Intersection between Mental Health and Violence

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Learning Objectives

Examine…

1. link b/w bullying and mental health (MH)
2. temporal sequence
3. heterogeneity in MH outcomes

Scope of the Problem

1. 15-20% of Canadian youth have serious MH problems

2. 50-75% of adult MH disorders began in childhood
   - Before 15
   - Kim-Cohen et al., 2003; Kessler et al., 2001; 2007; Weisz, 1998

JAMA Psychiatry

Original Investigation

Adult Functional Outcomes of Common Childhood Psychiatric Problems
A Prospective, Longitudinal Study

William E. Copeland, PhD; Dieter Wolke, PhD; Lilly Shanahan, PhD; E. Jane Costello, PhD

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Table 1. Definitions and Prevalence of Young Adult Outcomes

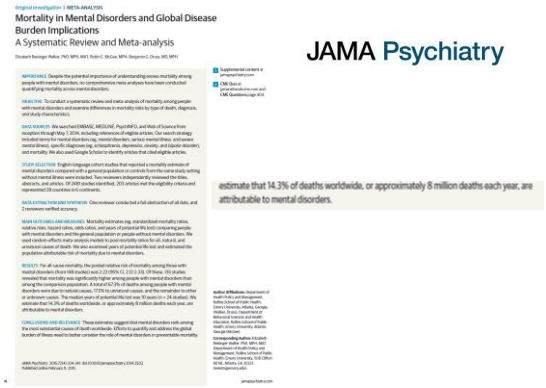
Domain	Definition	Prevalence,[a] %
Health		
Multiple psychiatric problems	Meeting full criteria for ≥2 different *DSM* disorders across all adult assessments	3.9
Multiple addictions	Meeting full criteria for *DSM* substance dependence for ≥2 substances across all adult assessments	5.3
Suicidality	Reporting recurrent thoughts of death (not just fear of dying), recurrent ideation, a suicide attempt, or specific plan for committing suicide	7.1
Serious physical event	Diagnosis with serious physical illness, involved in serious accident or death; physical illness and accidents had to involve risk of death or chronic disability	3.4
Legal		
Serious criminal activity	Official record of felony charge between 18 and 25 y	7.7
Incarceration	Participant reported time spent in jail or prison across adult assessments	3.3
Financial		
High-school dropout	Had not received high school diploma, equivalent degree, or GED by last adult assessment	12.4
Unable to keep job	Participant reported being fired from ≥3 jobs over the course of adult assessments	6.6
Residential instability	Moved ≥6 times in 5 y	5.2
Social		
Early parenthood	Participant reported becoming a parent prior to age of majority or legal adulthood (18 y)	4.6
No social support	Participant reported no best friend/confidante, little to no relationship with parents, and rare contact with peers across all adult assessments	3.0
Relational instability	Multiple divorces	4.8

Abbreviation: GED, General Education Development.
[a] All percentages are weighted.

- Adults with a childhood MH disorder 6X > to have at least 1 adverse adult outcome and 9X > to have 2 or more indicators

3. MH problems in childhood and adolescence leading cause of health-related burden
   - In adults, depression is the leading cause of disability worldwide

UNICEF, 2008; Whiteford et al., 2013


Original Investigation | META-ANALYSIS

Mortality in Mental Disorders and Global Disease Burden Implications
A Systematic Review and Meta-analysis

JAMA Psychiatry

estimate that 14.3% of deaths worldwide, or approximately 8 million deaths each year, are attributable to mental disorders.

❹ Most children with MH problems do not receive services and if they do, the services are often not evidence-based

- Evidence-Practice Gap

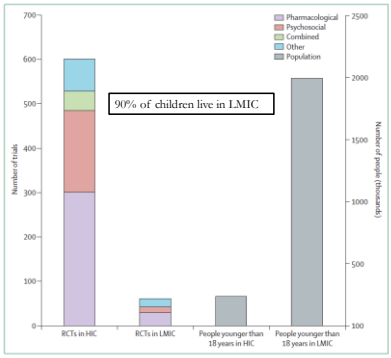


Figure 2: The 10–90% divide in research into treatment for childhood and adolescence mental health disorders
RCTs=randomised controlled trials (between 2001 and 2010). HIC=high-income countries. LMIC=low-income and middle-income countries.

Kieling et al., 2011

Call for action…

❶ MH problems by ❶ bullying

WHY?

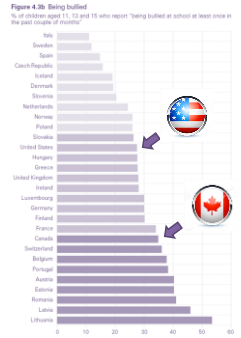
bullying ➲ MH problems

What is bullying?

- A person is being bullied if he or she is exposed repeatedly and over time, to negative actions on the part of one or more persons.
  - Three Criteria:
    repeated over time
    imbalance of power
    intentionality
- Systematic abuse of power.

