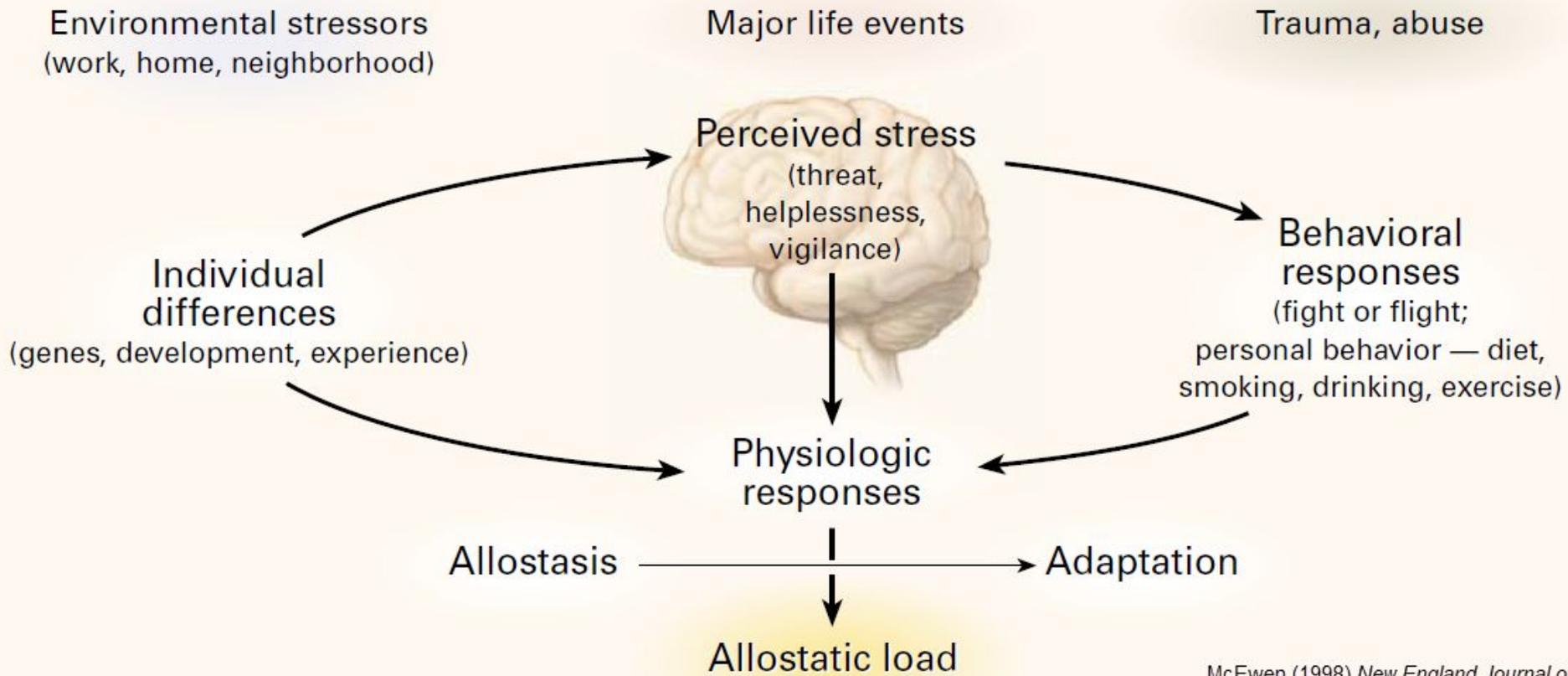


Restorative Biological Processes and Health : **still a useful concept**

Theodore F. Robles* and Judith E. Carroll
University of California, Los Angeles

**for health and
emotional well-being?**

Supported by a William T. Grant Foundation Research Grant, NIA R21 AG032494, UCLA Faculty Senate, UCLA Center for the Study of Women, Cousins Center for Psychoneuroimmunology



McEwen (1998) *New England Journal of Medicine*.

Restore:

1. Give back, return;
2. To put or bring back into existence or use; and
3. To bring back to or put back into a former or original state

Merriam-Webster

Allostatic processes:

Temporarily changing set points to adapt to environmental challenge

Restorative processes:

Returning organism to original state, ~~prior to environmental challenge~~

When there's relatively less environmental challenge

Response magnitude

Restorative processes



Sleep
Energy storage



Growth, repair, remodeling



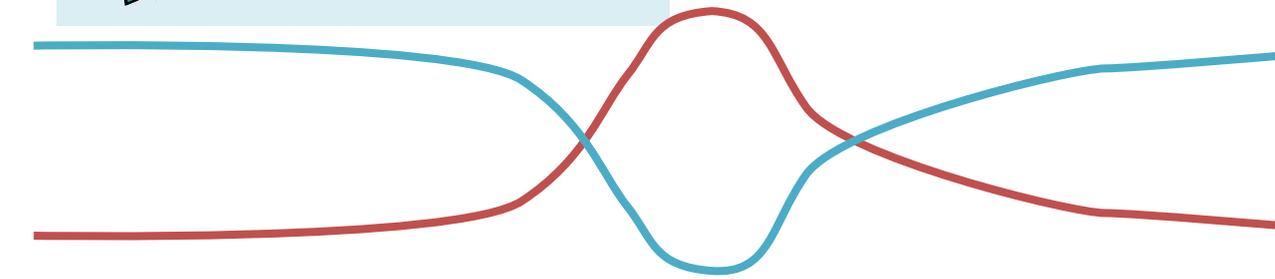
Antioxidant capacity
Telomerase activity



