



KLAUS-GRAWE-INSTITUT
FÜR PSYCHOLOGISCHE THERAPIE

Children exposed to violence: Most recent findings on gene-environment interaction and long-term effects on health

SGKJPP Congress

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1. INTRODUCTION

- Klaus-Grawe Think Tank Meeting 2012: Topic & Objectives
- Definitions & Prevalence

2. JUVENILE VIOLENCE VICTIMIZATION & LONG-TERM EFFECTS ON PHYSICAL HEALTH

- Inflammation (C-Reactive Protein; CRP)
- Telomere Erosion
- Epigenetics
- Perinatal Predictors

3. JUVENILE VIOLENCE VICTIMIZATION & CLINICAL INTERVENTION

- Evidence Base, Treatment & Practice

4. IMPLICATIONS & WRAP-UP



KLAUS-GRAWE THINK-TANK MEETING 2012

- ✓ **Hosted by:** The Klaus-Grawe-Foundation (June 23 to 27 in Zuoz, CH).
- ✓ **Topic:** “Children as victims: Psychosocial and psychobiological sequelae of early life violence exposure, state of the art, future research recommendations and goals for translation to prevention and intervention programs.”
- ✓ **Purpose:** To promote interdisciplinary and innovative research in clinical psychology, psychotherapy and their connected disciplines.
- ✓ **Objective:** To improve prevention and treatment of psychological disorders, and finally, to convey the evidence base into clinical practice.
- ✓ **Attendants:** Twelve international experts from the areas of developmental psychology, neurosciences, molecular biology, genetics, epigenetics, immunology, clinical psychology, child psychiatry, as well as of service delivery and social policy.



1. INTRODUCTION

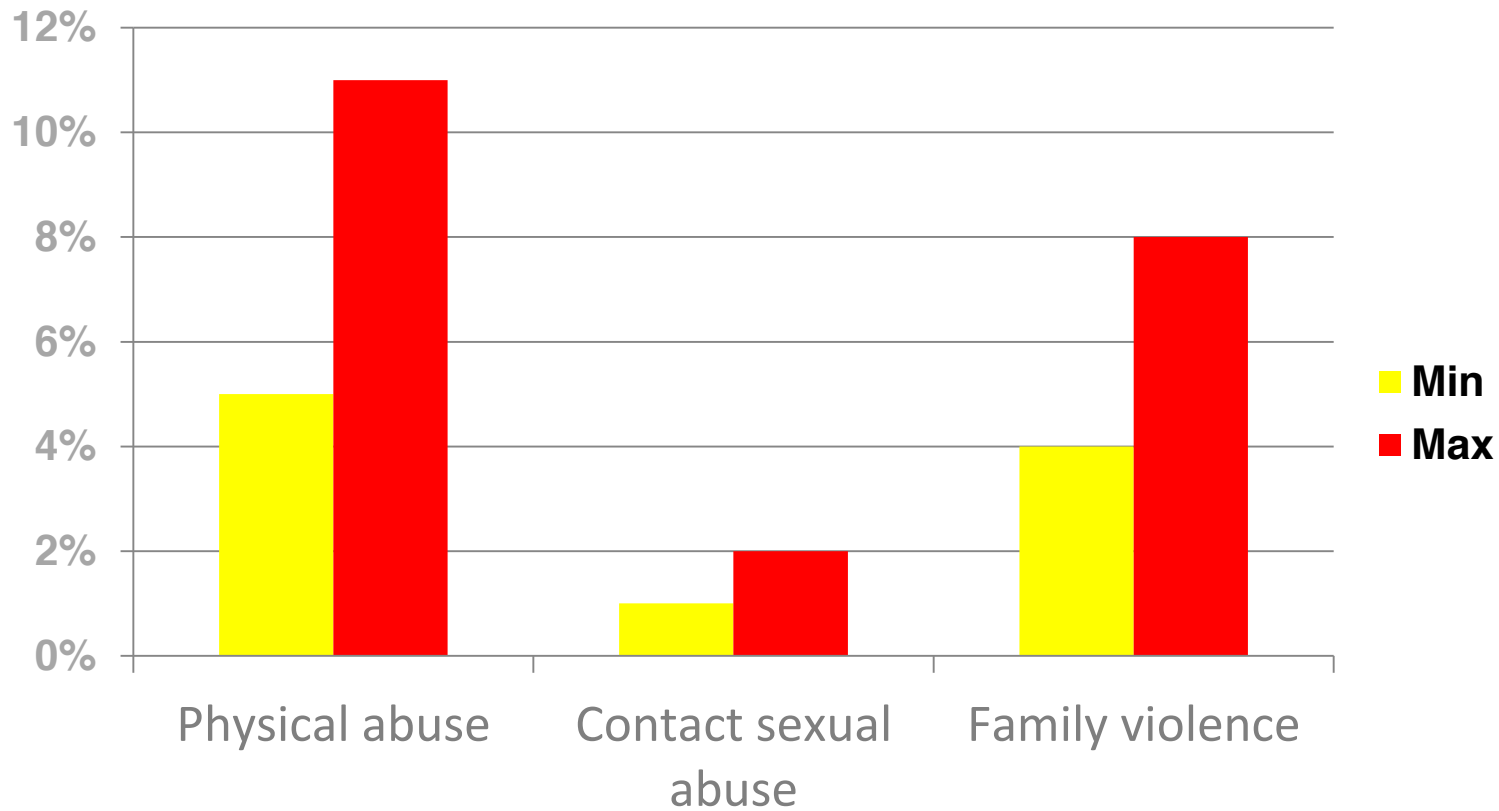
DEFINITION: JUVENILE VIOLENCE VICTIMIZATION (CHILD MALTREATMENT)

