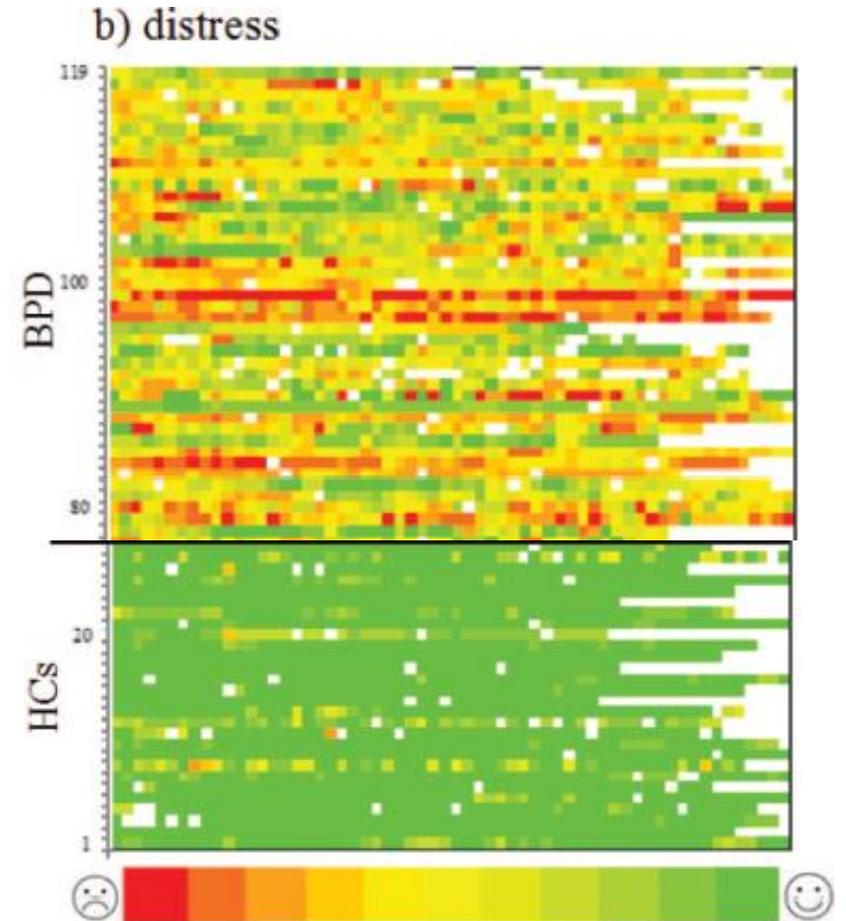


Source: <https://www.movisens.com/en/products/movisensxs/>

# Aversive Spannung und Affektive Instabilität

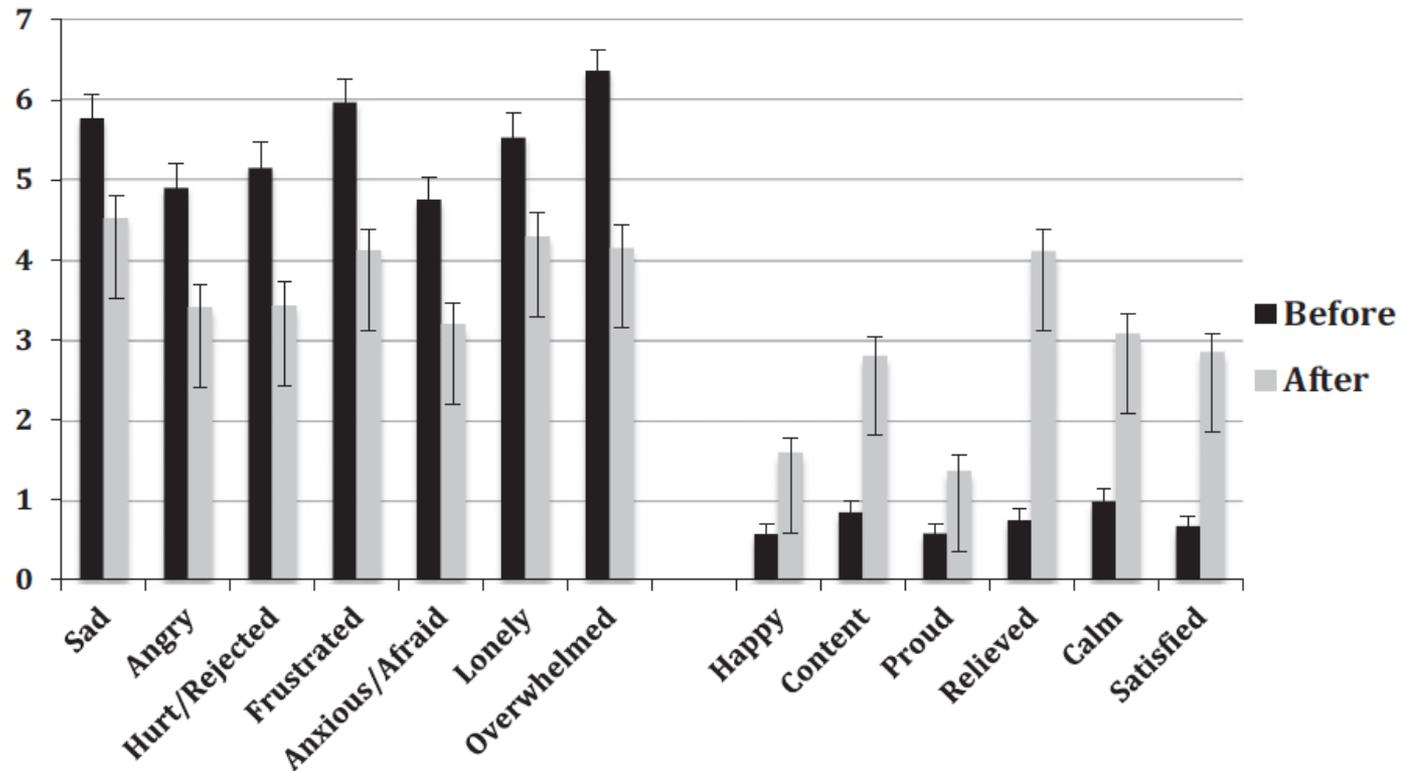


Stiglmayr et al., Acta Psychiatr Scand 2005

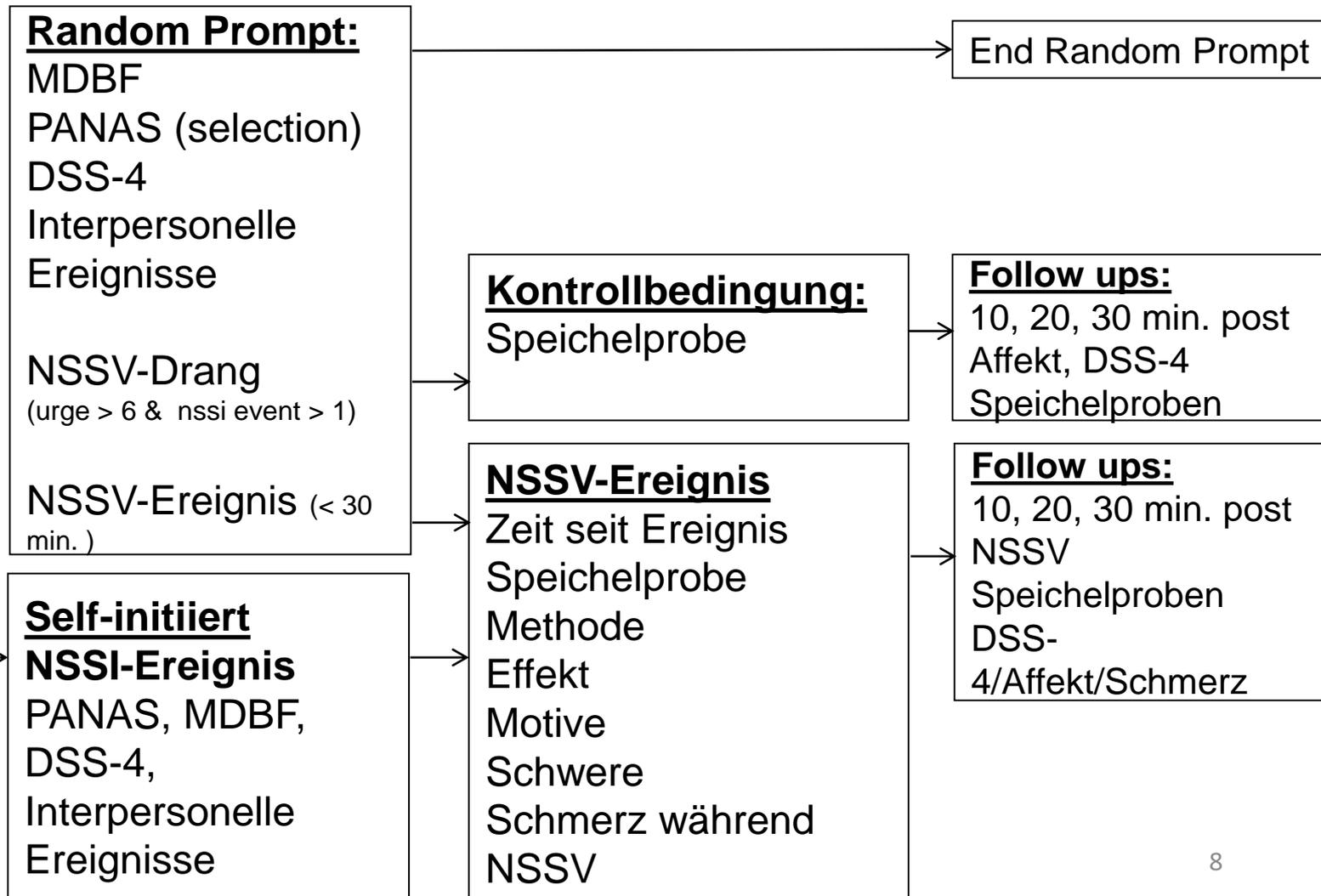


Santangelo et al., J Abnorm Psychology 2015

# Veränderungen von Emotionen kurz nach NSSV

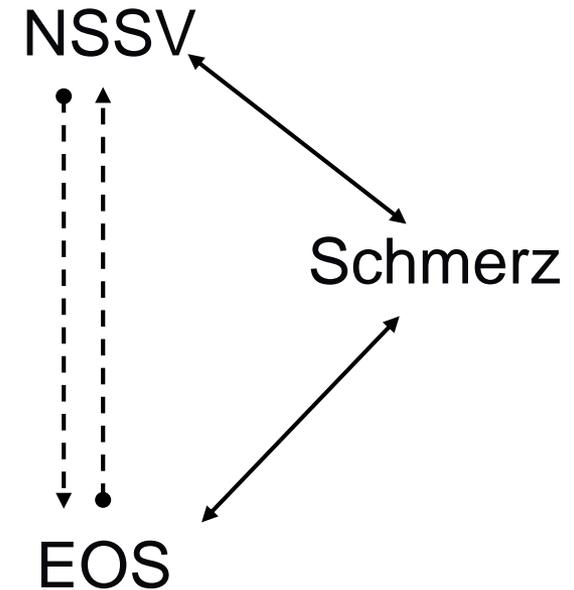


# EMA-Studie-Design

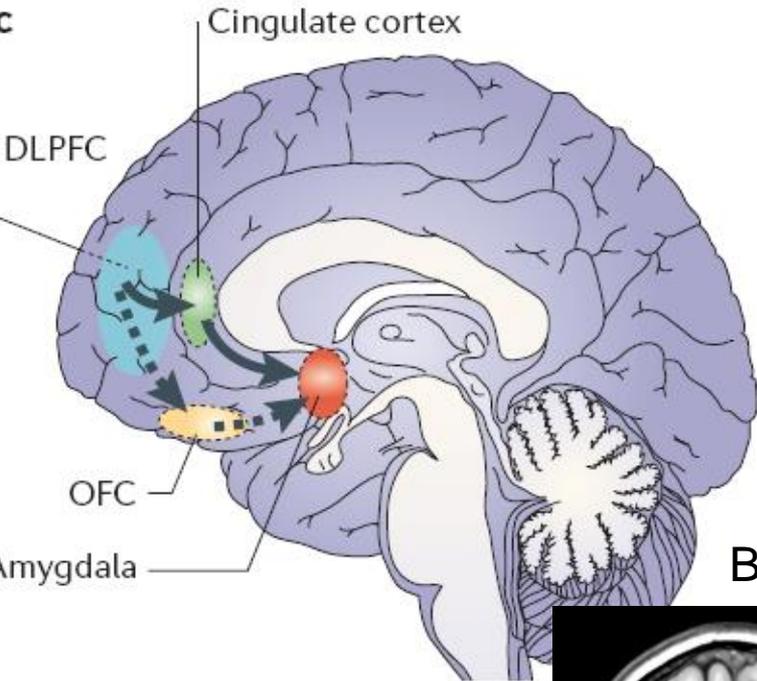


# NSSV und das Endogene Opioid-System

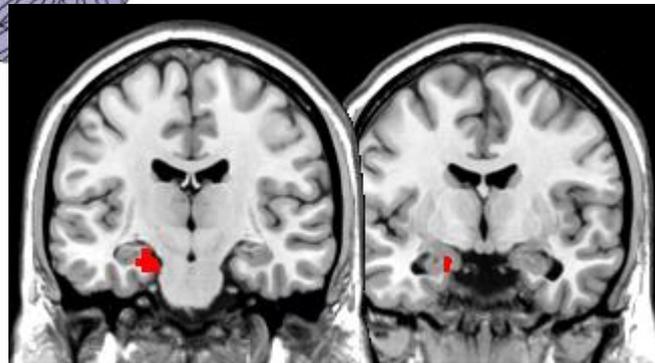
- Drei Klassen von Opioiden:  **$\beta$ -Endorphin**, Enkephalin und Dynorphin ( $\mu$ -,  $\delta$ -, and  $\kappa$ -opioid receptors; Dhawan et al., 1996)
