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# Posttraumatic stress disorder and resilience in the aftermath of disaster

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# Khaled Hosseini

„I became what I am today at the age of twelve, on a frigid overcast day in the winter of 1975. I remember the precise moment, crouching behind a crumbling mud wall, peeking into the alley near the frozen creek. That was a long time ago, but it's wrong what they say about the past, I've learned, about how you can bury it.

**Because the past claws its way out.** Looking back now, I realize I have been peeking into that deserted alley for the last twenty-six years.“

The Kite Runner, 2003



Tohoku Earthquake March 2011





Tohoku Earthquake March 2011

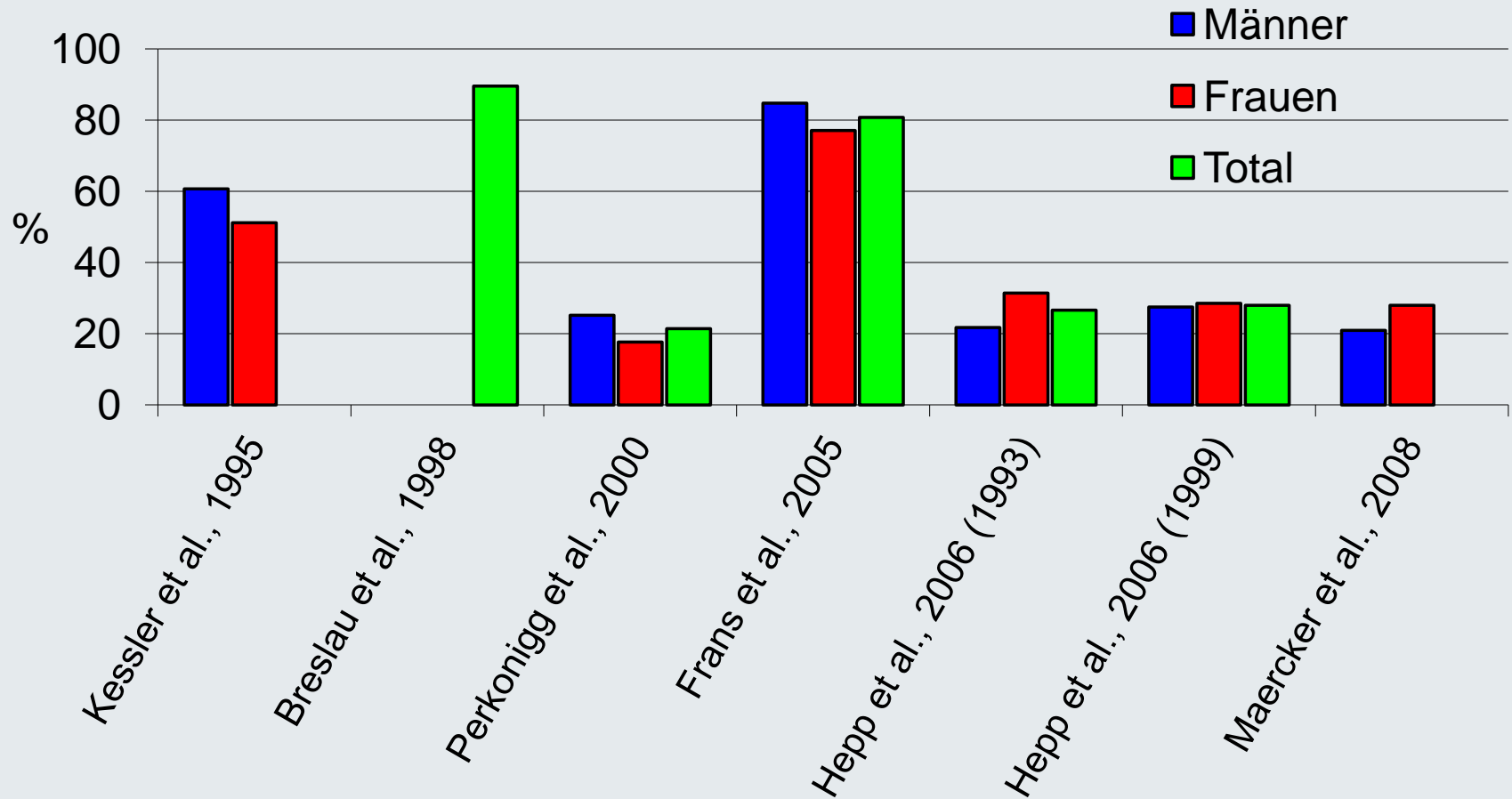
# Posttraumatic stress disorder and resilience in the aftermath of disaster

- „Trauma crash course“
- PTSD in accident survivors
- Resilience

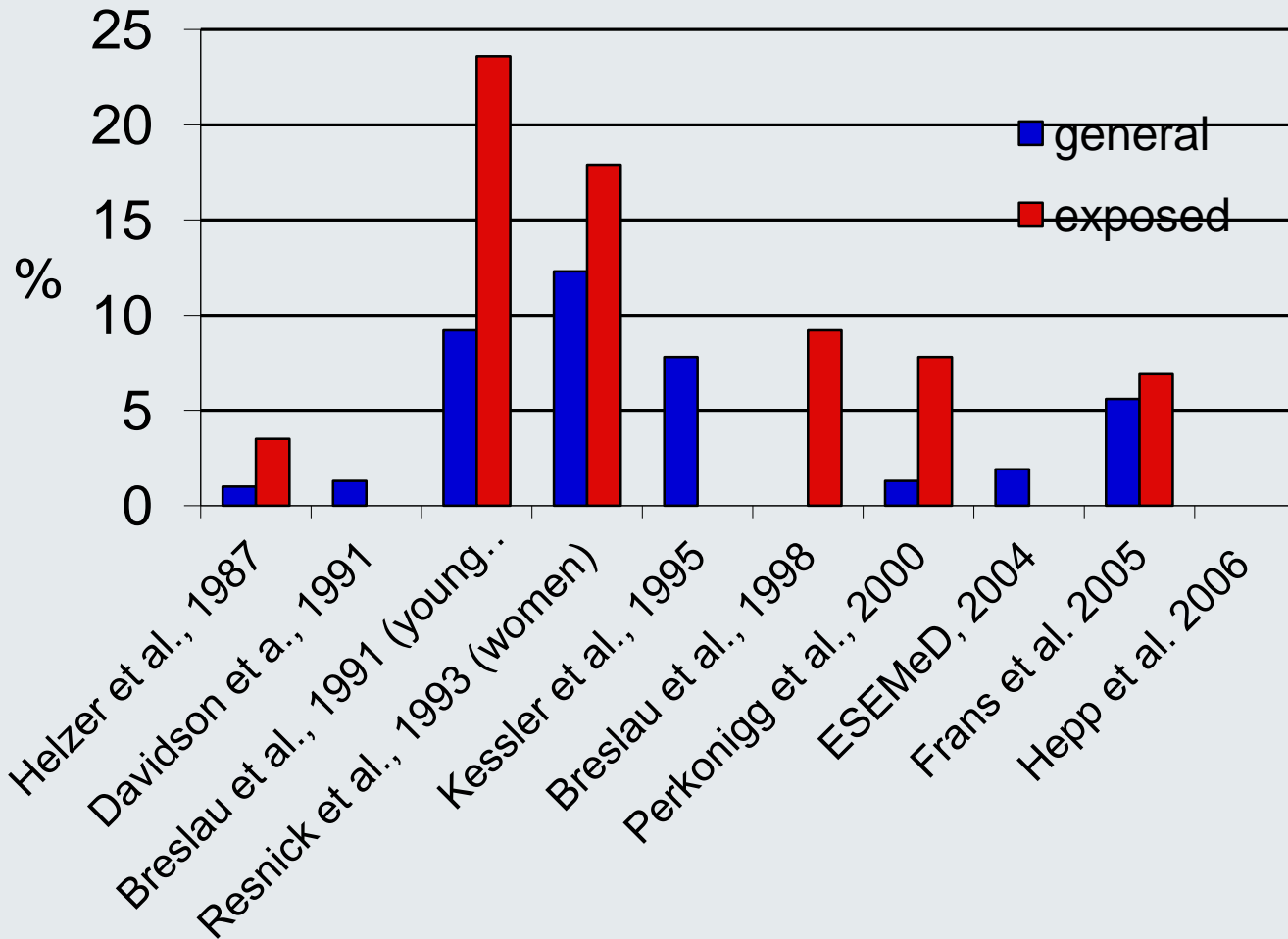
# Posttraumatic stress disorder and resilience in the aftermath of disaster