DNA repair

Allostatic processes

Acute HPA/ANS response
Immune response to antigens
Oxidative stress



Steady-state



“Stress”

Recovery

Steady-state

Time

Response magnitude

Restorative processes



Sleep
Energy storage



Growth, repair, remodeling



Antioxidant capacity
Telomerase activity



DNA repair

Allostatic processes

Acute HPA/ANS response
Immune response to antigens
Oxidative stress



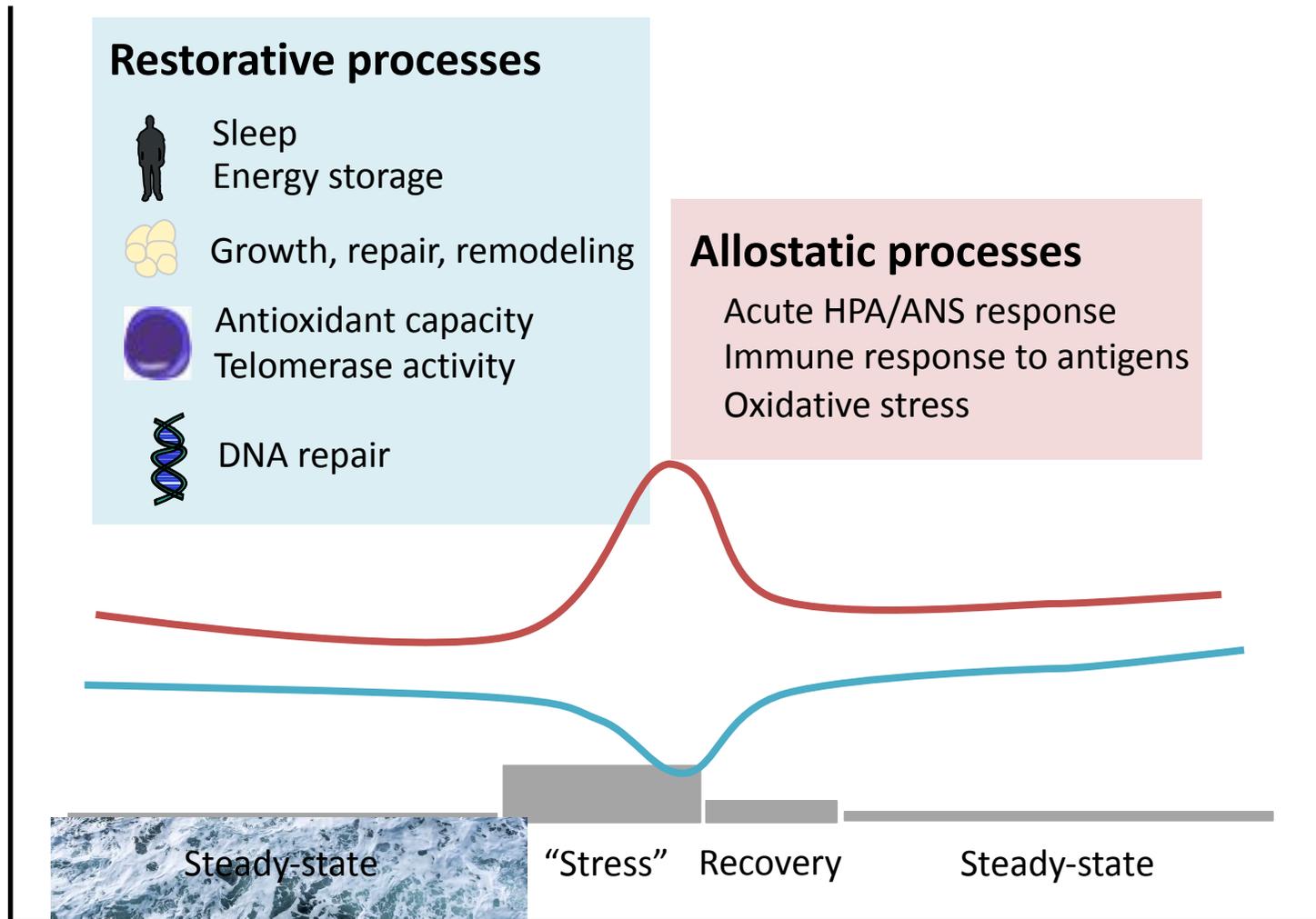
Steady-state

"Stress"