- **Aktivierung von  $\beta$ -Endorphin**: sozialer, emotionaler oder körperlicher Schmerz (Bresin & Gordon, 2013)
- Vermutung niedrigerer  $\beta$ -Endorphin-Spiegel bei NSSV/BPS (Prossin et al., 2010; Stanley et al., 2010)
  - Dysphorie
  - Innere Leere



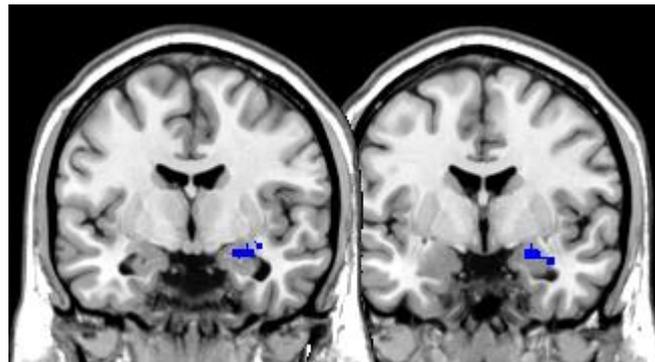
→ Können Abweichungen bei  $\beta$ -Endorphin mit NSSV in Verbindung gebracht werden?



Borderline PD



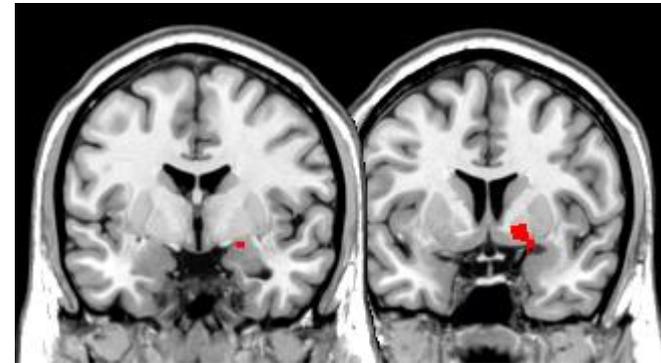
Major Depression



# STAR

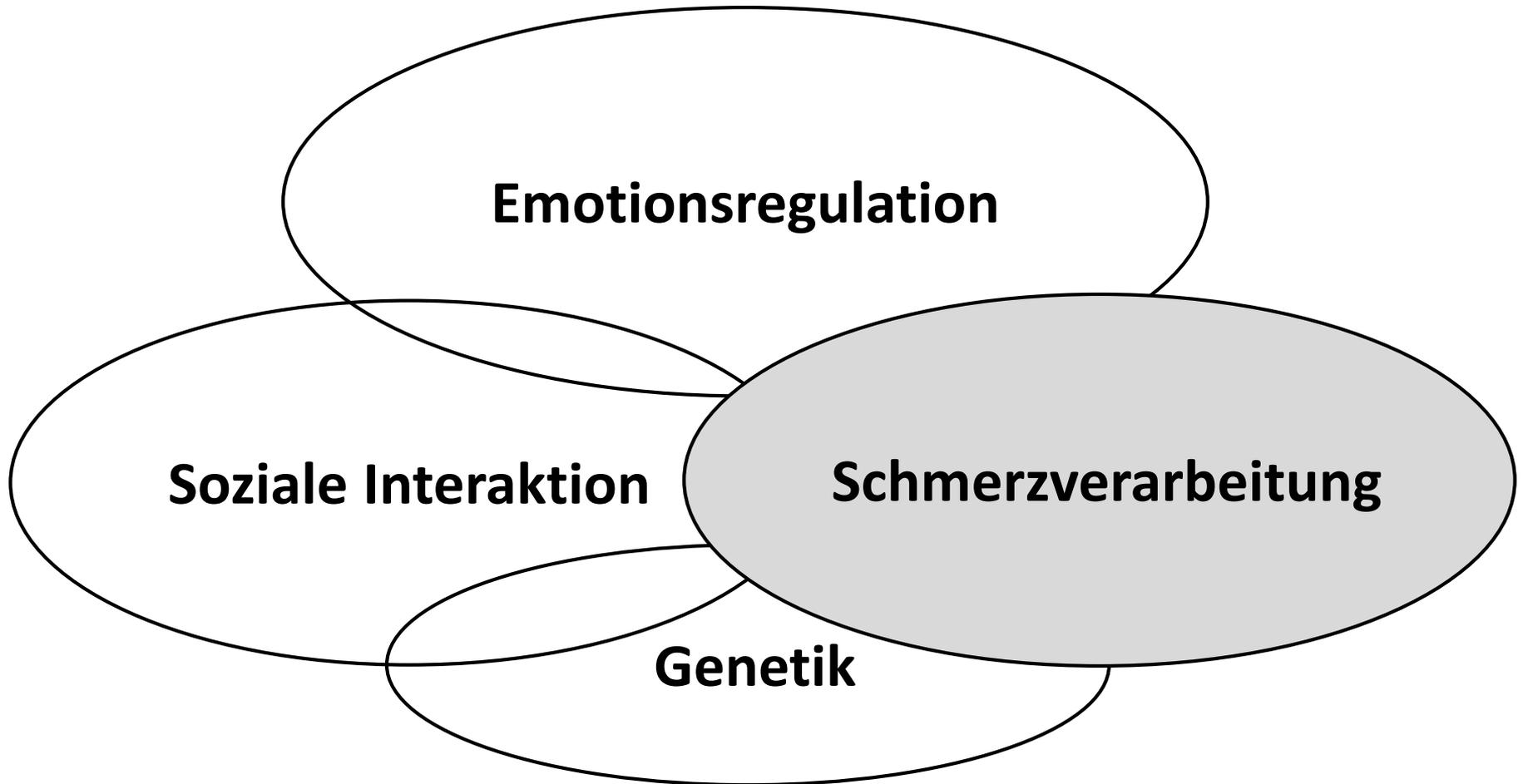
SELF-INJURY · TREATMENT ASSESSMENT RECOVERY

PTSD

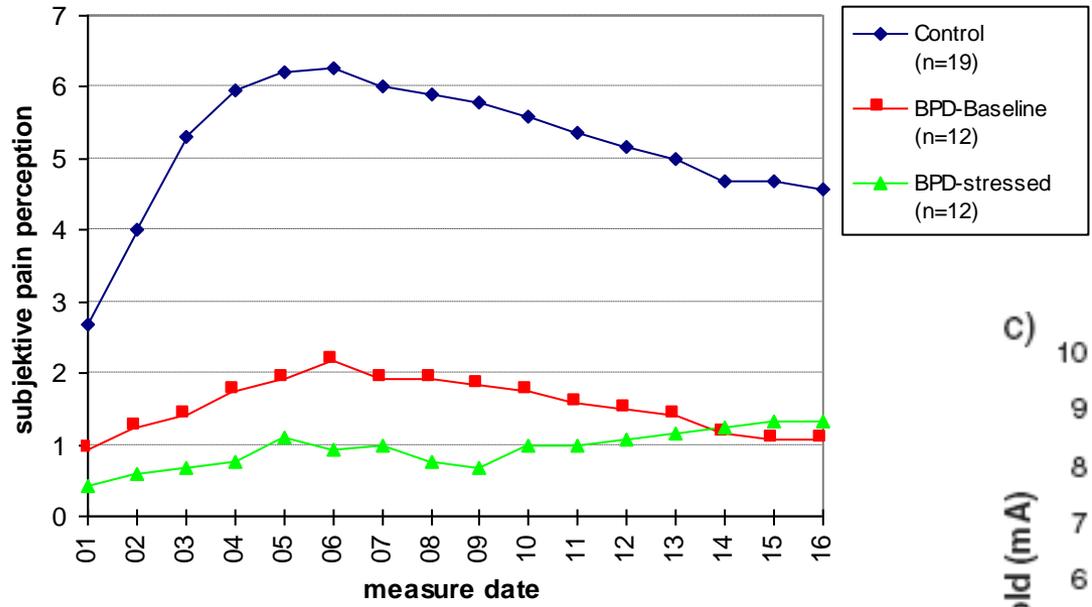


Meta-analysis of regions with positive (red) and negative (blue) response to emotional stimuli (significant with correction)