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# Lifetime Prevalence for Potentially Traumatic Events



# Lifetime prevalence for PTSD



# Posttraumatic Stress Disorder (DSM-IV)

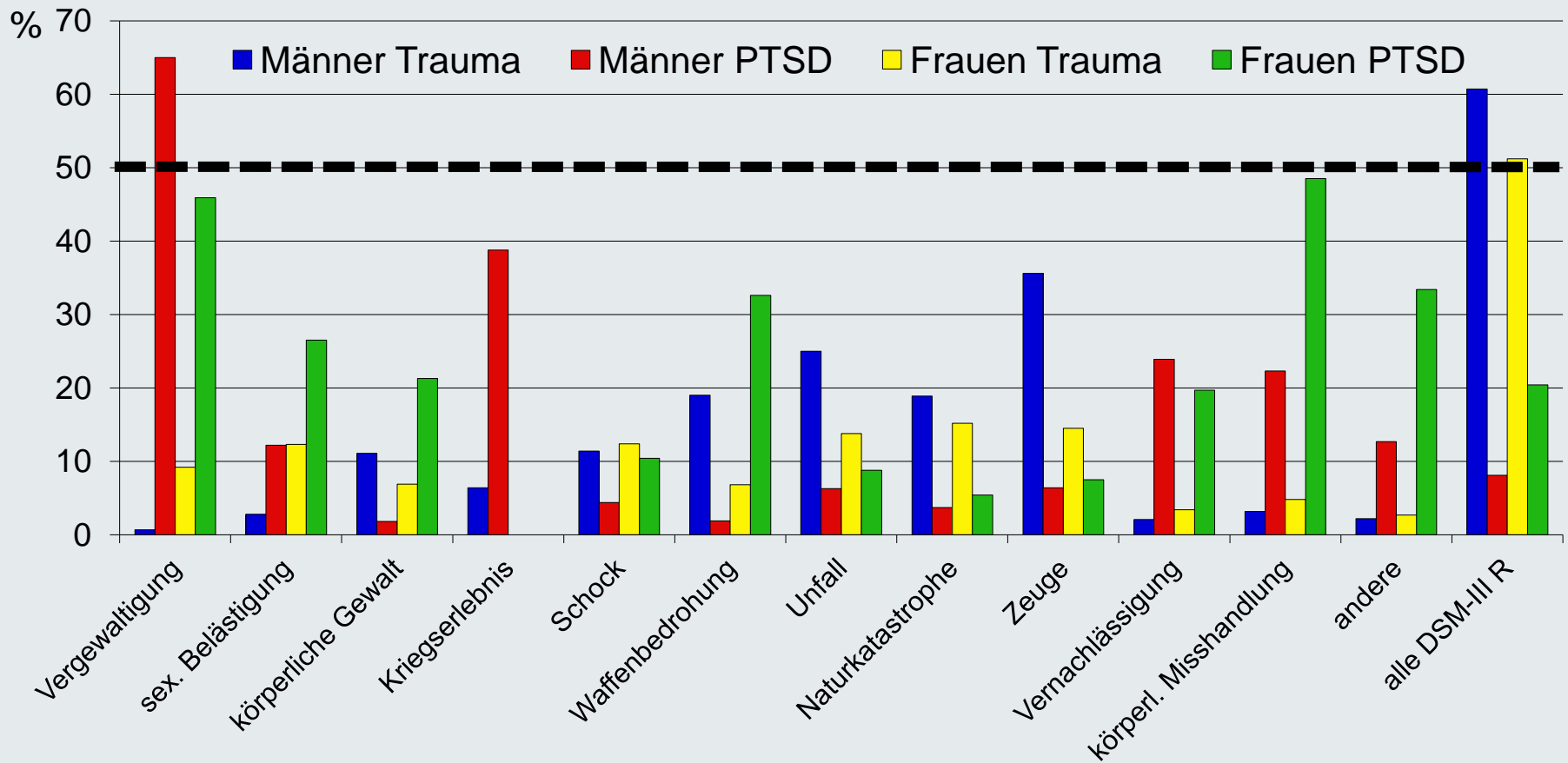
- A) Stressor criterium:
  - Event: Threat to life or physical integrity
  - Reaction: Intense anxiety, helplessness, or horror
- B) Re-experiencing symptoms: flashbacks, nightmares
- C) Avoidance symptoms: avoidance of specific reminders of the traumatic event
- D) Anxiety or psychophysiological hyper-arousal
- E) Duration of symptoms at least one month
- F) Substantial suffering or decrease in social, professional or other areas of functioning

