COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

Trauma, Disaster, Resilience:

Understanding the Human Capacity to Thrive in the Face of Extreme Adversity

George A. Bonanno, Ph.D.

The plan

- Part A
  1. Intro: background, common sense
  2. Individual differences/trajectories of adjustment
  3. Thinking about variation and heterogeneity
  4. Questions/discussion
- Part B
  1. Predictors: Why isn't everyone resilient?
  2. Flexibility in coping and emotion regulation
  3. Laughter
  4. Questions/discussion

Bad things happen

During the course of a normal lifespan . . .

- almost everyone must endure the death of loved ones
- most are exposed to at least one and often several violent or life-threatening event(s)
- Weekly internet check list of life events:
  - average for 4 years = 6 PTEs
  - at recall, most under-remembered

Nontheless, such events can be deeply distressing, and sometimes debilitating

Lalande & Bonanno (2011) *Psychological Trauma*

Two Common Approaches

The poignancy of these events has driven both clinical and scientific inquiry toward a primary focus on psychological damage

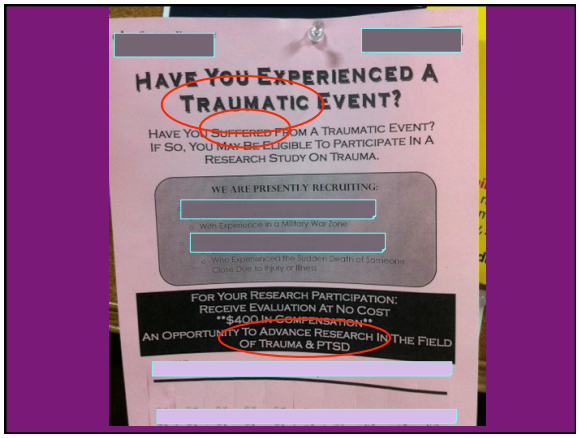
1. Psychopathology (e.g., PTSD)
2. Average impact of the event itself

Bonanno (2004) *American Psychologist*; Bonanno, Westphal, & Mancini (2011) *Annual Review Clinical Psychology*

The limits of diagnoses and the problem of averages

1. Focus on extreme: psychopathology
   - Grief related pathology (10%-65%)
   - Posttraumatic Stress Disorder (PTSD) (5%-90%)
- Limitations
  - Emphasis on pathology can result in sampling bias

Bonanno (2004) *American Psychologist*; Bonanno, Westphal, & Mancini (2011) *Annual Review Clinical Psychology*



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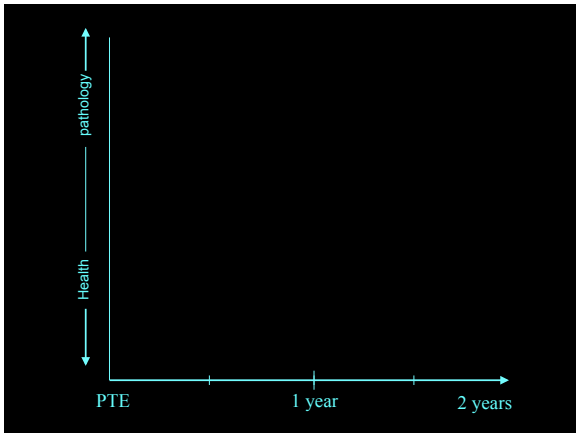
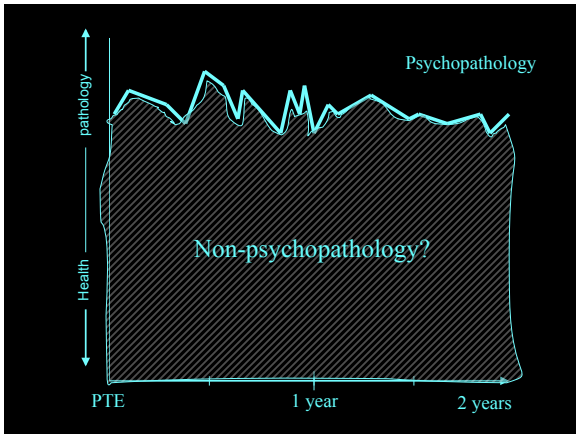
  - Emphasis on pathology can result in sampling bias
  - Uninformative about the underlying distribution

Bonanno (2004) *American Psychologist*; Bonanno, Westphal, & Mancini (2011) *Annual Review Clinical Psychology*

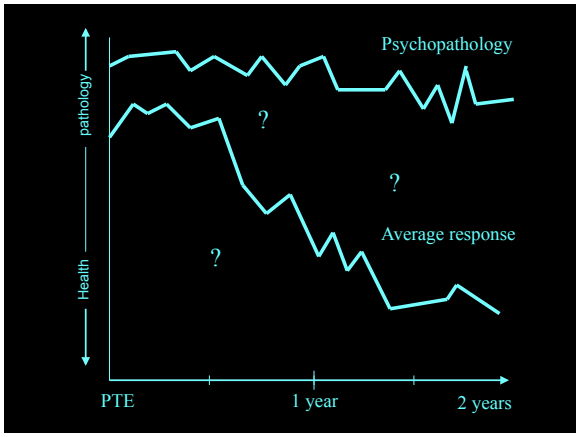




The Limits of diagnoses and the problem of averages

1. Focus on extreme: psychopathology
   - chronic grief and depression (10%-65%)
   - Posttraumatic Stress Disorder (PTSD) (5%-90%)
2. Focus on average: impact of the event
   - Compare groups exposed vs. non-exposed
   - Compare across different types of events

Bonanno (2004) *AP*; Bonanno, Westphal, & Mancini (2011) *ARCP*

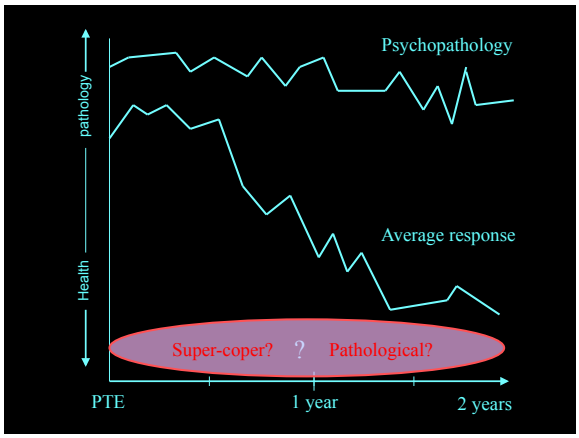


The limits of diagnoses and the problem of averages

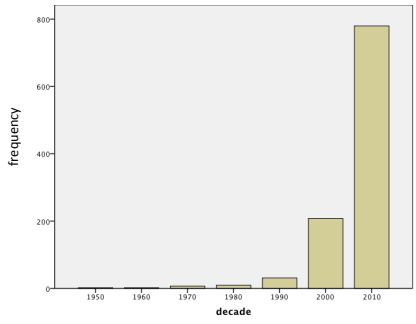
2. Focus on <u>average</u>: impact of event:
   1. Compare groups exposed vs. non-exposed
   2. Compare average duration of response
- Limitations
  - Uninformative about underlying distribution
  - Potentially misleading conclusions
    - Average is often mistaken for mode
    - Average differences may be driven by extreme groups

Bonanno (2004) *AP*; Bonanno, Westphal, & Mancini (2011) *ARCP*

The problem with averages



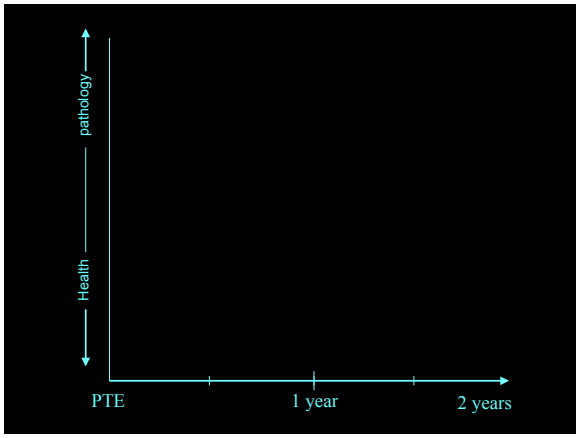
"resilient" "resiliency" "resilience"
in titles of social science journals

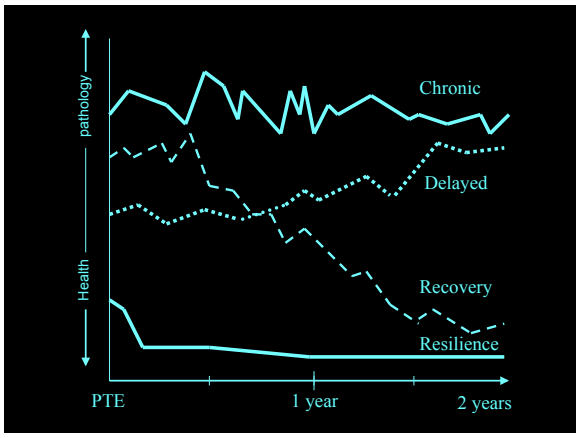


A broader approach: Mapping individual differences

- Phase I:
  - individual differences
  - trajectories of outcome

Bonanno (2004) *American Psychologist* Bonanno et al. (2011) *Annual Review of Clinical Psychology*