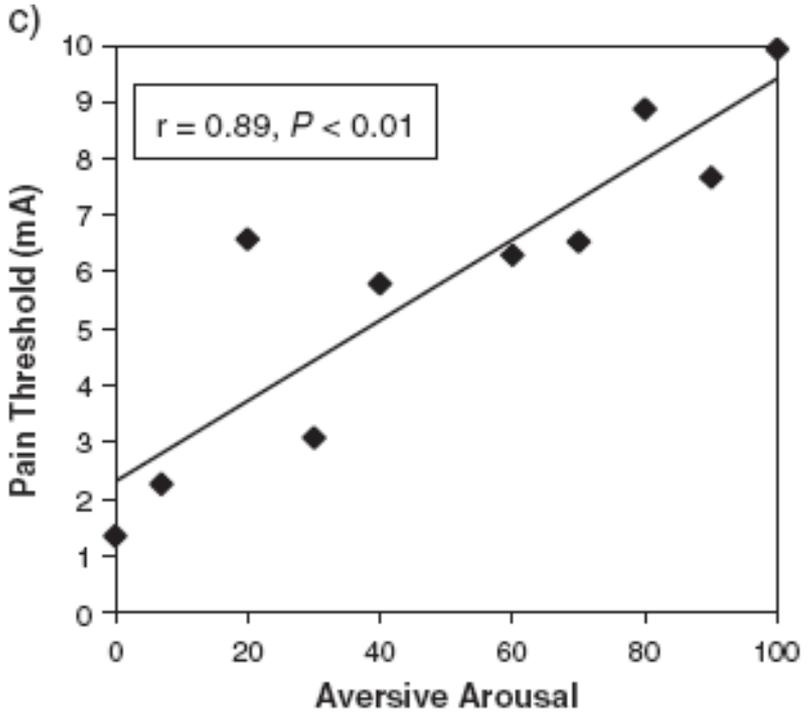




# Schmerzsensitivität und Stress bei der BPS



Bohus et al., Psychiatry Res 2000

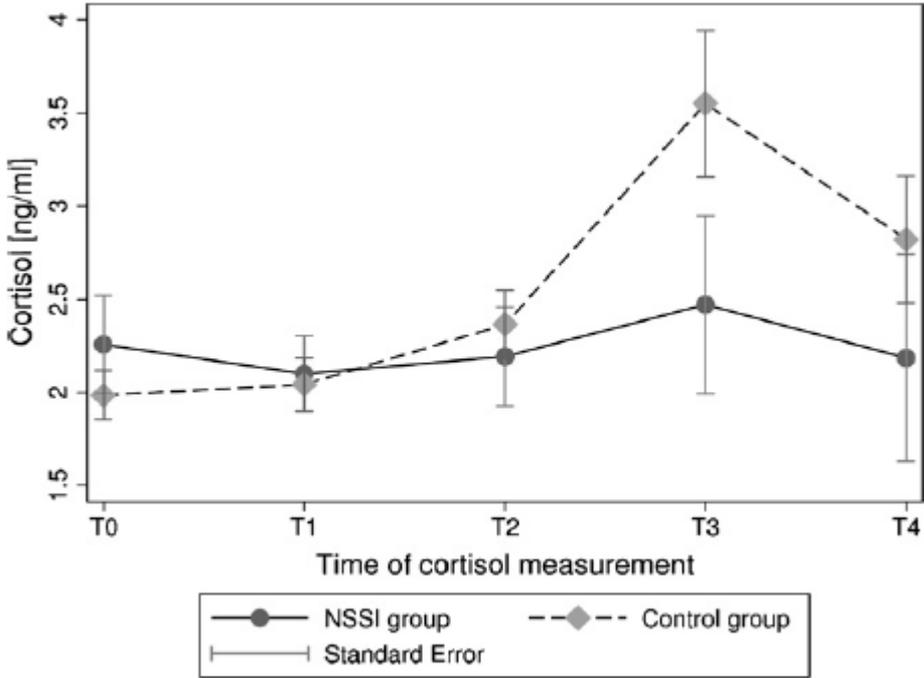


Ludäscher et al., Psychiatry Res 2007

# Cortisol-Stressreagibilität bei NSSV

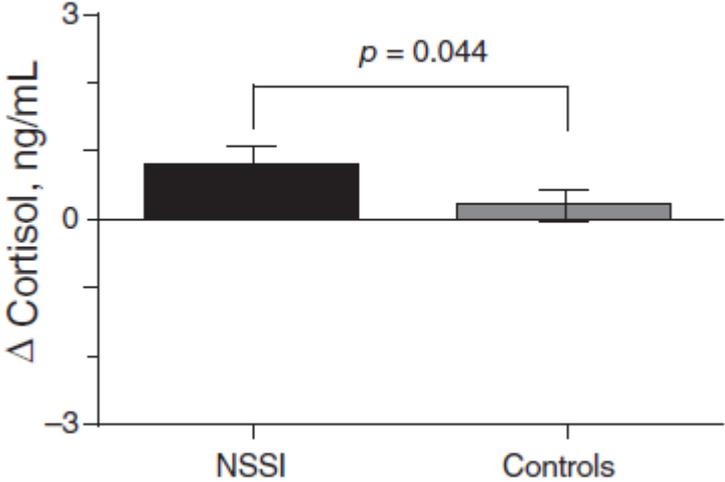


### TSST



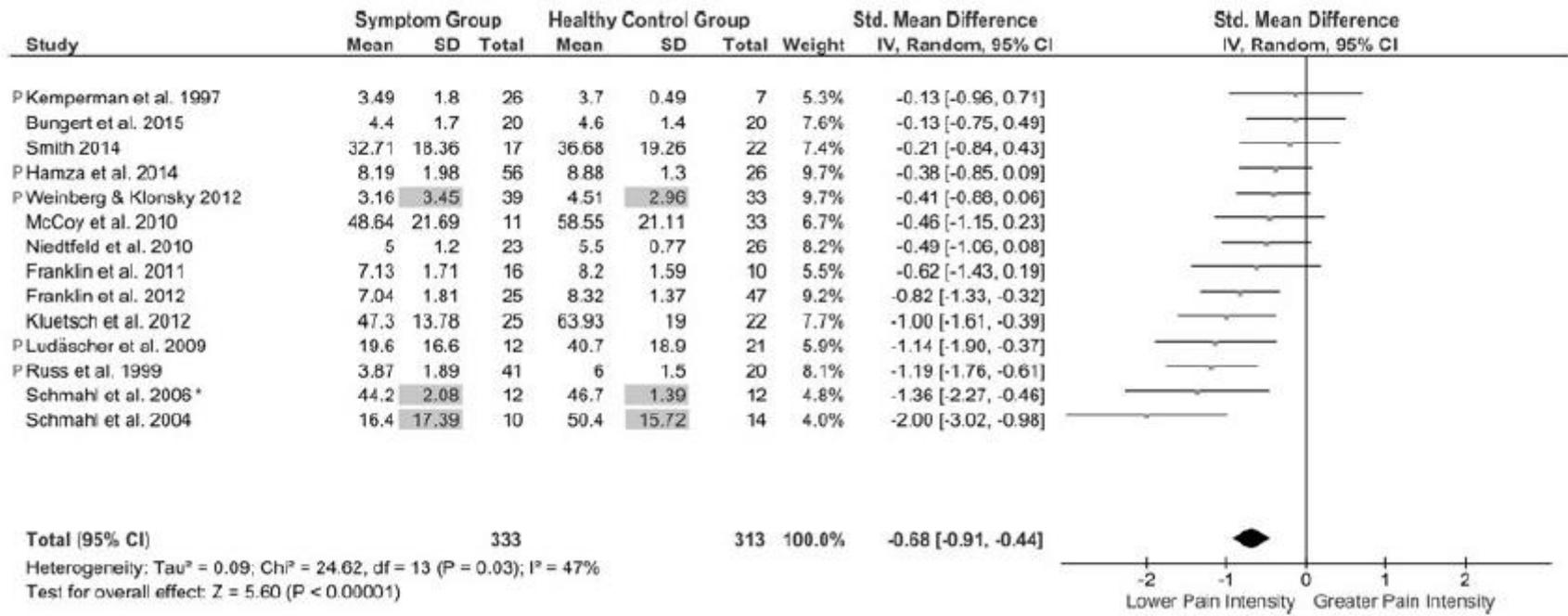
Kaess et al. 2012

### Schmerz



Koenig et al. 2017

# Meta-Analyse zur Schmerzsensitivität bei NSSV

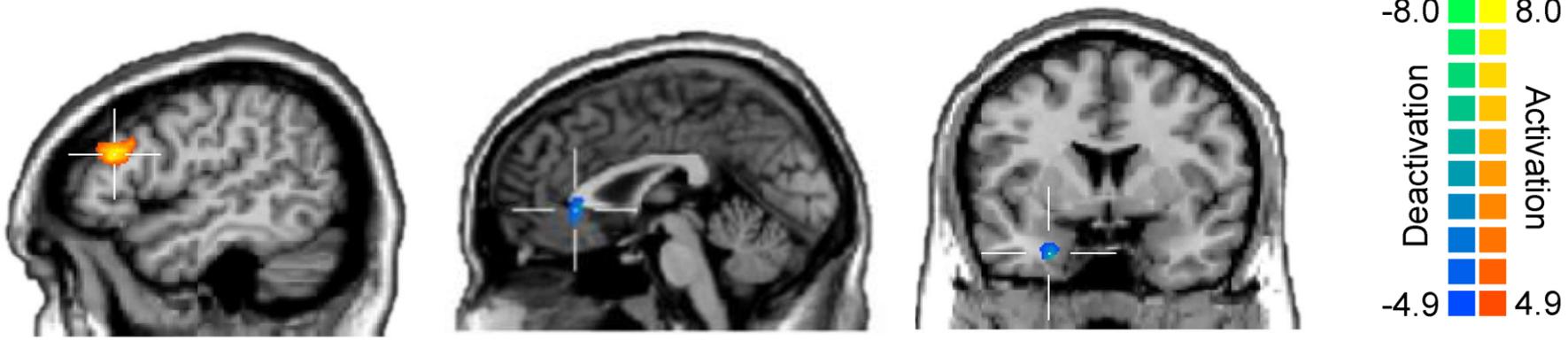
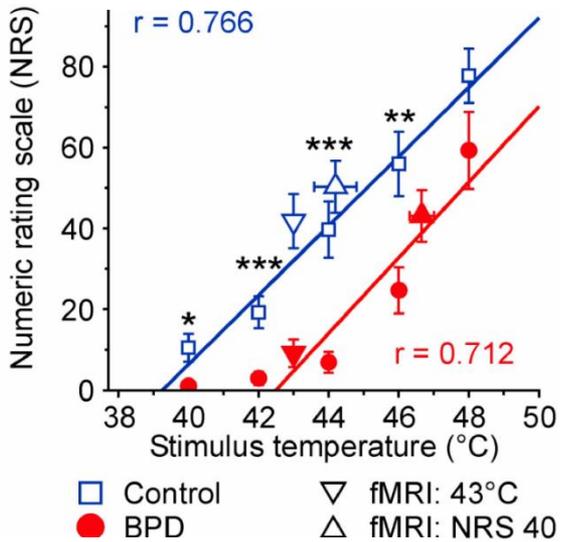