# PTSD rate depends on type of trauma

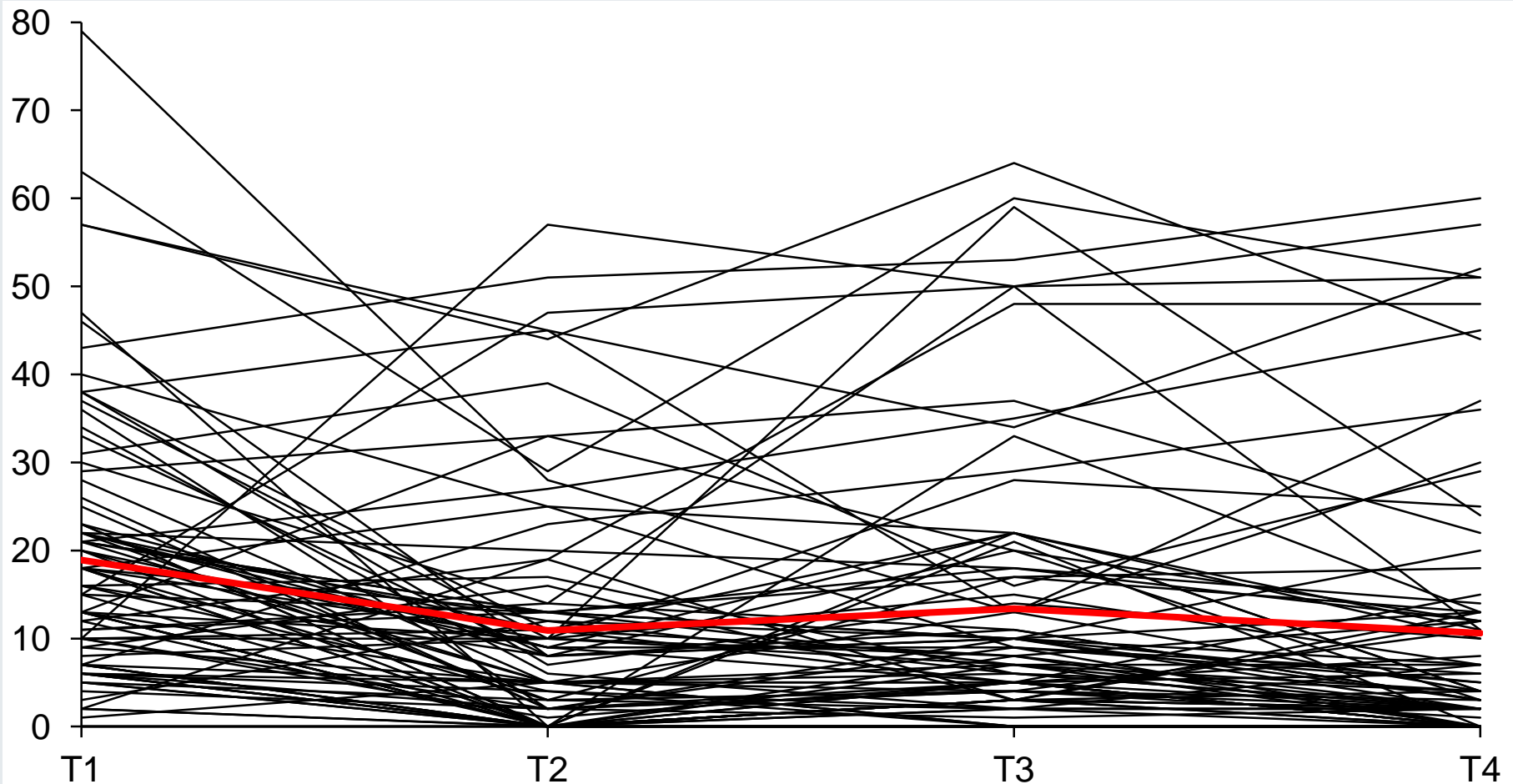


Kessler et al., 1995

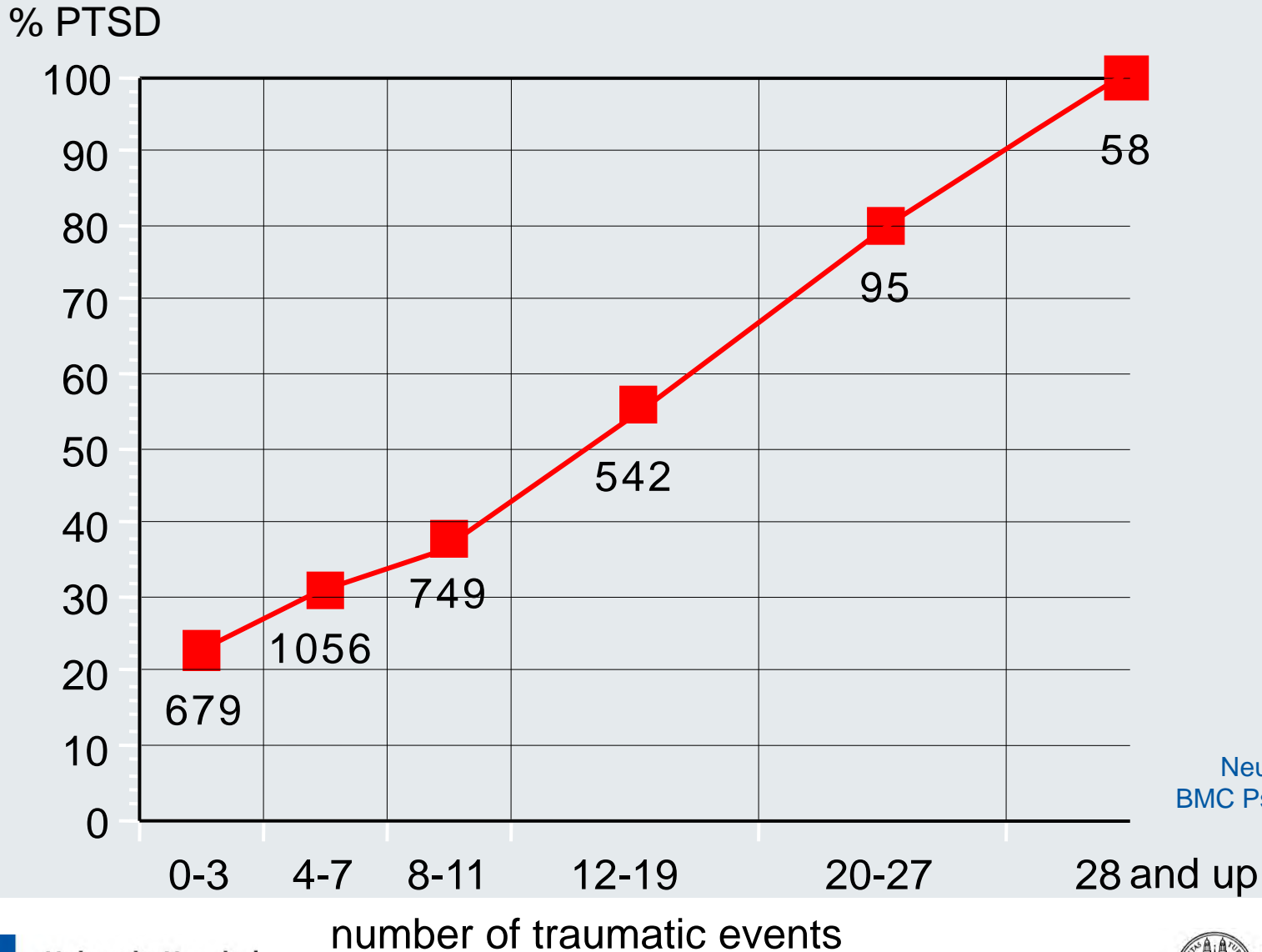
# Lifetime Prevalence for Trauma and PTSD Depending on Gender and Type of Trauma



# PTSD symptoms (CAPS total scores) in severely injured accident survivors over 3 years (N=90)



# PTSD: The Building Block Effect



Neuner et al.,  
BMC Psychiatry 2004

# Risk factors for PTSD

Brewin et al. 2000

<u>Risk factor</u>	<u>Weighted average effect size</u>
Gender (female)	.13
Younger age	.06
Low socio-economic status	.14
Lack of education	.10
Low intelligence	.18
Race (minority status)	.05
Psychiatric history	.11
Childhood abuse	.14
Other previous trauma	.12
Other adverse childhood	.19
Family psychiatric history	.13
Trauma severity	.23
Lack of social support	.40
Life stress	.32

# Trauma and PTSD: Epidemiology

- Lifetime prevalence for potentially traumatic events: 50-90%
- Posttraumatic stress disorders (PTSD) following potentially traumatic events: ~10%
- Lifetime prevalence for posttraumatic stress disorders: 8%
  - Men: 6%
  - Women: 12%

# Specific and unspecific posttraumatic mental disorders

- **Specific posttraumatic mental disorders:**
  - Acute Stress Disorder
  - Posttraumatic Stress Disorder (PTSD)
  - Enduring Personality Disorder after Extreme Traumatization
- **Unspecific posttraumatic mental disorders, z.B.:**
  - Depressive Disorders
  - Anxiety Disorders
  - Somatoform Disorders

# Posttraumatic stress disorder and resilience in the aftermath of disaster

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# 1<sup>st</sup> study of severely injured accident survivors

- Inclusion criteria:
  - Referral to the Intensive Care Unit due to a recent accident
  - Injury Severity Score (ISS)  $\geq 10$
  - Interview possible within a month after the accident
  - Between 18 and 70 years of age
  - Adequate knowledge of German
- Exclusion criteria:
  - Glasgow Coma Scale GCS  $< 9$
  - Major somatic and/or mental problems prior to trauma
  - Injuries due to attempted suicide
  - Injuries due to a physical attack

# Incidence of PTSD in severely injured accident survivors

*Schnyder et al. (2001) Am J Psychiatry 158: 594-599*

*Hepp et al. (2008) Br J Psychiatry 192: 376-383*

	2 weeks <sup>1</sup> (N=90)	12 months (N=90)	36 months (N=90)
Full PTSD	5 (5.6%)	2 (2.2%)	4 (4.4%)
Subsyndromal PTSD	19 (21.1%)	10 (11.1%)	9 (10.0%)

<sup>1</sup> Time criterion for PTSD not fulfilled

# Predictors of PTSD symptoms 12 months post accident

*Schnyder et al. (2001) Am J Psychiatry 158: 594-599*

Variable	Beta	p
Injury Severity Score (ISS)	.02	n.s.
Female sex	.11	n.s.
Biographical risk factors	.24	<.05
Stress due to life events (last 2 years)	.01	n.s.
Social network	-.07	n.s.
Sense of death threat	.26	<.01
Subjective appraisal of accident severity	.07	n.s.
IES subscale intrusion	.23	<.05
Active, problem-oriented coping	.20	<.05
Sense of Coherence (SOC)	-.07	n.s.

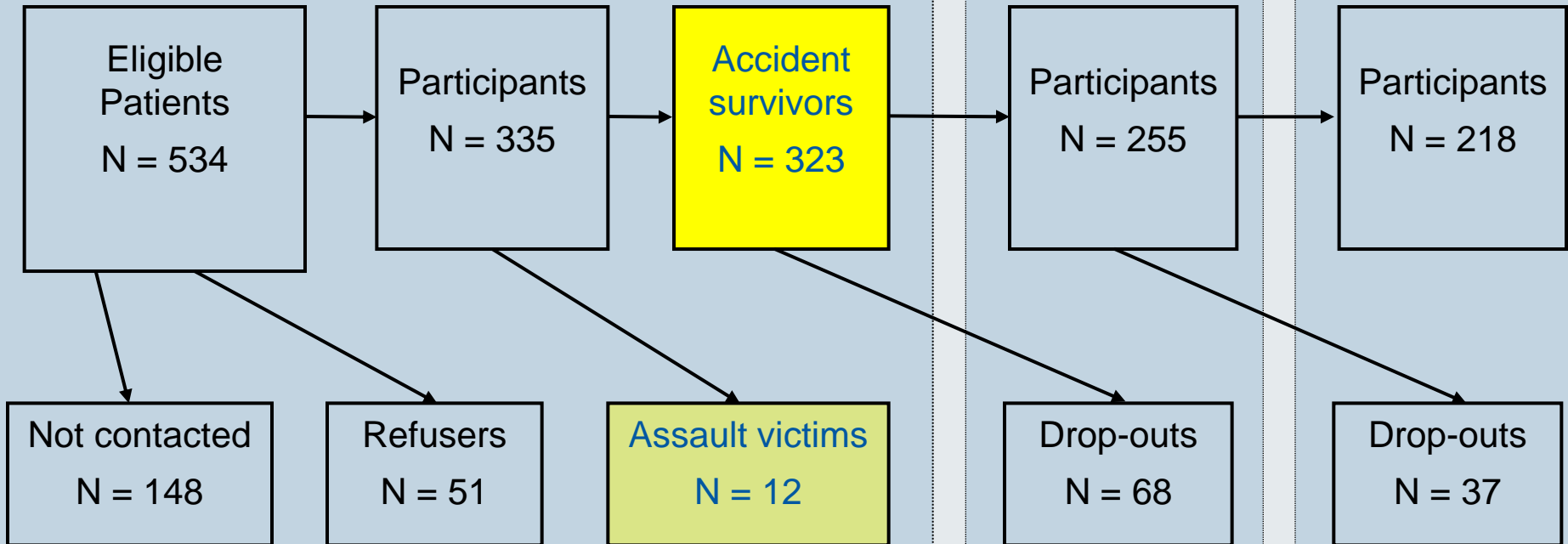
*Multiple regression: N = 104, R = .63, adjusted R<sup>2</sup> = .34, p < .001*