pathology
Health
PTE
1 year
2 years


pathology
Health
Chronic
Delayed
Recovery
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1 year
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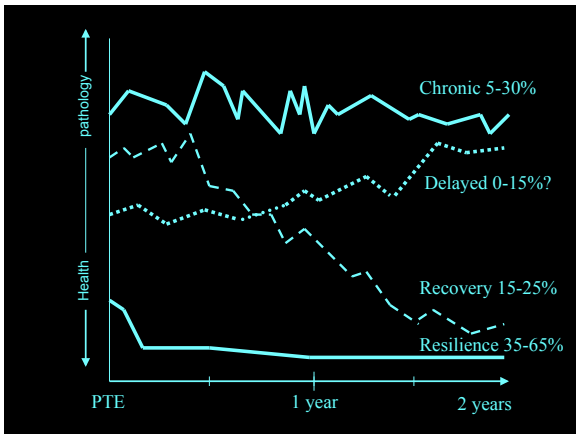
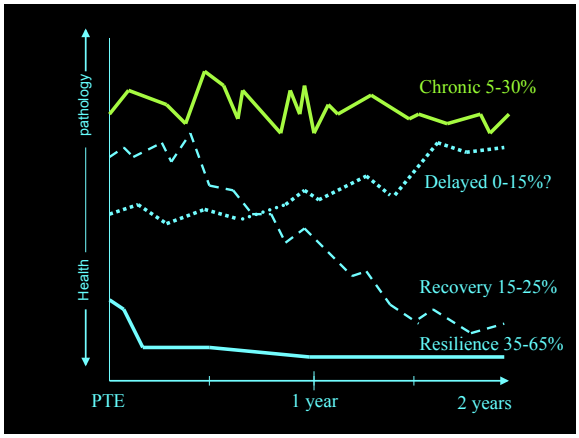

pathology
Health
Chronic 5-30%
Delayed 0-15%?
Recovery 15-25%
Resilience 35-65%
PTE
1 year
2 years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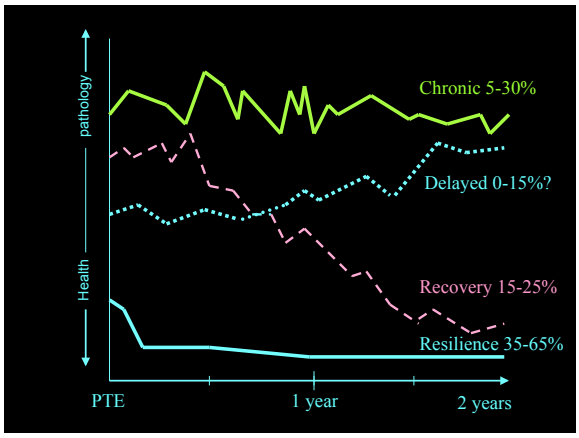
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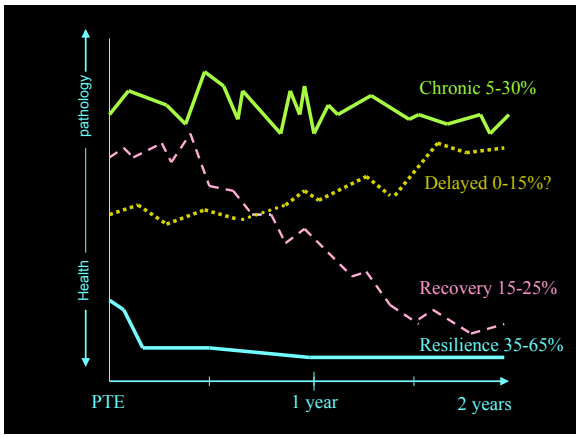
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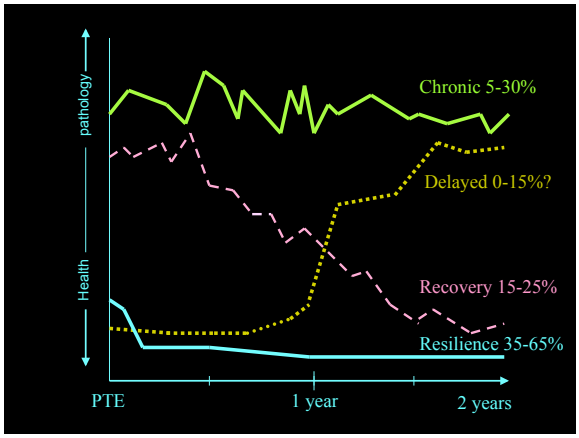
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Resilience 35-65%
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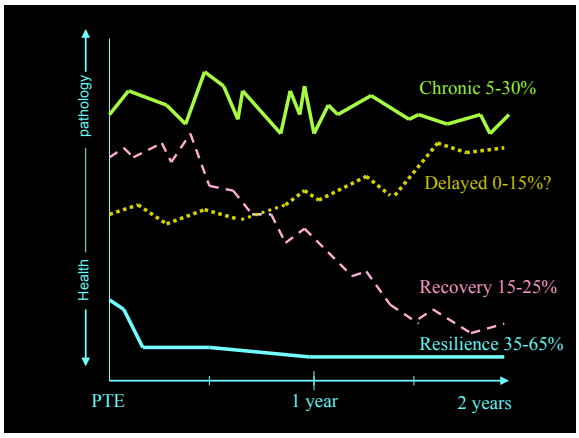
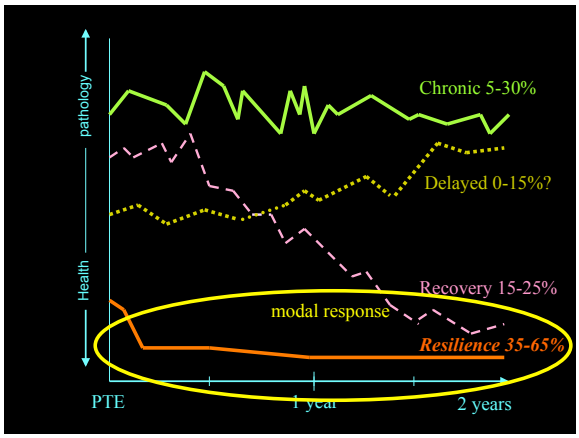
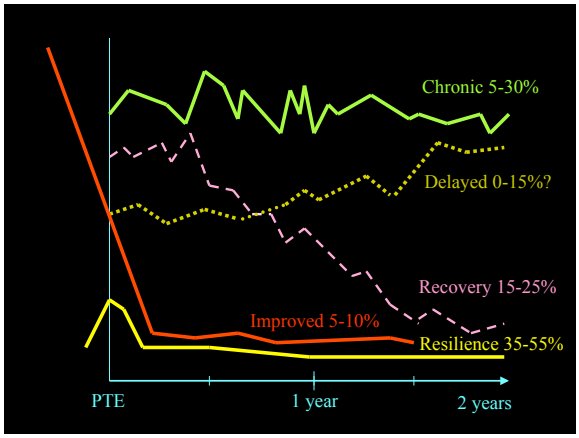
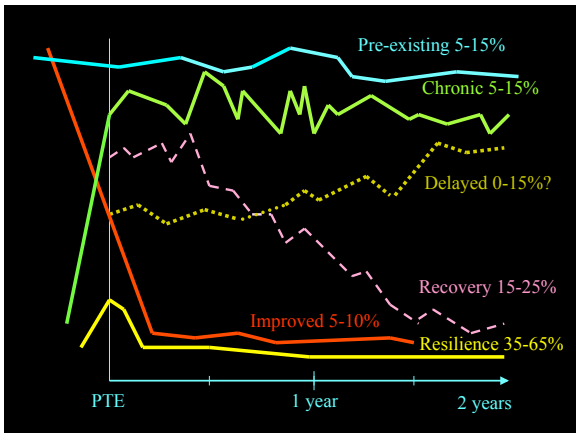

pathology
Health
Chronic 5-30%
Delayed 0-15%?
Recovery 15-25%
Resilience 35-65%
PTE
1 year
2 years


pathology
Health
Chronic 5-30%
Delayed 0-15%?
Recovery 15-25%
modal response
Resilience 35-65%
PTE
1 year
2 years


Chronic 5-30%
Delayed 0-15%?
Recovery 15-25%
Improved 5-10%
Resilience 35-55%
PTE
1 year
2 years


Pre-existing 5-15%
Chronic 5-15%
Delayed 0-15%?
Recovery 15-25%
Improved 5-10%
Resilience 35-65%
PTE
1 year
2 years

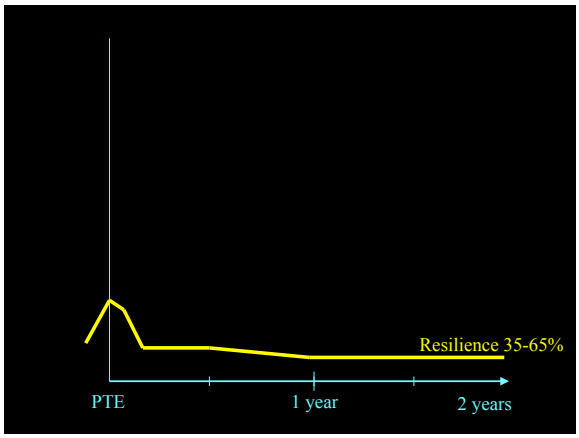
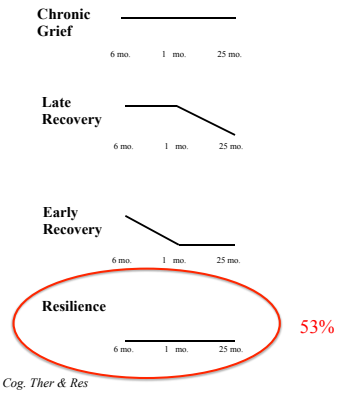

Resilience 35-65%
PTE
1 year
2 years

Table 2
Mean Grief-Specific Symptoms and Cell Frequency for Longitudinal Grief-Specific Symptom Categories

	Longitudinal grief symptom patterns									
	Prolonged (n = 10)		Recovered (n = 15)		Minimal (n = 17)		Delayed (n = 0)		Sample (n = 42)	
Time interval	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
6 months	15.10	2.80	12.26	2.46	4.64	2.36	—	—	9.85	5.18
14 months	14.50	3.47	5.33	2.80	2.58	3.16	—	—	6.40	5.64

41%

Bonanno et al., 1995, *JPSP*



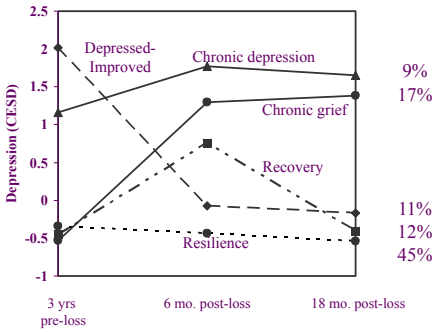
53%

Bonanno et al., 1999, *Cog. Ther & Res*

Changing Lives of Older Couples (CLOC): A prospective study

- 1,532 married individuals from Detroit area
- 205 lost a spouse during the 7-year course of the study,
  - interviewed prior to bereavement (on average 3 years pre-loss),
  - Interviewed at least twice after bereavement (6 and 18 months post-loss).