Prevalence Rate

- Prevalence rate
  ~ 30% are bullied occasionally
  ~ 7-10% are bullied ***on a daily basis***
  Source: Vaillancourt et al., 2010a, 2010b

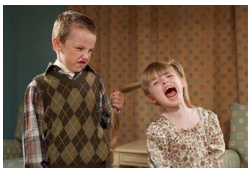


Source: UNICEF Innocenti Report Card 11, 2013

❶ Link b/w bullying and MH

- MH profile of targets

- MH profile of perpetrators



Long term consequences

- academic difficulties
- school truancy/avoidance
- increased absenteeism
- somatic complaints
- stress-related illness
- physical health problems
- low self-esteem
- depression
- social withdrawal/isolation
- social anxiety
- loneliness
- suicide
- aggressive behaviour

Long-Term Adult Outcomes of Peer Victimization in Childhood and Adolescence

Pathways to Adjustment and Maladjustment

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Article

Adult Health Outcomes of Childhood Bullying Victimization: Evidence From a Five-Decade Longitudinal British Birth Cohort

Ryu Takizawa, M.D., Ph.D.
Barbara Maughan, Ph.D.
Louise Arseneault, Ph.D.

Objective: The authors examined midlife outcomes of childhood bullying victimization.

Method: Data were from the British National Child Development Study, a 50-year prospective cohort of births in 1 week in 1958. The authors conducted ordinal logistic and linear regressions on data from 7,771 participants whose parents reported bullying exposure at ages 7 and 11 years, and who participated in follow-up assessments between ages 23 and 50 years. Outcomes included suicidality and diagnoses of depression, anxiety disorders, and alcohol dependence at age 45; psychological distress and general health at ages 23 and 50; and cognitive functioning, socioeconomic status, social relationships, and well-being at age 50.

Results: Participants who were bullied in childhood had increased levels of psychological distress at ages 23 and 50. Victims of frequent bullying had higher rates of depression (odds ratio=1.95, 95% CI=1.27–2.99), anxiety disorders (odds ratio=1.65, 95% CI=1.25–2.18), and suicidality (odds ratio=2.21, 95% CI=1.47–3.31) than their nonvictimized peers. The effects were similar to those of being placed in public or substitute care and an index of multiple childhood adversities, and the effects remained significant after controlling for known correlates of bullying victimization. Childhood bullying victimization was associated with a lack of social relationships, economic hardship, and poor perceived quality of life at age 50.

Conclusions: Children who are bullied—and especially those who are frequently bullied—continue to be at risk for a wide range of poor social, health, and economic outcomes nearly four decades after exposure. Interventions need to reduce bullying exposure in childhood and minimize long-term effects on victims' well-being; such interventions should cast light on causal processes.

(*Am J Psychiatry 2014; 171:777–784*)

Adult mental health consequences of peer bullying and maltreatment in childhood: two cohorts in two countries

Scott Tanyas Lereya, William E. Copeland, E Jane Costello, Dieter Wolke

Summary

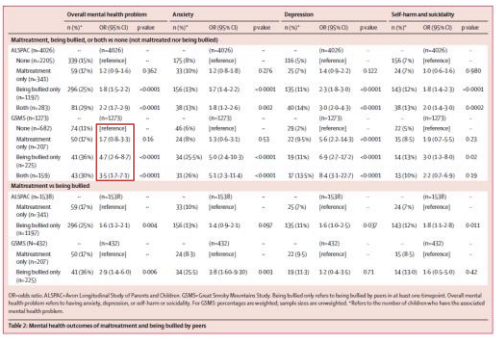
Background The adult mental health consequences of childhood maltreatment are well documented. Maltreatment by peers (ie, bullying) has also been shown to have long-term adverse effects. We aimed to determine whether these effects are just due to being exposed to both maltreatment and bullying or whether bullying has a unique effect.

Methods We used data from the Avon Longitudinal Study of Parents and Children in the UK (ALSPAC) and the Great Smoky Mountains Study in the USA (GSMS) longitudinal studies. In ALSPAC, maltreatment was assessed as physical, emotional, or sexual abuse, or severe maladaptive parenting (or both) between ages 8 weeks and 8·6 years, as reported by the mother in questionnaires, and being bullied was assessed with child reports at 8, 10, and 13 years using the previously validated Bullying and Friendship Interview Schedule. In GSMS, both maltreatment and bullying were repeatedly assessed with annual parent and child interviews between ages 9 and 16 years. To identify the association between maltreatment, being bullied, and mental health problems, binary logistic regression analyses were run. The primary outcome variable was overall mental health problem (any anxiety, depression, or self-harm or suicidality).