- ✓ Personal exposure to acts of intentional harm in the first 18 years of life
 - ✓ Physical or sexual maltreatment by parents/caregivers
 - ✓ Physical or sexual assault by other adults
 - ✓ Exposure to domestic violence: Witnessing abuse between parents/caregivers
 - ✓ Bullying by peers or siblings
 - ✓ Violence within context of romantic relationship
 - ✓ Emotional ill-treatment
 - ✓ Neglect
- Actual or potential harm to the child's health, development or dignity



1. INTRODUCTION

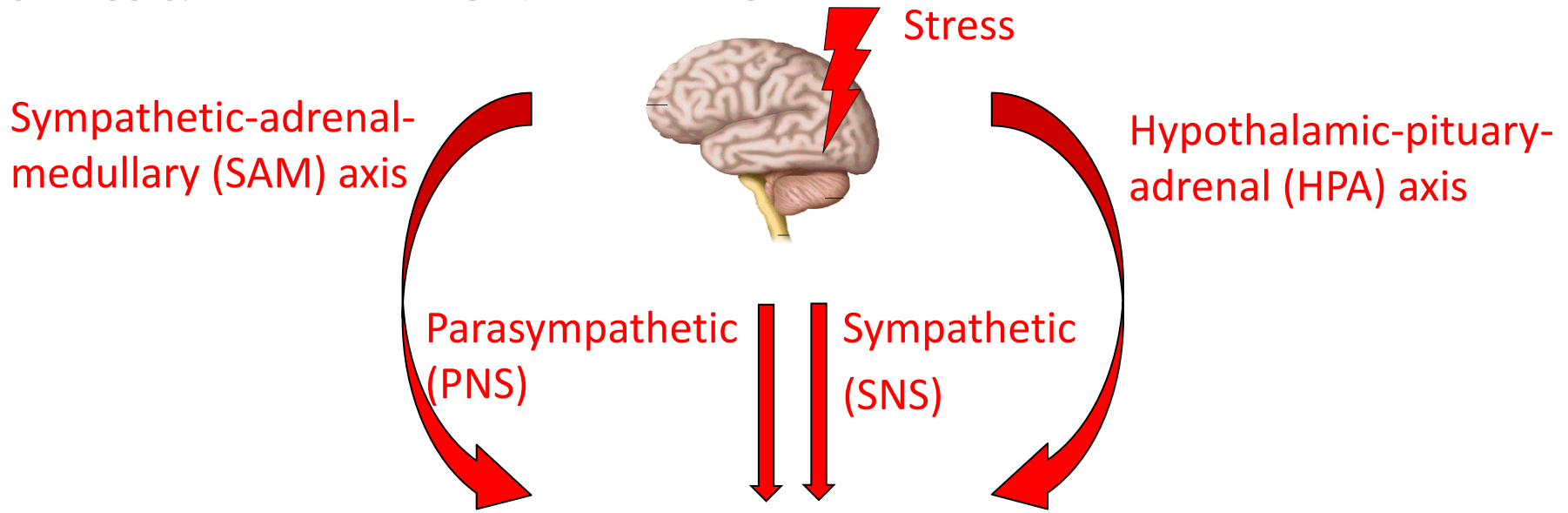
PREVALENCE OF JUVENILE VIOLENCE VICTIMIZATION



Kessler et al (2010): 51945 adults from 21 countries of varying economic status .