Bonanno, Wortman, Lehman, Tweed, Haring, Sonnega, Carr & Neese (2002).
Journal of Personality and Social Psychology



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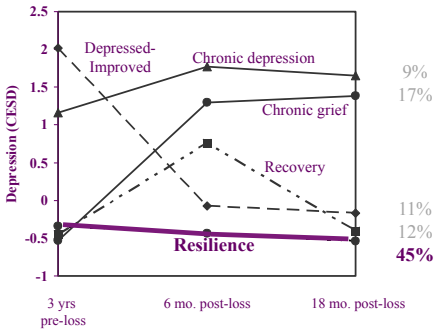
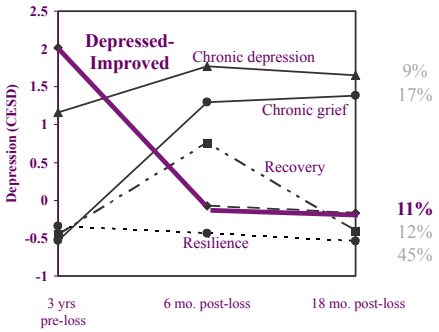


Resilience = normal, healthy

- No evidence for delayed grief
- Not unhealthy on any pre-loss measures
  - normal quality marriage
  - Not rated as cold or social inept by interviewers
- Higher scores on pre-loss protective factors
  - Belief in just world
  - Acceptance of death
  - instrumental support

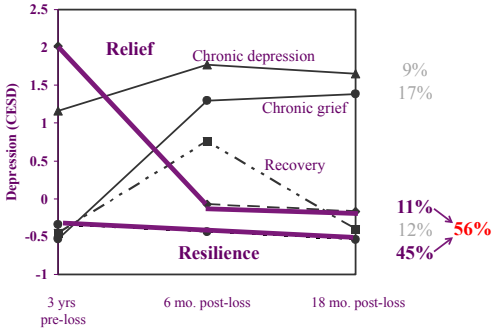
Bonanno, Wortman, Lehman, Tweed, Haring, Sonnega, Carr & Neese (2002).
Journal of Personality and Social Psychology



Depressed-improved Individuals?

- *Prior to the loss . . .*
- Ill spouse
- Poorer quality marriages
- More introspective and emotionally unstable
- lowest levels of instrumental support,
- believed that the world was particularly unjust to them ("everyone gets the breaks but me").

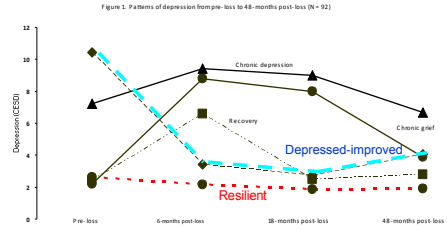
Bonanno, Wortman, Lehman, Tweed, Haring, Sonnega, Carr & Neese (2002).
Journal of Personality and Social Psychology



Resilient and improved evidence healthy adjustment *during bereavement*

- lowest in
  - *grief symptoms (e.g., yearning),*
  - *processing of the loss,*
  - *searching for meaning,*
  - *avoidance/distraction,*
- highest in
  - *positive affect*
  - *Comfort from positive memories of deceased*

Bonanno, Wortman & Nesse (2004). ***Psychology and Aging***

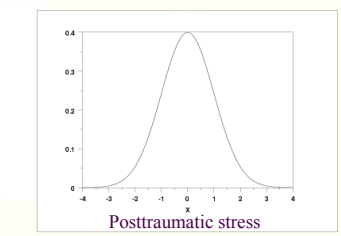


Boerner, Wortman, & Bonanno (2005). ***Journal of Gerontology: Psychological Science***

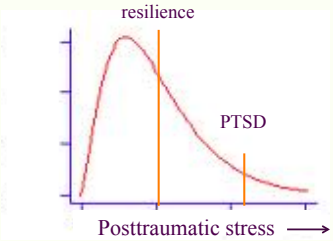
A broader approach: Mapping individual differences

- phase I: Identifying trajectories of outcome
  - Limitations:
    - Unsophisticated ("by hand" or primitive algorithm)
    - Theory driven
    - Not sensitive to parameters of heterogeneity
- phase II: Latent trajectory modeling

Normality and Homogeneity



Positive skew with arbitrary cut-offs



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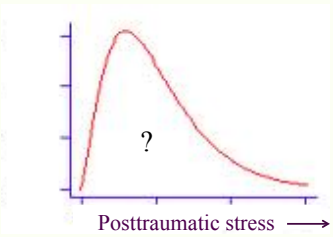
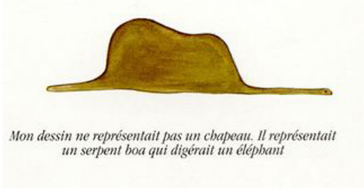


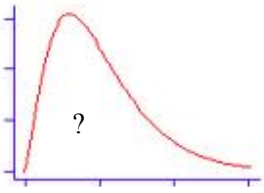


"Le Petite Prince" Antoine de Saint-Exupéry

Heterogeneity

Latent Growth Mixture Modeling (LGMM):

trajectories with random effects: unique distributions



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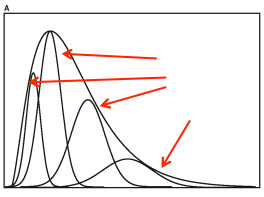
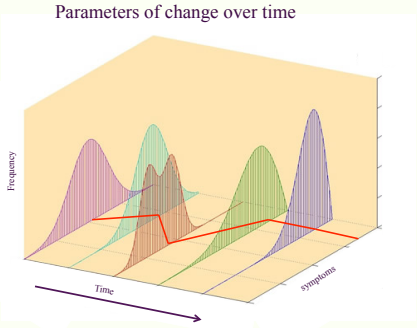


Parameters of change over time



German Panel Data

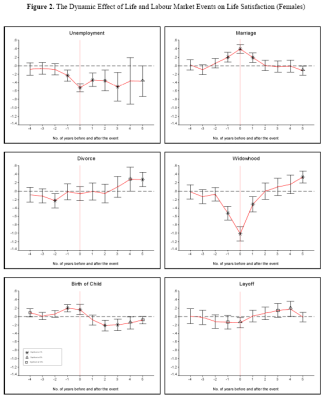
Nationally representative sampling of German Households followed 19 years (1984-2003)

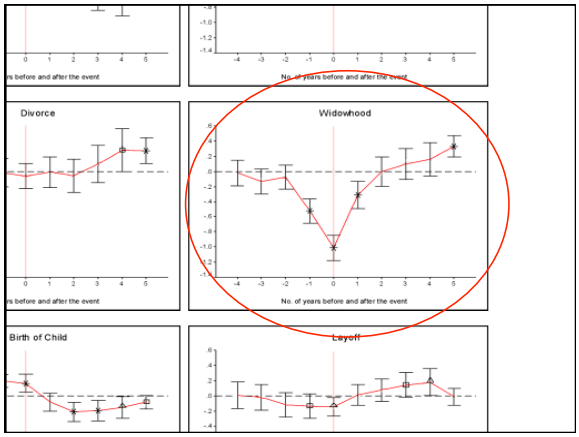
N = 16,795

DV = life satisfaction

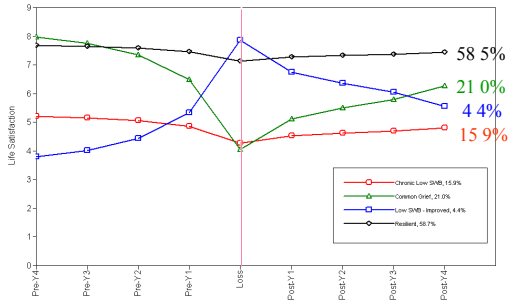
EVENTS
- unemployment
- layoff
- marriage
- divorce
- death of spouse
- birth of child

Clark, Diener et al. (2008)
The Economic Journal



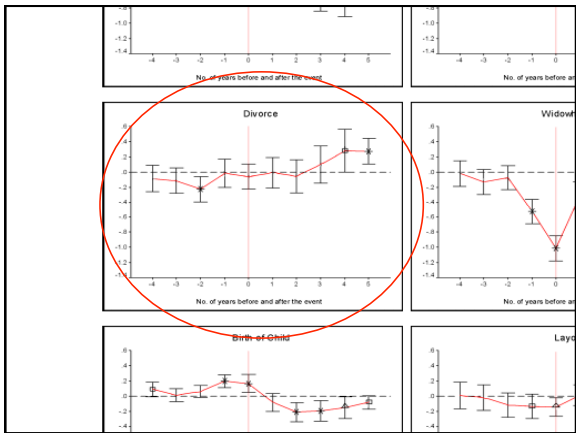


Widowhood (4 latent growth trajectories)

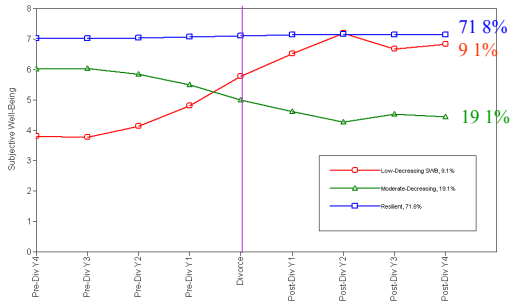


Years before and after loss

Mancini, Bonanno, & Clark (2011) *J Individual Diffs*



Divorce (3 latent growth trajectories)