Findings 4026 children from the ALSPAC cohort and 1420 children from the GSMS cohort provided information about bullying victimisation, maltreatment, and overall mental health problems. The ALSPAC study started in 1991 and the GSMS cohort enrolled participants from 1993. Compared with children who were not maltreated or bullied, children who were only maltreated were at increased risk for depression in young adulthood in models adjusted for sex and family hardships according to the GSMS cohort (odds ratio [OR] 4·1, 95% CI 1·5–11·7). According to the ALSPAC cohort, those who were only being maltreated were not at increased risk for any mental health problem compared with children who were not maltreated or bullied. By contrast, those who were both maltreated and bullied were at increased risk for overall mental health problems, anxiety, and depression according to both cohorts and self-harm according to the ALSPAC cohort compared with neutral children. Children who were bullied by peers only were more likely than children who were maltreated only to have mental health problems in both cohorts (ALSPAC OR 1·6, 95% CI 1·1–2·2; p=0·005; GSMS 3·8, 1·8–7·9, p<0·0001), with differences in anxiety (GSMS OR 4·9; 95% CI 2·0–12·0), depression (ALSPAC 1·7, 1·1–2·7), and self-harm (ALSPAC 1·7, 1·1–2·6) between the two cohorts.

Interpretation Being bullied by peers in childhood had generally worse long-term adverse effects on young adults' mental health. These effects were not explained by pre-victimisation. The findings have important implications for public health planning and service development for dealing with peer bullying.

Funding Wellcome Trust, Medical Research Council, Economic and Social Research Council, National Institute of Mental Health, the National Institute on Drug Abuse, NARSAD (Early Career Award), and the William T Grant Foundation.



	Overall mental health problem			Anxiety			Depression			Self-harm and suicidality		
	n (%)*	OR (95% CI)	p value	n (%)*	OR (95% CI)	p value	n (%)*	OR (95% CI)	p value	n (%)*	OR (95% CI)	p value
Maltreatment, being bullied, or both vs none (not maltreated nor being bullied)												
ALSPAC (n=4026)	–	(n=4026)	–	–	(n=4026)	–	–	(n=4026)	–	–	(n=4026)	–
None (n=2205)	339 (15%)	[reference]	–	175 (8%)	[reference]	–	186 (5%)	[reference]	–	156 (7%)	[reference]	–
Maltreatment only (n=345)	59 (17%)	1·2 (0·9–1·6)	0·162	33 (10%)	1·2 (0·8–1·8)	0·276	25 (7%)	1·4 (0·9–2·2)	0·122	24 (7%)	1·0 (0·6–1·6)	0·980
Being bullied only (n=1197)	296 (25%)	1·8 (1·5–2·2)	<0·0001	156 (13%)	1·7 (1·4–2·2)	<0·0001	135 (11%)	2·3 (1·8–3·0)	<0·0001	143 (12%)	1·8 (1·4–2·3)	<0·0001
Both (n=283)	81 (29%)	2·2 (1·7–2·9)	<0·0001	38 (13%)	1·8 (1·2–2·6)	0·002	40 (14%)	3·0 (2·0–4·3)	<0·0001	38 (13%)	2·0 (1·4–3·0)	0·0002
GSMS (n=1271)	–	(n=1271)	–	–	(n=1271)	–	–	(n=1271)	–	–	(n=1271)	–
None (n=682)	74 (11%)	[reference]	–	46 (6%)	[reference]	–	28 (2%)	[reference]	–	22 (3%)	[reference]	–
Maltreatment only (n=197)	50 (17%)	1·7 (0·8–3·3)	0·16	24 (8%)	1·3 (0·6–3·1)	0·53	22 (9·5%)	5·6 (2·2–14·3)	<0·0001	15 (8·5)	1·9 (0·7–5·5)	0·23
Being bullied only (n=225)	41 (18%)	1·7 (0·8–3·7)	<0·0001	34 (15·5%)	5·0 (2·4–10·3)	<0·0001	19 (11%)	6·9 (2·7–17·2)	<0·0001	14 (13%)	3·0 (1·2–8·0)	0·02
Both (n=319)	43 (30%)	3·5 (1·7–7·1)	<0·0001	31 (26%)	5·1 (2·3–11·4)	<0·0001	37 (13·5%)	8·4 (3·1–22·7)	<0·0001	33 (10%)	2·1 (0·7–6·9)	0·19
Maltreatment vs being bullied												
ALSPAC (n=3,538)	–	(n=3,538)	–	–	(n=3,538)	–	–	(n=3,538)	–	–	(n=3,538)	–
Maltreatment only (n=345)	59 (17%)	[reference]	–	33 (10%)	[reference]	–	25 (7%)	[reference]	–	24 (7%)	[reference]	–
Being bullied only (n=1197)	296 (25%)	1·6 (1·3–2·1)	0·004	156 (13%)	1·4 (0·9–2·1)	0·092	135 (11%)	1·6 (1·0–2·5)	0·037	143 (12%)	1·8 (1·1–2·8)	0·011
GSMS (n=432)	–	(n=432)	–	–	(n=432)	–	–	(n=432)	–	–	(n=432)	–
Maltreatment only (n=202)	50 (17%)	[reference]	–	24 (8·3)	[reference]	–	22 (9·5)	[reference]	–	15 (8·5)	[reference]	–
Being bullied only (n=225)	41 (36%)	2·9 (1·4–6·0)	0·006	34 (25·5)	3·8 (1·60–9·30)	0·003	19 (11·3)	1·2 (0·4–3·5)	0·71	14 (13·0)	1·6 (0·5–5·0)	0·42

