

I. Michael J. Friedlander, Ph.D.

Executive Director, VTCRI

Professor of Biological Sciences and of Biomedical
Engineering and Science, Virginia Tech



Brooks King-Casas
TBI and PTSD



Read Montague
computational psychiatry
addiction, autism,
personality
disorders



Warren Bickel
addiction
substance abuse
rehabilitation



Greg Valdez
aging/degeneration
of the nervous system
ALS



Mike Friedlander
biology of learning -
TBI recovery



Roslayn Moran
Alzheimer's
dementia

Mental health and addiction/substance abuse research programs at VTCRI



Stephen LaConte
neurorehabilitation
in brain injury



**Sharon Ramey,
Craig Ramey**
Child cognitive
development,



Alexei Morozov
disorders of empathetic
behavior systems



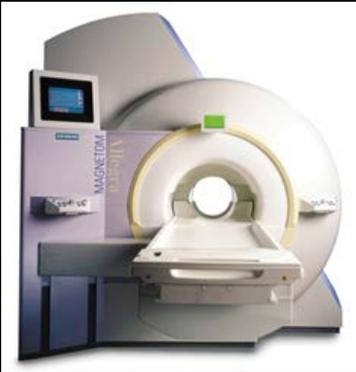
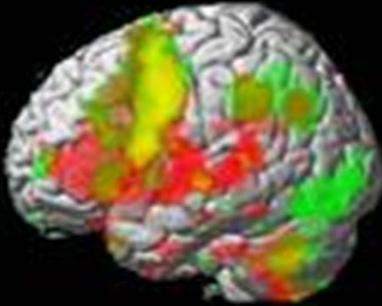
Pearl Chiu
smoking cessation,
addiction,
major depression



