

Cumulative Adversity and Smaller Gray Matter Volume in Medial Prefrontal, Anterior Cingulate and Insula Regions

Supplemental Information

Cumulative Adversity Interview (CAI) Description

Stressful events are scored as present or absent and summed for scale scores. Recent Life Events: comprise a checklist of 33 items referring to discreet stressful events occurring in the previous 12 months that occurred to the respondent or respondent's immediate family member. These are broadly divided into items referring to exits from the social field (i.e., death, divorce, relationships ending), and undesirable events both interpersonal and financial (i.e., being assaulted, financial crises, robberies). Major Life Events: this section includes 11 items relating to social adversities, not typically violent in nature, but which differ from standard life events due to their severity and potentially long-term consequences (1). Examples of items are parental divorce and failing a grade in school. Life Traumas: this section comprises 34 items relating to life trauma, witnessed violence and traumatic news. Life trauma includes events which imply force or coercion and include physical, emotional and/or sexual abuse, including rape and being injured with a weapon. Witnessed violence contains items which involve being present in dangerous or upsetting situations, such as seeing someone get shot or attacked with a weapon. Traumatic news is comprised of items which involve not being present, but rather hearing news about someone else being killed, abused or injured. Cumulative Adverse Life Events (CALE): the sum count of number of adverse life events from recent life events, major life events, and trauma that have occurred over the lifespan. Chronic Stressors: this section comprises 62 items relating to subjective experience of continuous stressors or ongoing life problems and hassles. Items are scored on a three point Likert scale ranging from not true to very true and refer to

perceived difficulties with ongoing interpersonal, social and financial relationships and responsibilities including difficulties in the work and home environment and relationships with family and significant others. Sample items include “You are trying to take on too many things at once,” “Too much is expected of you by others,” “Your job often leaves you feeling both mentally and physically tired,” “You have a lot of conflict with your partner/boyfriend/girlfriend,” and “There are some places in your neighborhood where you would never feel safe.” (Table S1 provides frequencies of each CAI item in this sample.)

Three month test-retest reliability was computed for a subsample of consecutive participants in the study ($n = 44$). Reliability coefficients for major life events, traumatic events, recent life events, CALE, and chronic stress were .79, .91, .70, .89, and .79 respectively indicating good to excellent reliability across scales. These reliabilities are also consistent with, or better than, test-retest coefficients found for other retrospective measures of stressful life events (2-9).

Table S1. Frequencies of Life Events Stressors

Content Areas of Stress	Frequency (<i>n</i> = 103)
Major Life Events	
Education setbacks	13
Separation from one or both parents	22
Parents divorced	35
Loss of child	8
Family or S.O. issues with substance use	32
Unfaithful S.O.	32
Trauma	
Loss of home due to natural disaster	5
Serious accident	6
Witnessed serious accident or injury	26
Sexual abuse or assault	6
Physical abuse	14
Emotional abuse	9
Witnessed assault	27
Threatened with assault, not hurt	23
Physical assault	22
Exposed to combat or war	7
Kidnapped	0
Immediate family member or S.O. died	13
Grandparent died	68
Important other died	43
Knew someone who was seriously assaulted, killed, completed suicide	61
Recent Life Events (last 12 months)	
Serious accident, injury, or illness	26
Child or S.O. died	3
Legal difficulties	14
Robbed or house/car broken into	17
Physical assault	5
Unwanted pregnancy	7
Abortion or miscarriage	6
School problems (dropout, failure)	6
Close friend died	9
Separation or divorce	4
Lost home due to natural disaster	0
Job difficulties (lost job, worse job, demotion, pay loss)	31

Financial crisis	9
Went on welfare	2
Relationship difficulties (unfaithful, arguments increased, ended)	38
Close relationship ended	12
Moved to worse neighborhood	7
Kicked out of house	0
Kicked child out of house	0

S.O. refers to significant other inclusive of spouse, partner, or boyfriend/girlfriend. Recent life events occurred in either self or immediate family member.

Table S2. Correlation Matrix for Cumulative Adversity Interview Subscales, Age, and Education.

	1.	2.	3.	4.	5.
1. Major Life Events	--				
2. Traumatic Life Events	.29**	--			
3. Recent Life Events	.23*	.26*	--		
4. Chronic Stress	.39**	.14	.06	--	
5. Age	.08	.21*	-.13	-.08	--
6. Education	-.13	.04	.05	.09	.22*

* $p < .05$ ** $p < .01$

Table S3. Regions within Gray Matter Volume Clusters in which CAI Scales are Associated with Smaller Volume

CAI Scale	Cluster Size	P Value	Region	Brodman Areas	Montreal Neurological Institute Coordinates (x,y,z; mm) for Cluster Peak
Cumulative Adverse Life Events	20679	< .001 (FWE)	frontopolar cortex; ventromedial and OFC, gyrus rectus; inferior frontal gyrus; anterior cingulate, subgenual cingulate, caudate	6, 9, 10, 11, 25, 32, 44, 47	6,51,4
Recent Life Events	7131	.001 (FWE)	frontopolar cortex; dorsomedial prefrontal cortex, ventromedial and OFC, gyrus rectus	9, 10, 11	14, 69, 21
	3893	.028 (FWE)	insula; putamen; OFC , superior temporal gyrus	10, 11, 13, 22, 38	39, 20, -8
Trauma	12835	< .001 (FWE)	ventromedial and dorsomedial prefrontal cortex; rostral anterior cingulate; subgenual cingulate; left ventral striatum, caudate, frontopolar cortex; right inferior frontal gyrus	8, 9, 10, 11, 24, 25, 32, 47	0,15,-12
Chronic Stress x Cumulative Adverse Life Events Interaction	7175	.001 (FWE)	subgenual cingulate, gyrus rectus, orbitofrontal cortex, inferior frontal gyrus, left ventral anterior cingulate; right anterior insula	10, 11, 25, 32, 45, 47	36, 24, -24

CAI, Cumulative Adversity Interview; FWE, family-wise error; OFC, orbital frontal cortex.

Supplemental References

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