OR=odds ratio. ALSPAC=Avon Longitudinal Study of Parents and Children. GSMS=Great Smoky Mountains Study. Being bullied only refers to being bullied by peers in at least one timepoint. Overall mental health problem refers to having anxiety, depression, or self-harm or suicidality. For GSMS percentages are weighted; sample sizes are unweighted. *Refers to the number of children who have the associated mental health problem.

Table 2: Mental health outcomes of maltreatment and being bullied by peers

❷ Temporal Sequence

- Do children and youth become unwell as a consequence of poor treatment?

OR

- Are children and youth bullied because they are unwell to begin with?

  – Bullied ➲ poor MH?
  – Poor MH ➲ bullied ➲ poorer MH?

Internalizing Problems

- Peer victimization linked to ↑ internalizing problems in ensuing years
  - Arseneault et al., 2006; Goodman, Stormshak & Dishion, 2001; Hanish & Guerra, 2002; Hodges, Boivin, Vitaro, & Bukowski, 1999; Hodges & Perry, 1999; Kumpulainen & Rasanen, 2000; Schwartz, Gorman, Nakamoto, & Toblin, 2005; Snyder et al., 2003; Sweeting, Younger, West & Der, 2006; Troop-Gordon & Ladd, 2005; Vaillancourt et al., 2011; Zwierzynska, Wolke, & Lereya, 2012;
  - see also meta-analyses by Reijntjes, Kamphius, Prinzie, & Telch, 2010; Ttofi, Farrington, Losel, & Loeber, 2011

Do the victims of school bullies tend to become depressed later in life? Yes
A systematic review and meta-analysis of longitudinal studies

Maria M. Ttofi, David P. Farrington, Friedrich Lösel and Rolf Loeber

Maria M. Ttofi, David P. Farrington and Friedrich Lösel are based at the Institute of Criminology, Cambridge University, Cambridge, UK. Rolf Loeber is based at the Western Psychiatric Institute and Clinic, University of Pittsburgh, Pittsburgh, Pennsylvania, USA.

Abstract

Purpose – *The purpose of this paper is to investigate the extent to which bullying victimization in school predicts depression in later life and whether this relation holds after controlling for other major childhood risk factors.*

Design/methodology/approach – *As no previous systematic review has been conducted on this topic, effect sizes are based on both published and unpublished studies: longitudinal investigators of 28 studies have conducted specific analyses for the authors' review.*

Findings – *The probability of being depressed up to 36 years later (mean follow-up period of 6.9 years) was much higher for children who were bullied at school than for non-involved students (odds ratio (OR) = 1.99; 95 per cent CI: 1.71-2.32). Bullying victimization was a significant risk factor for later depression even after controlling for up to 20 (mean number of six covariates) major childhood risk factors (OR = 1.74; 95 per cent CI: 1.54-1.97). Effect sizes were smaller when the follow-up period was longer and larger the younger the child was when exposed to bullying. Finally, the summary effect size was not significantly related to the number of risk factors controlled for.*

Originality/value – *Although causal inferences are tentative, the overall results presented in this paper indicate that bullying victimization is a major childhood risk factor that uniquely contributes to later depression. High quality effective anti-bullying programmes could be viewed as an early form of public health promotion.*

Keywords *Bullying, Schools, Adults, Depression*
Paper type *Research paper*

Externalizing Problems

- Peer victimization linked to ↑ externalizing problems in ensuing years
  - Barker, Arseneault, Brendgen, & Maughan 2008; Hanish & Guerra, 2002; Ladd & Troop-Gordon, 2003; Smith, Talamelli, Cowie, Naylor, & Chauhan, 2004; Yeung & Leadbeater, 2010; see also meta-analysis by Reijntjes et al., 2011

Symptom Driven Pathway

- Meta-analytic work supports observation…
  - internalizing challenges can also antecede peer victimization although the reverse direction is stronger
    - Reijntjes et al. 2010
  - externalizing symptoms are sometimes observed to precede peer victimization
    - Reijntjes et al., 2011

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Longitudinal Links Between Childhood Peer Victimization, Internalizing and Externalizing Problems, and Academic Functioning: Developmental Cascades

Tracy Vaillancourt · Heather L. Brittain · Patricia McDougall · Eric Duku

5 INT → 6 VIC → 7 INT → 8 VIC

Academic Functioning

- Knowledge is more limited and associations less straightforward
  - pathways are often indirect or are not found
    - Beran, 2008; Hanish & Guerra, 2002; Kochenderfer & Ladd, 1996
  - some longitudinal studies show that victimized children fare less well academically and avoid school more over time
    - Buhs et al., 2006; Gastic, 2008; Kochenderfer & Ladd, 1996; Nansel, Haynie, & Simons-Morton, 2003; Schwartz et al., 2005

