Poor Decision Making and Behavioral Dysregulation in Psychopathic Offenders: An Attention-Based Perspective

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Wisconsin State Public Defender's Office

Acknowledgements

- **Wisconsin Department of Corrections**
  - Oakhill Correctional Institution
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  - Taycheedah Correctional Institution
  - Oshkosh Correctional Institution
  - Dodge Correctional Institution
  - Fox Lake Correctional Institution
  - Robert E. Ellsworth Correctional Center
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Faculty Collaborators:

John C. Curtin, Kent A. Kiehl, Michael R. Koenigs, Christine L. Larson, Carl Lejuez

University of Wisconsin – Department of Corrections Collaborative Project

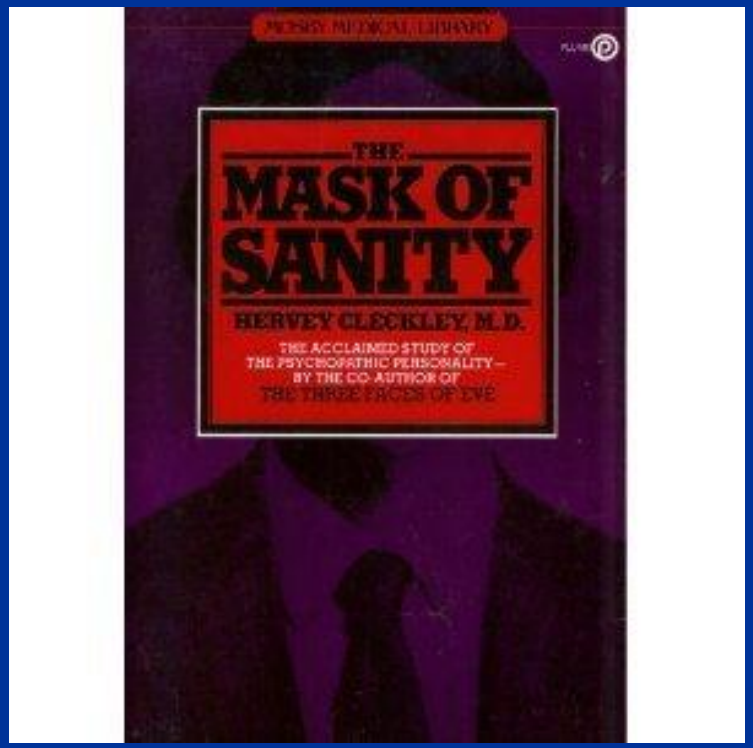
- More than 6000 male and 1000 female offenders interviewed and diagnosed with Hare's Psychopathy Checklist since 1981
- Inmates from minimum, medium, and maximum security prisons - Oakhill, Columbia, Oshkosh, Dodge, Fox Lake, Taycheedah, Robert E. Ellsworth Correctional Institutions
- Roughly 150 journal articles and chapters on psychopathy and other forms of disinhibition:
  - PCL-R, African Americans, Women, Substance Abuse, On-grounds neuroimaging; Theory-based cognitive remediation interventions

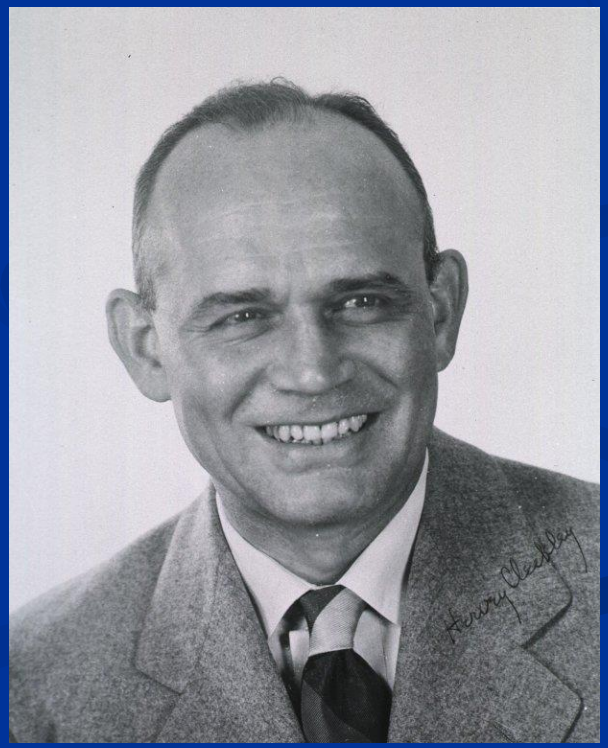
Workshop Plan

- Review the psychopathy construct and distinguish it from other disinhibitory psychopathy using the PCL-R
- Review three major models of the psychopathic deficit:
  - Low Fear / Amygdala Dysfunction Model
  - Somatic Marker / Ventromedial Prefrontal Cortex Model
  - Attention Bottleneck / Impaired Integration Model
- Implications of these psychobiological deficits for the decision making and self-regulation deficits of psychopathic offenders and their treatment