STRESS & INFLAMMATION: PATHWAYS



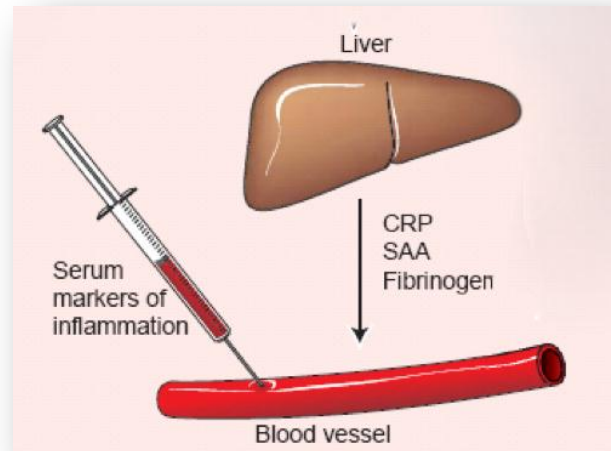
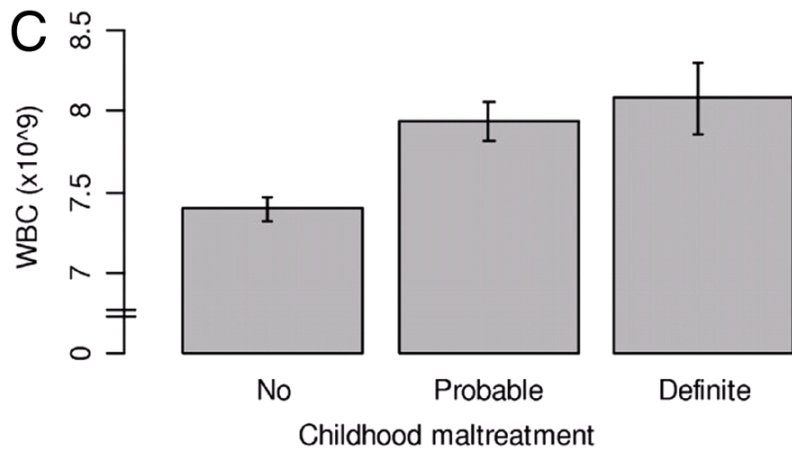
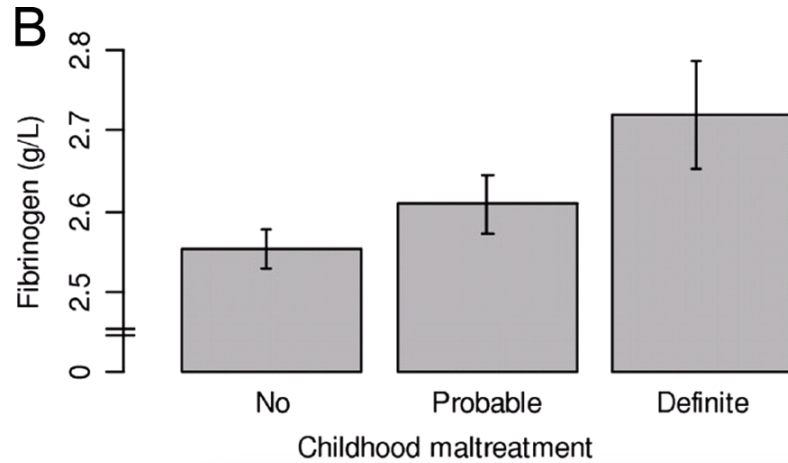
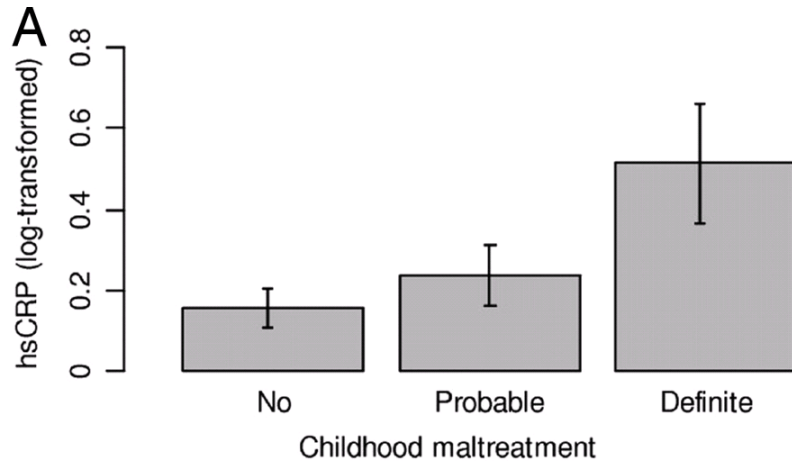
AMPLIFIED IMMUNE RESPONSE, CHRONIC INFLAMMATION
BIOMARKER: C-REACTIVE PROTEIN: CRP