MH profile of children who bully others

Research Article

Psychological Science
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Impact of Bullying in Childhood on Adult Health, Wealth, Crime, and Social Outcomes

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Abstract

Bullying is a serious problem for schools, parents, and public-policymakers alike. Bullying creates risks of health and social problems in childhood, but it is unclear if such risks extend into adulthood. A large cohort of children was assessed for bullying involvement in childhood and then followed up in young adulthood in an assessment of health, risky or illegal behavior, wealth, and social relationships. Victims of childhood bullying, including those that bullied others (*bully-victims*), were at increased risk of poor health, wealth, and social-relationship outcomes in adulthood even after we controlled for family hardship and childhood psychiatric disorders. In contrast, pure bullies were not at increased risk of poor outcomes in adulthood once other family and childhood risk factors were taken into account. Being bullied is not a harmless rite of passage but throws a long shadow over affected people's lives. Interventions in childhood are likely to reduce long-term health and social costs.

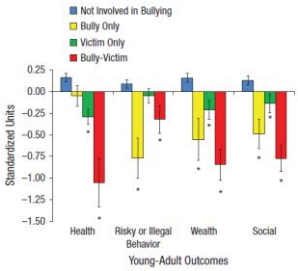

Fig. 2. Associations between childhood role in bullying and young-adult standardized outcome scales (unadjusted for childhood family hardships and childhood psychiatric problems). Across all domains, negative scores indicate more problems than the mean for the total sample, and positive scores indicate fewer problems. Asterisks indicate significant differences from the not-involved-in-bullying group ($p < .05$).

- But when controlling for family hardship and childhood psychiatric disorders:
  - Targets at risk
    - poor health, wealth, & social-relationship outcomes in adulthood
  - Perpetrators were not at risk

Bullying Is Power: Implications for School-Based Intervention Strategies

Tracy Vaillancourt
Shelley Hymel
Patricia McDougall

Much of what is known about bullies and bullying behavior comes from Olweus's (1973, 1978, 1993, 1996) large-scale studies of Scandinavian children in which he distinguished bullies from noninvolved students or victims in terms of their positive views of violence and of themselves (high rather than low self-esteem), their impulsivity and physical strength, and their lack of insecurity, anxiety and empathy for victims. More recent studies have focused on the mental health functioning of children identified as bullies. Like victims, bullies are at risk for internalizing difficulties including depression, suicidal ideation (Kaltiala-Heino, Rimpela, Marttunen, Rimpela, & Rantanen, 1999), and loneliness (Forero & McLellan, 1999), and like aggressive children, bullies are at risk for externalizing disorders (Kumpulainen et al., 1998), delinquency and criminality (Olweus, 1993), as well as poor academic achievement, smoking, and substance abuse (Nansel et al., 2001). These findings are consistent with traditional, intuitive notions of bullies as poorly accepted, marginal members of the peer group who are psychologically unfit. We question this stereotypic portrayal

This chapter was adapted from "Bullying Is Power: Implications for School-Based Intervention Strategies" by Tracy Vaillancourt, Shelley Hymel, and Patricia McDougall, *Journal of Applied School Psychology, 19*(2), pp. 157-176.

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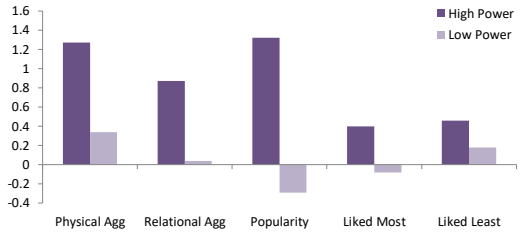
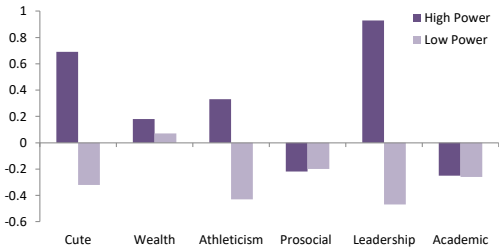




Why these divergent pathways?

Targets

- Interferes with their fundamental need to belong.

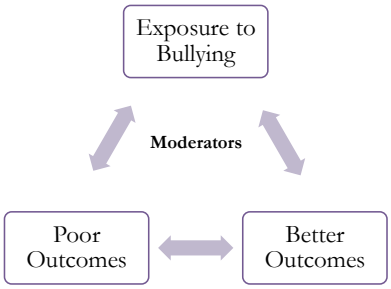
Perpetrators

- Does not interfere with their fundamental need to belong.
- Linked to high status.

❸ Heterogeneity in MH outcomes

- Why is it that some youth are so adversely affected by bullying while others seem to cope better?