König et al. 2016

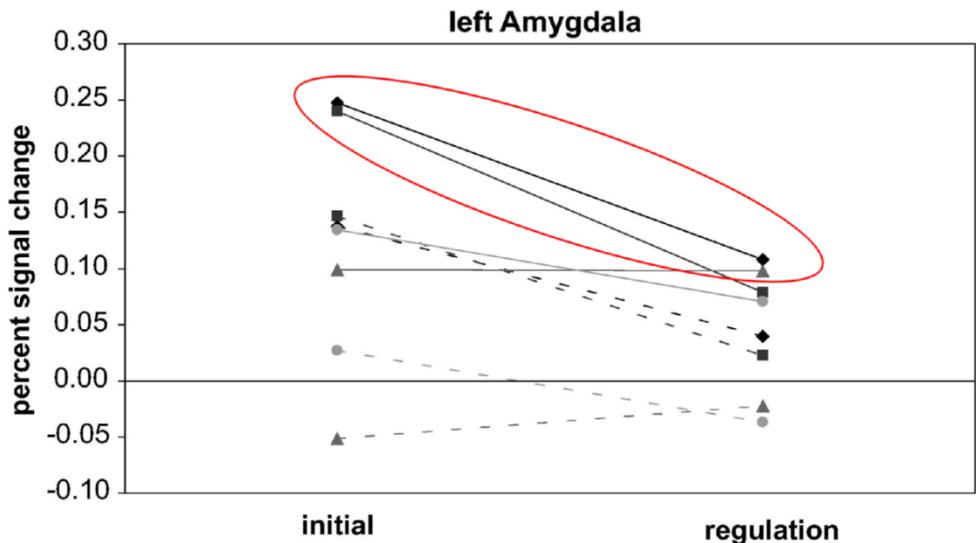
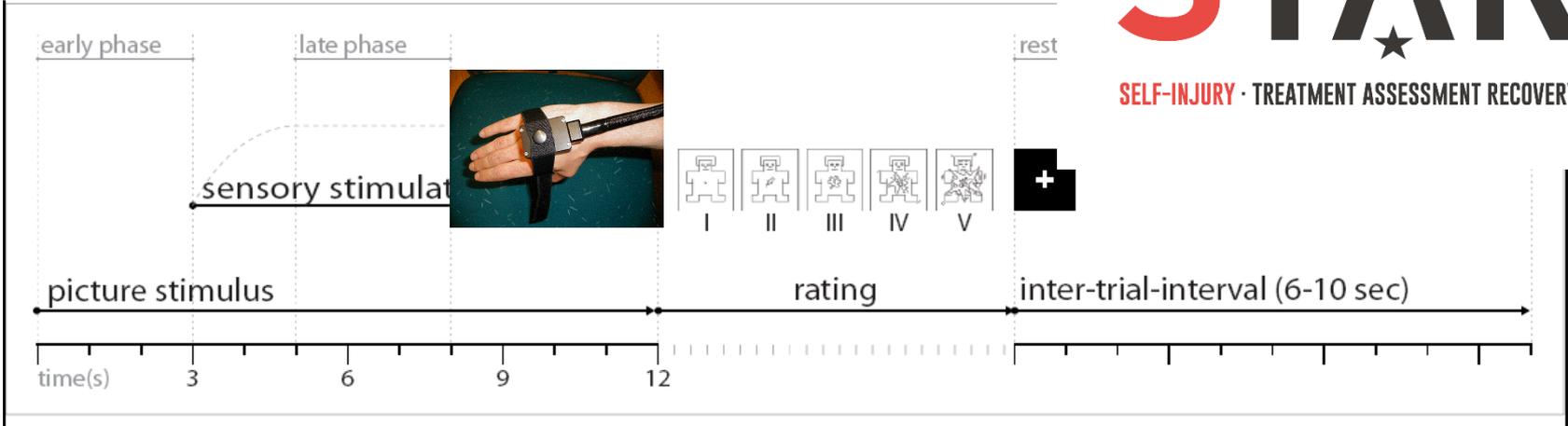
# Neuronale Schmerzverarbeitung bei der BPS



SELF-INJURY · TREATMENT ASSESSMENT RECOVERY



# Emotionsregulation durch sensorische Reize bei der BPS

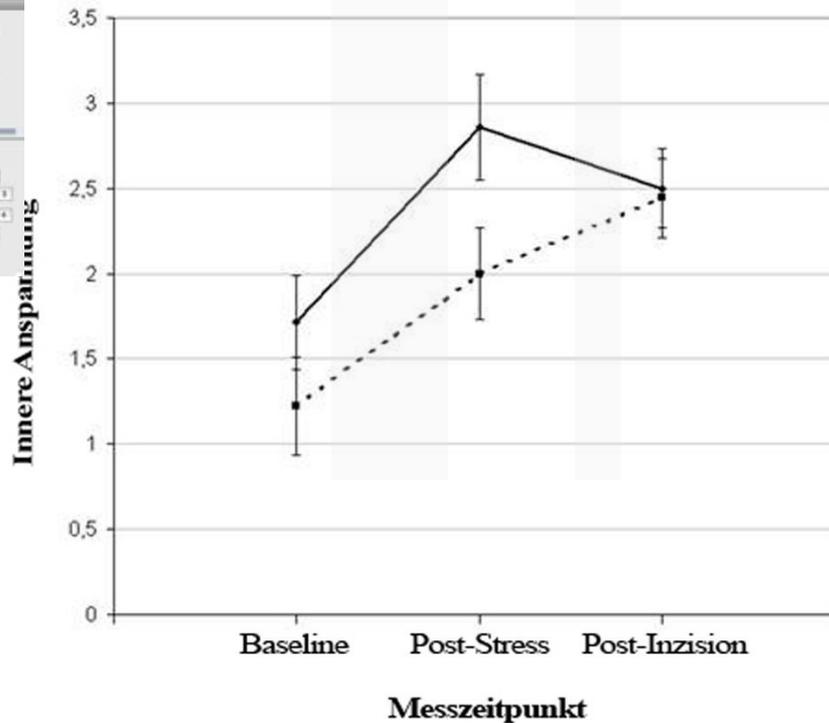


◆ negative hot
■ negative warm
▲ neutral hot
● neutral warm
— BPD
- - HC

# Emotionale Regulation durch Inzision

# STAR

SELF-INJURY · TREATMENT ASSESSMENT RECOVERY



—●— BPS ···■··· GK

**BPD:** n=14, all unmedicated, frequent ( $\geq 1$ /week) SIB, mean age 26.8 yrs.

**HC:** n=18, mean age 25.7 yrs.

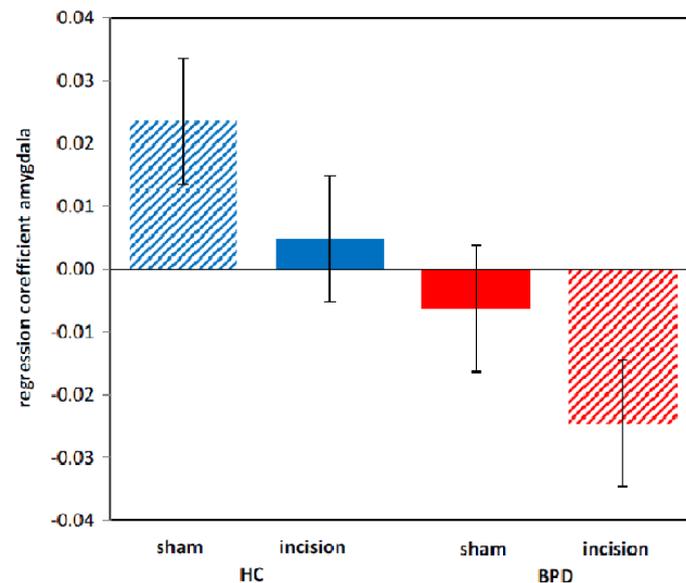
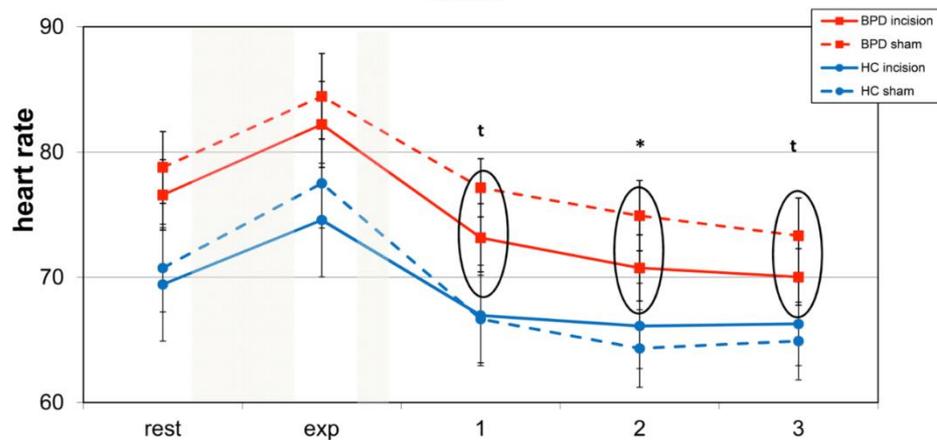
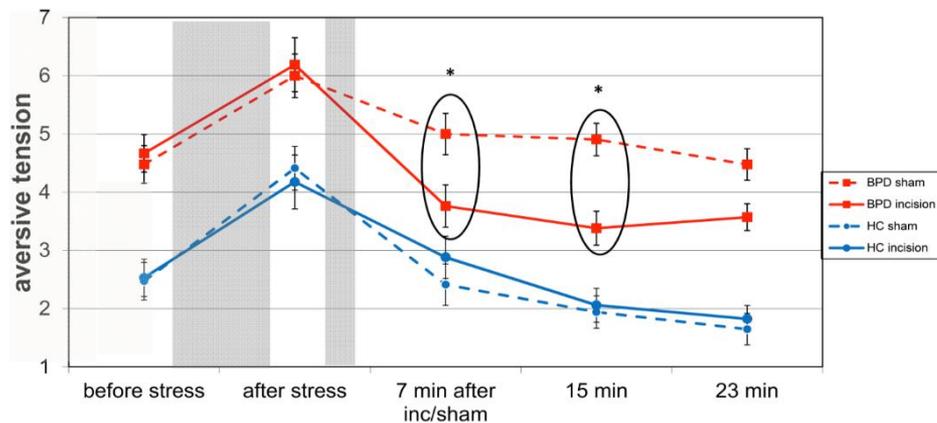
3-way ANOVAS  
(time\*condition\*group)