The Psychopathy Construct

- Hervey Cleckley's view: "The Mask of Sanity"





Cleckley's 16 Criteria

1. Superficial charm and good "intelligence"
2. Absence of delusions and other signs of irrational thinking
3. Absence of "nervousness" or psychoneurotic manifestations
4. Unreliability
5. Untruthfulness and insincerity
6. Lack of remorse or shame
7. Inadequately motivated antisocial behavior
8. Poor judgment and failure to learn by experience
9. Pathologic egocentricity and incapacity for love
10. General poverty in major affective reactions
11. Specific loss of insight
12. Unresponsiveness in general interpersonal relations
13. Fantastic and uninviting behavior with drink
14. Suicide rarely carried out
15. Sex life impersonal, trivial, and poorly integrated
16. Failure to follow any life plan

Heterogeneity of Criminal Behavior

- Sub-cultural offenders (peer and parenting problems affecting socialization)
- "Neurotic" offenders (emotion-related problems with socialization; hyper-sensitive to reward, to frustration, to interpersonal slights)
- Inadequate offenders (intellectual problems hampering socialization)
- ***Primary psychopathy*** (intrinsic immunity to socialization)

Mask of Sanity
Abstract Decision Making versus Living

"In complex matters of judgment involving ethical, emotional, and other evaluational factors …he also shows no evidence of a defect. So long as the test is verbal or otherwise abstract, so long as he is not a direct participant, he shows that he knows his way about. He can offer wise decisions not only for others in life situations but also for himself so long as he is asked what he would do (or should do, or is going to do). When the test of action comes to him we soon find ample evidence of his deficiency."

Cleckley, 1976; p. 346

Mask of Sanity
Abstract Decision Making versus Living

"Only when the subject sets out to conduct his life can we get evidence of how little good theoretical understanding means to him…What we take as evidence of his sanity will not significantly or consistently influence his behavior"

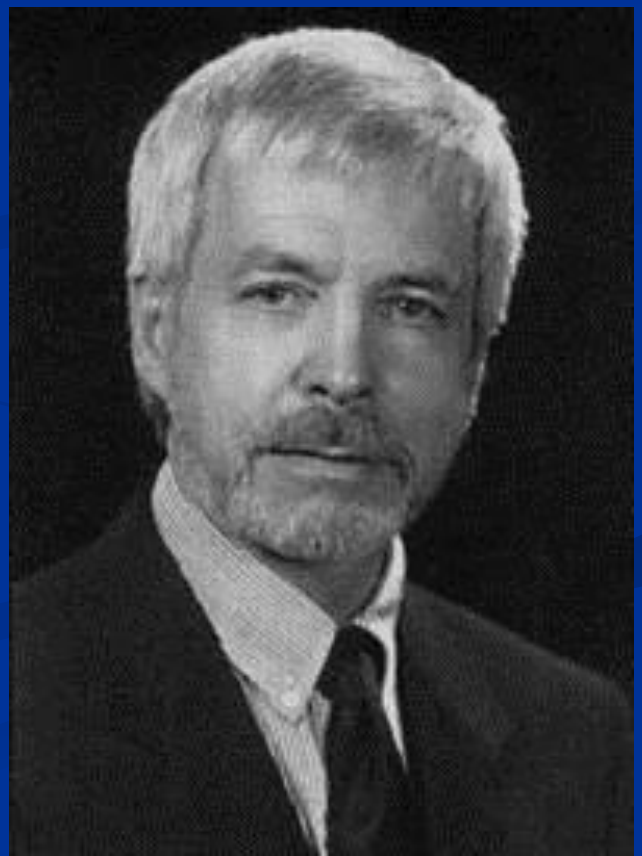
Cleckley (1976, p. 385)