Jamie Tyler
ultrasound for
seizures -
Parkinson's disease

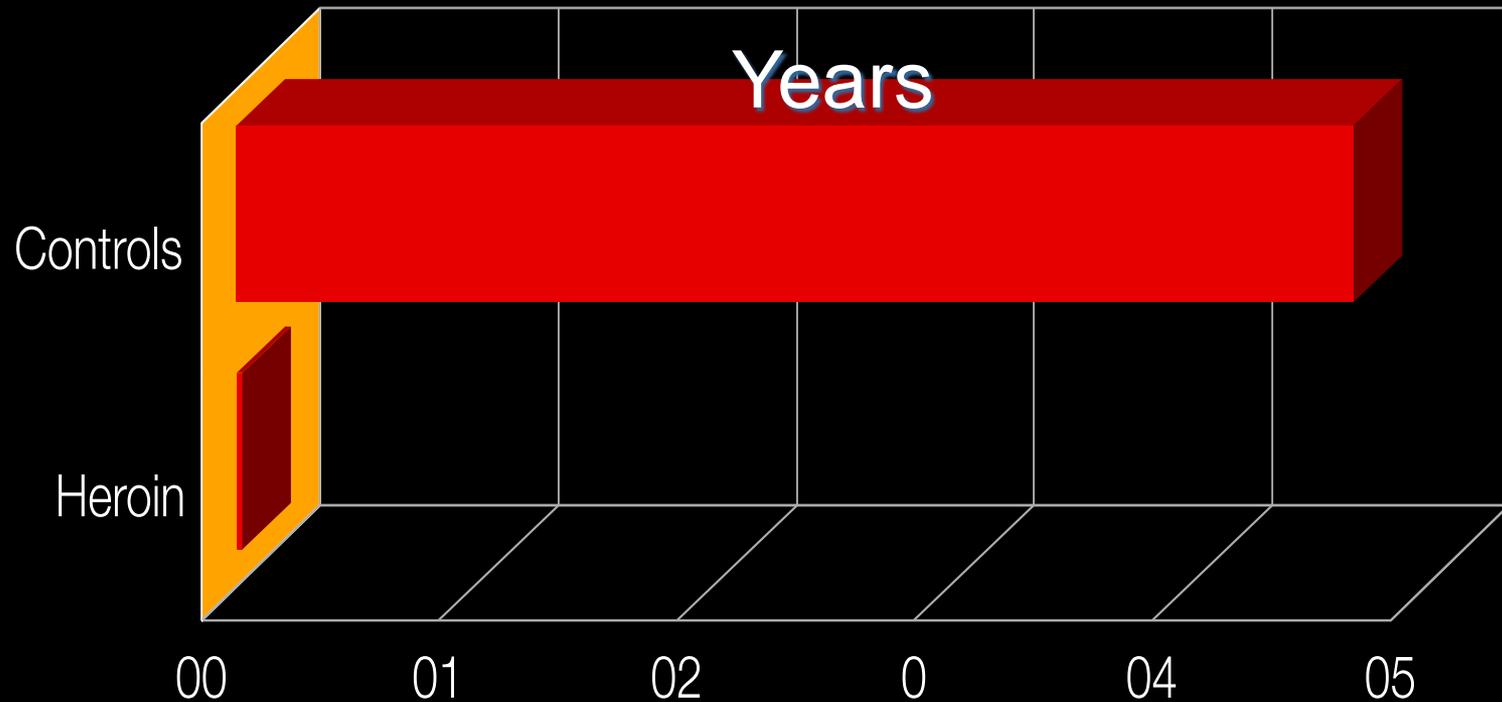


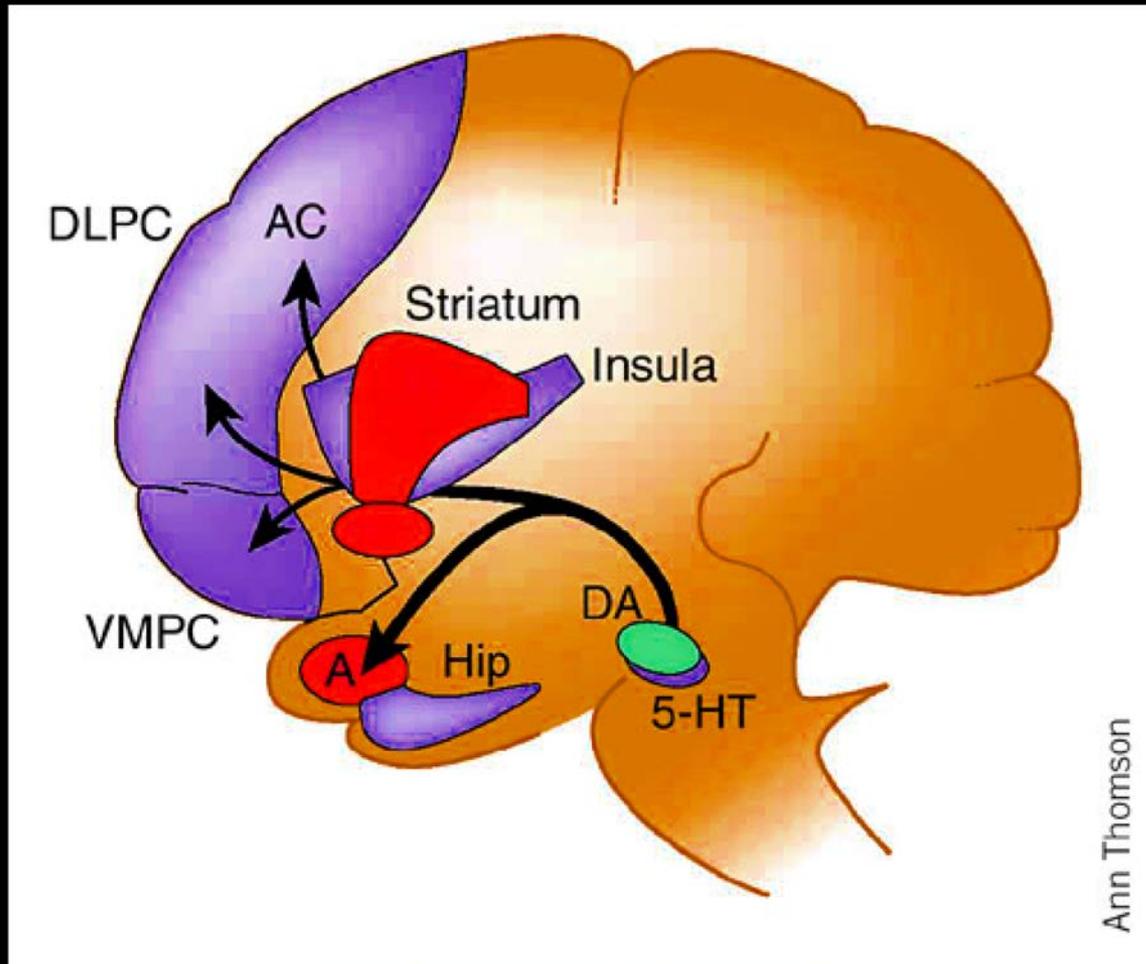
Konark Mukherjee
molecular genetics
of mental
retardation