Reitz et al.,  
JPD 2012

# Emotionale Regulation durch Inzision -fMRT



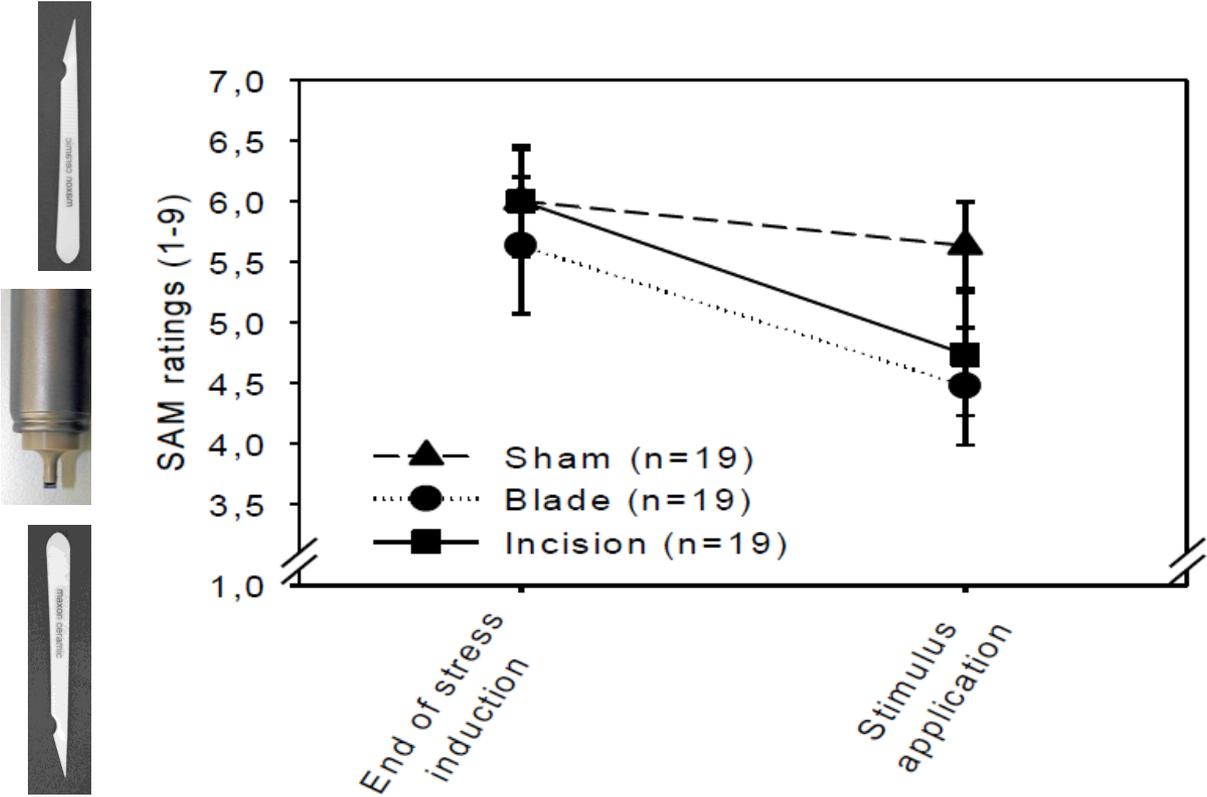
SELF-INJURY · TREATMENT ASSESSMENT RECOVERY



# Einfluss der Gewebeverletzung



SELF-INJURY · TREATMENT ASSESSMENT RECOVERY

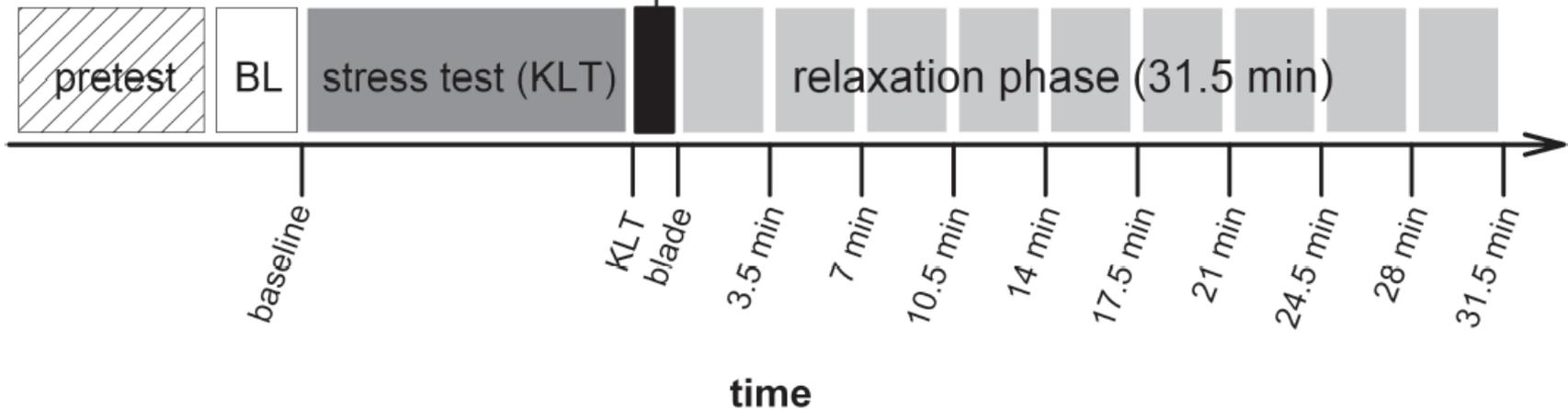


Willis et al., Pain 2017

# Einfluss des Sehens von Blut



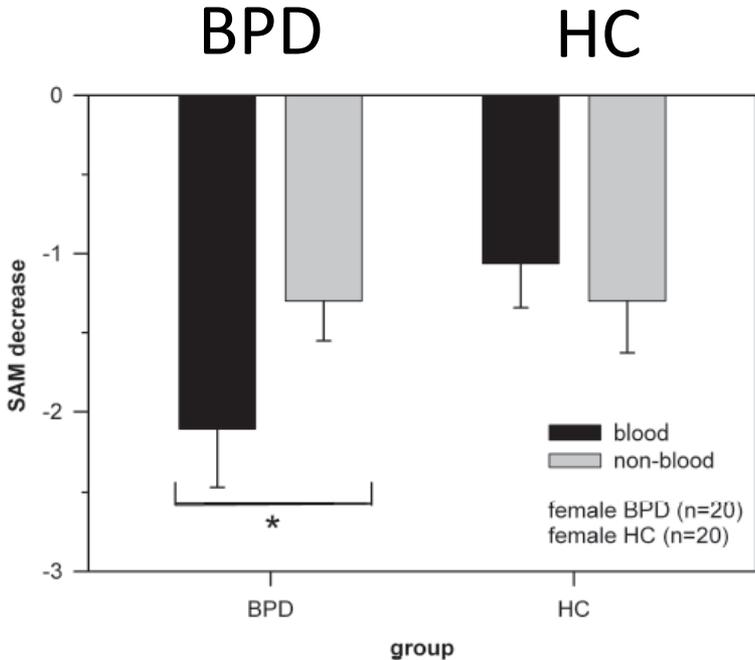
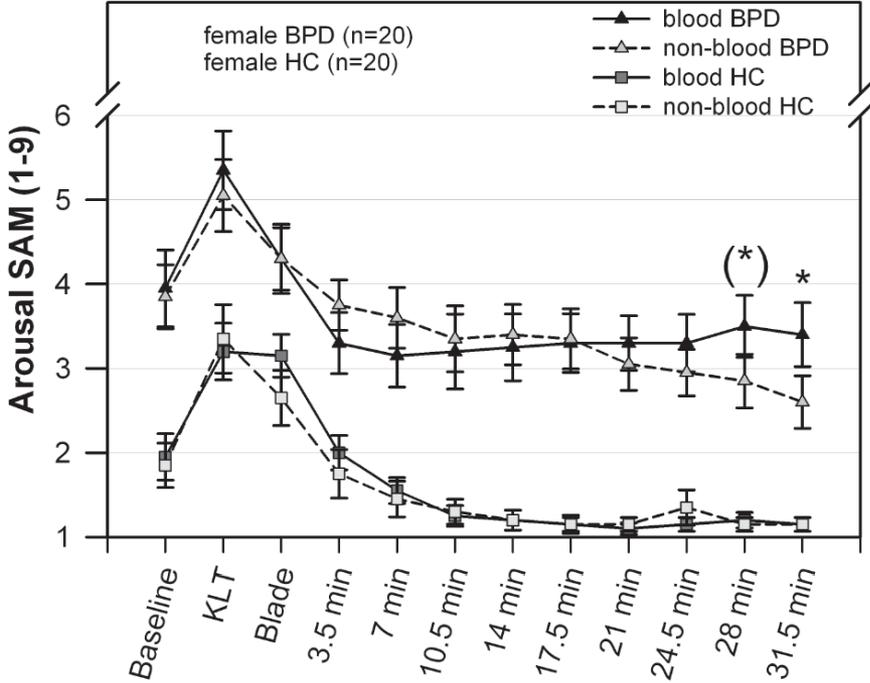
blade stimulus  
with/without blood  
(7 sec)