Recovery

Steady-state

Time



Informing (and oversimplifying) concepts

Entropy

Disorder

Order

Metabolism

Catabolic

Anabolic

ANS biology

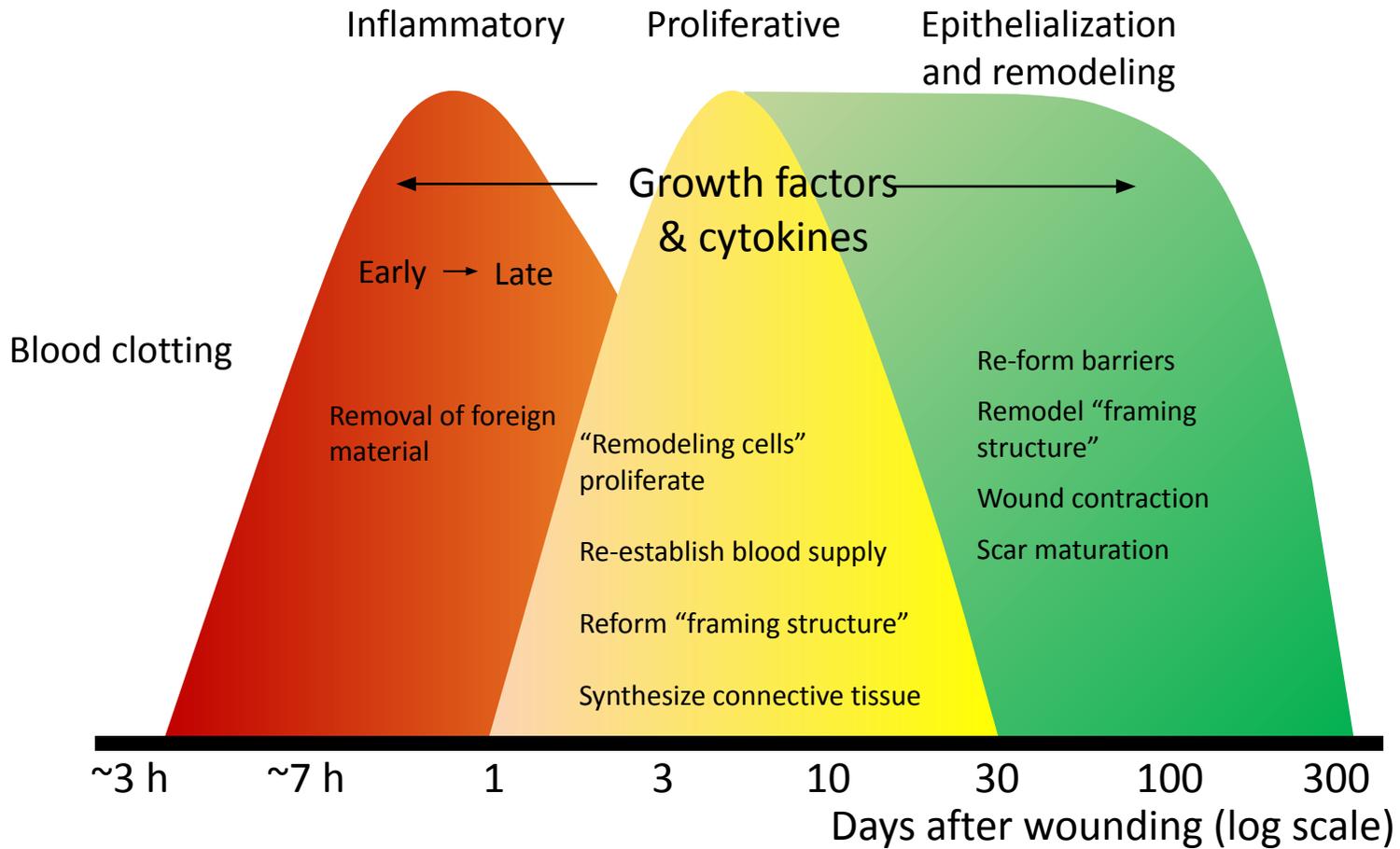
Sympathetic

Parasympathetic

Allostatic

Restorative



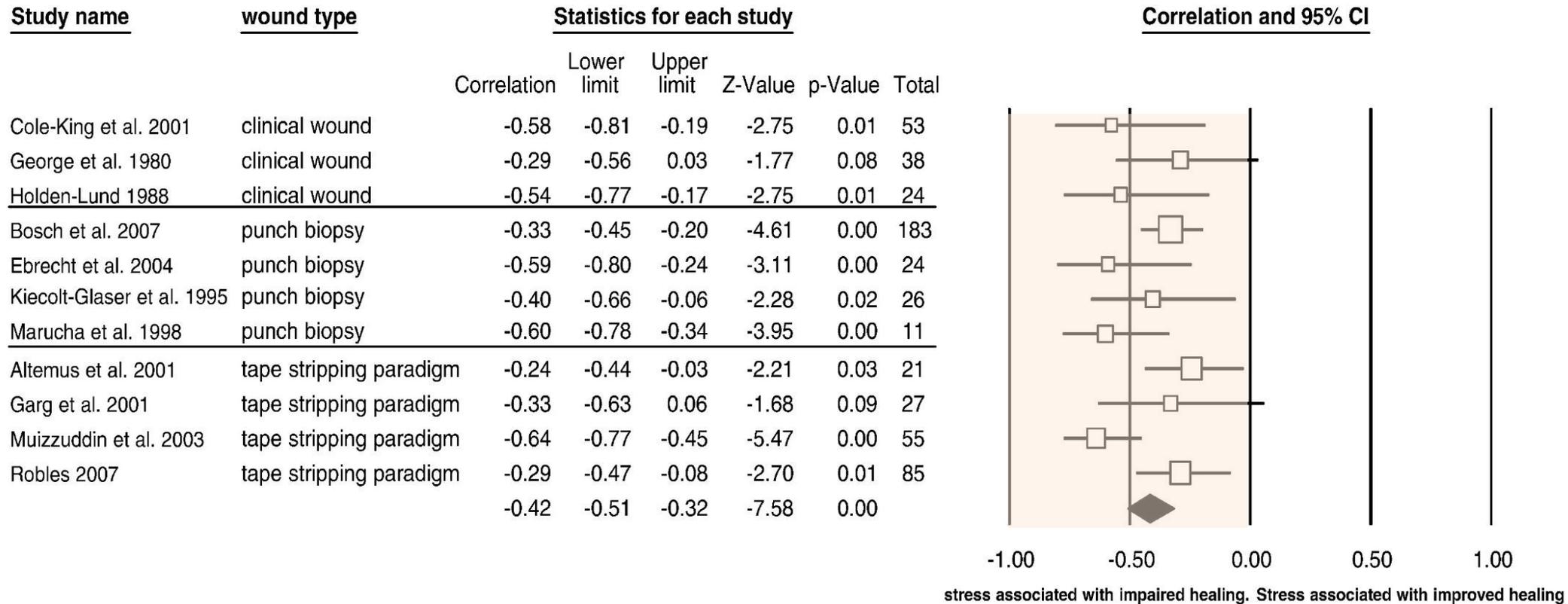


but...fuzzy boundaries

How could psychosocial factors affect restorative processes?