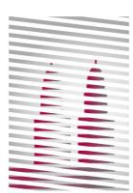
SIGNIFICANT TISSUE DAMAGE

AGE-RELATED DISEASE: CARDIOVASCULAR DISEASE, TYPE 2 DIABETES,
DEMENTIA

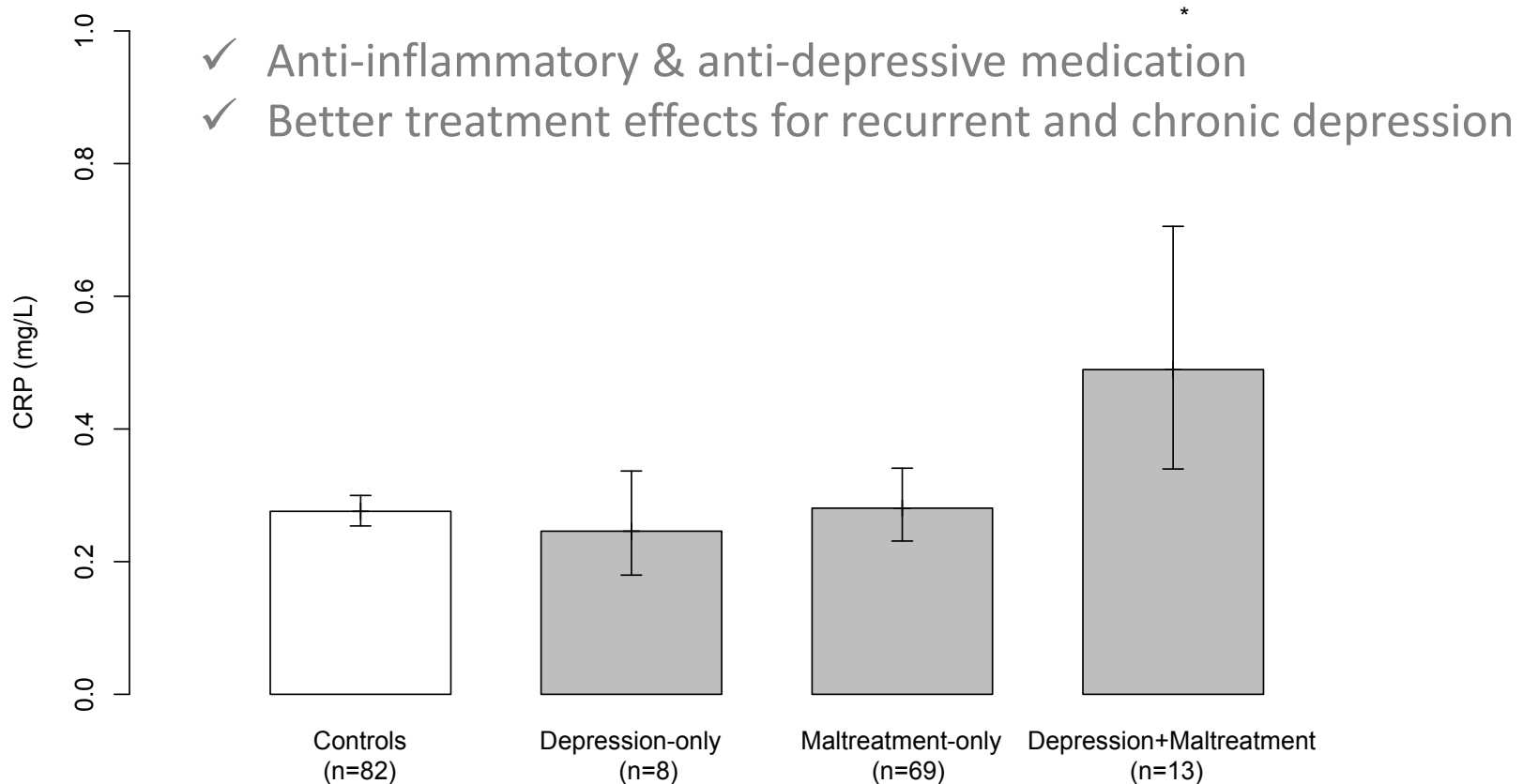


MALTREATMENT & ADULT INFLAMMATION:

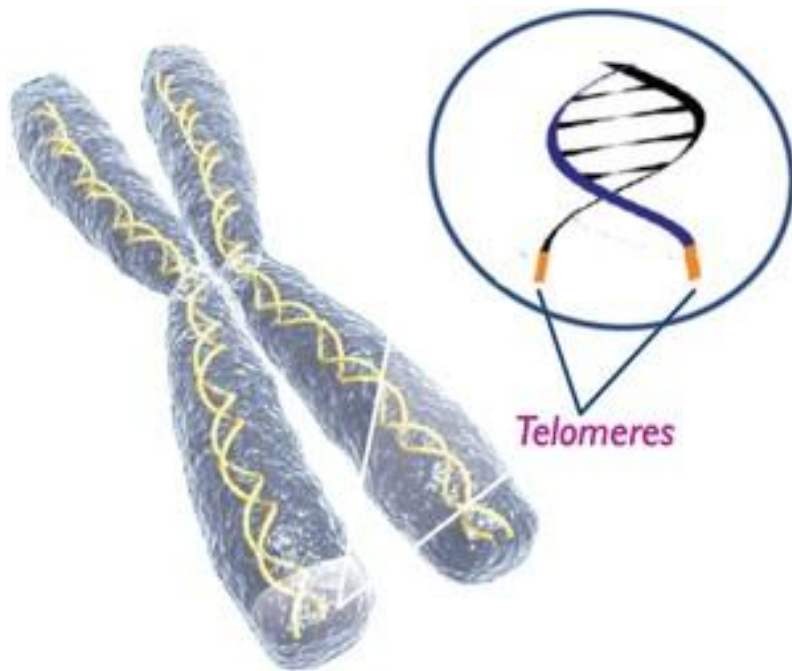




MALTREATMENT, DEPRESSION & INFLAMMATION (IN CHILDREN):



EFFECTS OF JUVENILE VICTIMIZATION EXPOSURE ON TELOMERE EROSION:

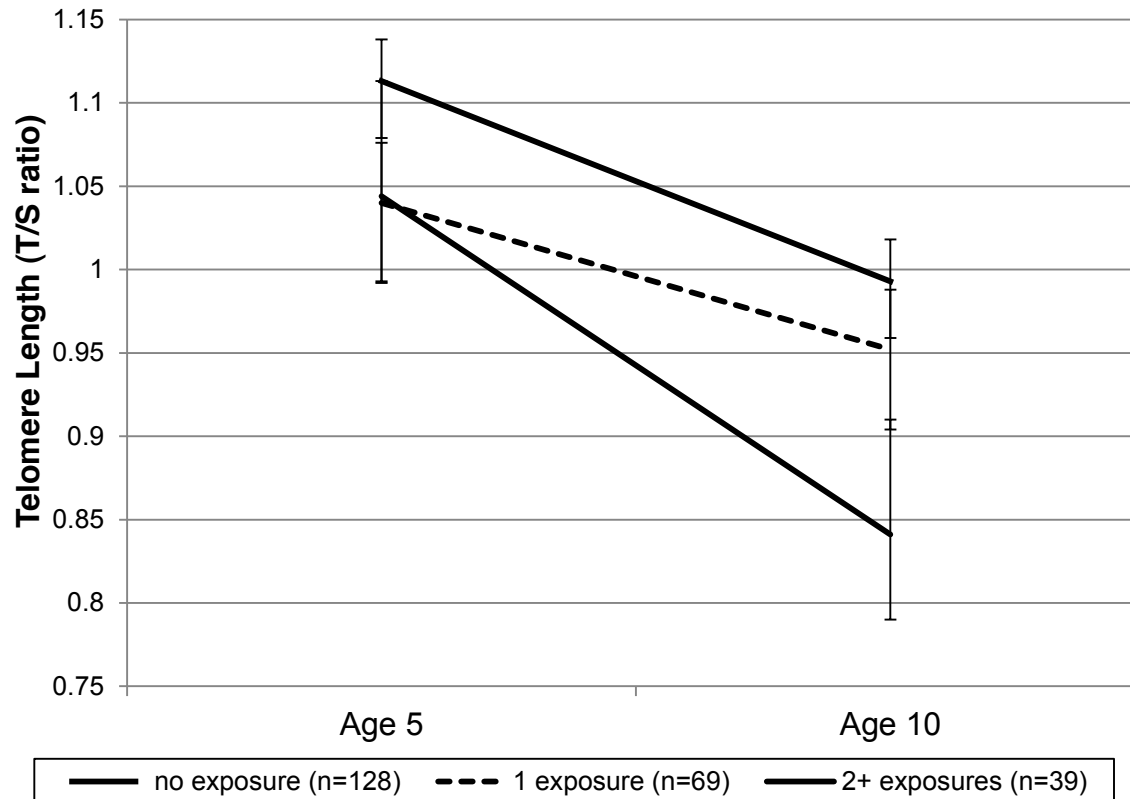


- ✓ A telomere is a region of repetitive nucleotide sequences at each end of a chromosome.
- ✓ Telomeres protect the end of the chromosome from deterioration or from fusion with neighboring chromosomes (shoelace).
- ✓ Telomeres are consumed during cell division (telomere erosion).
- ✓ Telomere length is a marker for biological aging and predicts lifespan.
- ✓ Biological & psychosocial stress lead to faster telomere erosion.



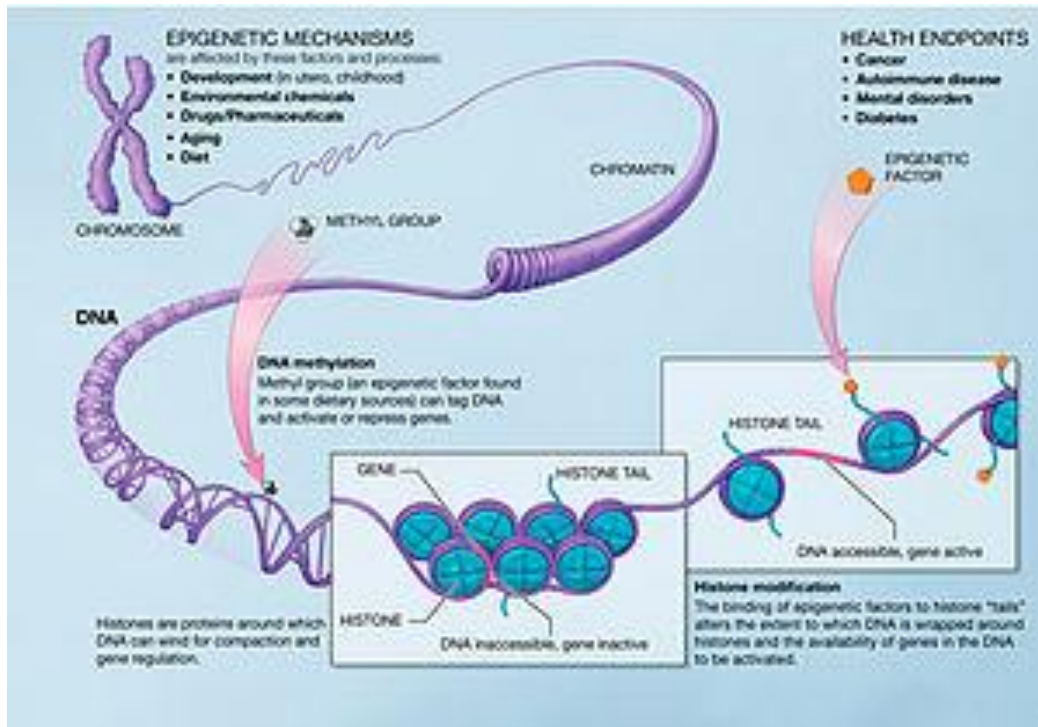
EFFECTS OF JUVENILE VICTIMIZATION EXPOSURE ON TELOMERE EROSION:

Cumulative Violence Exposure and Telomere length



- ✓ Exposure to violence during childhood is associated with telomere erosion from 5-10 years of age (Shalev I et al., 2012; MolPsych)
- ✓ E-Risk-Study: UK-representative birth cohort (1994 -1995; N=2232 children, 1116 families).