# 2<sup>nd</sup> study of severely injured accident survivors

**T1**  
(5 days post accident)

**T2**  
(6 months)

**T3**  
(12 months)



# Incidence of ASD and PTSD

*Fuglsang et al. (2002) Psychother Psychosom 71: 214-222*

*Schnyder et al. (2008) Psychother Psychosom 77: 111-118*

## Acute Stress Disorder

(5 days post accident, N = 255)

	N	%
ASD	10	3.9
Subsyndromal ASD	25	9.8

## Post-Traumatic Stress Disorder

(Six-month follow-up, N = 255)

	N	%
PTSD	8	3.1
Subsyndromal PTSD	20	7.8

# Prediction of PTSD symptoms at 6-month follow-up

*Schnyder et al. (2008) Psychother Psychosom 77: 111-118*

Independent variable (T1)	beta	p
Female sex	.09	.077
Pre-existing mental disorder	.03	.531
Insufficient German proficiency	.10	.076
Sense of Coherence	-.13	.029
Injury Severity Score	.10	.089
Mild traumatic brain injury	.21	<.001
Pain	.11	.046
ASD criterion A	.06	.330
ASD score	.25	<.001
Perceived responsibility for accident	-.16	.004
Emotional coping	.19	.001
Type of accident: Traffic	.01	.889
Sports / leisure time	-.02	.745

N= 241, R=.66, adjusted R<sup>2</sup>=.40 (p<.001)

# Possible explanations for the low rates of PTSD following accidental injuries in Switzerland

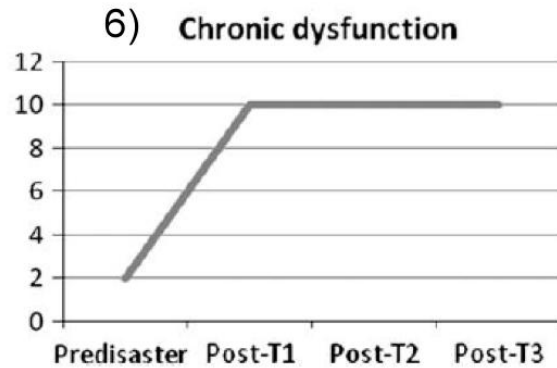
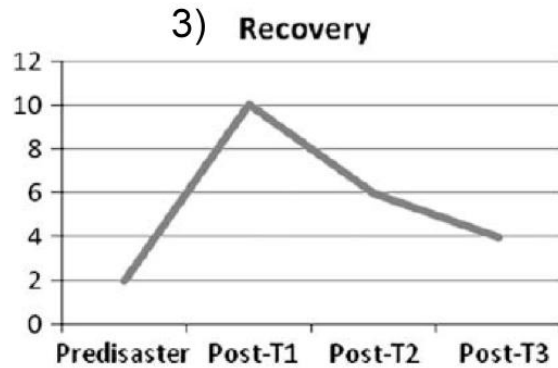
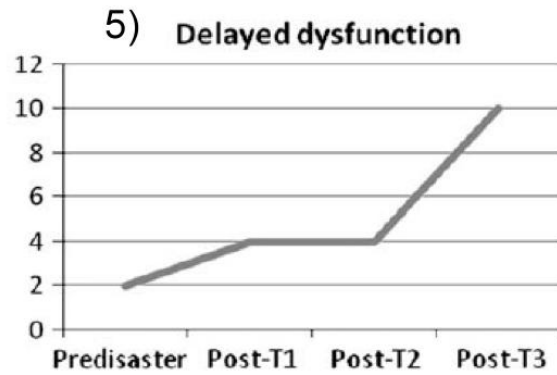
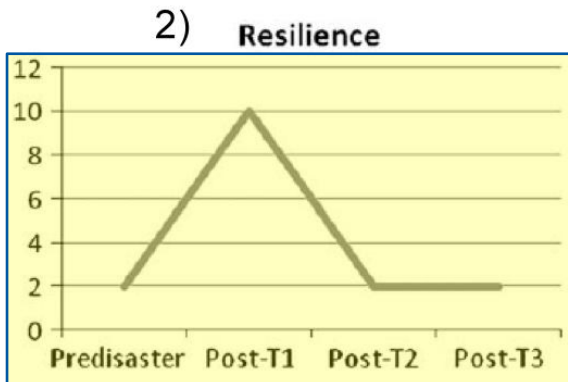
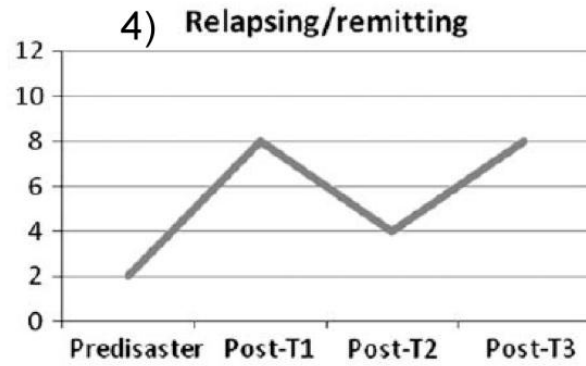
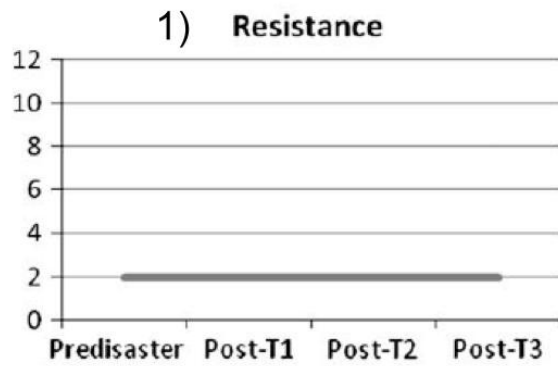
- Low pre-existing trauma load?
- Advanced rescue and health care system in Switzerland?
- Social support in the aftermath of trauma?
- Low PTSD symptom levels in spite of „trauma physiology“?
- High „resilience“ in the Swiss population?

# Posttraumatic stress disorder and resilience in the aftermath of disaster

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# What is Resilience?

- Resilience is a personality trait that moderates the negative effects of stress, and promotes adaptation
- Resilient individuals have been described as possessing self-esteem, self-confidence, curiosity, and control over the environment
- They have satisfying interpersonal relationships and a repertoire of problem-solving skills
- They tend to show adaptive behavior in the areas of social functioning, morale and somatic health