Divergent Pathways



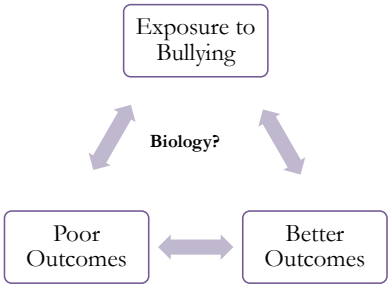
Moderators

- Environmental characteristics
  - Youth with better home environments fare better when bullied than youth with poorer home environments
    - Baldry & Farrington, 2005; Flouri & Buchanan, 2002
  - In classrooms where victimization emerges as central, the negative impact of victimization on mental health outcomes is greater
    - Huitsing et al., 2012

Moderators cont.

- Personal Characteristics
  - Peer victimization at age 8 was associated with suicide attempts before age 25 for females but not for males (controlling for conduct and depressive symptoms).
    - Klomek et al., 2009
  - Internalizing problems persisted even after the bullying had stopped for girls, but not for boys.
    - Rueger et al., 2011

Divergent Pathways



Not Drama Queens!

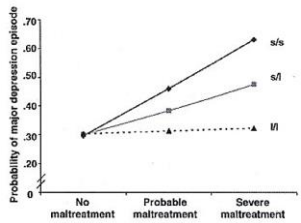
Influence of Life Stress on Depression: Moderation by a Polymorphism in the 5-HTT Gene

Avshalom Caspi,[1,2] Karen Sugden,[1] Terrie E. Moffitt,[1,2]* Alan Taylor,[1] Ian W. Craig,[1] HonaLee Harrington,[2] Joseph McClay,[1] Jonathan Mill,[1] Judy Martin,[3] Antony Braithwaite,[4] Richie Poulton[3]

In a prospective-longitudinal study of a representative birth cohort, we tested why stressful experiences lead to depression in some people but not in others. A functional polymorphism in the promoter region of the serotonin transporter (5-HTT) gene was found to moderate the influence of stressful life events on depression. Individuals with one or two copies of the short allele of the 5-HTT promoter polymorphism exhibited more depressive symptoms, diagnosable depression, and suicidality in relation to stressful life events than individuals homozygous for the long allele. This epidemiological study thus provides evidence of a gene-by-environment interaction, in which an individual's response to environmental insults is moderated by his or her genetic makeup.

18 JULY 2003 VOL 301 SCIENCE www.sciencemag.org

Serotonin Gene, Experience, and Depression: Age 26



*Allele= 1 of 2 or more forms of a gene

Replicated with bullied youth

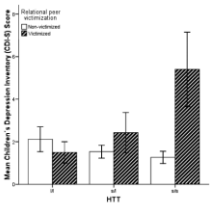


Figure 1 Depressive symptoms by genotype and relational peer victimization group. *Note.* *l/l* = homozygous for long allele; *s/l* = heterozygous for short and long allele; *s/s* = homozygous for short allele; *t = 3.8, $p < .01$

Banny et al., 2013
☑ Benjet et al., 2010
Iyer et al., 2013
Sugden at al., 2010
Kretschmer et al. 2014*

*peer rejection predicting antisocial behaviour

Bullying gets under the skin

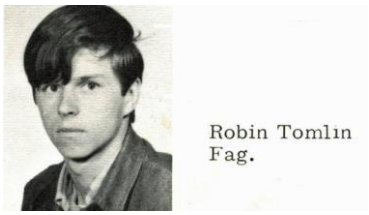
❶ Experience of being bullied by peers becomes biologically embedded in the physiology of the developing person.

❷ These invisible scars change a person's capacity to deal with subsequent stressors and negatively modifies their future health and learning trajectories.

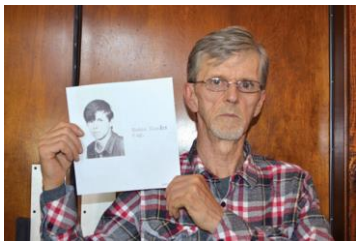
UN World Report on Violence against Children (2006)

- "...persistent social acceptance of some types of violence against children..."
- "…corporal punishment and other forms of cruel or degrading punishment, bullying and sexual harassment, and a range of violent traditional practices may be perceived as normal, particularly **when no lasting visible physical injury results.**"

Neurophysiological Evidence



"I feel like, emotionally, they have been beating me with a stick for 42 years"



- People can relive and re-experience social pain more easily than physical pain and the emotions they feel are more intense and painful.
  - Chen, Williams, Fitness, Newton, 2008
- Physical pain is often short lived whereas social pain can last a life time.