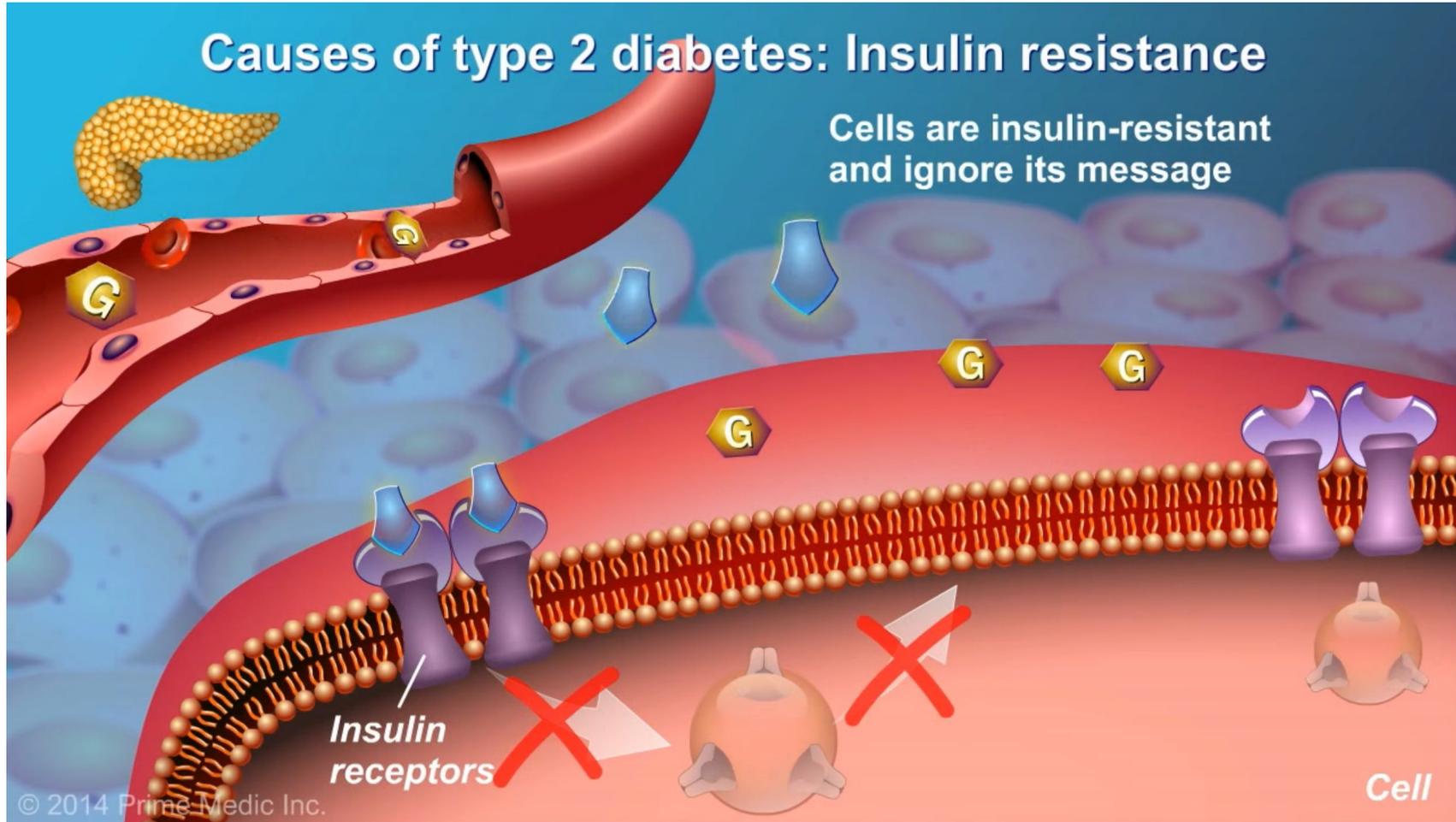


Slow the rate of repair



Walburn, Vedhara, et al. (2009). *Journal of Psychosomatic Research*.

Disrupt processes, integrity of materials



Sleep

Reduction in Insulin Sensitivity
(% of normal bedtime condition)

0
-5
-10
-15
-20
-25
-30
-35



Sleep Restriction

Sleep Fragmentation

Reutrakul & Van Cauter (2018). *Metabolism*.