Norris et al.  
2009

# Resilience

Role models

Neuroendocrine factors

Positive emotions:  
Optimism, Humor,  
Gratitude

Powerful extinction process

Personal integrity

Properly functioning  
reward circuitry

Reciprocal altruism

Meaning and  
purpose in life

Religion and spirituality

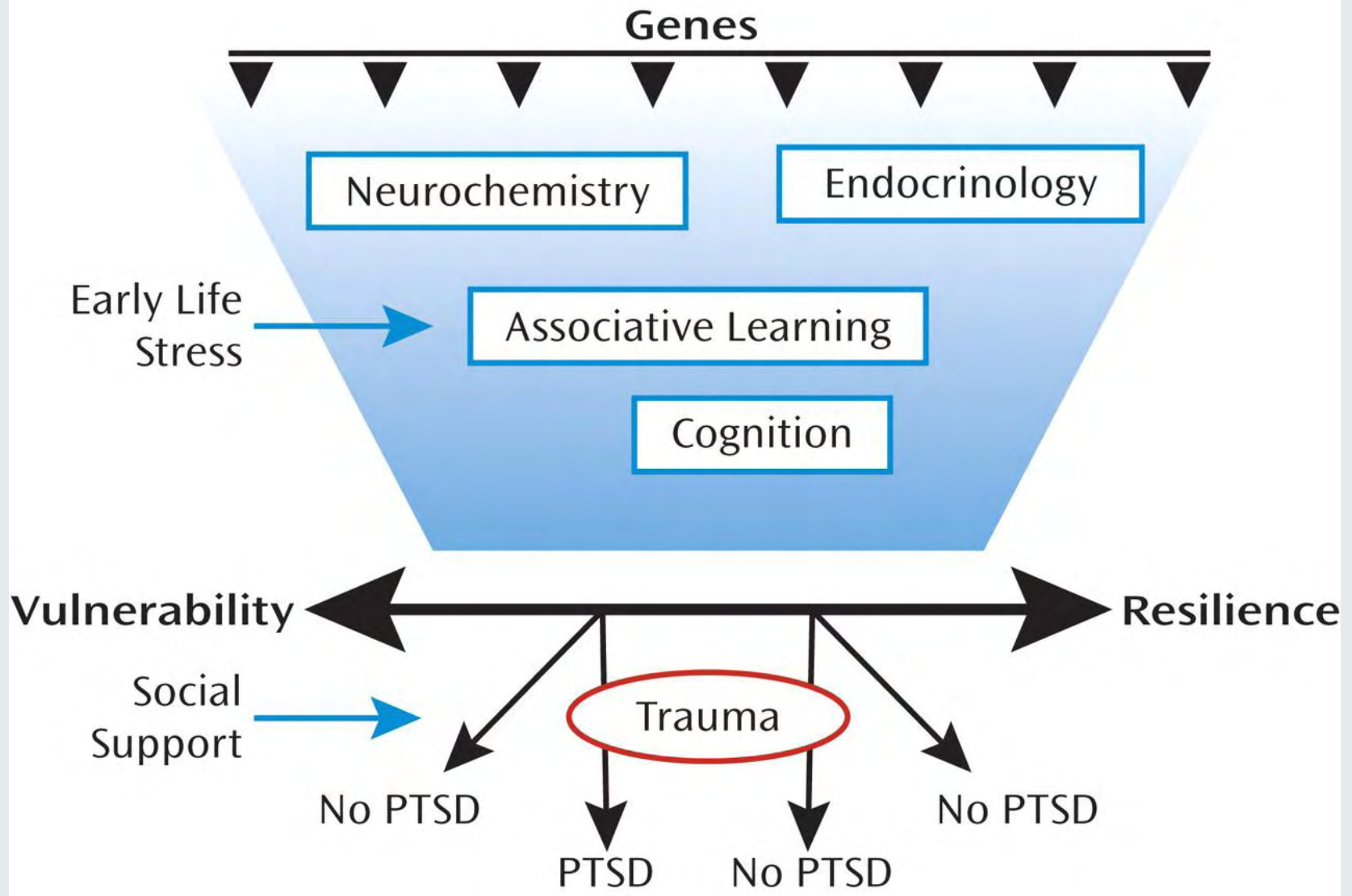
Cognitive flexibility  
posttraumatic growth  
acceptance

Signature strengths:  
match of skills with challenges

Active coping  
facing fear

Social support

Southwick, Vythilingham et al. 2005; McCullough et al., 2002  
Casada & Roache, 2005; Guyer et al., 2006; Haglund et al., 2007



(Jovanovic and Ressler 2010)

# Lower plasma DHEA concentration in the long-term after severe accidental injury

Oe et al. (2012) *Psychother Psychosom* 81: 121-123

**Remitted PTSD (n=13):** severe accidental injuries 10 years ago, PTSD or sub-threshold PTSD according to DSM-IV in the year following the accident 10 years ago, no current PTSD diagnosis.

**Trauma-control (n=14):** severe accidental injuries 10 years ago, no life-time diagnosis of PTSD, no previous or current psychiatric or neurologic condition.

**No Trauma (n=16):** matched for age and gender, no life-time traumatic events, no previous or current psychiatric or neurologic condition

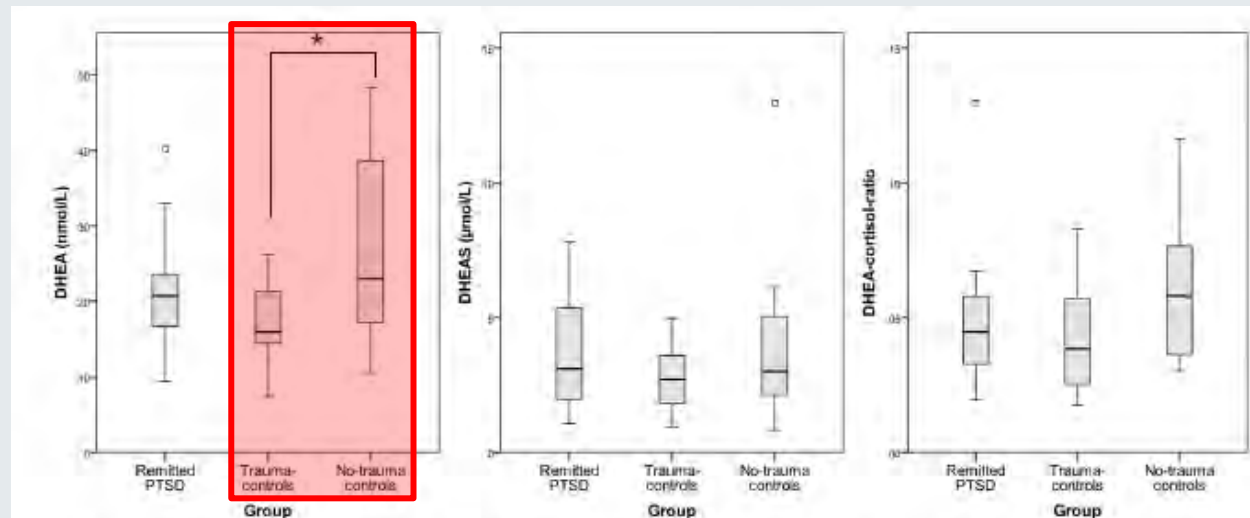
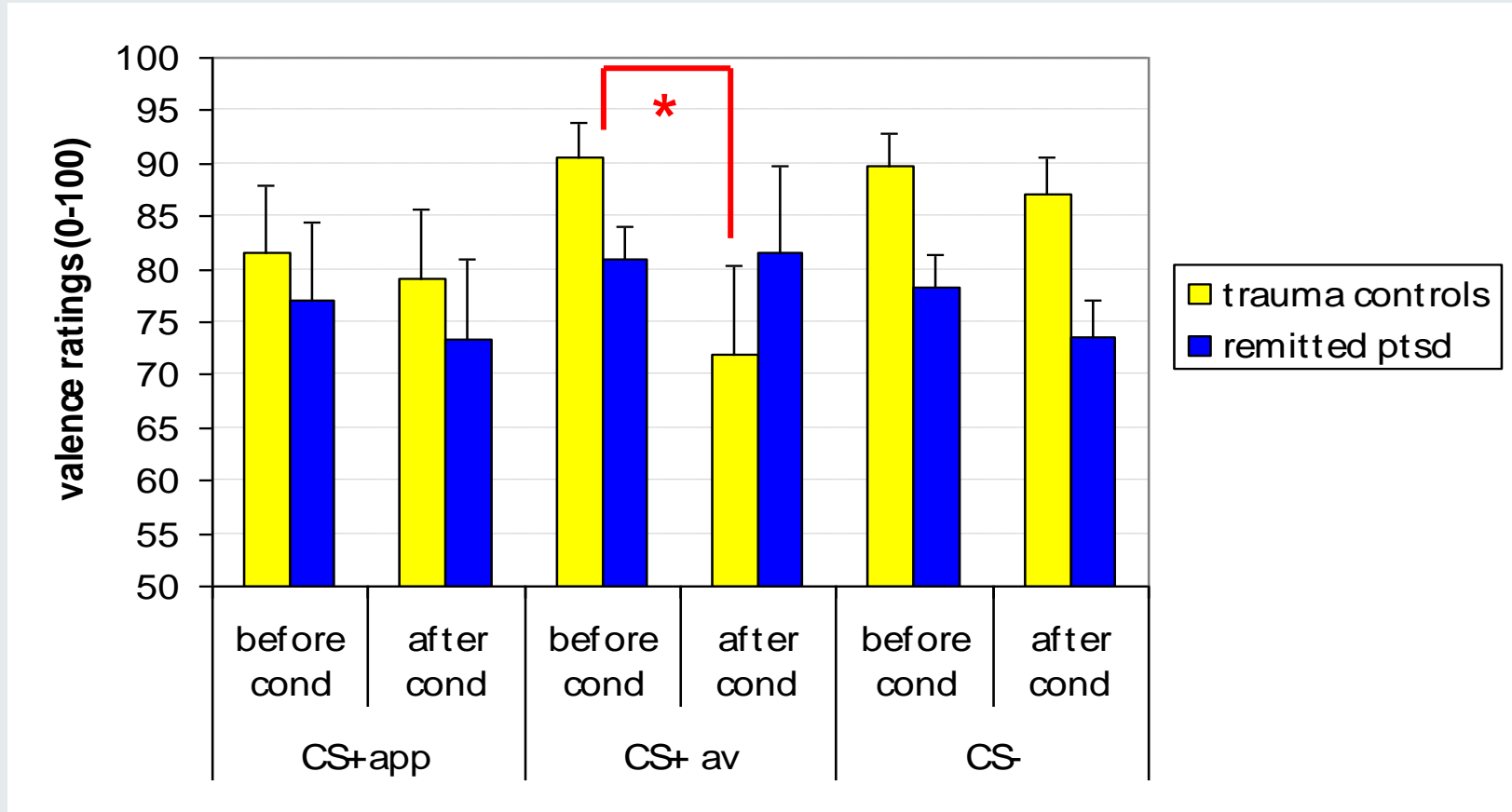