Sir Winston Churchill (1874-1965)

"Criticism may not be agreeable, but it is necessary. It fulfills the same function as pain in the human body. It calls attention to an unhealthy state of things"

doi:10.1093/scan/nsp007 SCAN (2009) 4, 143–157

Neural correlates of social exclusion during adolescence: understanding the distress of peer rejection

Parts of the cortical physical pain network are also activated when a person is socially excluded
- Physical and social pain share similar neural structures
- Linked to evolution

a preset computer program. Afterwards, participants reported their exclusion-related distress and rejection sensitivity, and parents reported participants' interpersonal competence. Similar to findings in adults, during social exclusion adolescents displayed insular activity that was positively related to self-reported distress, and right ventrolateral prefrontal activity that was negatively related to self-reported distress. Findings unique to adolescents indicated that activity in the subgenual anterior cingulate cortex (subACC) related to greater distress, and that activity in the ventral striatum related to less distress and appeared to play a role in regulating activity in the subACC and other regions involved in emotional distress. Finally, adolescents with higher rejection sensitivity and interpersonal competence scores displayed greater neural evidence of emotional distress, and adolescents with higher interpersonal competence scores also displayed greater neural evidence of regulation, perhaps suggesting that adolescents who are vigilant regarding peer acceptance may be most sensitive to rejection experiences.

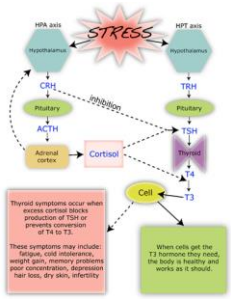
Keywords: peer rejection; adolescence; functional magnetic resonance imaging

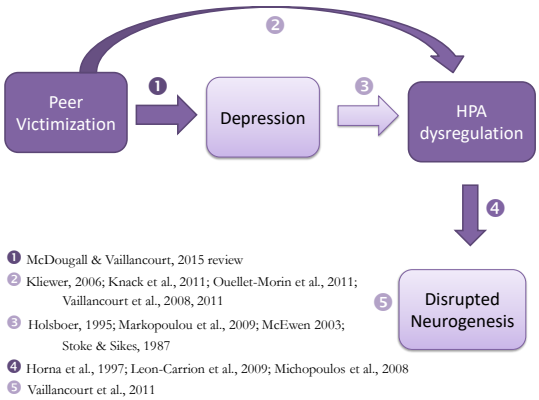
Neural Alarm

- Rejection is differentiated in less than 500 ms by children
  - Using event-related potentials (ERPs) to study neural activity that occurs when a person is rejected

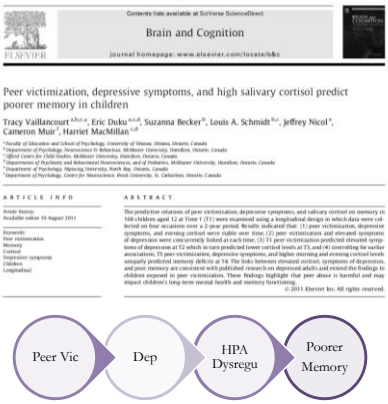
Crowley et al., 2010

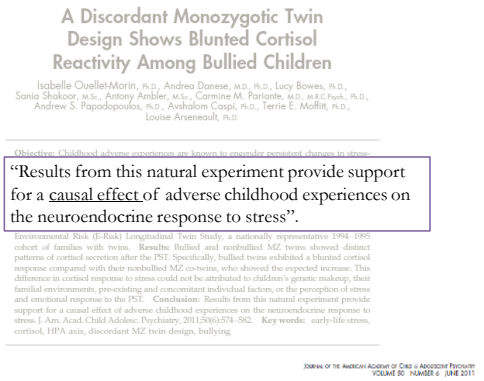
Neuroendocrine Evidence





1. McDougall & Vaillancourt, 2015 review
2. Kliewer, 2006; Knack et al., 2011; Ouellet-Morin et al., 2011; Vaillancourt et al., 2008, 2011
3. Holsboer, 1995; Markopoulou et al., 2009; McEwen 2003; Stoke & Sikes, 1987
4. Horna et al., 1997; Leon-Carrion et al., 2009; Michopoulos et al., 2008
5. Vaillancourt et al., 2011





Telomere

- Repetitive nucleotide sequence (TTAGGG) at the end of chromosomes
  - Promotes chromosomal stability and regulates cells' cellular replicative lifespan.
    - Kiecolt-Glaser et al., 2011, p. 16

Telomere Erosion

- Linked to normal processes like aging and …
  - health behaviour e.g., smoking and obesity
  - diseases e.g., cancer, dementia, diabetes, and cardiovascular problems
- Shorter telomere length linked to psychological stress and mortality.