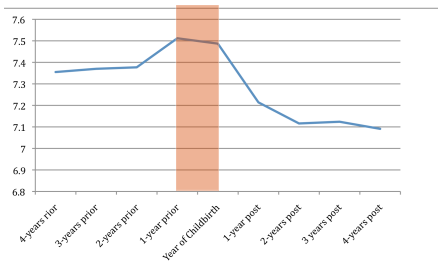


Years before and after divorce

Mancini, Bonanno, & Clark (2011) *J Individual Diffs*

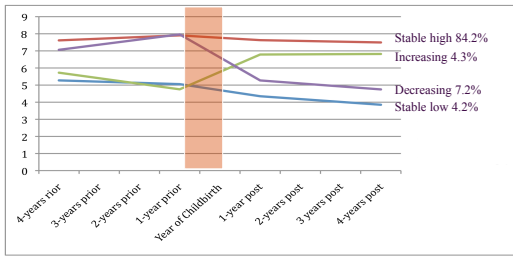
PARENTHOOD

Figure 1. *Estimated Means of Subjective Well-Being (n= 2410).*

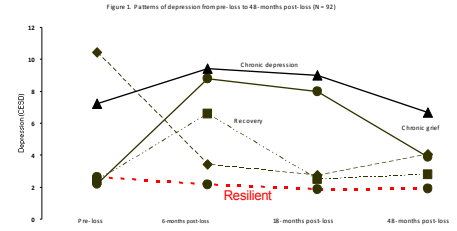


PARENTHOOD

Four Class Growth Mixture Model (n=2410).



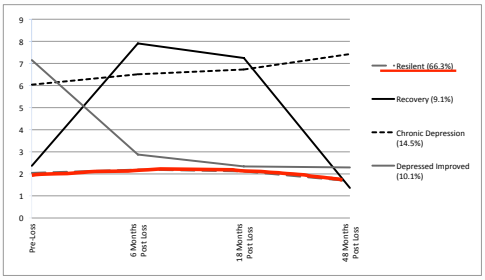
Galatzer-Levy, Murzursky, Mancini, & Bonanno (2011). *Journal of Family Psychology*



Boerner, Wortman, & Bonanno (2005). ***Journal of Gerontology: Psychological Science***

Figure 1

4-Class Unconditional Trajectory Model of CED-S Scores (N=301)



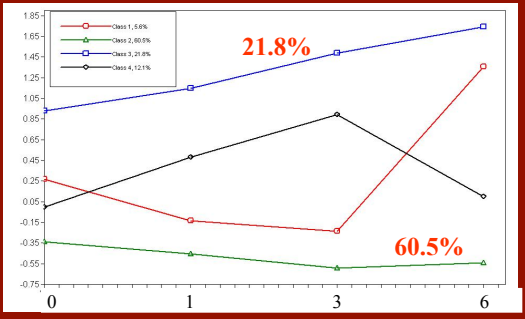
Galatzer-Levy & Bonanno (2011), *Soc. Sci. & Med.*

Traumatic injury (US)

- 330 men and women
- Single-incident traumatic injury (motor vehicle crash, fall, gun-shot)
- Taken to level 1 trauma center
- required emergency surgery
- PTSD and depression
  - Hospitalization
  - 1 month post-hospitalization
  - 3 month post-hospitalization
  - 6 month post-hospitalization

DeRoon-Cassini, Mancini, Rusch, & Bonanno (2010) *Rehabilitation Psychology*

PTSD symptoms (standardized) at hospitalization and 1,3, and 6 months post-hospitalization



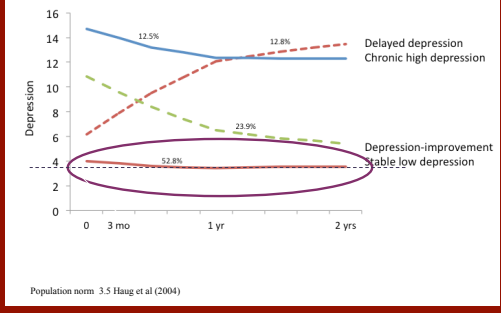
DeRoon-Cassini, Mancini, Rusch, & Bonanno (2010)

Spinal Cord Injury

- 233 SCI patients recruited from spinal cord centers in England, Switzerland, Sweden, Germany, Austria, and Ireland.
- Data collected soon after injury and at 3 months, 12 months, and 24 months

Bonanno, Kennedy, Galatzer-Levy, Lude, & Elfstrom (2012)

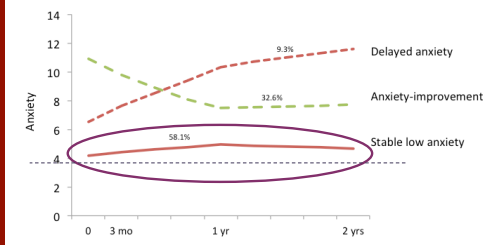
Depression at hospitalization, 3, 12, and 24 months post-injury



Population norm 3.5 Haug et al (2004)

Bonanno, Kennedy, Galatzer-Levy, Lund, & Elfstrom (2012)

Anxiety at hospitalization, 3, 12, and 24 months post-injury



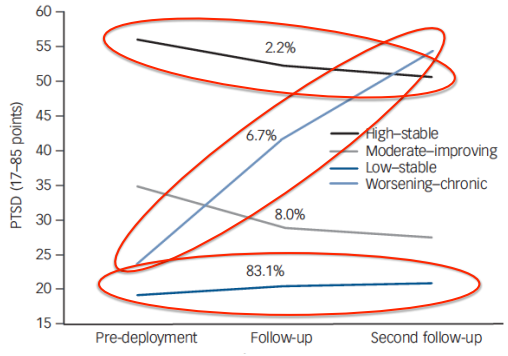
Population norm = 3.9 Haug et al (2004)

Bonanno, Kennedy, Galatzer-Levy, Lund & Elfstom (2012)

The Psychological Cost of War

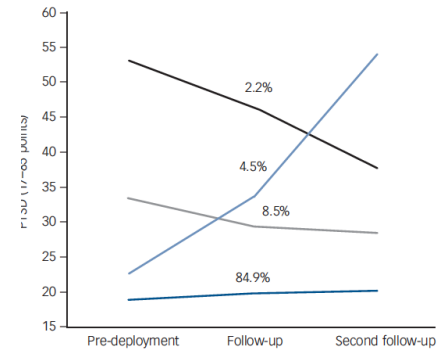
- The Millennium Cohort Study (Tyler Smith et al.)
  - Prospective, with pre- and post-deployment data
  - Large pool (Ongoing enrollment targets 140,000; 77,047 enrolled in initial panel, 30% deployed)
  - Confidential/anonymous

Single deployers



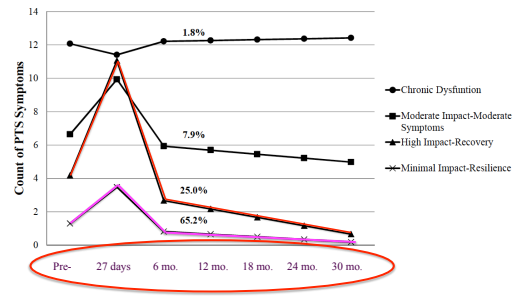
Bonanno et al , 2012, *Brit. J Psychiatry*

Multiple deployers



Bonanno et al , 2012, *Brit J Psychiatry*

2008 NIU mass shooting (n = 660)



Orcutt, Bonanno, Hanna, Miron (2013)

	Resilient	Chronic	
Bereavement			Bonanno et al. (1995, 1999)
bereavement			Bonanno et al. (2002, 2004)
bereavement			Galatzer-Levy & Bonanno (2012)
bereavement			Mancini et al. (2011)
Terrorist attack			Bonanno et al. (2005)
Terrorist attack			Bonanno et al. (2006, 2007)
SARS (bio-disaster)			Bonanno et al. (2008
Traumatic injury			deRoon-Cassini et al. (2010)
Breast cancer surgery			Lam et al. (2010)
Mass shooting			Orcutt et al. (2013)
Job loss			Galatzer-Levy et al. (2010)
divorce			Mancini et al. (2011)
Birth of a child			Galatzer-Levy et al. (2011)
Combat deployment			Bonanno et al. (2012)
Spinal cord lesion			Bonanno et al. (2012)

	Resilient	Chronic	
Bereavement	53%	14%	Bonanno et al. (1995, 1999)
bereavement	56%	17%	Bonanno et al. (2002, 2004)
bereavement	66%	14%	Galatzer-levy & Bonanno (2012)
bereavement	59%	21%	Mancini et al. (2011)
Terrorist attack	35%	29%	Bonanno et al. (2005)
Terrorist attack	56%	6%	Bonanno et al. (2006, 2007)
SARS (bio-disaster)	35%	42%	Bonanno et al. (2008)
Traumatic injury	61%	21%	deRoon-Cassini et al. (2010)
Breast cancer surgery	66%	15%	Lam et al. (2010)
Mass shooting	62%	8%	Orcutt et al. (2013)
Job loss	69%	4%	Galatzer-Levy et al. (2010)
divorce	72%	19%	Mancini et al. (2011)
Birth of a child	84%	7%	Galatzer-Levy et al. (2011)
Combat deployment	83%	7%	Bonanno et al. (2012)
Spinal cord lesion	53%	12%	Bonanno et al. (2012)