Disrupt processes, integrity of materials

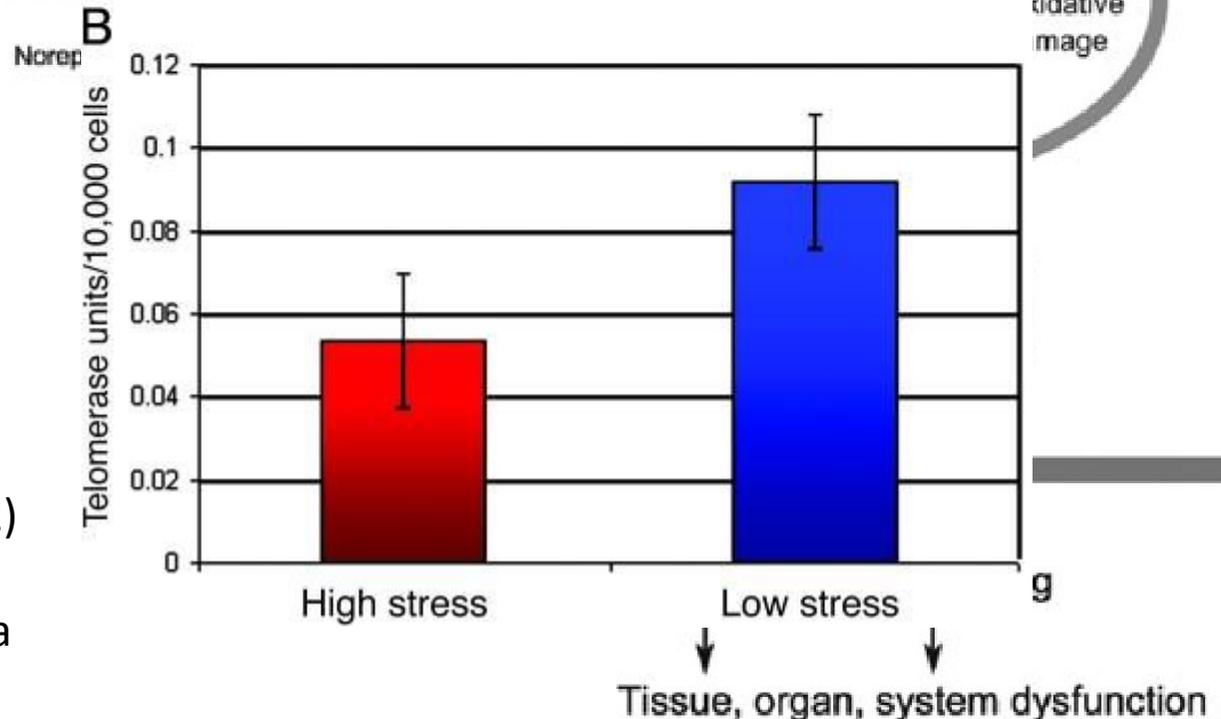
Accelerated telomere shortening in response to life stress

Psych

Elissa S. Epel^{*,†}, Elizabeth H. Blackburn[‡], Jue Lin[‡], Firdaus S. Dhabhar[§], Nancy E. Adler^{*}, Jason D. Morrow[¶], and Richard M. Cawthon^{||}

Neuroendocrine mediators:

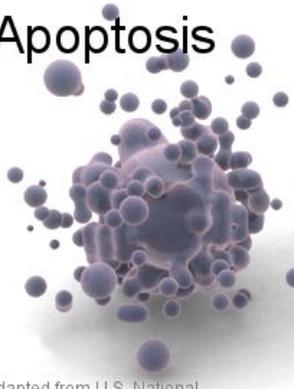
■ intracellular



Check out Lin & Epel (2022) review:
<https://doi.org/10.1016/j.arr.2021.101507>

Overcompensation

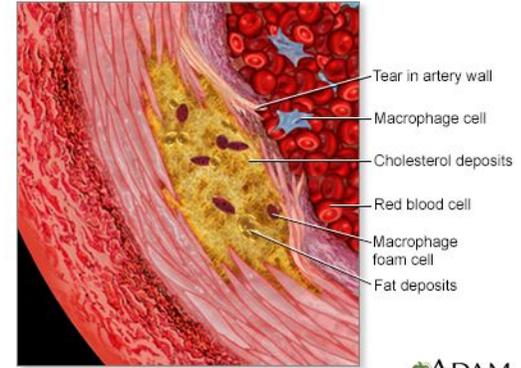
Apoptosis



Adapted from U.S. National Library of Medicine



Cut-section of artery



ADAM.



Slow rate of repair

Disrupted processes, integrity of materials

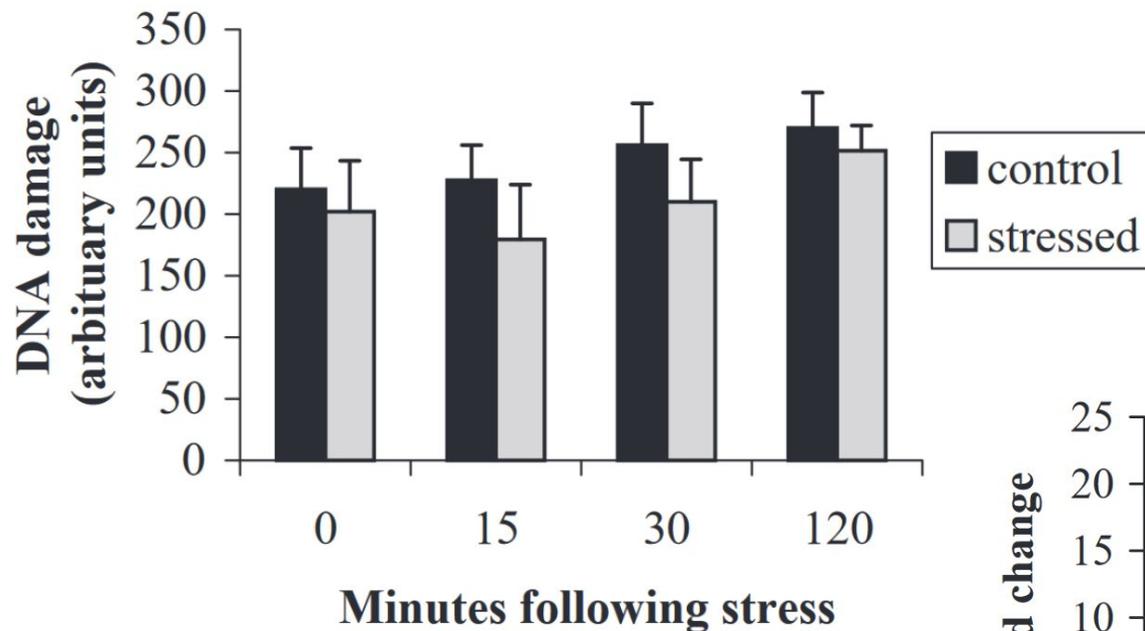
Disrupted normative processes
(*overcompensation*)