Vaillancourt et al., 2013, 2017 for reviews

Molecular Psychiatry (2012), 1 –6
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www.nature.com/mp

ORIGINAL ARTICLE

Exposure to violence during childhood is associated with telomere erosion from 5 to 10 years of age: a longitudinal study

I Shalev[1,2], TE Moffitt[1,2,3,4], K Sugden[1,2,3,4], B Williams[1,2,3,4], RM Houts[1,2], A Danese[4,5], J Mill[6], L Arseneault[4] and A Caspi[1,2,3,4]

There is increasing interest in discovering mechanisms that mediate the effects of childhood stress on late-life disease morbidity and mortality. Previous studies have suggested one potential mechanism linking stress to cellular aging, disease and mortality in humans: telomere erosion. We examined telomere erosion in relation to children's exposure to violence, a salient early-life stressor, which has known long-term consequences for well-being and is a major public-health and social-welfare problem. In the first prospective-longitudinal study with repeated telomere measurements in children while they experienced stress, we tested the hypothesis that childhood violence exposure would accelerate telomere erosion from age 5 to age 10 years. Violence was assessed as exposure to maternal domestic violence, frequent bullying victimization and physical maltreatment by an adult. Participants were 236 children (49% females; 42% with one or more violence exposures) recruited from the Environmental-Risk Longitudinal Twin Study, a nationally representative 1994–1995 birth cohort. Each child's mean relative telomere length was measured simultaneously in baseline and follow-up DNA samples, using the quantitative PCR method for *T/S* ratio (the ratio of telomere repeat copy numbers to single-copy gene numbers). Compared with their counterparts, the children who experienced two or more kinds of violence exposure showed significantly more telomere erosion between age-5 baseline and age-10 follow-up measurements, even after adjusting for sex, socioeconomic status and body mass index ($\beta = -0.052$, s.e. = 0.021, $P = 0.015$). This finding provides support for a mechanism linking cumulative childhood stress to telomere maintenance, observed already at a young age, with potential impact for life-long health.

Molecular Psychiatry advance online publication, 24 April 2012; doi:10.1038/mp.2012.32

Keywords: childhood stress; cumulative violence exposure; erosion; longitudinal; telomere length

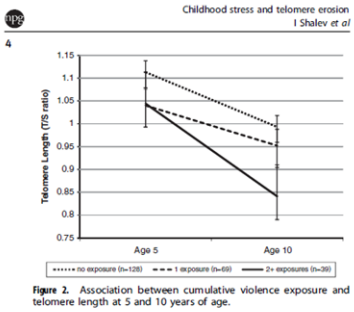
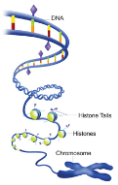


Figure 2. Association between cumulative violence exposure and telomere length at 5 and 10 years of age.

Epigenetic Evidence

- Biological mechanism ➲ environmental signals are translated into molecular events.
  - Bick et al., 2012; see also Vaillancourt et al., 2015
- Example: DNA methylation
  - changes gene expression by activating or silencing the gene
    - Vaillancourt et al., 2013, 2017



- Childhood adversity linked to changes in DNA methylation which has an effect on later stress reactivity
  - see Vaillancourt et al., 2015, 2017 for reviews

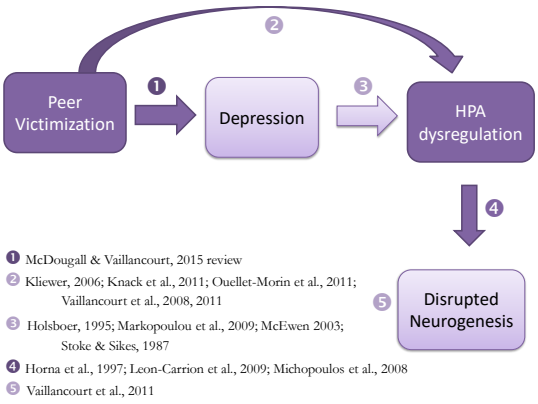
Psychological Medicine (2013), **43**, 1883–1825. © Cambridge University Press 2012
doi:10.1017/S0033291712002794

ORIGINAL ARTICLE

Increased serotonin transporter gene (*SERT*) DNA methylation is associated with bullying victimization and blunted cortisol response to stress in childhood: a longitudinal study of discordant monozygotic twins

I. Ouellet-Morin[1,2], C. C. Y. Wong[1], A. Danese[1,3], C. M. Pariante[3], A. S. Papadopoulos[3,4], J. Mill[1] and L. Arseneault[1]*

- Found that…
  - ❶ higher DNA methylation of the serotonin transporter gene between ages 5 and 10 for bullied twins but not for non-bullied twins, and
  - ❷ this was associated with blunted cortisol response to stress.



1. McDougall & Vaillancourt, 2015 review
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3. Holsboer, 1995; Markopoulou et al., 2009; McEwen 2003; Stoke & Sikes, 1987
4. Horna et al., 1997; Leon-Carrion et al., 2009; Michopoulos et al., 2008
5. Vaillancourt et al., 2011

- We do not know if the biological scars can be reversed…
  - it seems prudent to fight the root cause directly
  - by encouraging policy makers and practitioners to prioritize the reduction of bullying
  - which will help improve MH

STAND UP! DON'T STAND BY
Community-University Research Alliance for the Prevention of Bullying mac-cura.ca

What does this all mean?