	Resilient	Chronic	
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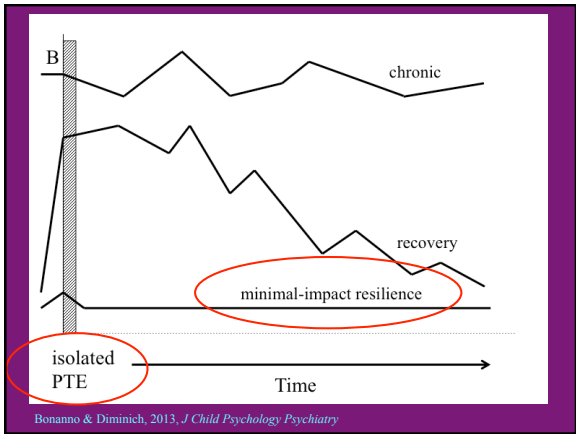
	Resilient	Chronic	
Bereavement	53%	14%	Bonanno et al. (1995, 1998)
bereavement	56%	17%	Bonanno et al. (2002, 2004)
bereavement	66%	14%	Galatzer-Levy & Bonanno (2012)
Terrorist attack	57%	10%	Norris et al. (2009)
Terrorist attack	35%	29%	Bonanno et al. (2005)
Terrorist attack	56%	6%	Bonanno et al. (2006, 2007)
SARS (bio-disaster)	35%	42%	Bonanno et al. (2008)
mudslide	35%	10%	Norris et al. (2009)
Hurricane (children)	37%	20%	La Greca et al. (2013)
Mass shooting	62%	8%	Orcutt et al. (2013)
Job loss	69%	4%	Galatzer-Levy et al. (2010)
divorce	72%	19%	Mancini et al. (2011)
Birth of a child	84%	7%	Galatzer-Levy et al. (2011)
Combat deployment	83%	7%	Bonanno et al. (2012)
Spinal cord lesion	53%	12%	Bonanno et al. (2012)

Resilience and positive adjustment

- Absence of symptoms and distress
- Subjective well-being and life satisfaction
- Level of mental health and functioning
  - Less cortisol dysregulation (diurnal profile)(Ong et al., 2011)
- Positive adjustment as rated confidentially by close friends-relatives
  - Bereaved partners (Bonanno et al., 2005)
  - High-exposure survivors of 9/11 (Bonanno et al., 2005).
- Positive experiences
  - Positive body image after cancer surgery (Lam et al., 2012)
  - Comfort from positive memories of deceased (Bonanno et al., 2004)

Resilience after **isolated** PTEs

- occurring *circumstances*
- Resilience as *minimal response or rapid return to baseline*

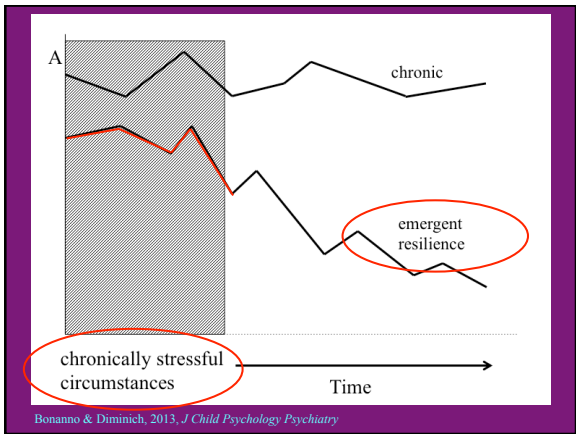


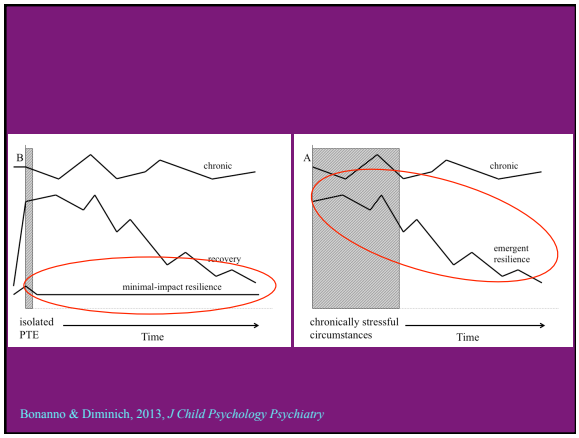
Resilience after **isolated** PTEs

- occurring *circumstances*
- Resilience as *minimal response or rapid return to baseline*

Resilience following **chronic** adversity

- *pervasive and enduring* aversive life circumstances
- Resilience as eventual emergence of positive outcomes

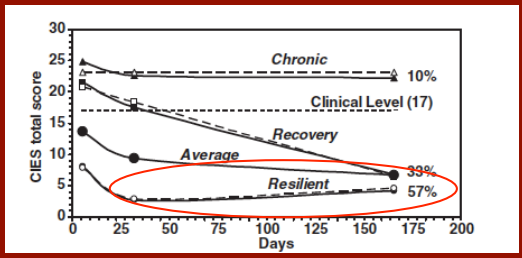




Bonanno & Diminich, 2013, *J Child Psychology Psychiatry*

Child acute PTE: Traumatic Injury (Australia)

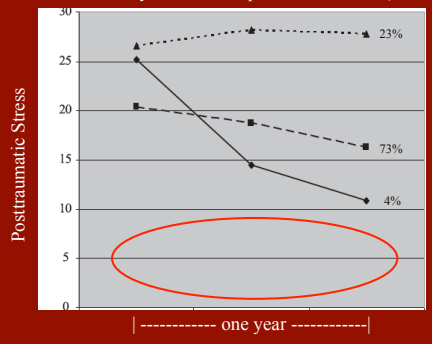
Children (6-16 years) admitted to pediatric ER for injury (n = 180)



Le Brocque et al., (2009). *J Pediatric Psych*

Adult chronic: Palestinians in West Bank and Gaza

Mass causality and chronic political violence (N= 764)



Hobfoll et al. (2011) *Social Science & Medicine*

A broader approach: Mapping individual differences

- phase I: Identifying trajectories of outcome
- phase II: Latent trajectory modeling
- phase III: Predictors

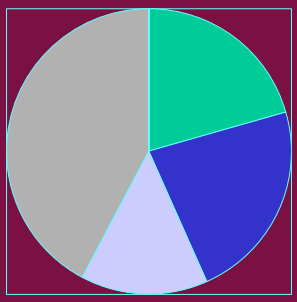
A broader approach: Mapping individual differences

- phase I: Identifying trajectories of outcome
  - Limitations:
    - Unsophisticated ("by hand" or primitive algorithm)
    - Theory driven
    - Not sensitive to parameters of heterogeneity
- phase II: Latent trajectory modeling
- phase III: Predictors

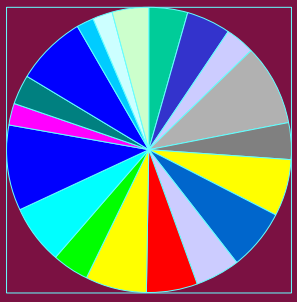
Why are *most* but not all resilient?

- Many people evidence *minimal-impact* resilient outcomes
  - Large group: 33% - 66% and typically a majority
  - Heterogeneity: Different people, different experiences, different backgrounds
  - Likely many different routes to the same end
- *Multiple* and *sometimes unexpected* predictors

Predictors of resilient outcomes?



Multiple, unique predictors with *small effect sizes*



Multiple, unique predictors of resilient outcomes

- Pre-event context
  - Demographic factors (age, gender)
  - Preparation and prior exposure
  - Economic resources (employment, income)
  - Beliefs (acceptance of death, justice, shared cultural norms)
  - Social resources (support, social network)
  - Personality (trait self-enhancement, optimism, hardiness, coping self-efficacy, perceived control, etc)
  - Genetic disposition (G X E)
- Proximal exposure
  - Witnessing death, serious injury to others
  - Objective danger to self
  - Extent of loss (death, loss of property)
- The aftermath (distal exposure)
  - distal exposure (loss of economic, personal, or health resources)
  - Reduced search for meaning, worry, rumination
  - Reduced ongoing stress
  - Coping and appraisal
  - Positive emotion and emotional flexibility

Bonanno, Brewin, Kaniasty, & La Greca (2010). *Psychological Science in the Public Interest*

Multiple, unique predictors of resilient outcomes

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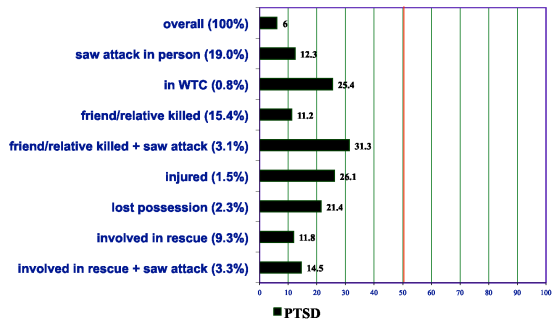
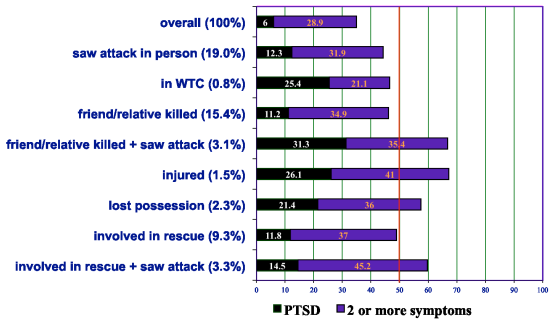
Representative sample of New Yorkers



Bonanno, Galea et al. (2006, 2007) *Psychological Science JCCP*

Representative sample of New Yorkers



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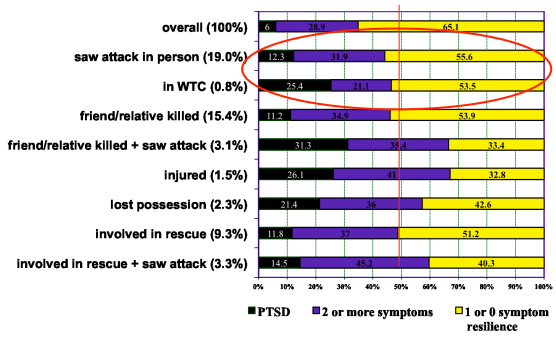