Figure 1: Plots of plasma DHEA / DHEAS concentration and DHEA-cortisol ratio.

(\*  $p < 0.05$ )

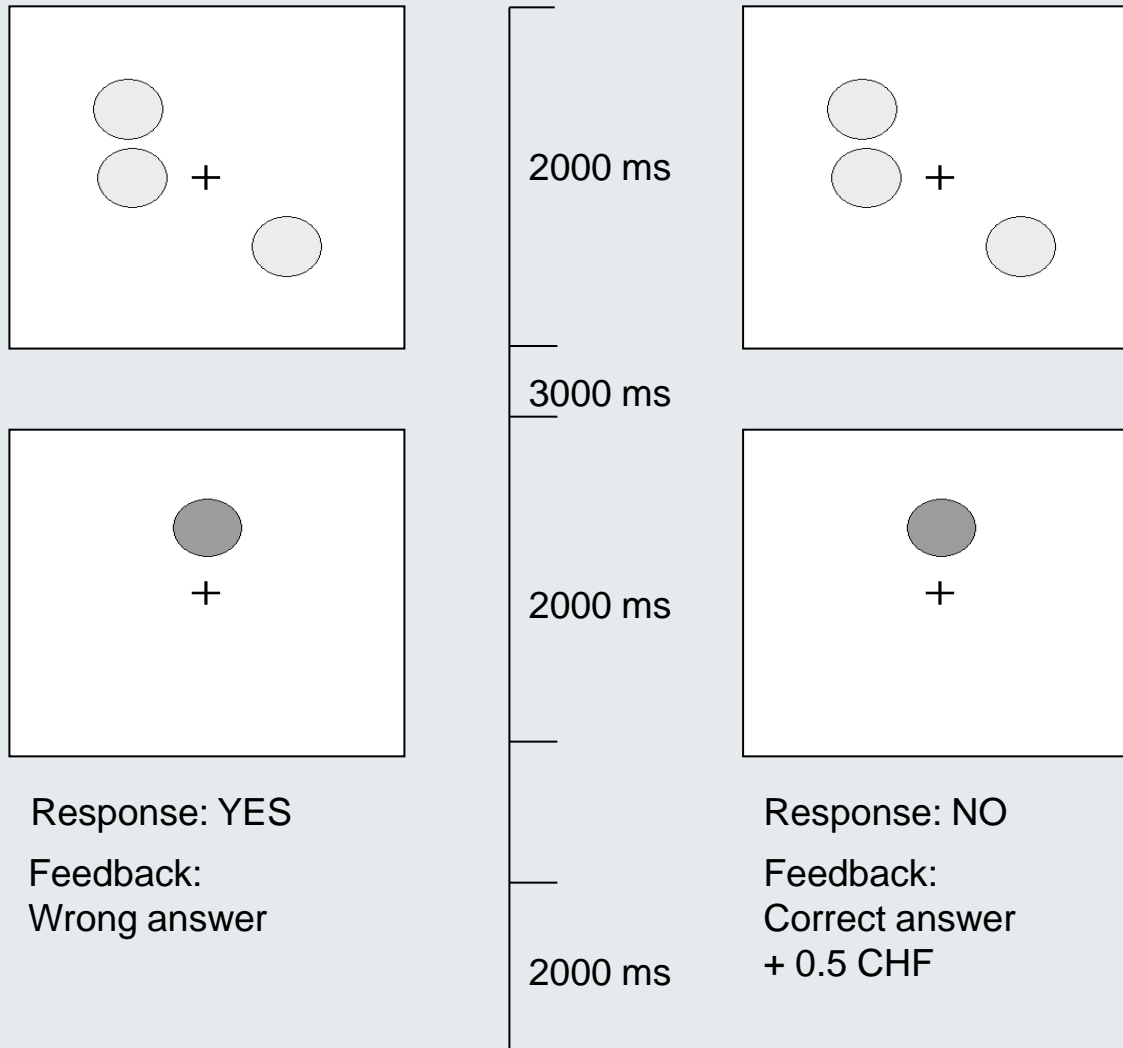
# Discriminative conditioning: valence ratings

*Kuehlen et al. in preparation*

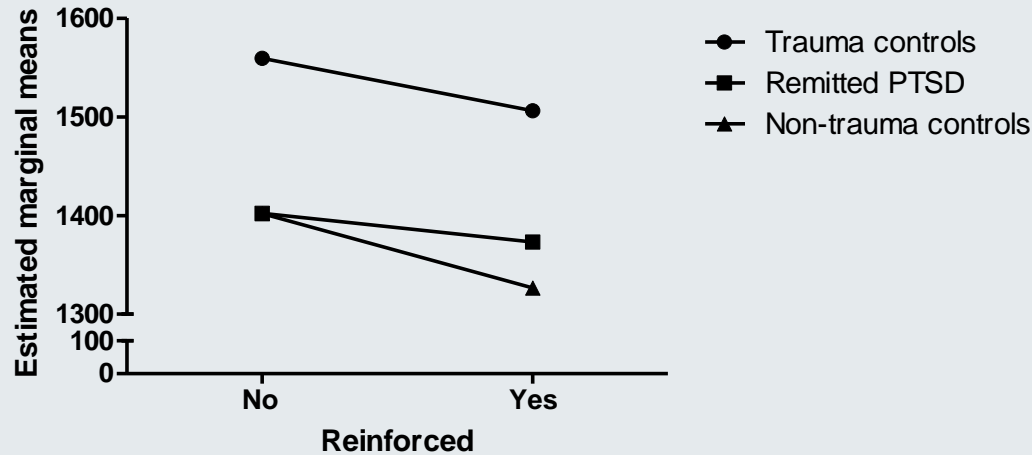


Significant group x time x CS type interaction ( $F_{2,52} = 4.89, p < 0.01$ ) expressed by a significant decrease of the valence of the CS associated with an aversive US after conditioning (CS+av) in the trauma controls only.