III. Warren K. Bickel, Ph.D.,
Director, VTCRI Addiction Recovery Research Center
Professor of Psychology, Virginia Tech

Temporal Horizon





Bechara 2005

quitandrecovery.org



Beating addiction is easier with help.

Most people who try to quit smoking fail in the first week. Others kick three-pack-a-day habits and never take another puff. Why do some people succeed in overcoming addictions while others relapse, at great cost to their health, their families, and even their lives?

The National Quit & Recovery Registry taps the insights and experiences of people, who have been in recovery from an addiction—whether to tobacco, alcohol, drugs, or a harmful behavior—for at least a year. Sponsored by the Virginia Tech Carilion Research Institute, the registry seeks to help scientific understanding of recovery and to inspire those struggling with addiction.

[Become a Recovery Hero Now >>](#)

In the end, some of your greatest pains become your greatest strengths.

—Drew Barrymore, Actress and Recovery Hero

success stories

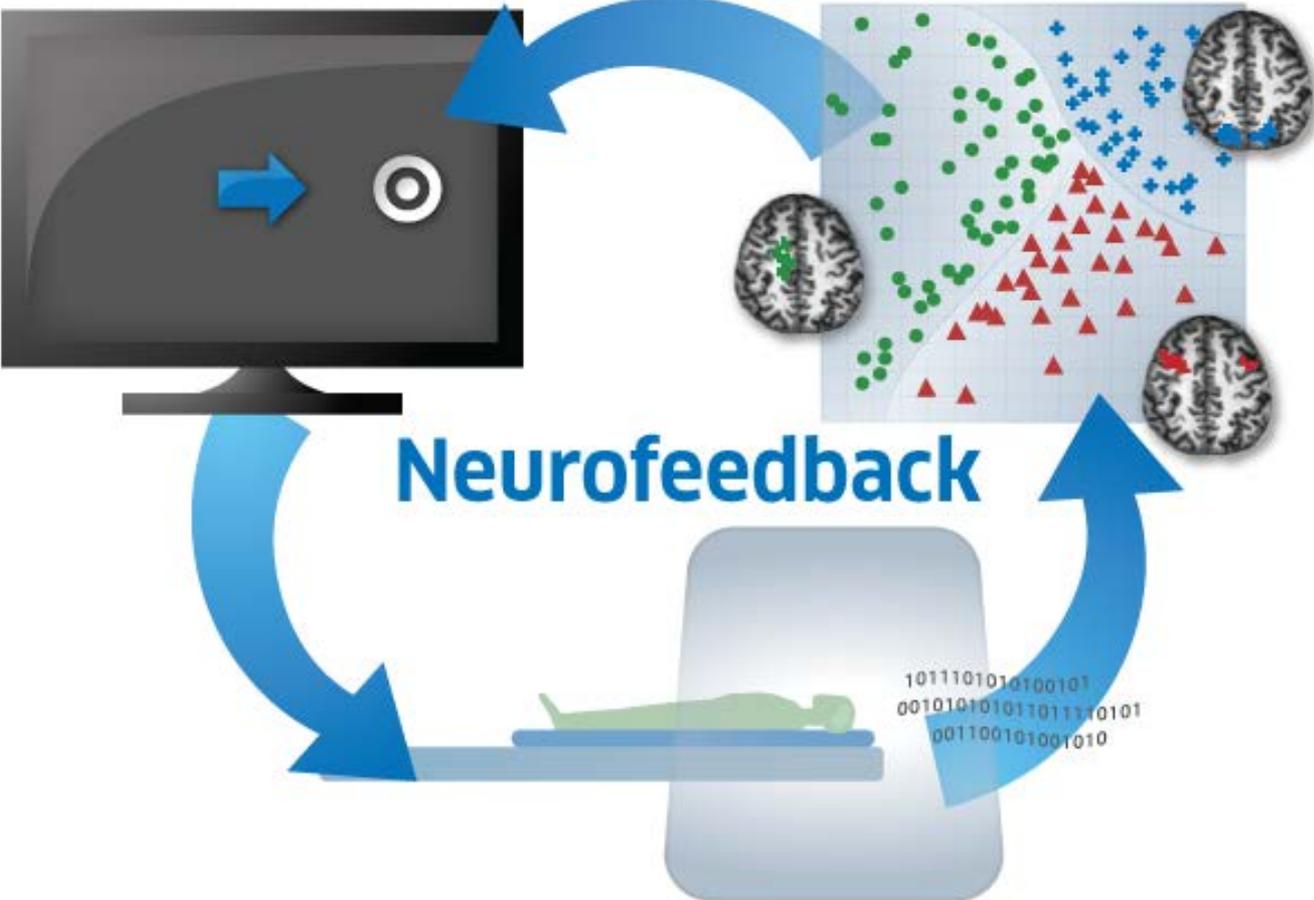
"I was 27 years old and sporting a three-pack-a-day habit when I realized I had the hacking cough of an elderly man with emphysema..."

"Hi. My name is Bob and I'm an alcoholic. As part of my journey of recovery I've been saying these words for more than 20 years

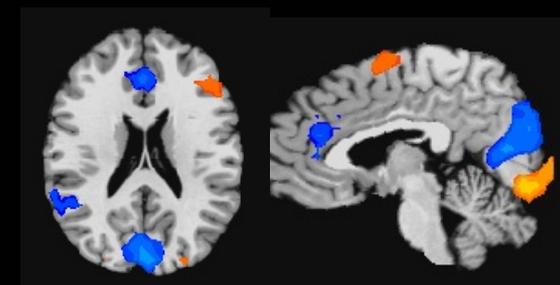
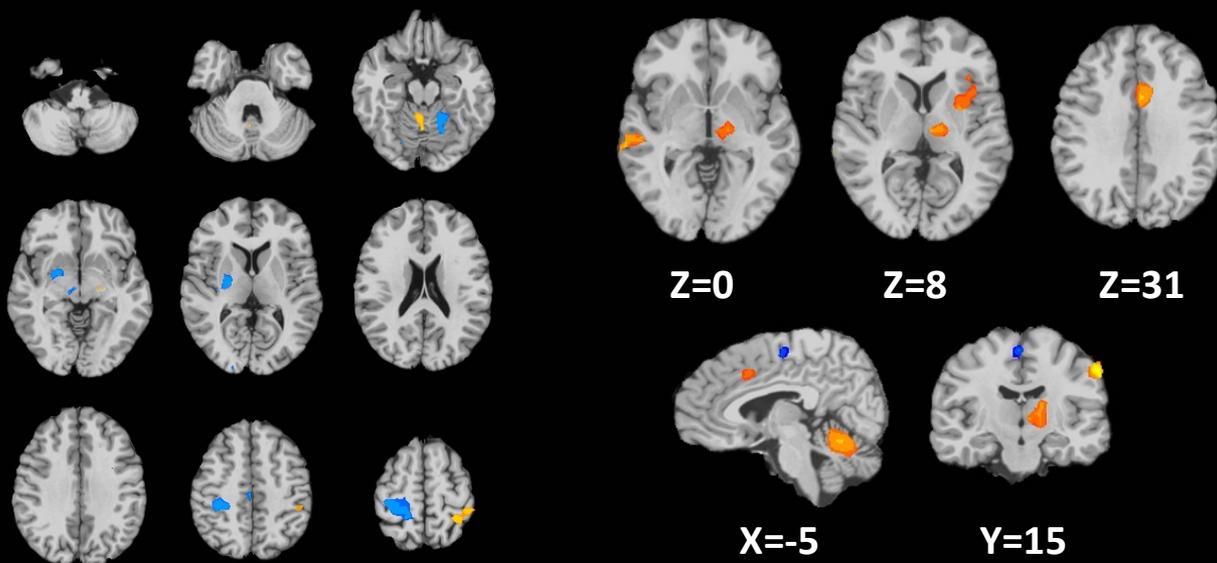
"I got into drugs, tobacco, you name it, when I was 13. I started off sniffing gasoline out of a lawnmower, then moved on to