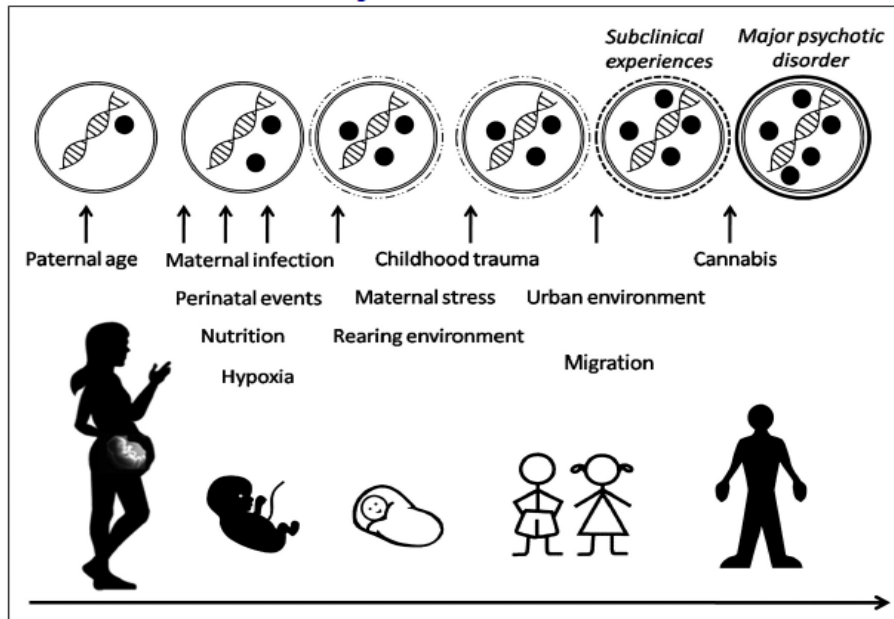
JUVENILE VICTIMIZATION EXPOSURE & EPIGENETICS:



- ✓ Regulation of gene-expression mediated through changes in DNA-methylation and chromatin structure, **independently** of DNA sequence.
- ✓ Epigenetic regulation determines, how much of the mRNA is made, and where and when it is synthesized (post-translational modifications).

JUVENILE VICTIMIZATION EXPOSURE & EPIGENETICS:

Epigenetic correlates of environmental sensitivity in mental illness

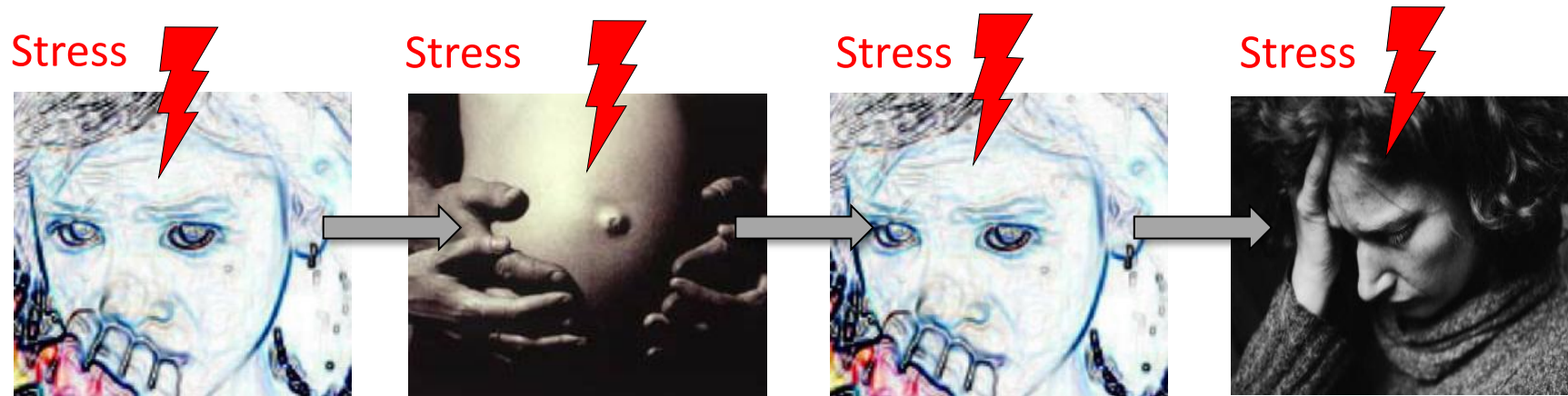


Rutten B P F, Mill J Schizophr Bull 2009;35:1045-1056

- ✓ Epigenetic regulation is influenced by environmental factors, developmental factors, and events in the cell .
- ✓ Epigenome is particularly susceptible to deregulation during embryogenesis and early childhood.
- ✓ Epigenetic changes can be inherited mitotically down somatic cell lineages.

- ✓ Environmental effects on the epigenome can have long-term effects on gene-expression (and health).