Cleckley's (1976) Hypothesis

- The psychopath "has a serious and subtle abnormality or defect at deep levels disturbing the integration and normal appreciation of experience…" (p. 388)

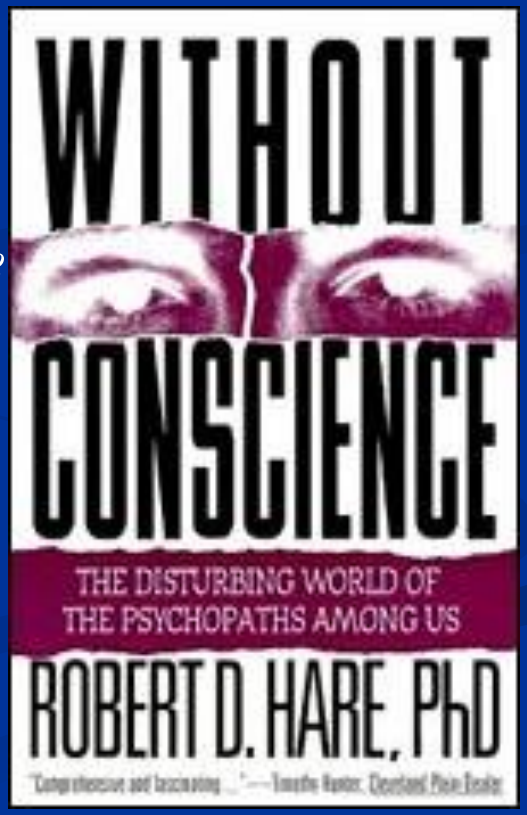
Development of Hare's Psychopathy Checklist

- Psychopathy Assessment – history
- Personality & Individual Differences
  - 1980 publication; conference bet
- Criminal Justice & Behavior, 1996
  - Hare Psychopathy Checklist



Hare's "Without Conscience"

Psychopaths are:
egocentric, arrogant, deceitful,
shallow, impulsive individuals
who callously use, manipulate and prey on
others with no sense of shame, guilt, or remorse



PCL-R SCORESHEET

Subject: _____ TOTAL SCORE: _____/_____
Date: _____ Prorated score: _____/40
Rater: _____ Prototypicality: _____ (# of 2s)

Item:	Score:			
1. Glibness/ superficial charm	0	1	2	omit
2. Grandiose sense of self worth	0	1	2	omit
3. Proneness to boredom/ need for stimulation	0	1	2	omit
4. Pathological lying	0	1	2	omit
5. Conning/ manipulative	0	1	2	omit
6. Lack of remorse	0	1	2	omit
7. Shallow affect	0	1	2	omit
8. Lack of empathy	0	1	2	omit
9. Parasitic lifestyle	0	1	2	omit
10. Poor behavioral controls	0	1	2	omit
11. Promiscuous sexual behavior	0	1	2	omit
12. Early behavior problems	0	1	2	omit
13. Lack of realistic long-term goals	0	1	2	omit
14. Impulsivity	0	1	2	omit
15. Irresponsibility	0	1	2	omit
16. Failure to accept responsibility for actions	0	1	2	omit
17. Many marital relationships	0	1	2	omit
18. Juvenile delinquency	0	1	2	omit
19. Poor risk for conditional release	0	1	2	omit
20. Criminal versatility	0	1	2	omit

Reliabilities (2nd Edition of Manual)

Internal

Alpha

Male offenders	.84
Female offenders	.82

Interrater

Male offenders

ICC	.93

Female offenders

ICC	.97

The PCL-R: Factor Structure

Factor 1
(Interpersonal/Affective)

- Glibness/superficial charm
- Grandiose sense of self-worth
- Pathological lying
- Conning/manipulative
- Lack of remorse/guilt
- Shallow affect
- Callous/lack of empathy
- Failure to accept responsibility for own actions

Factor 2
(Behavioral/Lifestyle)