VI. Stephen M. LaConte, Ph.D.
VTCRI Assistant Professor
Assistant Professor of Biomedical Engineering and
Science, Virginia Tech

fMRI



Support Vector Machine Maps of Real-Time Tasks



Rehabilitation and Therapy potential:

Traumatic Brain Injury

- Automobile accidents
- Domestic violence
- Military service
- Athletics

Addiction

- Nicotine
- Alcohol

Speech

- Developmental disorders
- Stroke and TBI
- Neurodegenerative diseases



Mood/Anxiety

- PTSD
- Depression

II. P. Read Montague, Ph.D.

Director, VTCRI Computational Psychiatry Unit

Director, VTCRI Human Neuroimaging Lab

Professor of Physics, Virginia Tech

**“Computational approaches to
mental illness”**

IV. Pearl Chiu, Ph.D.
VTCRI Assistant Professor
Assistant Professor of Psychology, Virginia Tech

Depression & substance dependence are major public health issues

Feeling Depressed or Down?

Counseling may help

Volunteers are needed to participate in an fMRI study

Participants will:

- Receive counseling at no cost
- Participate in interviews and complete questionnaires
- Play computer games during fMRI scans
- Be paid \$15/hour or more for participating

To be eligible, you must:

- be 18-55 years old
- have problems with depression
- NOT be taking antidepressants
- NOT have any metal implants
- NOT be claustrophobic



Contact:

participate@vtc.vt.edu
540-526-2091

VTC Virginia Tech Carilion
Research Institute

- depression is the leading cause of disability for ages 15 - 44
- 43% of adults with depression are smokers
- affect relationships, health, and all aspects of functioning
- great personal & fiscal cost
- **no** cure
- **no** blood test or biomarker

Translational fMRI to refine and develop assessments & treatments

Feeling Depressed or Down?