Bonanno, Galea et al., (2006, 2007) *Psychological Science, JCCP*

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Multiple, unique predictors of resilient outcomes

- Pre-event context
  - Demographic factors (older, male, greater education)
  - Preparation and prior exposure
  - Economic resources (employment, income)
  - Beliefs (acceptance of death, justice)
  - Social resources (support, social network)
  - Personality (trait self-enhancement, optimism, hardiness, coping self-efficacy, ego-resiliency, etc)
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  - Positive emotion and emotional flexiblity

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  - Witnessing death, serious injury to others
  - Objective danger to self
  - Extent of loss (death, loss of property)
- The aftermath (distal exposure)
  - Less resource loss (economic, personal, or health)
  - search for meaning, worry, rumination
  - Less ongoing stress
  - Coping and appraisal: challenge (vs threat); fighting spirit
  - Positive emotion and flexibility

Multiple, unique predictors of resilient outcomes

- Pre-event context
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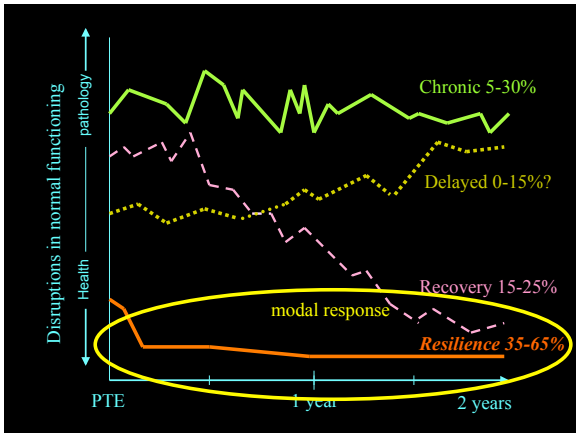
  - Coping and appraisal: challenge (vs. threat); fighting spirit
  - **Positive emotion and flexibility**

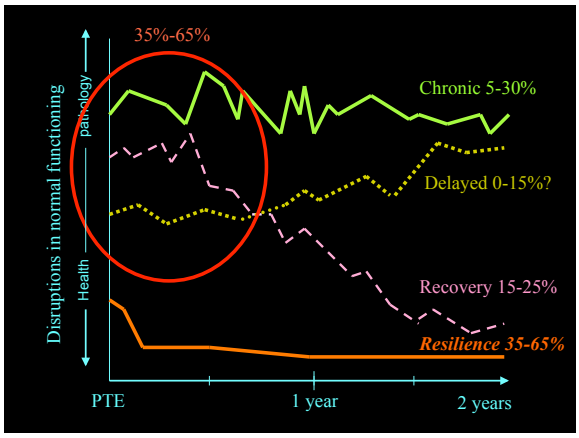
Predictors and clinical implications

- Resilient:



Predictors and clinical implications

- Resilient:
  - not likely to show delayed elevations
  - Support, comfort, perhaps consultation but...
  - treatment is not indicated
- Early difficulties (i.e., elevated symptoms lasting several months or longer)



Predictors and clinical implications

- Resilient:
  - not likely to show delayed elevations
  - Support, comfort, perhaps consultation but...
  - treatment is not indicated
- Early difficulties (i.e., elevated symptoms lasting several months or longer)
  - Deficits in emotion regulation ability

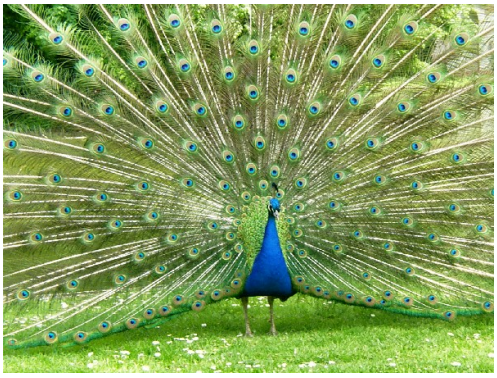
Regulatory Flexiblity

- their dynamic nature Folkman, Gross)
  - Person-situation interaction
  - Shifting nature of situational demands
- in practice, we tend to categorize strategies as generally adaptive (e.g., support seeking, reappraisal, finding meaning) or generally maladaptive (e.g., avoidance, suppression)
- "Fallacy of uniform efficacy" (Bonanno & Burton, in press)

Bonanno, 2012, *Memory*; Bonanno et al. 2004, *Psych Science*; Bonanno & Burton, in press, *Perspectives*

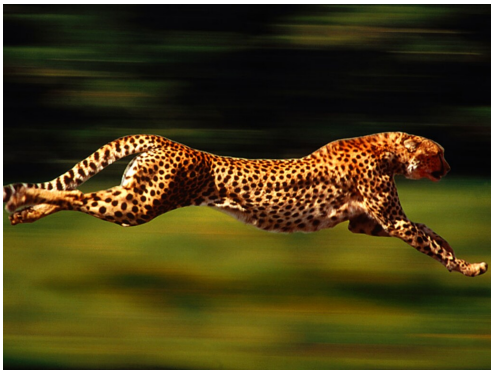
Costs and benefits in nature

-
- costs
- ***the peacock's colorful tail***



Costs and benefits in nature

-
-
  cost
- ***the Cheetah's speed***



Regulatory Flexiblity

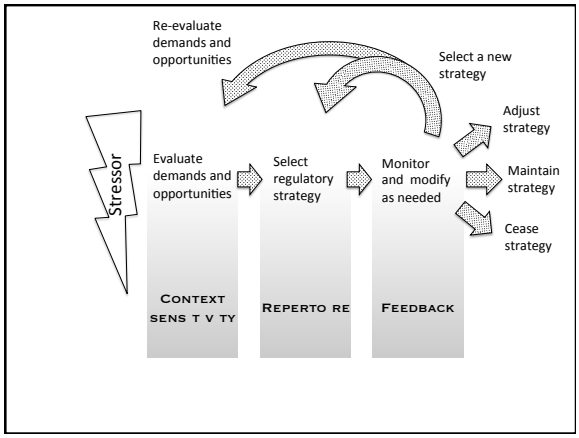
- "Fallacy of uniform efficacy"
- Different aversive situations present different challenges (e.g., Hurricane vs. terrorist attack vs. abuse vs. loss vs. serious injury)
- A given regulatory behavior may be adaptive in one context but less adaptive or even maladaptive in another, or at another point in time

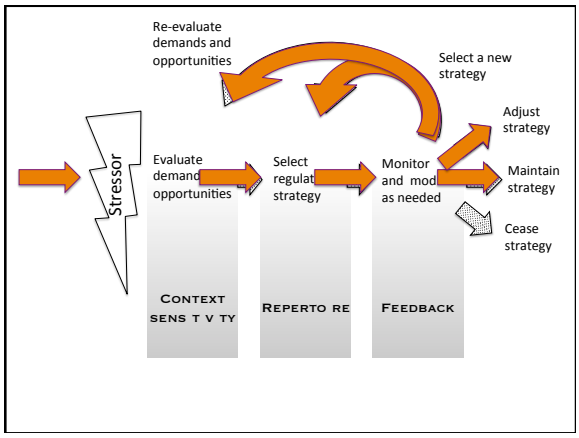
(Bonanno, 2012, *Memory*; Bonanno et al. 2004, *Psych Science*; Bonanno & Burton, in press, *Perspectives*

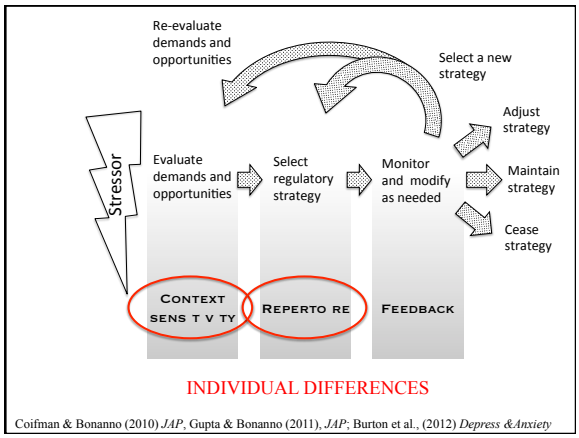
Regulatory Flexibility

- Adaptation requires flexible use of regulatory behaviors and strategies
- 3 sequential components
  - Ability to read the demands of the situation (***context sensitivity***)
  - Broad ***repertoire*** of regulatory responses
  - Monitor ***feedback*** from environment and adjust behavior as needed

Bonanno & Burton, in press, *Perspectives on Psychological Science*







Coifman & Bonanno (2010) *JAP*, Gupta & Bonanno (2011), *JAP*; Burton et al., (2012) *Depress &Anxiety*

Context sensitivity

- Emotions are *functional* evolved as solutions to *specific* threats and opportunities
  - *Fear*
    -
    - Affect: concentrates attention on immediate threat, rapidly prepare to flee or fight,
    - Expression: signals others of danger, etc
  - *Sadness*
    -
    - Affect: attention is turned inward, fosters adjustment/ recalibration of beliefs and expectations
    - Expression: signals others of the need for assistance

Context sensitivity

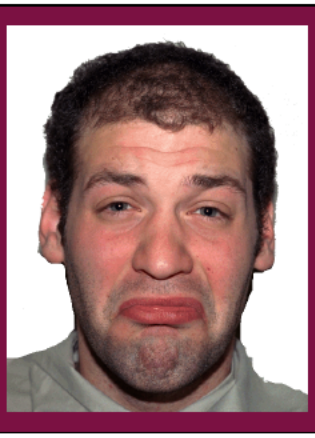
- The functions of emotions are "context bound" (Cole et al , 1994)
- Emotional responding that is sensitive to context (emotion match the situational context) allows us to take advantage of this evolved and highly adaptive system . . .
- . . . which in turn promotes mental health
- Emotional responding that is not sensitive to context (emotions occur irrespective of context (mismatch) can lead to dysregulation and psychopathology