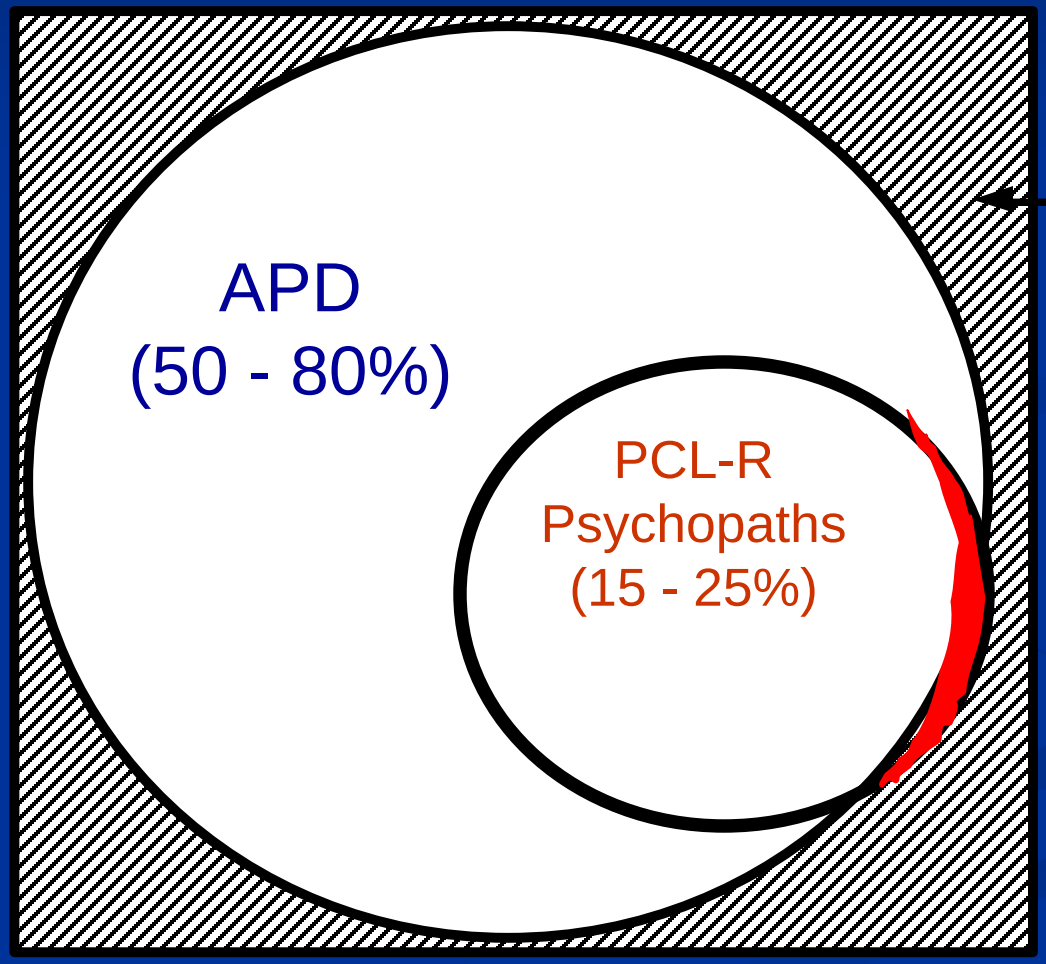
- Need for stimulation
- Parasitic lifestyle
- Poor behavioral controls
- Early behavioral problems
- Lack of realistic, long-term plans
- Impulsivity
- Irresponsibility
- Juvenile delinquency
- Revocation of conditional release

Plus: Promiscuous Sexual Behavior, Many Short-Term Marital Relationships, Criminal Versatility

PCL-R and APD: Asymmetric Association

- In forensic populations
  - Base rate for APD is 50-80%
  - Base rate for psychopathy is 15-25%
  - Most psychopaths are APD
  - Most APD are not psychopaths

Psychopathy and APD: Offender Populations



All
Offenders
(100%)

Correlation with Other Assessments

Measure	Factor 1	Factor 2	PCL Total
ASPD	.32*	.63	.54
Cleckley	.80	.65	.80

Psychopathy & the Externalizing Spectrum

Psychopathy *Externalizing*

- Overlapping features: impulsive/irresponsible, conduct disorder, antisocial behavior, substance use disorders, reactive aggression

- Distinctive features: interpersonal distance, emotionally-stable, shallow affect, instrumental aggression

- Distinctive features: emotionally reactive, excessive reward seeking, poor impulse control

Questions?