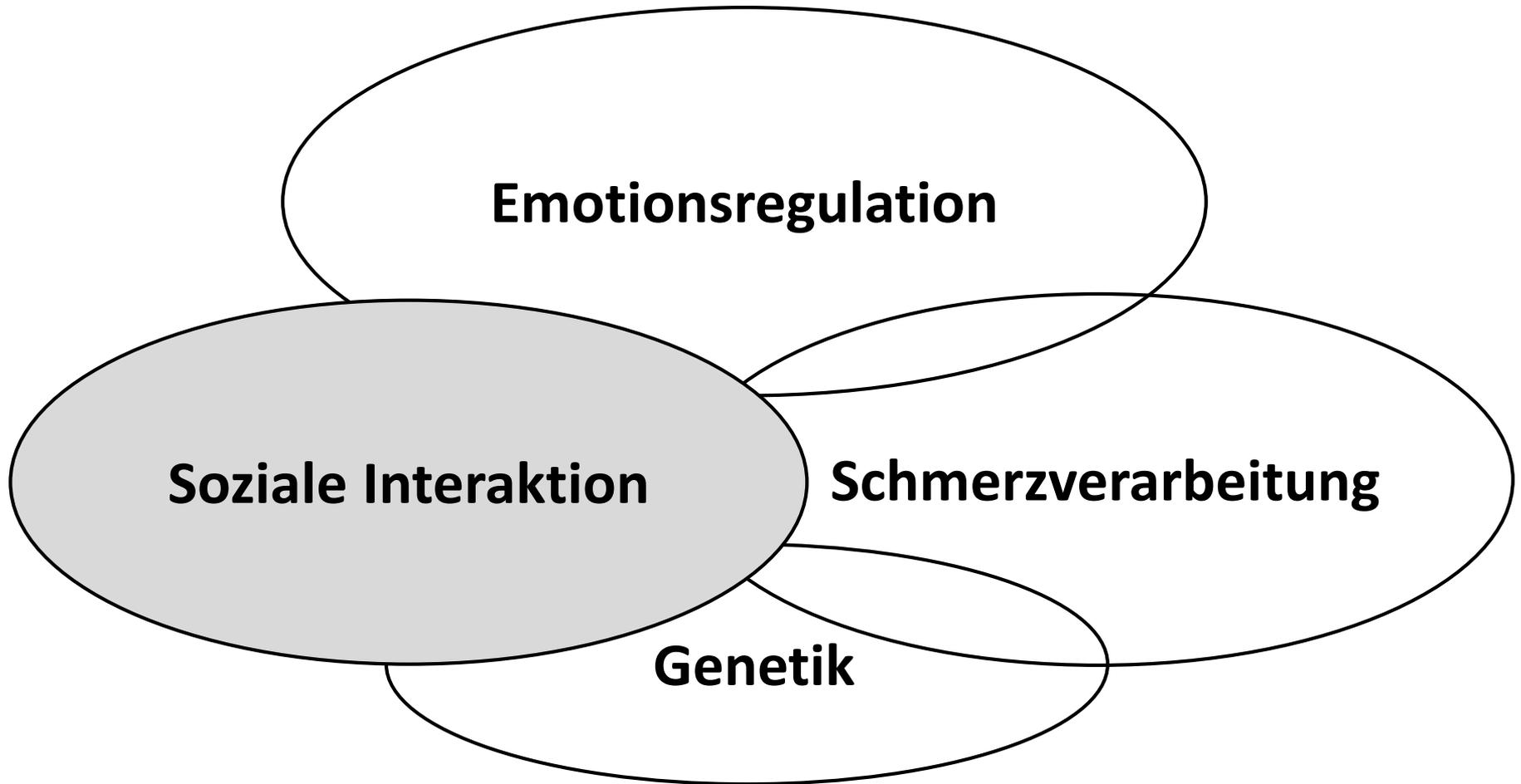
# Einfluss des Sehens von Blut



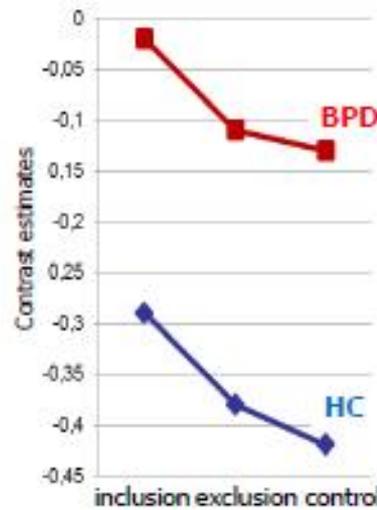
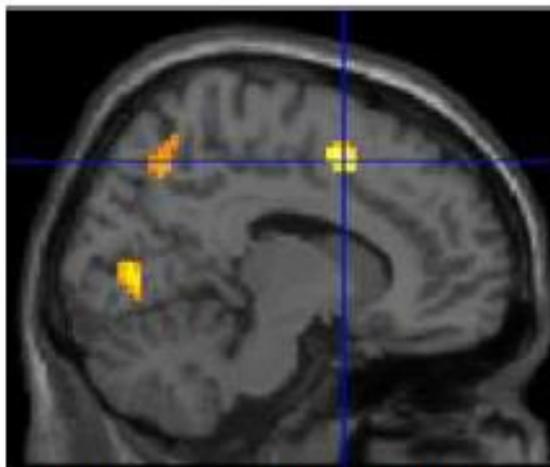
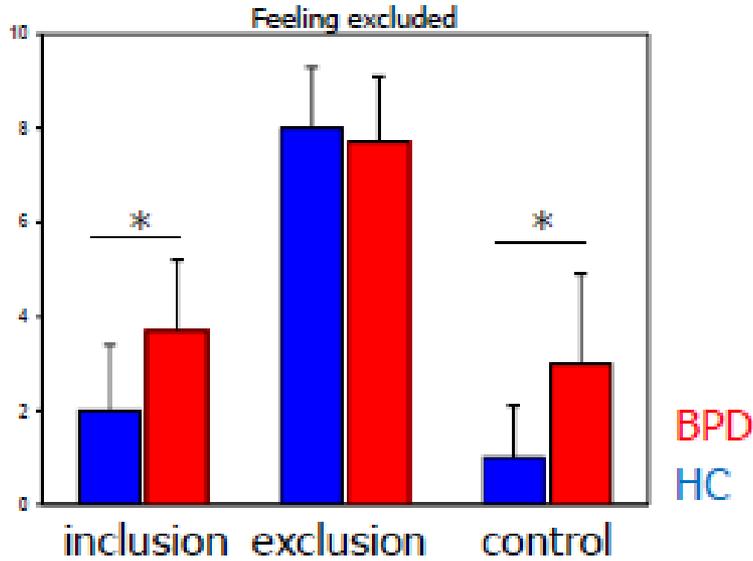
SELF-INJURY · TREATMENT ASSESSMENT RECOVERY



Naoum et al., Psychiatry Res 2016



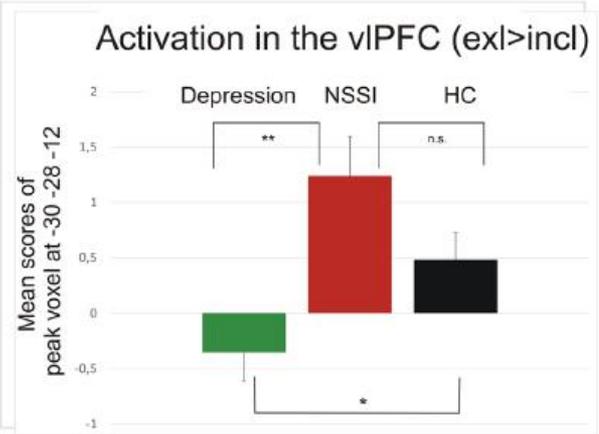
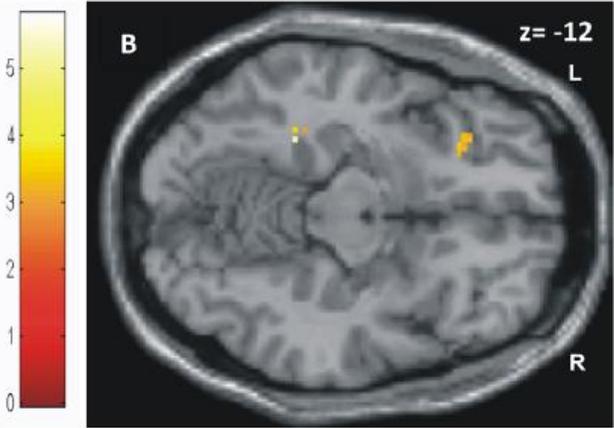
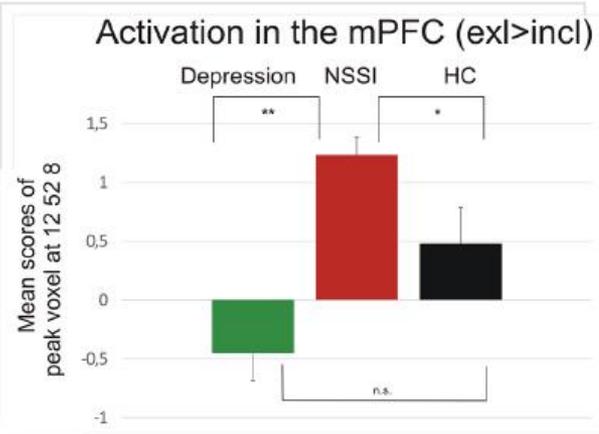
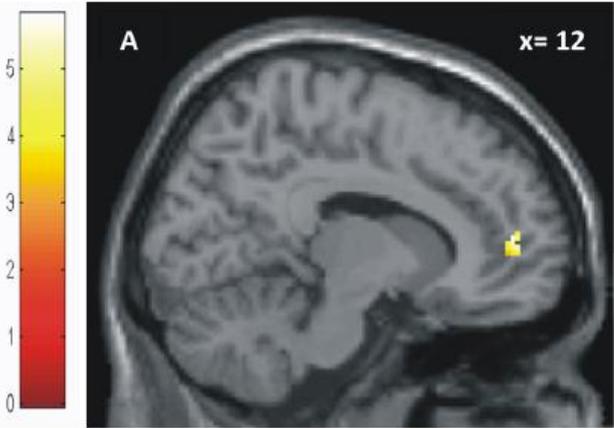
# Sozialer Ausschluss und Borderline-Störung



# Sozialer Ausschluss und NSSV



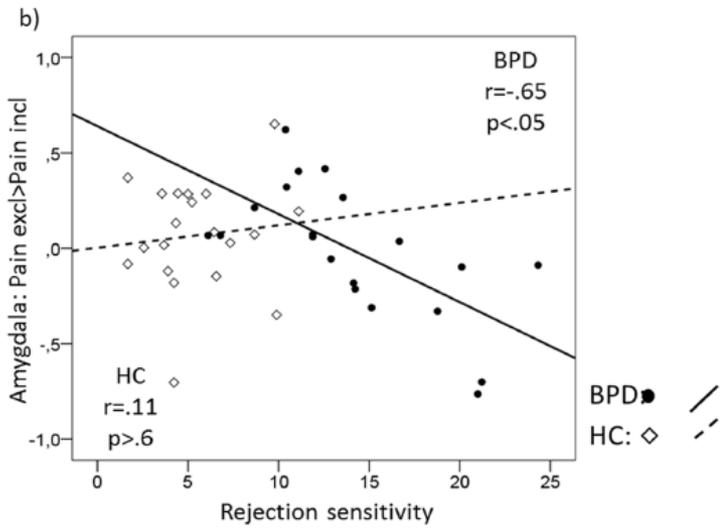
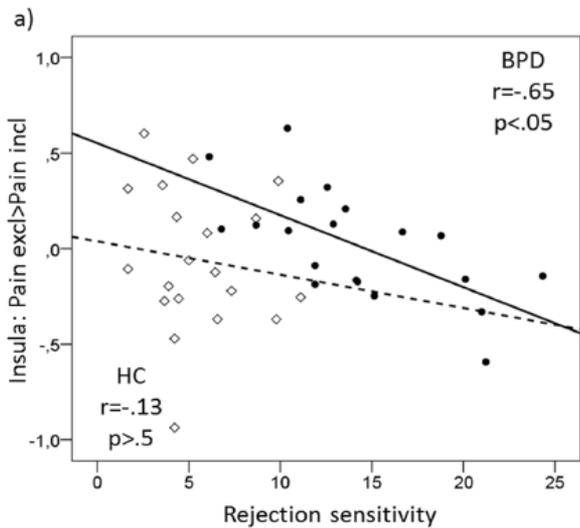
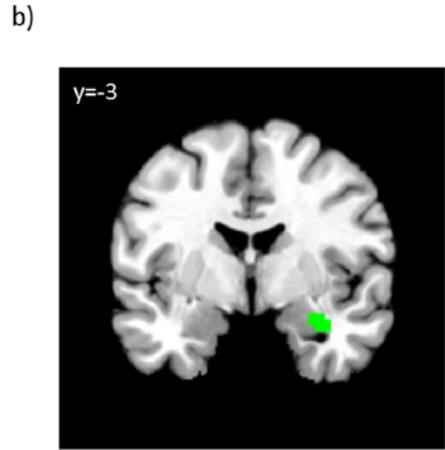
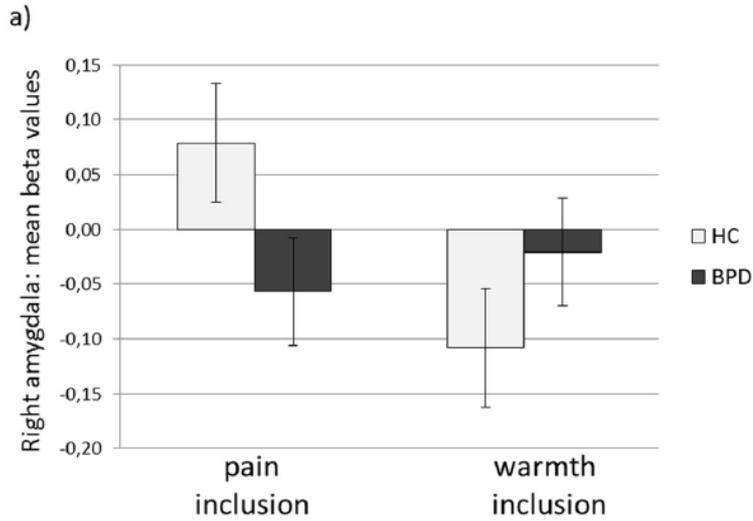
SELF-INJURY · TREATMENT ASSESSMENT RECOVERY