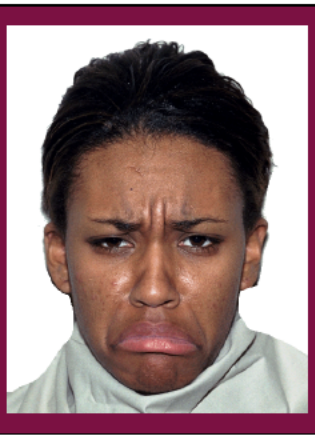
Context insensitivity and psychopathology

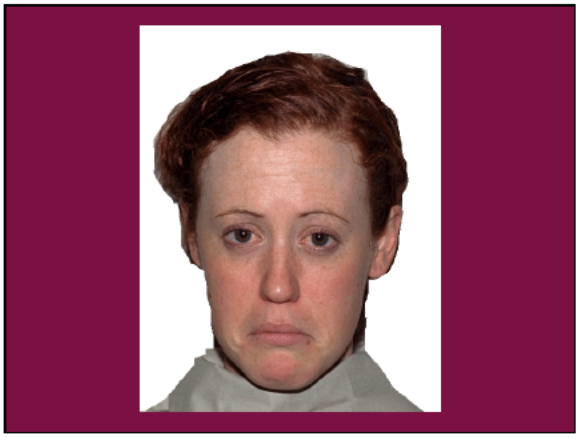
- Depression (MDD): Less modulation of sadness across contexts (e.g., sad and neutral films) (Rottenberg et al , 2002, 2005)
- Depressed bereaved
  - Complicated Grief (CG): less modulation across interview contexts (Diminich & Bonanno, 2013) and film contexts (Bullock & Bonanno, 2012)
  - Modulation of negative emotions across interview contexts *early in bereavement* predicted the recovery pathway (reduced depressive symptoms later in bereavement) Coifman & Bonanno, 2010

Why is lack of expressiveness a problem?

- Sadness helps us recalibrate but also signals others that we need help, care
- Sad expressions evoke sympathy in others



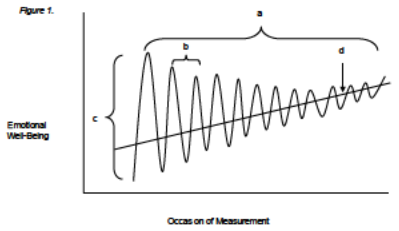




Why is lack of expressiveness a problem?

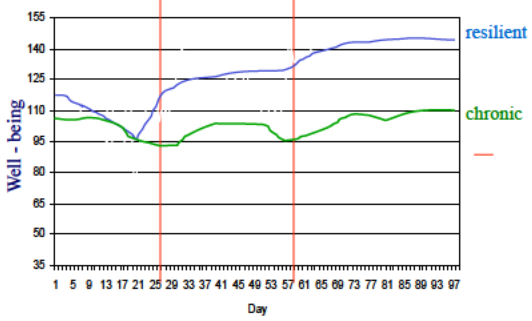
- Sadness helps us recalibrate but also signals others that we need help, care
- Sad expressions evoke sympathy in others
- Prolonged expressions of pain/distress become difficult for support providers to bear
- Lack of expressiveness . . .
  - Removes this valuable communicative function
  - Leads to further social isolation
- Another important piece of the puzzle . . .
- . . . oscillation . . .

Stress reactivity: a pendulum with friction



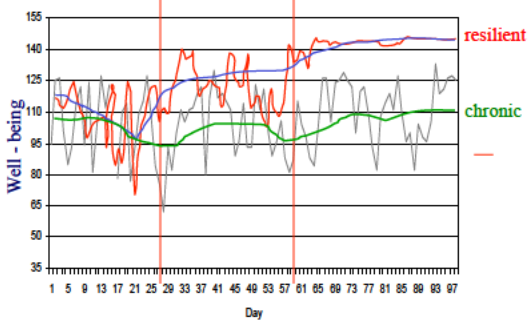
Bisconti, Bergeman, & Boker (2006)

Average fluctuations in well-being following the death of a spouse



Bisconti, Bergeman, & Boker (2006)

Daily fluctuations in well-being following the death of a spouse



Bisconti, Bergeman, & Boker (2006)

Why oscillate?

Efficiency (emotions do their job, run their course, become less necessary over time)

Adaptive

- Hence we did not have the luxury of tuning the world out for long periods of time
- Oscillation provides opportunities to re-engage the world, remain alert for dangers, reconnect with others
- opportunity for positive emotion signals

- WTC resilience and laughter
  - CG example (4:30-6:45; 13:30-15:30) (no sound)
  - [wtc1143] (0:25 – 9:45) (with sound)

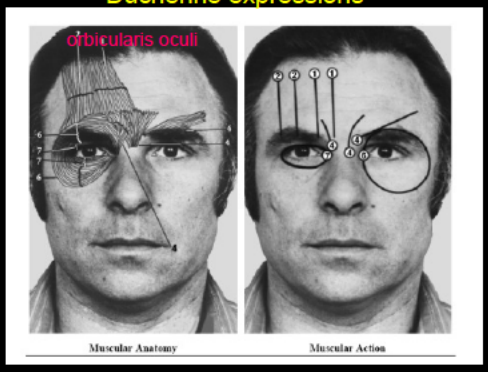
Positive Emotion Signals

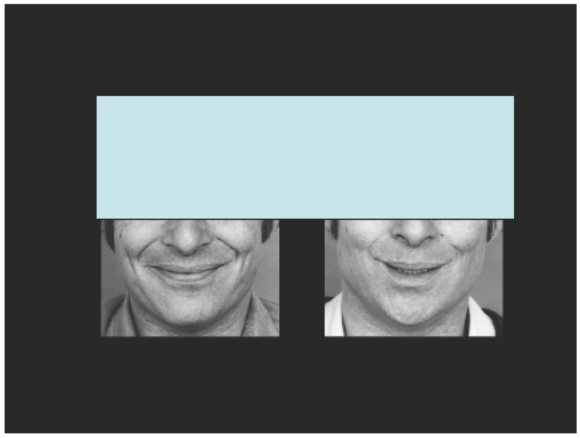
Two functions of Laughter and Smiling

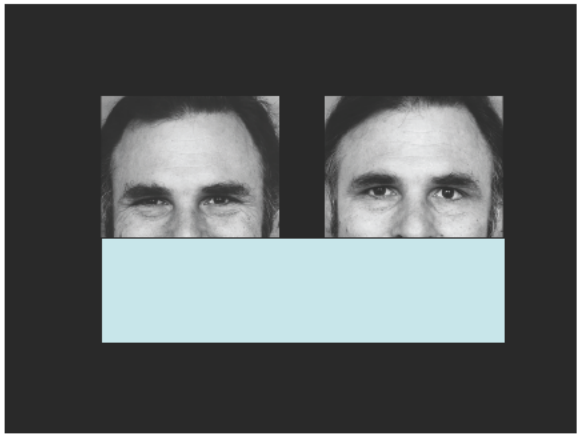
- **Foster self-regulation**
  - Breather (Lazarus, Kanner, & Folkman, 1980)
  - helps *undo negative emotion* (Fredrickson, 2001)
  - associated with distancing, reinterpreting, or reframing of negative events (akin to humor)
- **Social benefits**
  - laughter is pro-social, increases group cohesion
  - laughter is *contagious* and evokes positive responses in others

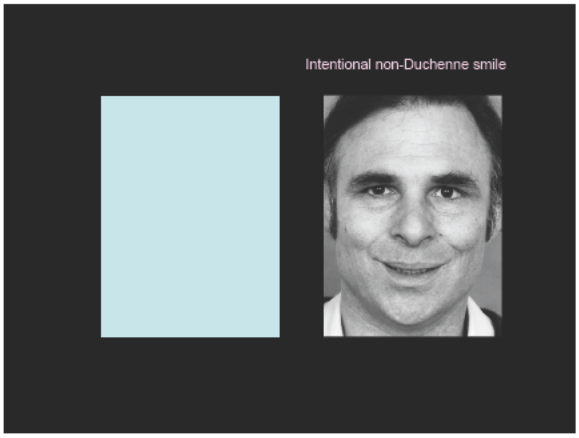
Bonanno, & Keltner (1997) *JAP;* Keltner & Bonanno (1997) *JPSP*