Restorative processes and positive psychological functioning and emotional well-being:

What questions should we be asking?

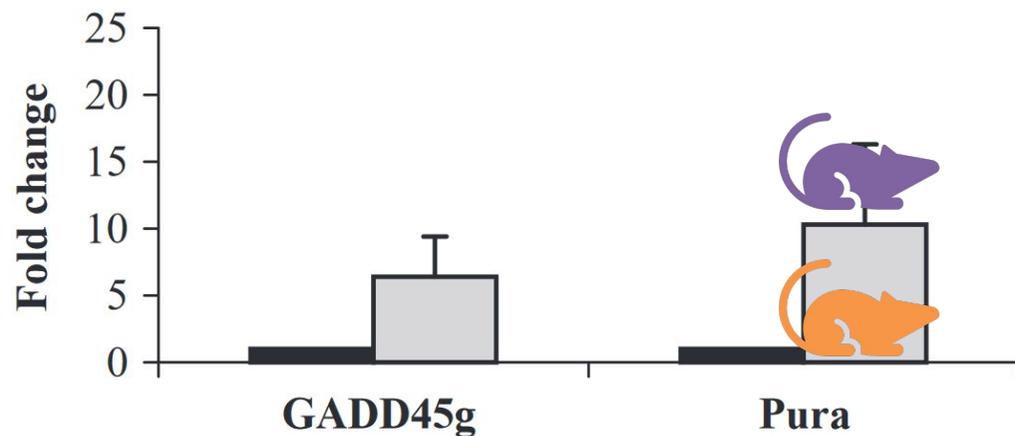
What predicts “normative” restorative function despite adversity?

Mice: Control condition vs. Restraint stress

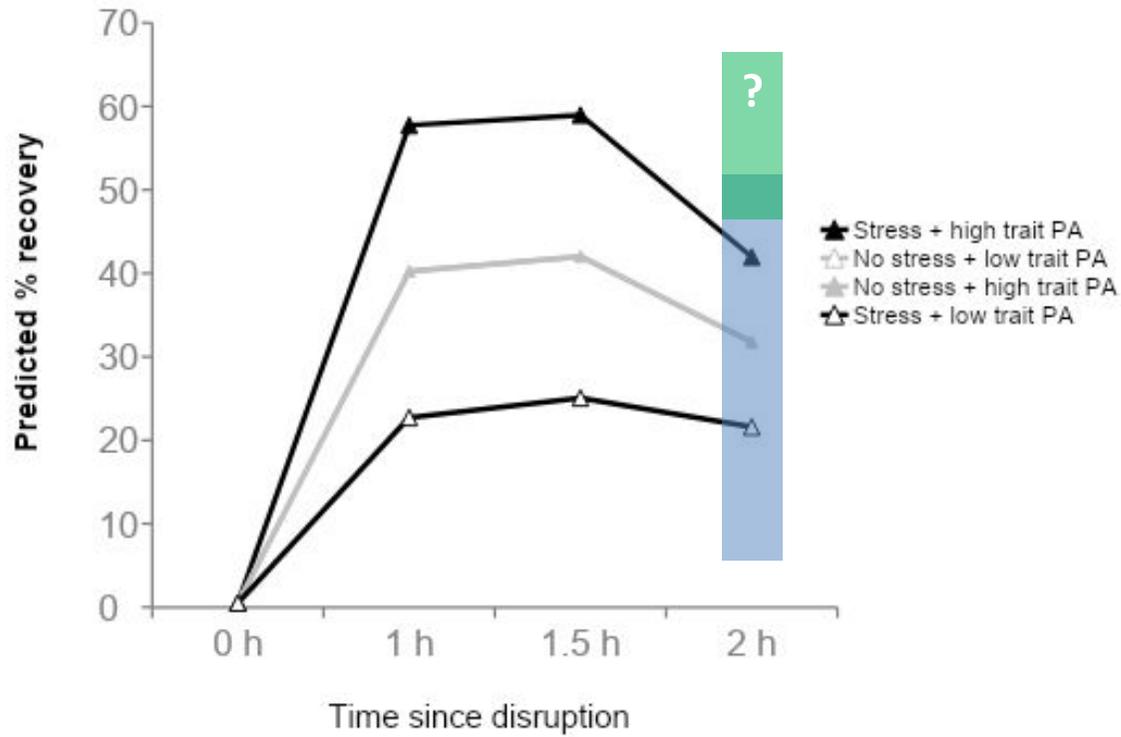


← No differences in DNA damage

↓ Up-regulation of ~15 genes involved in DNA damage response



Enhancement?