Counseling may help
Volunteers are needed to participate in an fMRI study



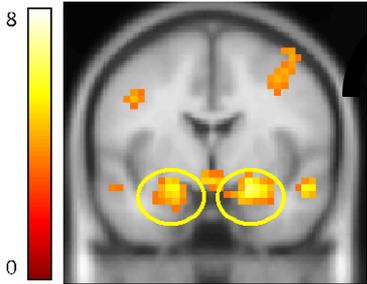
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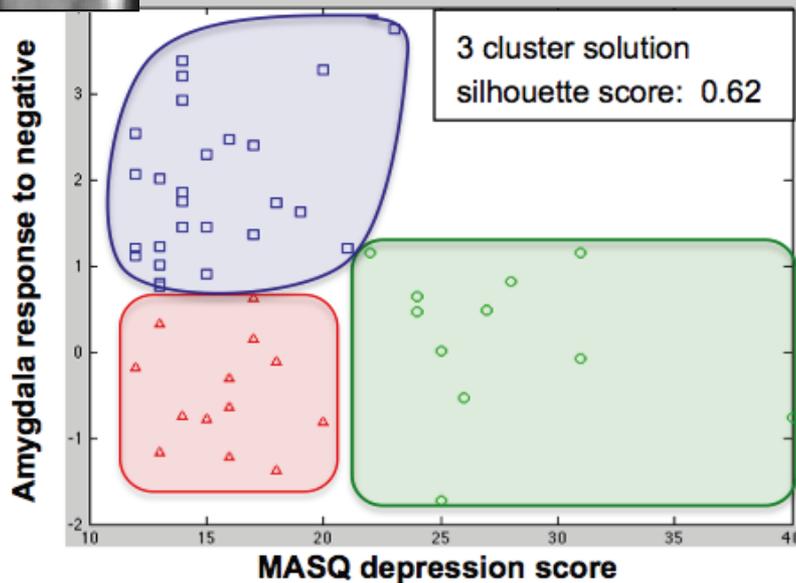
- identify types of depression & substance dependence based on brain and behavior “types”
- guide subsequent treatment based on baseline assessment
- psychotherapy or pharmacotherapy

By studying the brain, we can develop new biomarkers and therapies

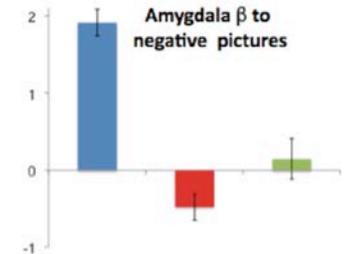
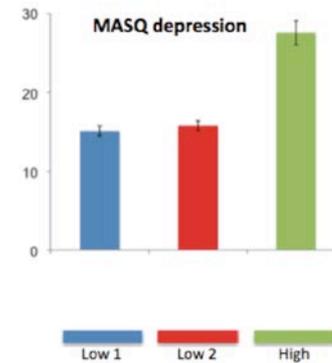
Brain responses



are converted to numbers



which identify new types of depression



Using these biomarkers, we can 'coach' the brain
(with Stephen LaConte & Brooks King-Casas)

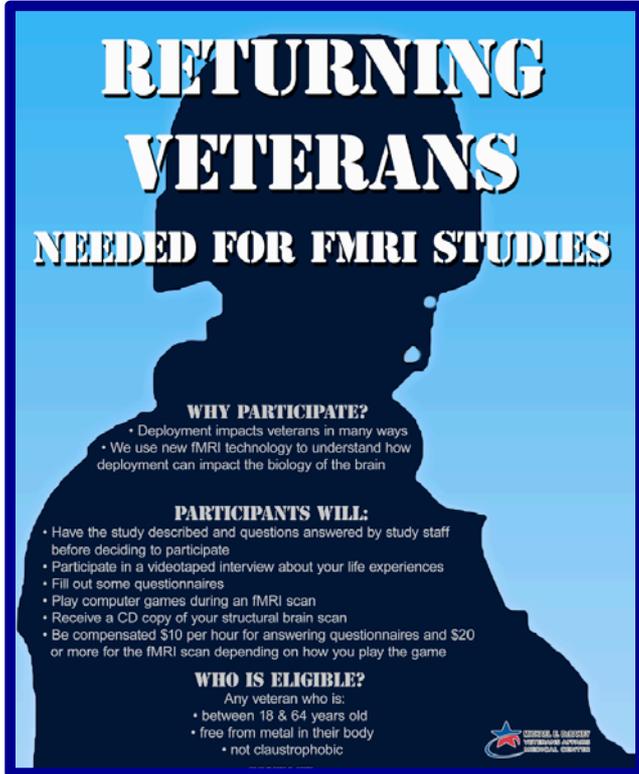


which are used to develop new treatments



V. Brooks King-Casas, Ph.D.
VTCRI Assistant Professor
Assistant Professor of Psychology, Virginia Tech

Social difficulties in post-traumatic stress disorder



RETURNING VETERANS NEEDED FOR FMRI STUDIES

WHY PARTICIPATE?