# Reward Task

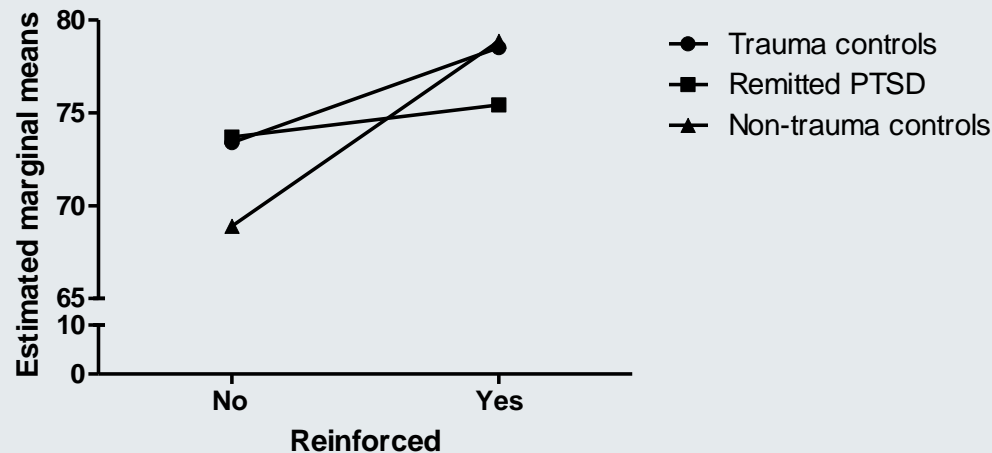


### Reaction time (ms)



Reaction times are faster in the reinforced conditions in all three groups

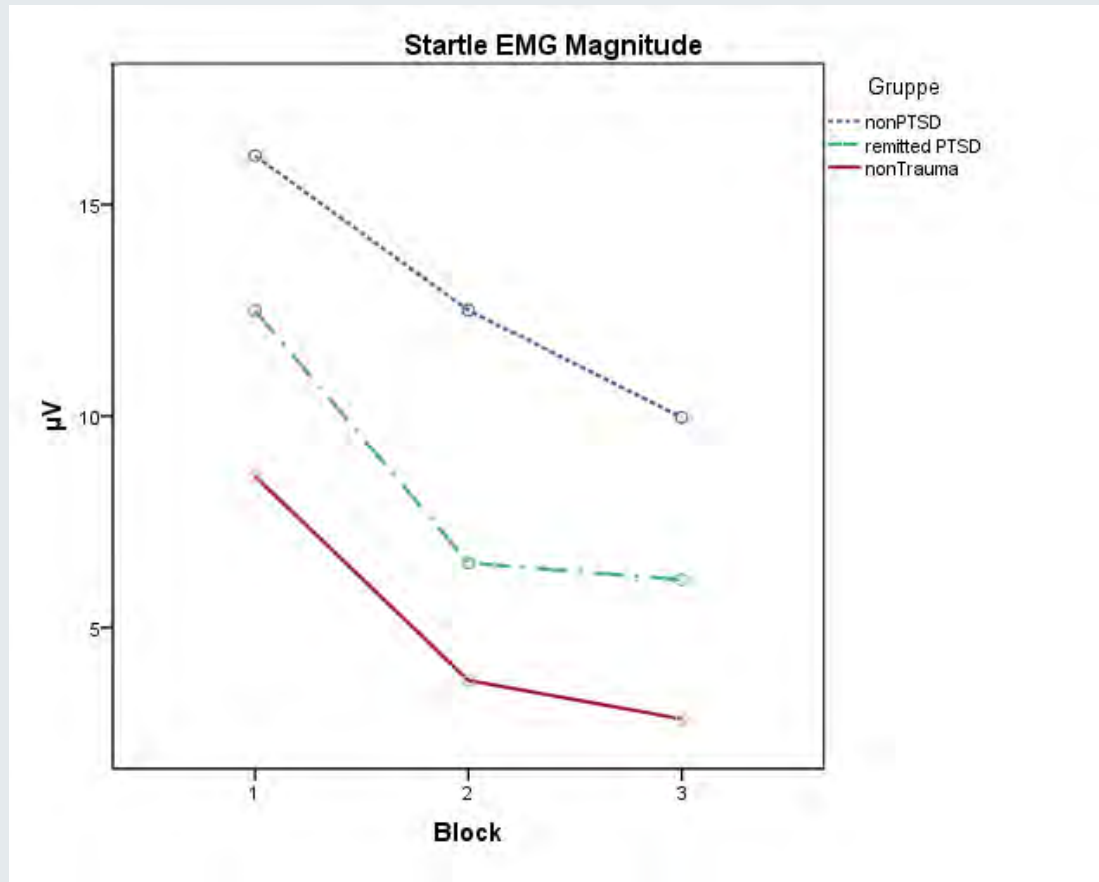
### Mood rating (0 = bad, 100 = good)



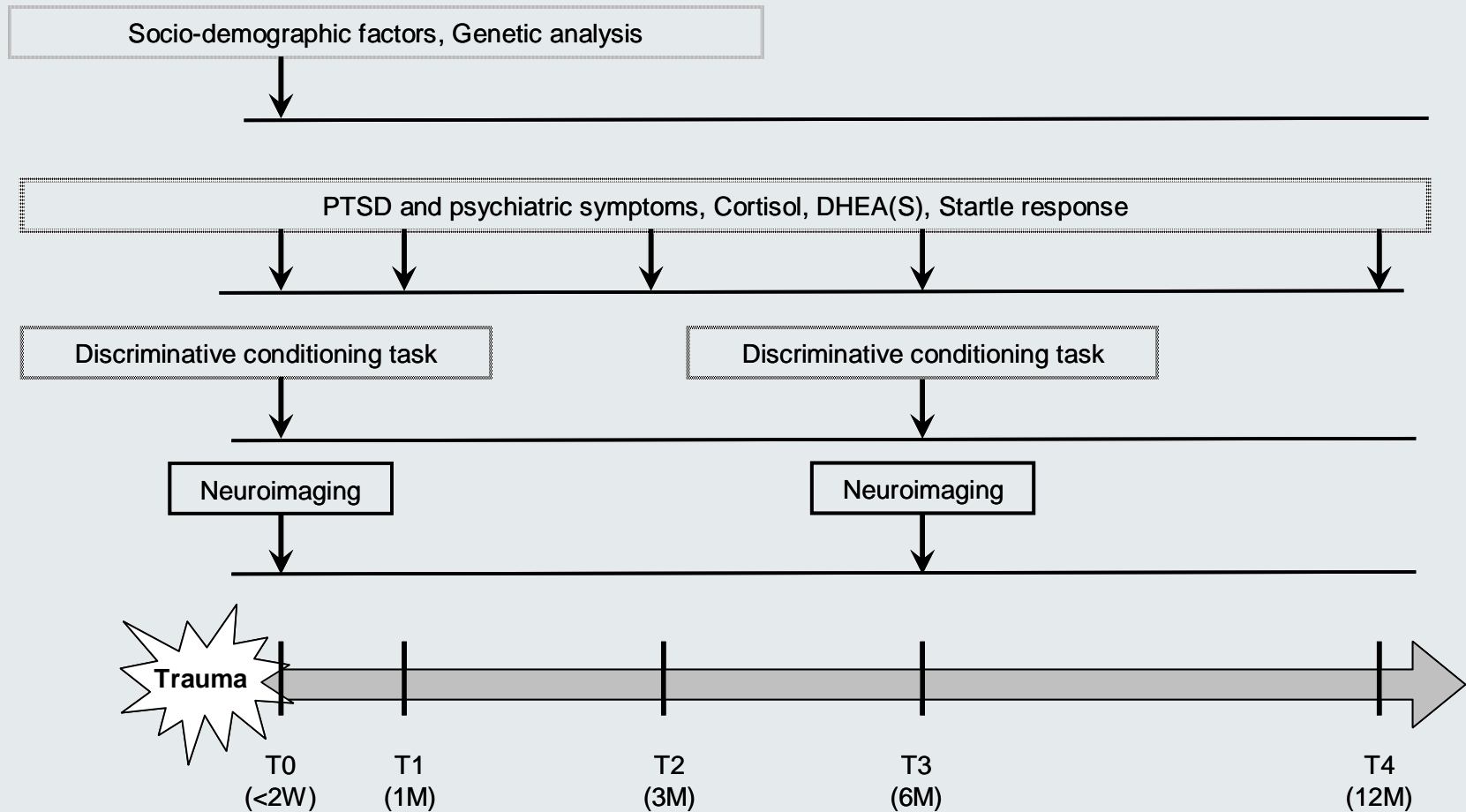
Mood ratings are higher during reinforced conditions for the trauma-controls and the non-trauma-controls, but not for the remitted PTSD participants