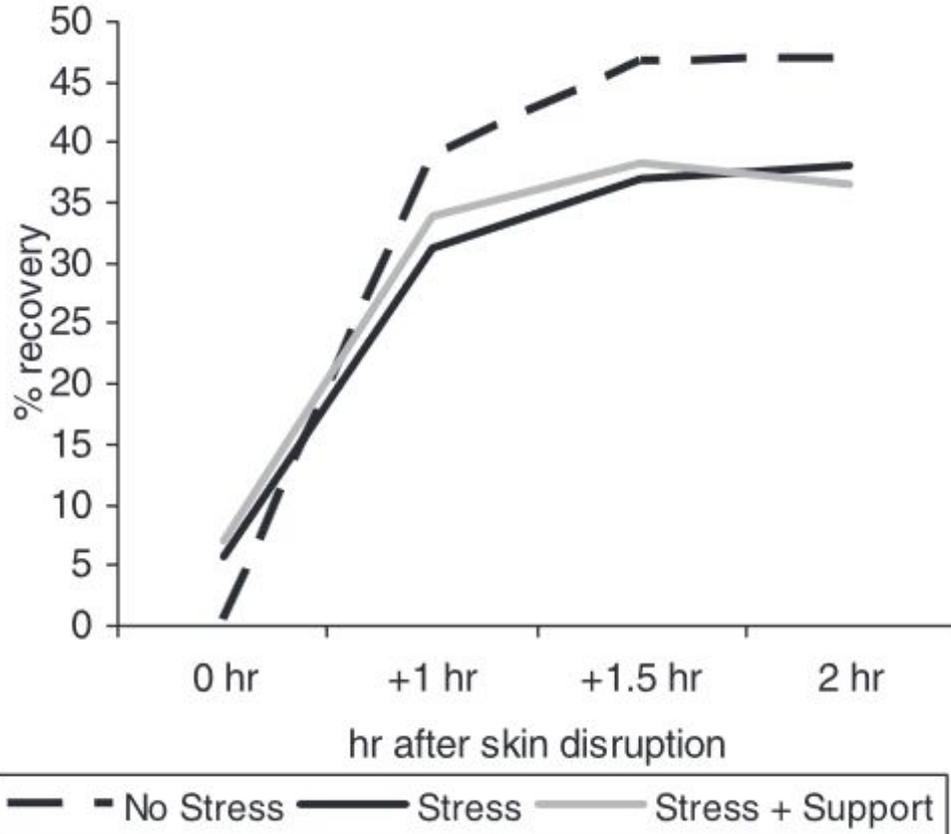
Robles, Brooks, & Pressman (2008). *Health Psychology*.

Social connection as target?

Health Psychology
2017, Vol. 36, No. 7, 619–629

© 2017 American Psychological Association
0278-6133/17/\$12.00 <http://dx.doi.org/10.1037/hea0000492>

Robles (2007)



The Role of Social Closeness During Tape Stripping to Facilitate Skin Barrier Recovery: Preliminary Findings

Hayley Robinson and Abhimati Ravikulan
University of Auckland

Urs M. Nater and Nadine Skoluda
University of Marburg

Paul Jarrett
University of Auckland and Middlemore Hospital, Auckland,
New Zealand