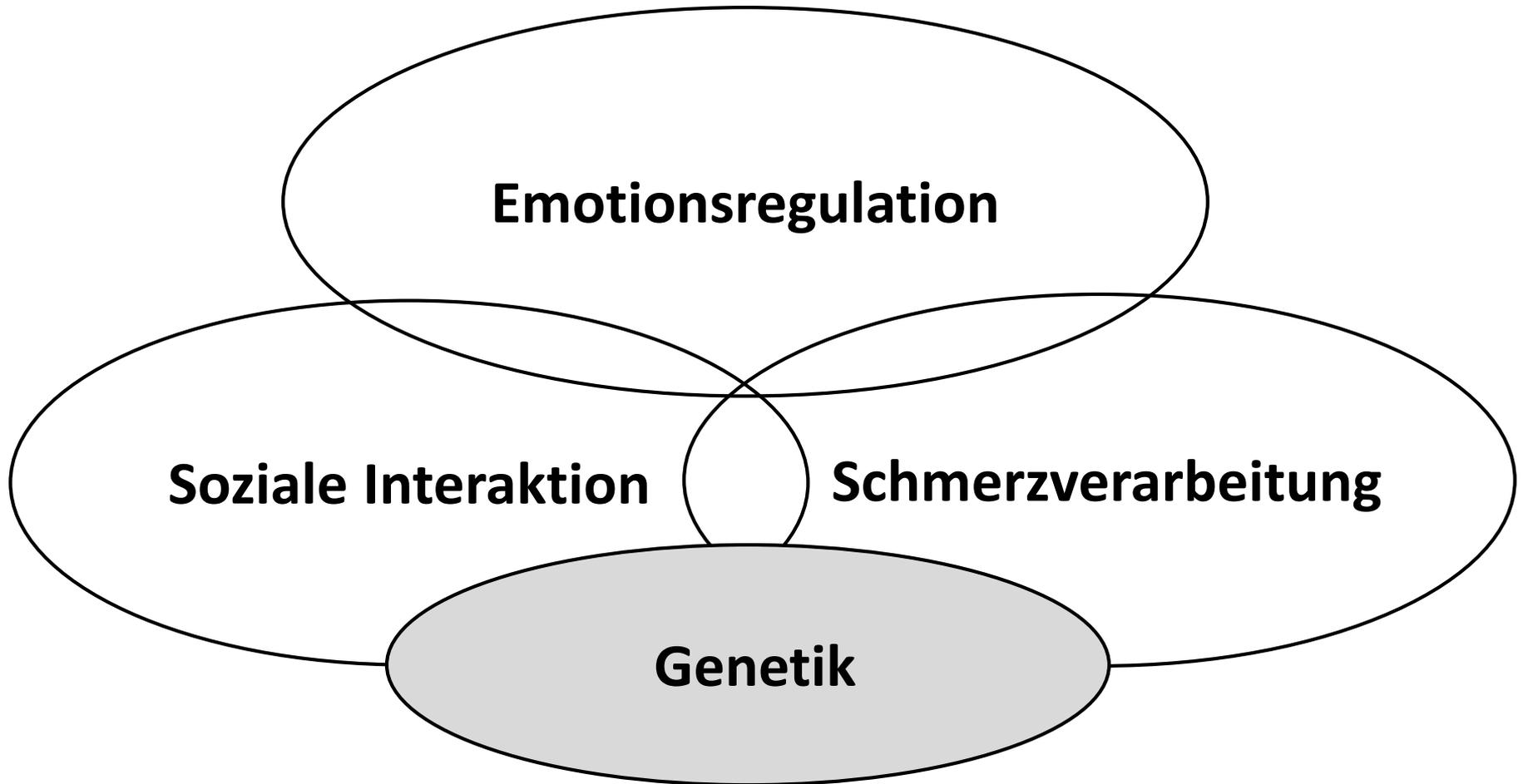
# Sozialer Ausschluss und Schmerz

# STAR

SELF-INJURY · TREATMENT ASSESSMENT RECOVERY



Bungert et al. 2015



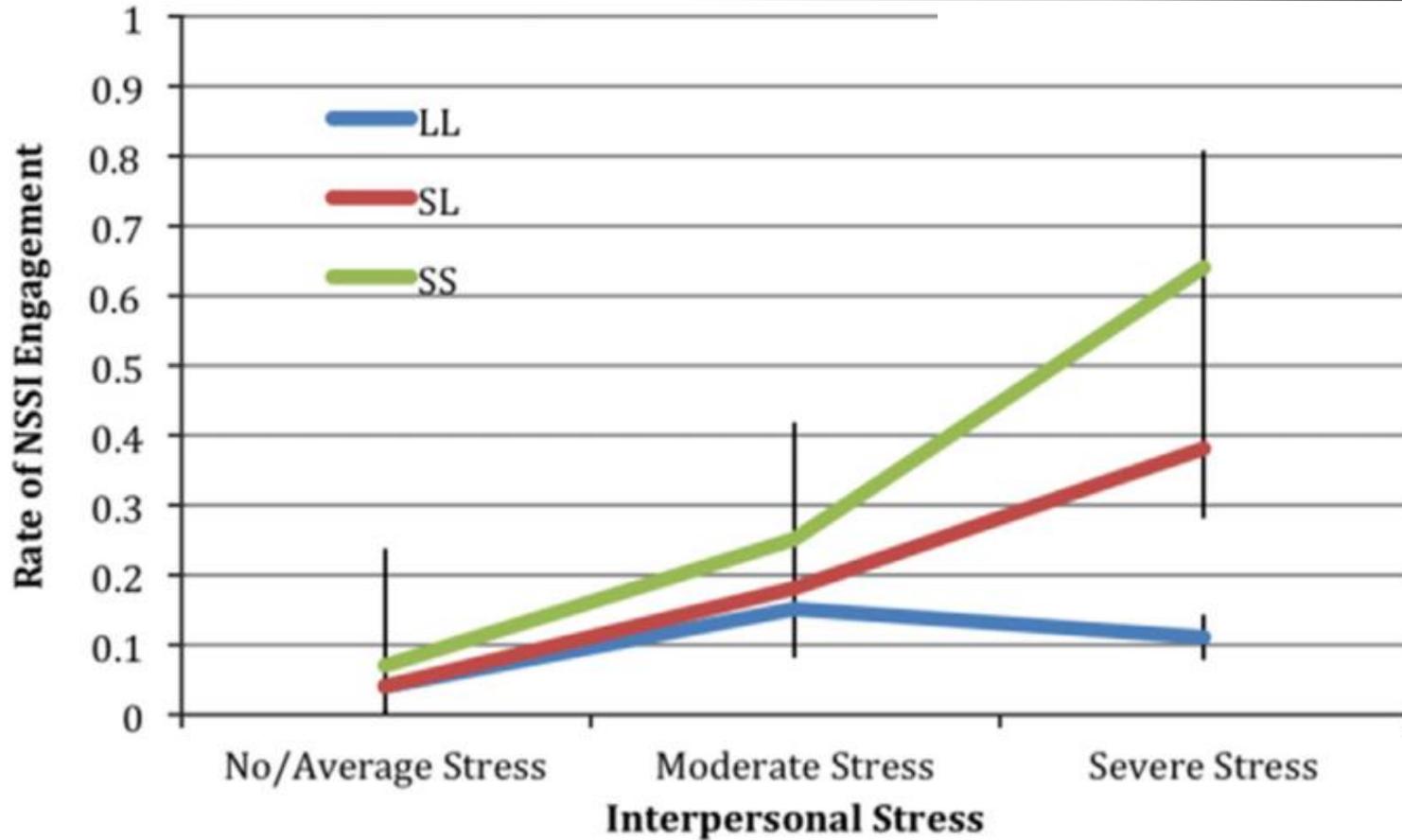
# Kandidatengene



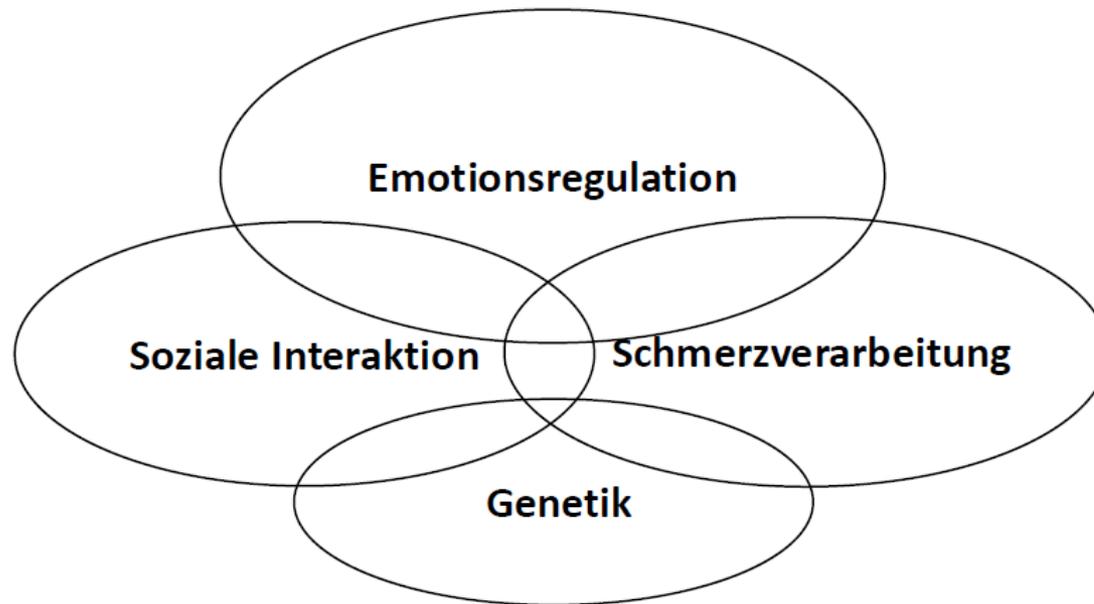
SELF-INJURY · TREATMENT ASSESSMENT RECOVERY

- Serotonin
  - 5-HTTLRP
  - 5-HTT rs25531,
  - FKBP5 rs380037
  - HTR2C rs6318
  - TPH2 rs10784941
  - TPH2 rs2171363
- Dopamin
  - DRD4
  - DDC rs1271854
  - COMT rs6269
- Oxytocin
  - OXTR rs53576
  - OXTR rs2254298
  - OXTR rs1042778
- Opioide
  - OPRM1 rs1799971