EXPOSURE TO MATERNAL DEPRESSION IN UTERO & EXPERIENCE OF CHILDHOOD MALTEATMENT:

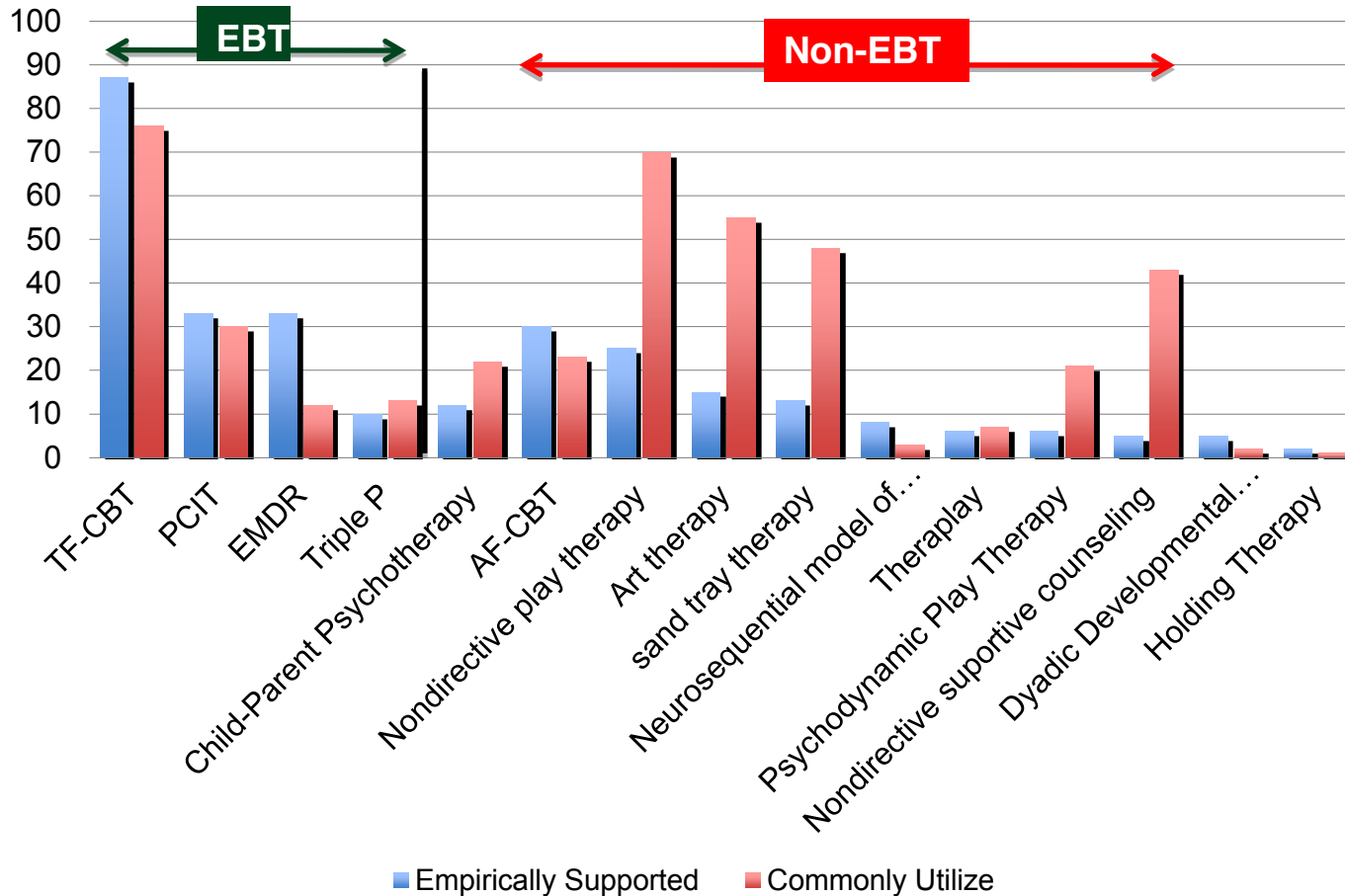


- ✓ Maltreated children have a higher risk to develop psychopathological symptoms during course of life (incl. perinatal depression).
- ✓ Exposure to maternal depression in utero leads to a higher risk for the development of psychopathological symptoms (in the child), and to a higher risk for child maltreatment.
- ✓ Mechanisms: Epigenetics!



3. JUVENILE VIOLENCE VICTIMIZATION & CLIN. INTERVENTION

EVIDENCE BASE, TREATMENT & PRACTICE:



3. JUVENILE VIOLENCE VICTIMIZATION & CLIN. INTERVENTION

IMPORTANCE OF PREVENTION & EVIDENCE-BASED INTERVENTIONS:

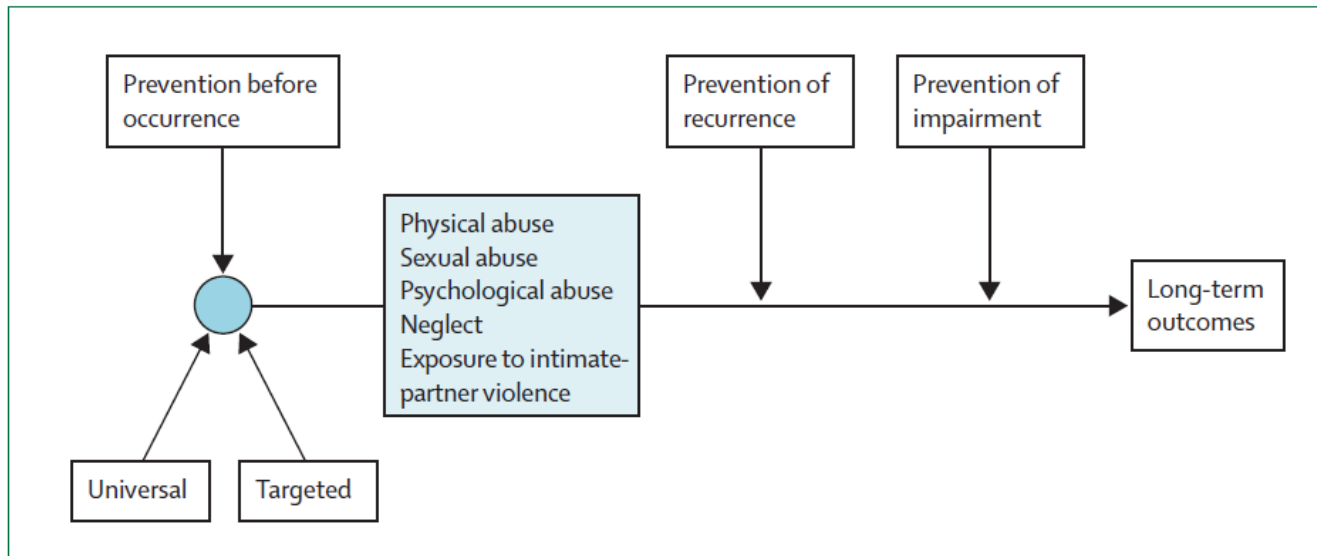


Figure 1: Framework for prevention of child maltreatment and associated impairment

Macmillan HL et al., 2009; Lancet.

- ✓ Evidence-based prevention programs: Triple P, Couple-based prevention programs
- ✓ Specific evidence-based treatments: Trauma-focused CBT, Parent-Child-Interaction Therapy (PCIT), Eye-movement Desensitization and Reprocessing (EMDR)



WRAP-UP:

- ✓ Juvenile violence victimization has severe and long-term health effects:
 - ✓ Higher risk to develop psychopathological symptoms during life course
 - ✓ Higher risk to develop long-term physical health issues

- ✓ Questions:
 - ✓ What are the precise mechanisms behind the development of psychological and physiological long-term effects after childhood maltreatment?
 - ✓ What are the specific pathways?
 - ✓ Might there be a common mechanism?



4. WRAP-UP & IMPLICATIONS

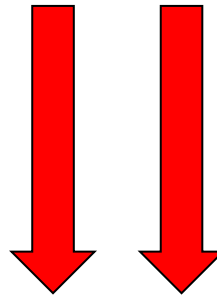
WRAP-UP:

CHILDHOOD TRAUMA

COMMON PATHWAY?

BIOCHEMICAL STRESSORS
(IMFLAMATION, OXIDATIVE
STRESS)

PSYCHOSOCIAL STRESSORS



- ✓ RISK FOR AGE-RELATED DISEASES / POOR IMMUNE FUNCTION
- ✓ CARDIOVASCULAR DISEASE, CANCER, METABOLIC DISEASE, DEMENTIA
- ✓ PSYCHIATRIC DISORDERS



IMPLICATIONS:

- ✓ Interdisciplinary research to find out more about the mechanisms behind the association between child maltreatment and health effects
- ✓ Improve the evidence base (biology/physiology *and* psychotherapy research)
- ✓ Convey preclinical knowledge into clinical practice
- ✓ Disseminate evidence-based treatments
- ✓ Improve prevention and intervention practice of child maltreatment



- ✓ Prof. Dr. Avshalom Caspi, Duke University
- ✓ Prof. Dr. Edith Chen, University of British Columbia
- ✓ Prof. Dr. Andrea Danese, Kings College
- ✓ Dr. Helen Fisher, Kings College
- ✓ Prof. Dr. Nina Heinrichs, University of Bielefeld
- ✓ Dr. Mariann Grawe-Gerber, Klaus-Grawe-Institute Zurich
- ✓ Dr. Jonathan Mill, Kings College
- ✓ Prof. Dr. Greg Miller, University of British Columbia
- ✓ Prof. Dr. Terrie Moffitt, Duke University
- ✓ Prof. Dr. Carmine Pariante, Kings College
- ✓ Prof. Dr. Matt Sanders, University of Queensland
- ✓ Dr. Idan Shalev, Duke University
- ✓ Prof. Dr. Susanne Walitza, University of Zurich
- ✓ Prof. Dr. Kurt Hahlweg, TU Braunschweig
- ✓ Prof. Dr. Donald Baucom, University of North Carolina
- ✓ Ann-Katrin Job, MSc, TU Braunschweig
- ✓ Misa Kuper-Yamanaka, lic.phil., Klaus-Grawe-Institute Zurich, University of Bielefeld



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