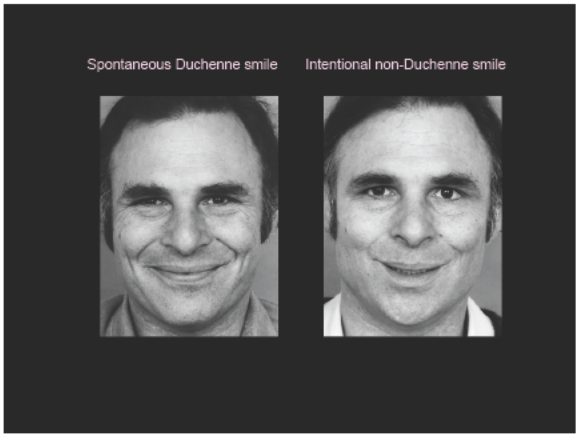
Duchenne expressions

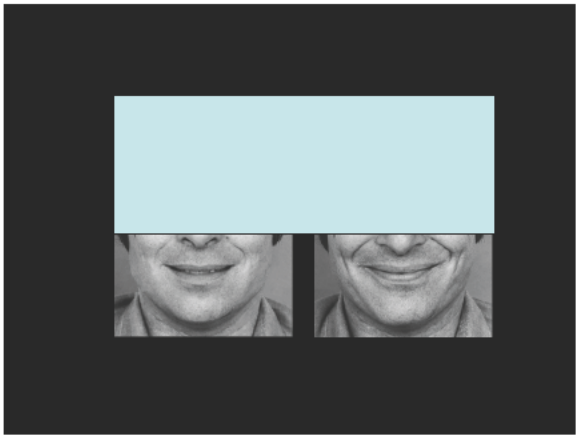


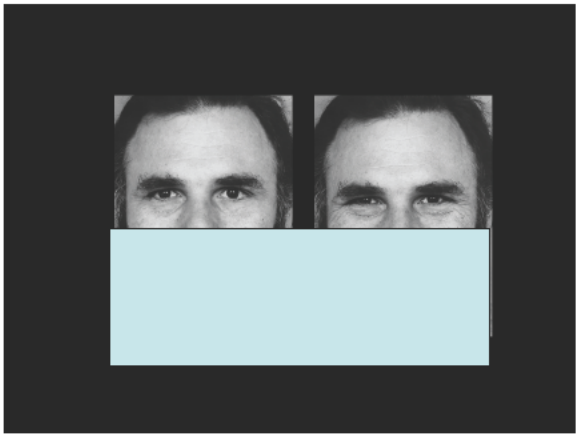


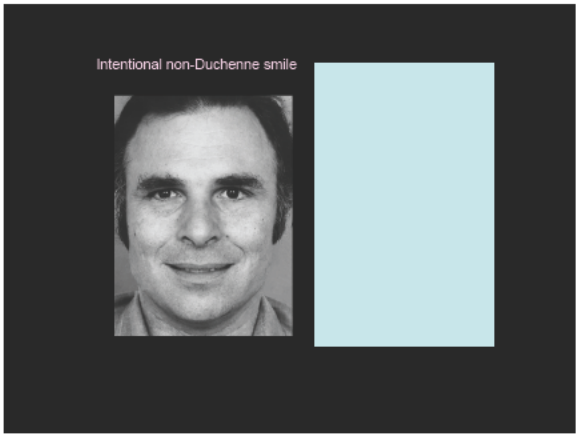


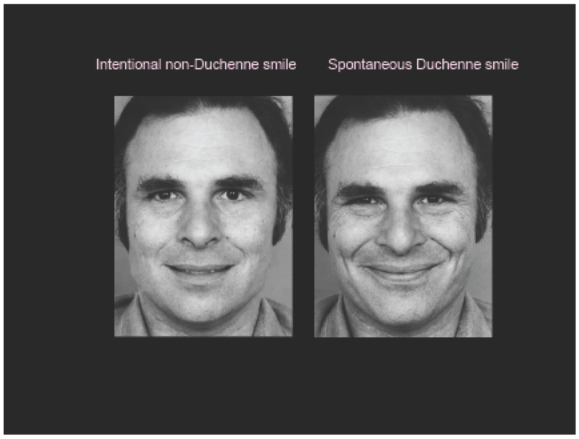

Intentional non-Duchenne smile


Spontaneous Duchenne smile
Intentional non-Duchenne smile

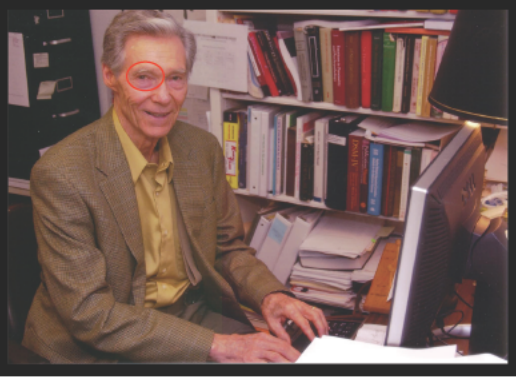




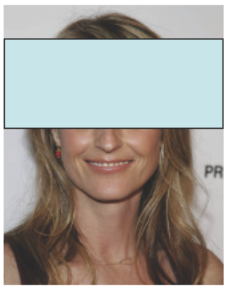

Intentional non-Duchenne smile

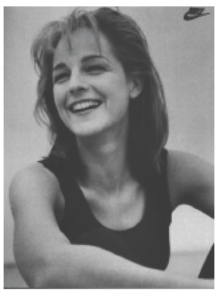

Intentional non-Duchenne smile
Spontaneous Duchenne smile

Duchenne expressions?



Duchenne and nonDuchenne smiles





- Duchenne and non-Duchenne expressions appear to be associated with different neural pathways
- nonDuchenne expressions are associated with social politeness; also concealment, deception
- Only "Duchenne" expressions are associated
  - with genuine positive emotion, contagion
  - evoke favorable responses from untrained observers
  - consistently predict favorable long-term outcome following adversity

Bonanno & Keltner, 1997; Bonanno et al., 2007; Keltner & Bonanno, 1997; Ong et al., 2010, 2011; Papa & Bonanno, 2008

Duchenne expressions evoke positive response in untrained observers

Table 8
Correlations Between Measures of Laughter, Smiling Behavior, and Observers' Responses

Observer's response	Duchenne laughter	Non-Duchenne laughter	Duchenne smile	Non-Duchenne smile
Perceived suffering	−.35*	.08	−.25	.15
Perceived adjustment	.31*	.12	.32*	−.24
Comfort	−.24	−.08	−.20	−.33**
Avoidance	.00	−.22	−.26	.18
Compassion	−.24	−.01	−.17	−.26′
Sadness	−.09	−.05	−.14	−.24
Frustration	−.33*	−.16	−.22	.23
Amusement	.36*	−.03	.27	.14
Happiness	.29′	−.27′	.48**	−.23
Positive emotion	.38*	−.16	.42**	.05

′ $p < .10$ (marginally significant). * $p < .05$. ** $p < .01$.

Keltner & Bonanno (1997) *JPSP*

Repertoire

Tool box of possible regulatory behaviors and strategies

- Fallacy of uniform efficacy:
  - expression = good
  - suppression = bad
- Suppression can be adaptive
  - Bonanno et al (1995) "When avoiding unpleasant emotion might not be such a bad thing" *JPSP*
- The expression or suppression of emotion is not as important as is the "*suppress emotional expression* in accord with situational demands" (Bonanno et al , 2004).

Expressive Flexibility

- Measured experimentally as ability to enhance or suppress expression of emotion relative to own baseline
- Both enhancement and suppression ability (and their combination as a flexibility score) predicted better adjustment. . .
  - during bereavement (Gupta & Bonanno, 2010)
  - after high cumulative life stress (Westphal et al., 2010)
  - following the 9/11 terrorist attack (Bonanno et al., 2004)

Next steps

- Further exploration of context sensitivity and repertoire using longitudinal and prospective designs
  - How these components relate to each other
  - Measuring "affective flexibilty" (e.g., bio-markers of affective experience; EEG and facial EMG)?

Coping Flexiblity

- Historically, clinical theories have emphasized *confronting/processing the traumatic event*
- However, recent research shows the advantage of *focusing beyond the trauma*: optimism, distraction, active coping and rebuilding, finding new goals and opportunities
- Cheng (2001, 2003): coping flexiblity
- Bereavement: Stroebe & Schut dual process model
- The Perceived Ability to Cope with Trauma (PACT) scale (Bonanno, Pat-Horenczyk, & Noll, 2011 *Psychological Trauma)*

Perceived Ability to Cope with Trauma (PACT)

- Examined numerous pairs of opposing coping items specific to aversive life events
- Confirmatory factor analyses using samples (US and Israel) revealed two factors:
  - *Trauma focus* (focusing on the event)
  - *forward focus* (moving beyond the event)
- Validity: Both *forward focus* and *trauma focus* unrelated to trauma exposure, social desirability, or neuroticism; positively related to ego-resiliency

Bonanno, Pat-Horenczyk, & Noll (2011). *Psychological Trauma*

Trauma focus

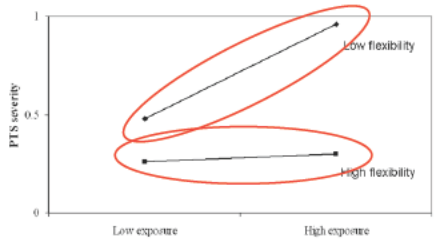
Forward focus

Perceived Ability to Cope with Trauma (PACT)

- Sample: 315 students of Hebrew University (Jerusalem) recruited for likely high exposure to terrorist violence.
- Predicted results: Both and *trauma focus* independently predicted reduced PTS and interacted with trauma exposure
- Flexibility (relatively balanced, high scores on both measures) predicted less change in PTS at higher levels of trauma exposure

Bonanno, Pat-Horenczyk, & Noll (2011). *Psychological Trauma*

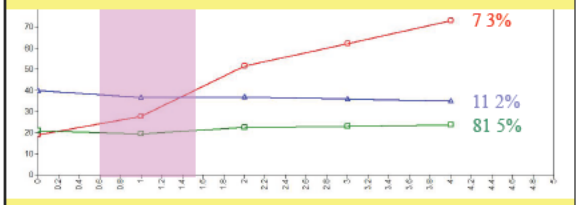
Israeli students: high exposure to terrorist violence (N = 315)



Bonanno, Pat-Horenczyk, & Noll (2011). *Psychological Trauma*

Flexibility During and After Combat Deployment

Prospective study of US army soldiers deployed in Afghanistan



base deployment 6 mo 12 mo 18 mo

Bonanno & Geraci (2011)

Flexibility During and After Combat Deployment

Prospective study of US army soldiers deployed in Afghanistan

1. Resilient class (81.5%)
    1. Greater trauma focus during deployment
    2. Greater forward focus after deployment
2. Chronic class (7.3%)
    1. Greater forward focus during deployment
    2. Greater trauma focus after deployment

Bonanno & Geraci (2011)

So . . . bad things happen

- Observable individual differences (heterogeneity)
  - Some people are severely distressed
  - Some people struggle and recover
  - Most people are generally ok soon afterwards
- There are multiple and unexpected predictors
-
  - Context sensitive emotion - oscillation
  - Repertoire of regulatory strategies
  - Ability to monitor feedback and adjust

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THANK YOU!

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