# Gen-Umwelt-Interaktion (5-HTTLPR)

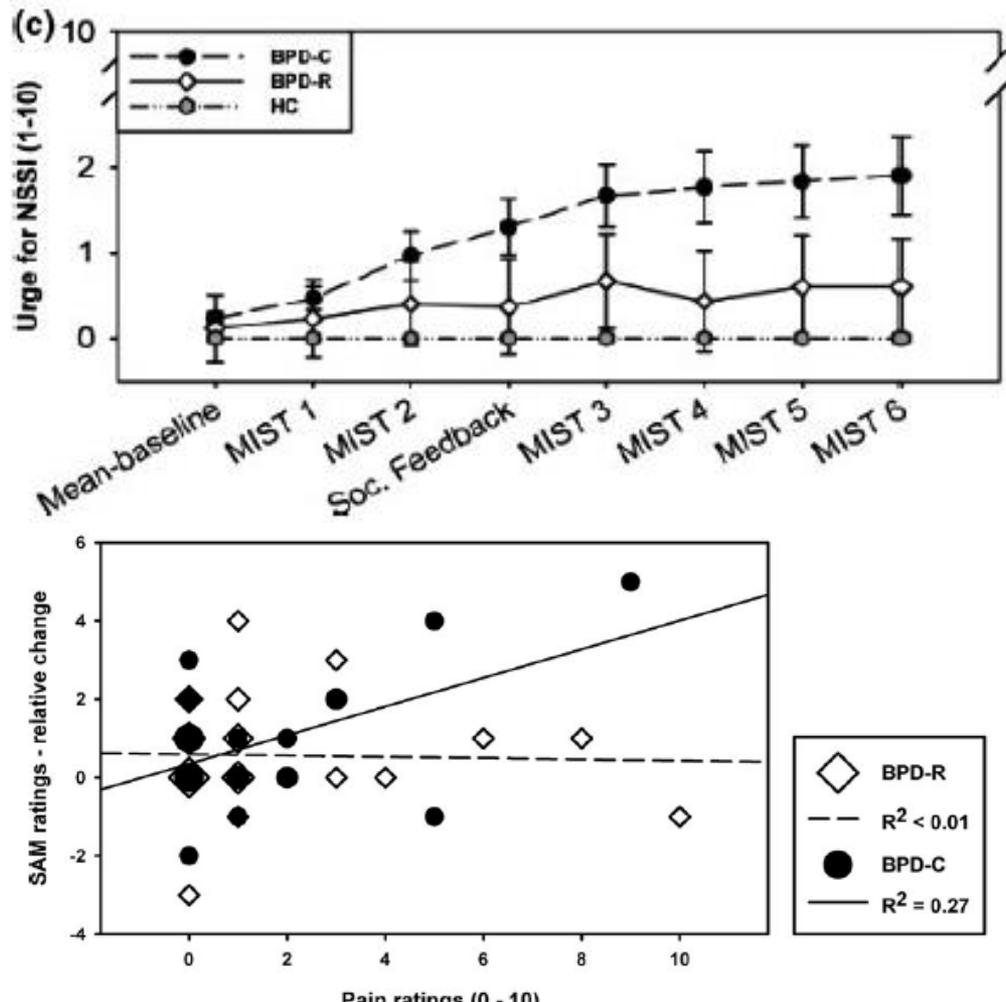


Hankin (2016)



Sind diese Mechanismen modifizierbar?

# Veränderung des Mechanismus bei Remission der BPS

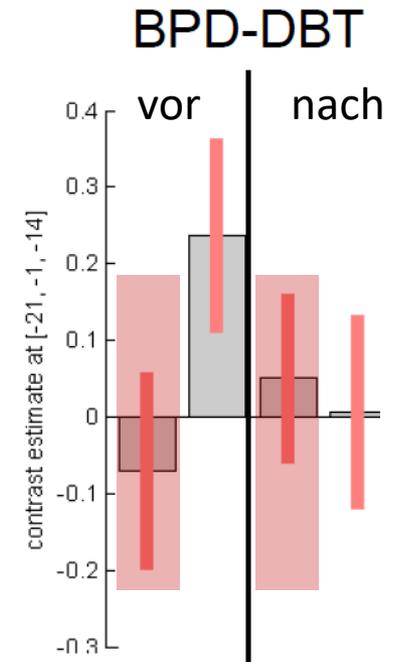
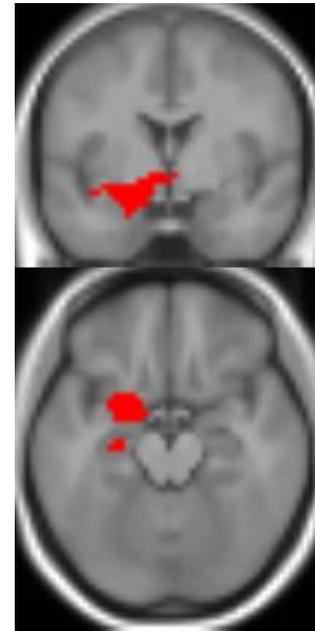
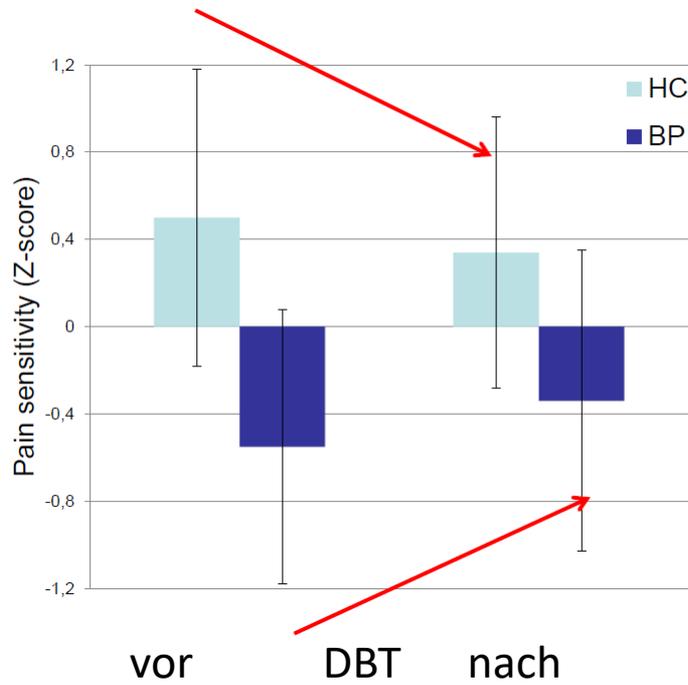


- Kaum Anstieg des NSSV-Dranges nach Stress-Induktion
- Kein Zusammenhang zwischen Schmerzhaftigkeit und Spannungsreduktion

# Veränderung des Mechanismus durch Psychotherapie

# STAR

SELF-INJURY · TREATMENT ASSESSMENT RECOVERY

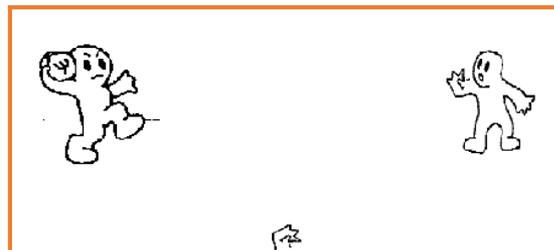
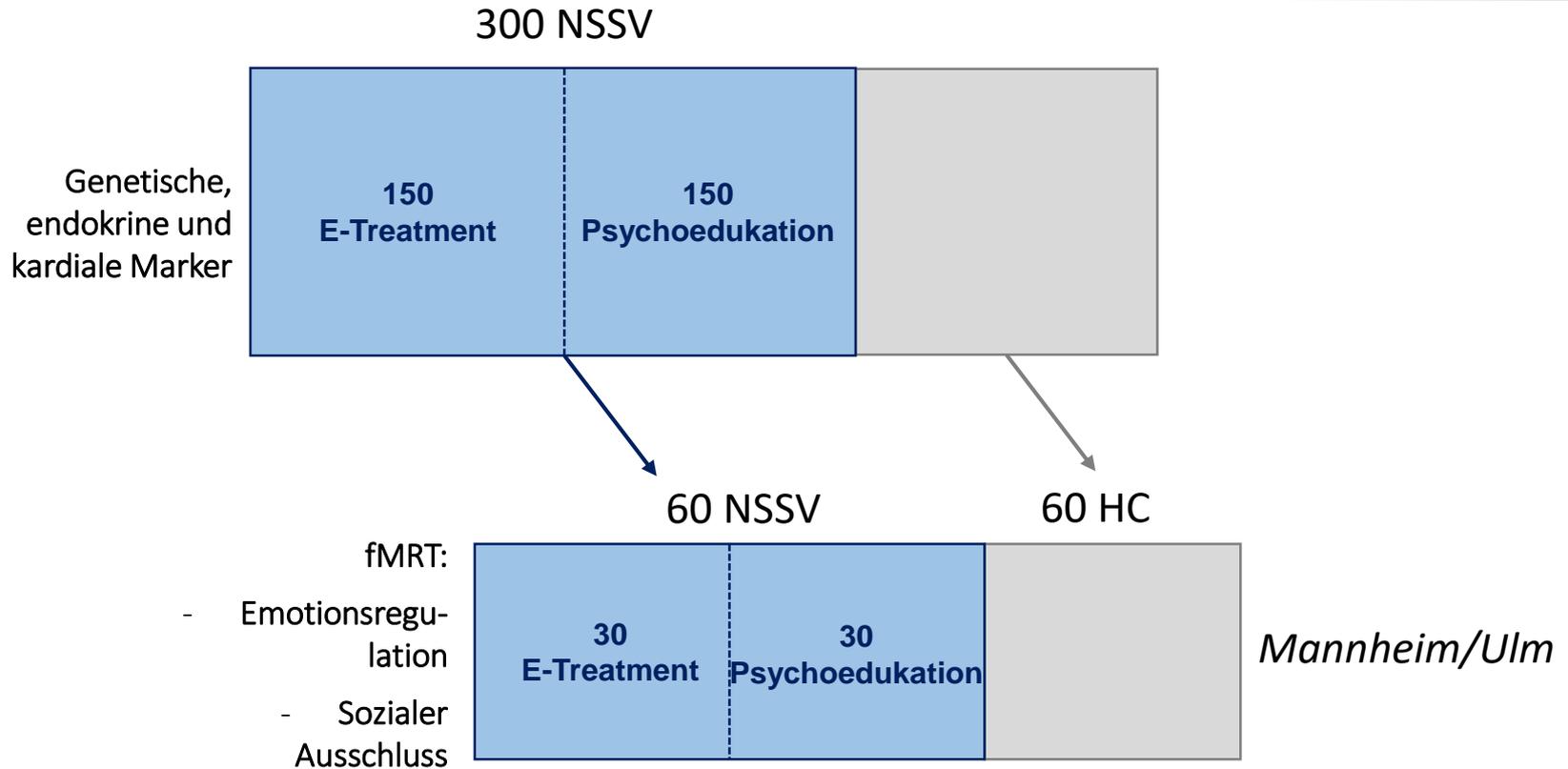


Negative Bilder+Schmerz

# STAR-NEURO



SELF-INJURY · TREATMENT ASSESSMENT RECOVERY



- NSSV ist klar mit reduzierter Schmerzsensibilität assoziiert
- Die zugrundeliegenden neuronalen Mechanismen deuten auf eine Dysregulation von limbischen Regionen, insbesondere der Amygdala, hin
- Remission und Psychotherapie können diese Mechanismen verändern
- Genauere Aufschlüsselung der neurobiologischen Korrelate von NSSV von großer Bedeutung