Elizabeth Broadbent
University of Auckland

After 30 min

$30 \pm 11\%$

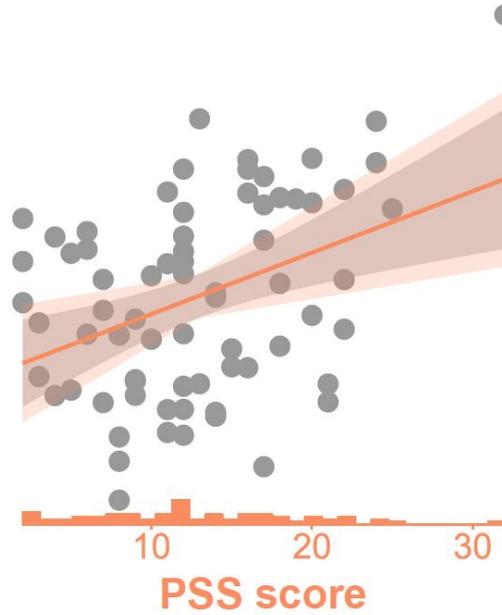
$23 \pm 7.5\%$

Social closeness
manipulation

Control
manipulation

$r = .36$

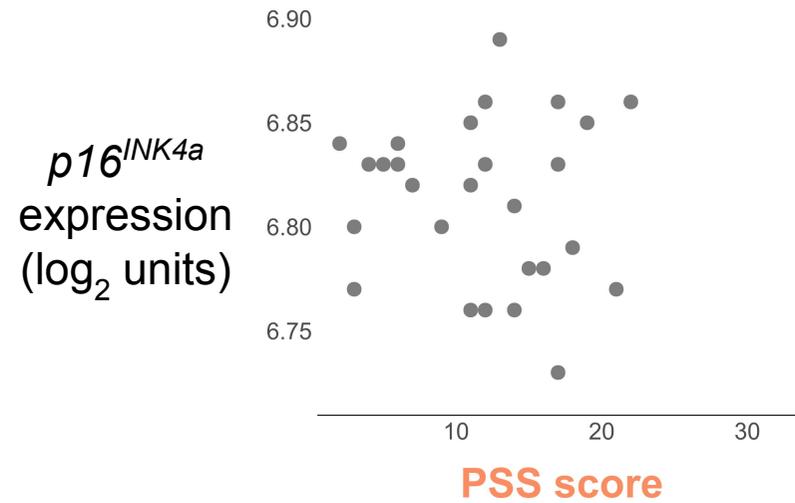
Perceived stress

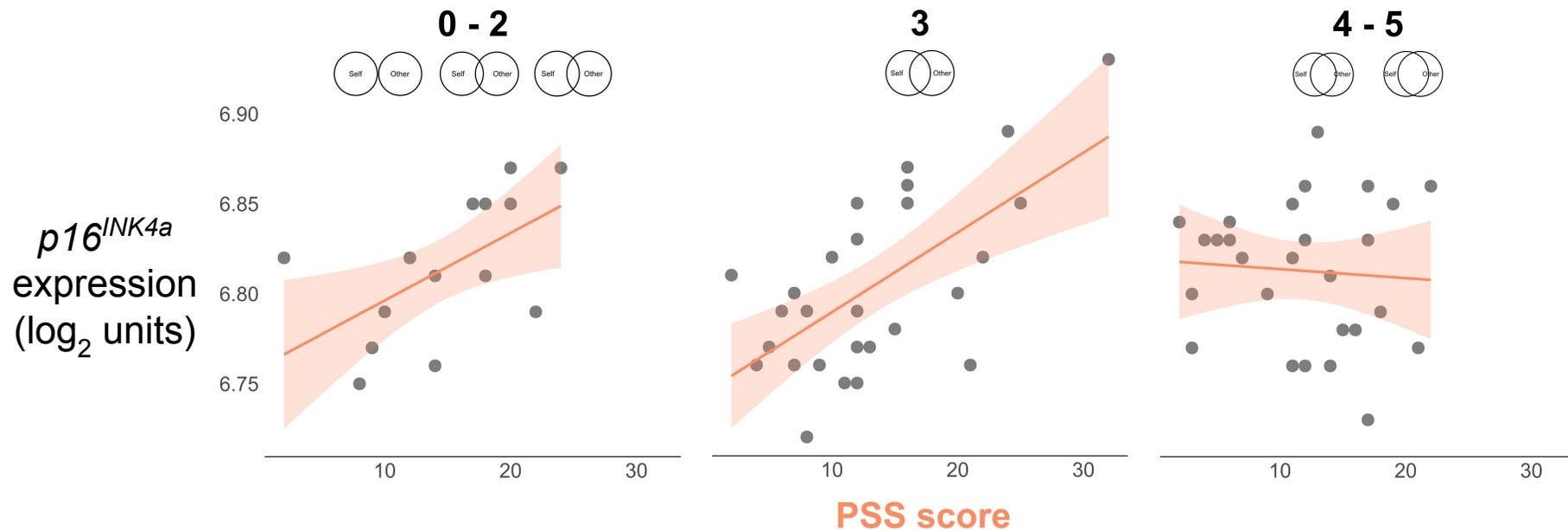


Pseudo $R^2 = .14$

$N = 73$

Random effects models (accounting for nesting within dyads).
Covariates: Age, biological sex, BMI, ethnicity (Hispanic, African-American)



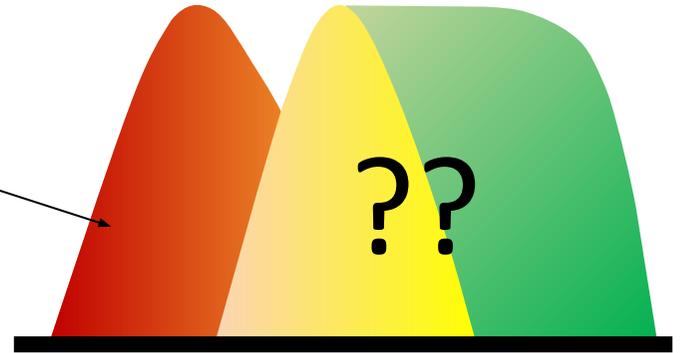


Random effects models (accounting for nesting within dyads).
 Covariates: Age, biological sex, BMI, ethnicity (Hispanic, African-American)

Novel mechanisms to explore

- Parasympathetic
- Metabolic and growth pathways

Primary focus in PNI



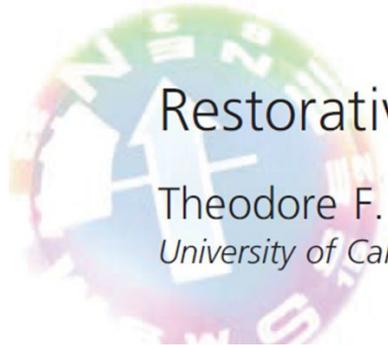
- Remodeling and repair mechanisms
- *Health behaviors* – diet/nutrition, exercise

Maintaining normative function despite adversity?

Is enhancement possible through intervention?

Social targets?

Novel mechanisms – repair, growth processes?



Restorative Biological Processes and Health : **still a useful concept**

Theodore F. Robles* and Judith E. Carroll
University of California, Los Angeles

**for health and
emotional well-being?**

Supported by a William T. Grant Foundation Research Grant, NIA R21 AG032494, UCLA Faculty Senate, UCLA Center for the Study of Women, Cousins Center for Psychoneuroimmunology