# Psychophysiology: startle magnitude

*Schumacher et al. (2010)*



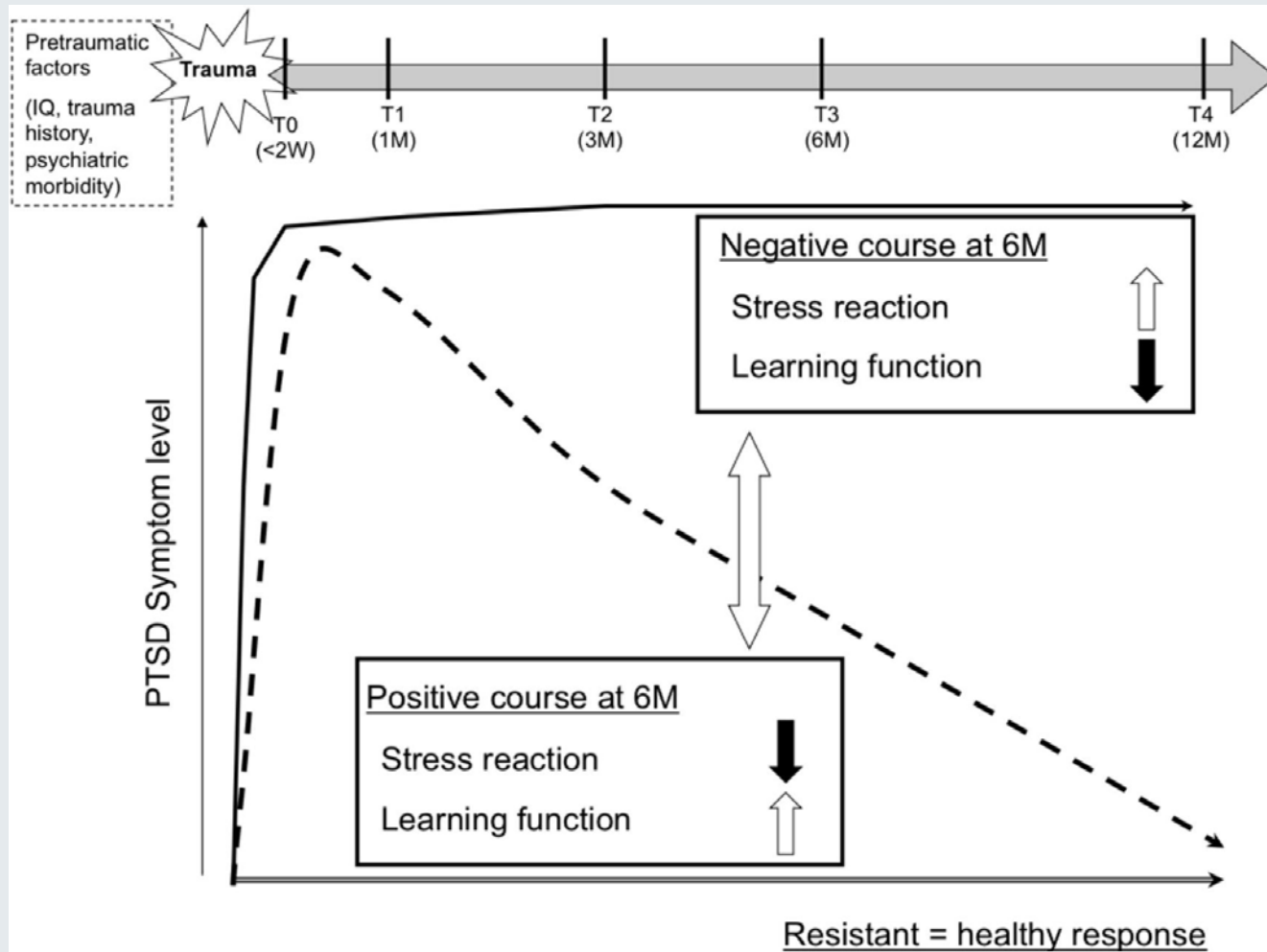
Startle response of trauma-controls, remitted PTSD patients, and no trauma controls. ANOVA showed a time effect ( $F=27.06$ ,  $p<0.001$ ), but no significant group effect ( $F=3.03$ ,  $p=0.06$ ). Covariant-Analysis with State Anxiety showed a significant group effect ( $F=3.75$ ,  $p=0.034$ )-

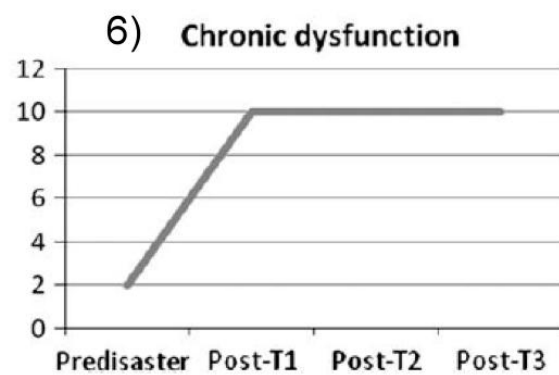
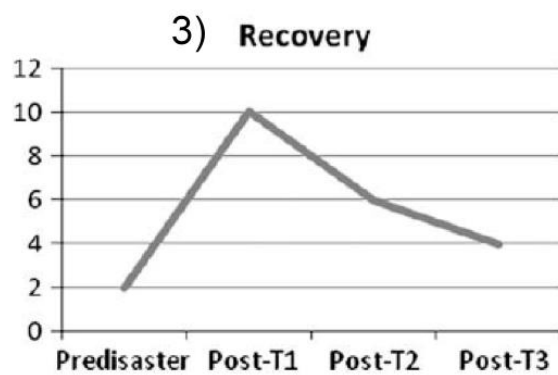
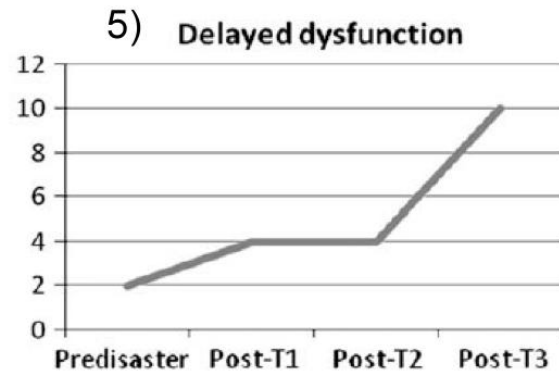
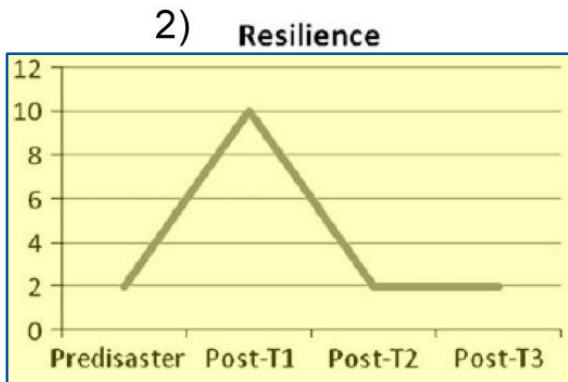
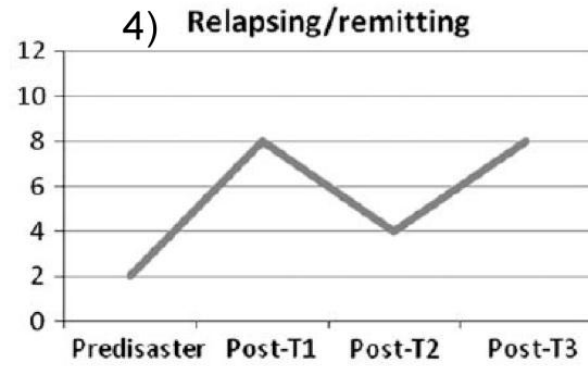
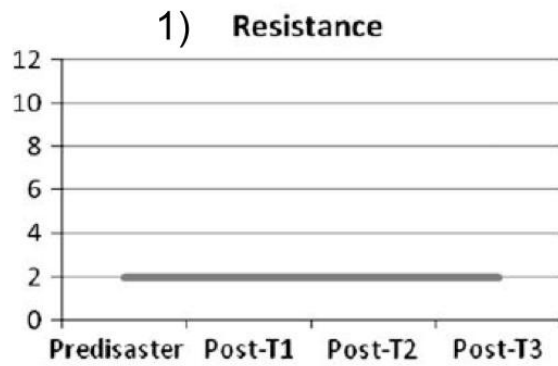


150 survivors of recent acts of non-sexual, non-domestic physical assault will be recruited from the Department of Trauma Surgery at the University Hospital Zurich, and assessed within 2 nights to 2 weeks after the assault, as well as 1 month, 3 months, 6 months, and 12 months after the assault.

A subsample of 25 resistant subjects (CAPS total score <20) and 50 highly symptomatic patients (CAPS total score >50) will undergo neuroimaging in conjunction with the conditioning experiments.

# Hypothesized course of PTSD symptoms following traumatic exposure





Norris et al.  
2009

# Khaled Hosseini

„Mariam ... thought of her entry into this world, the *harami* child of a lowly villager, an unintended thing, pitiable, regrettable accident. A weed. And yet she was leaving the world as **a woman who had loved and been loved back**. She was leaving it as a friend, a companion, a guardian. A mother. A person of consequence at last.“

A Thousand Splendid Suns, 2007



Tohoku Earthquake March 2011





Tohoku Earthquake March 2011

Thank you for your attention!



Pablo Picasso: Le Bouquet