- Deployment impacts veterans in many ways
- We use new fMRI technology to understand how deployment can impact the biology of the brain

PARTICIPANTS WILL:

- Have the study described and questions answered by study staff before deciding to participate
- Participate in a videotaped interview about your life experiences
- Fill out some questionnaires
- Play computer games during an fMRI scan
- Receive a CD copy of your structural brain scan
- Be compensated \$10 per hour for answering questionnaires and \$20 or more for the fMRI scan depending on how you play the game

WHO IS ELIGIBLE?

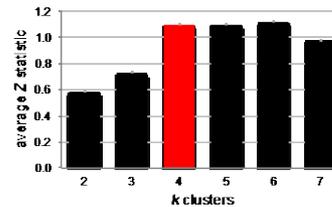
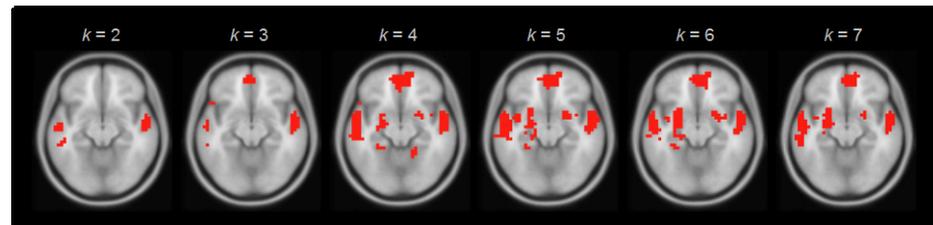
Any veteran who is:

- between 18 & 64 years old
- free from metal in their body
- not claustrophobic

GEORGE M. SMITH
VETERANS AFFAIRS
MEDICAL CENTER

- combat veterans experiencing post-traumatic stress disorder report an average of **13.3 acts of violence** over the previous year, more than three times the number reported by combat veterans without PTSD
- stronger among individuals with PTSD resulting from military war experience relative to other types of trauma
- become more severe with increasing time from traumatic event

Social difficulties in post-traumatic stress disorder



k = 4	"	!	"	!	N
	transfer \$	challenge?	defend \$	challenge \$	
1	1.0 (0.87)	No	0.0 (0.0)	0.0 (0.0)	148
2	3.8 (0.43)	No	0.0 (0.0)	0.0 (0.0)	408
3	0.5 (0.68)	Yes	6.2 (3.3)	5.8 (3.3)	305
4	3.3 (0.74)	Yes	4.3 (3.6)	6.0 (3.1)	219

From neural correlates to neurofeedback

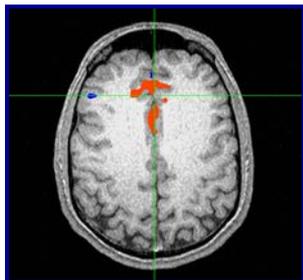
with Stephen LaConte and Pearl Chiu

“Allow yourself to experience emotion”

“Let your thoughts wander away”



“Use the script you have written to recall as many details surrounding that event as possible.”



Individual participant

Sample Script:

“You never know where the bullets are coming from— over here, over there, coming overhead. Like mortar shells, bombs, artillery. You’re frightened.

Anybody who says they’re not afraid, they’re a big...they’re a liar, you know. What I was trying to do was help my buddy. He’d got a bullet through his mouth. I was dragging him back to safety, and that’s when I got hit.

The bomb went off and the shrapnel caught me right in the stomach. Didn’t feel very good. But at the same time, what else can you do?”