Psychobiological Models of Psychopathic Behavior

The Low Fear Model

Lykken, 1995
Low Fear Hypothesis

People with primary psychopathy are born with below average levels of fearfulness (a low fear IQ)

The fearlessness of psychopathic individuals makes them difficult to socialize

Lykken, 1957, 1995

The Low Fear Hypothesis: Weak emotion/inhibition

<u>Distal cause</u> <u>Proximal cause</u>

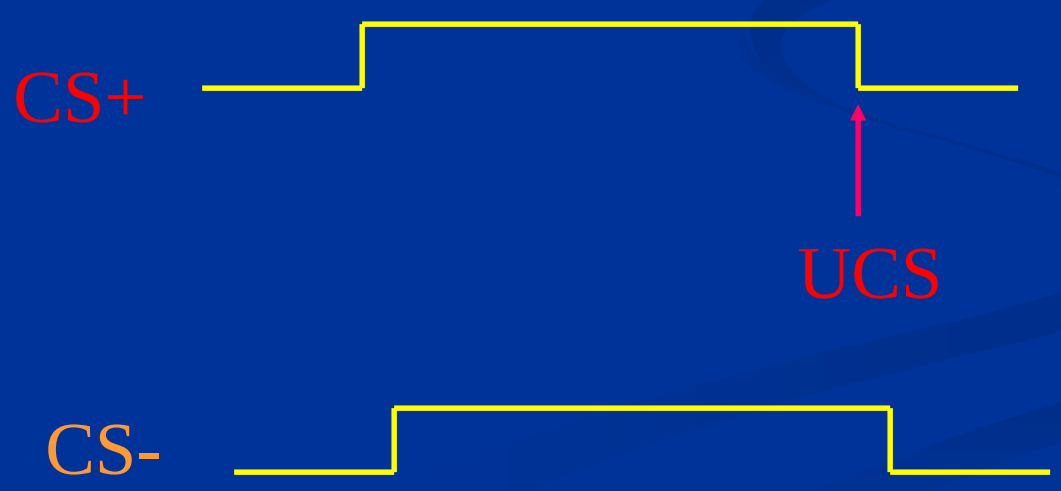
Low fear → Poor fear conditioning → Poor Passive Avoidance

Fear Conditioning

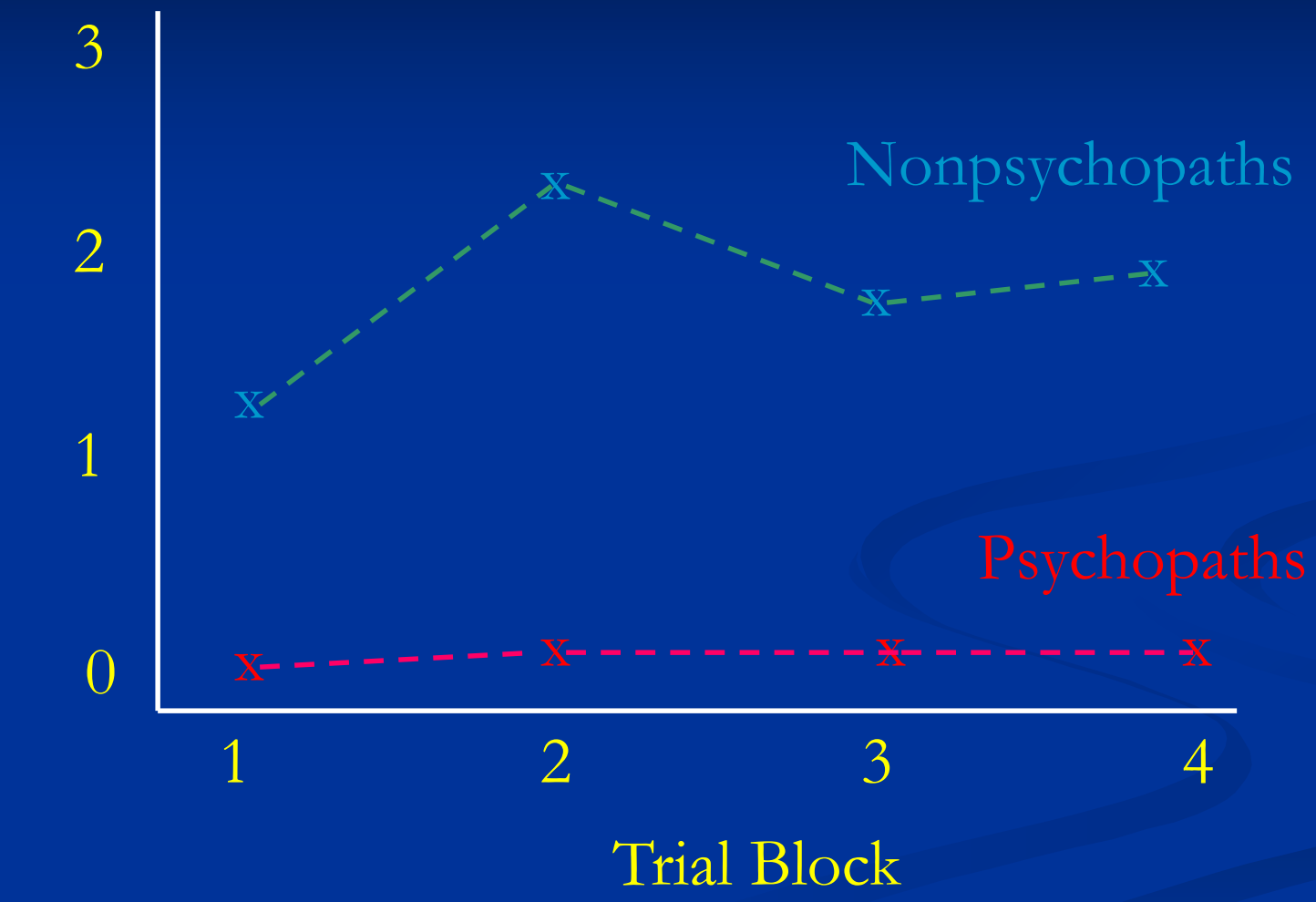
An early study of conditioned "fear" responses in psychopaths:

Hare & Quinn, 1971

- CS+ and CS- were tones, each 10 sec long
- UCS was strong electric shock
- Electrodermal & HR responses recorded



Mean Differential Anticipatory
Skin Conductance Response (μmhos)



Hare & Quinn, 1971

Hare, 1987 (Lykken, 1995)

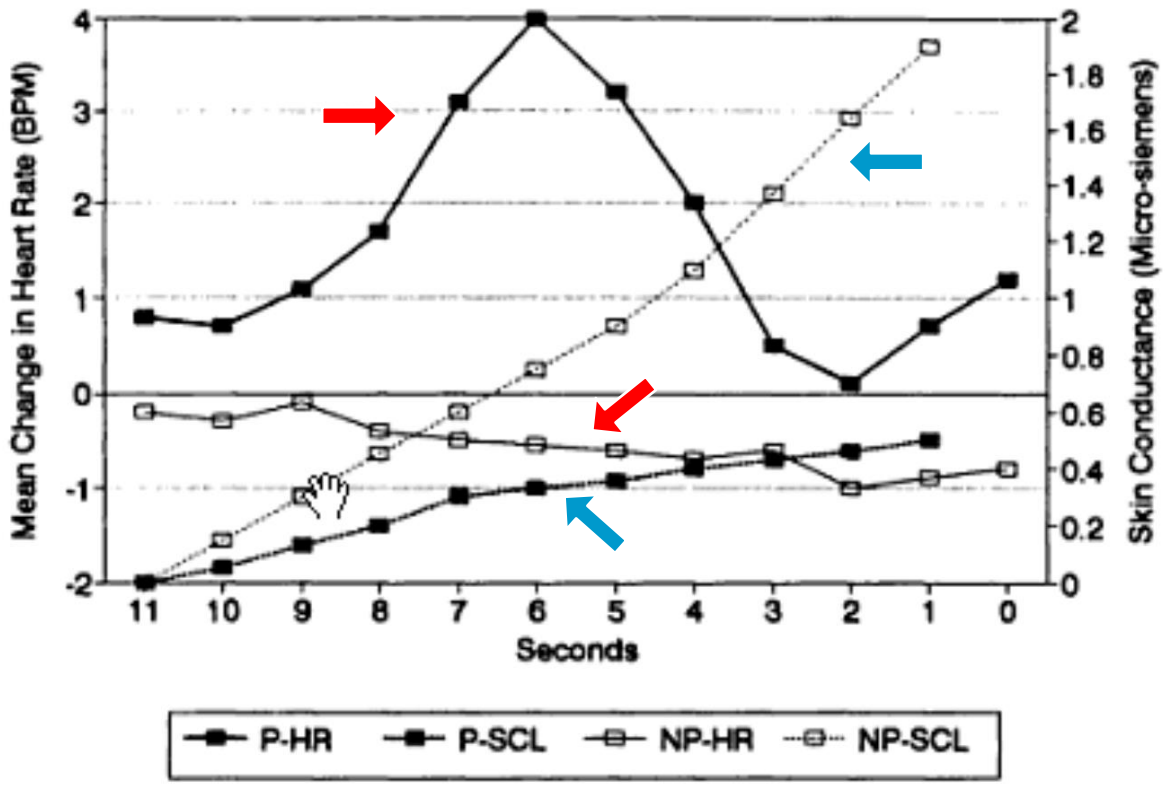
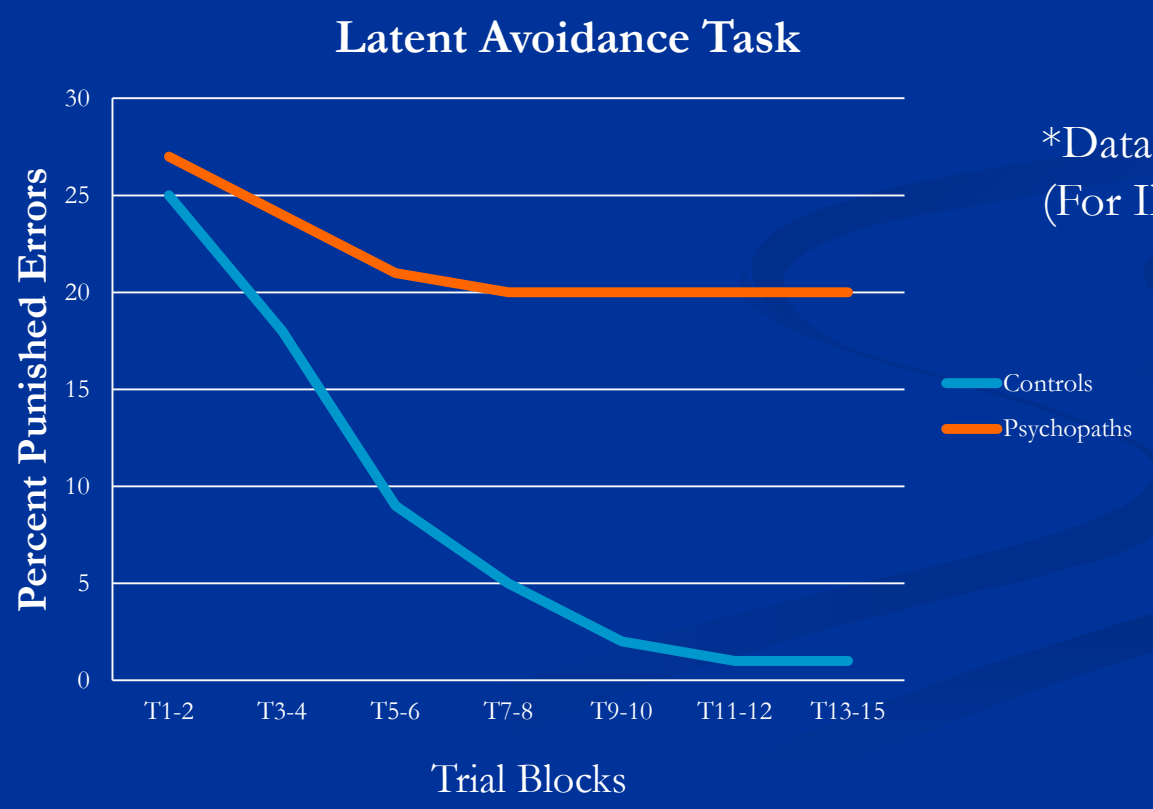


FIG. 11.1. Autonomic changes during countdown (psychopaths vs. nonpsychopaths). The dotted lines show how the skin conductance level (SCL) increases during the Hare countdown, much more for nonpsychopaths than for psychopaths (all subjects are prison inmates). The solid lines show a remarkable increase in heart rate (HR) for the psychopaths during the same countdown (redrawn from Hare, 1987b).

Passive Avoidance

Lykken's Mental Maze Task*

- 4 levers, 20 steps, 15 trials
- Manifest Task: 20 correct responses
- Latent Task: avoid "shocked" choices at each step



*Data Estimated
(For Illustration)

Neuroimaging

Neuroimaging Results

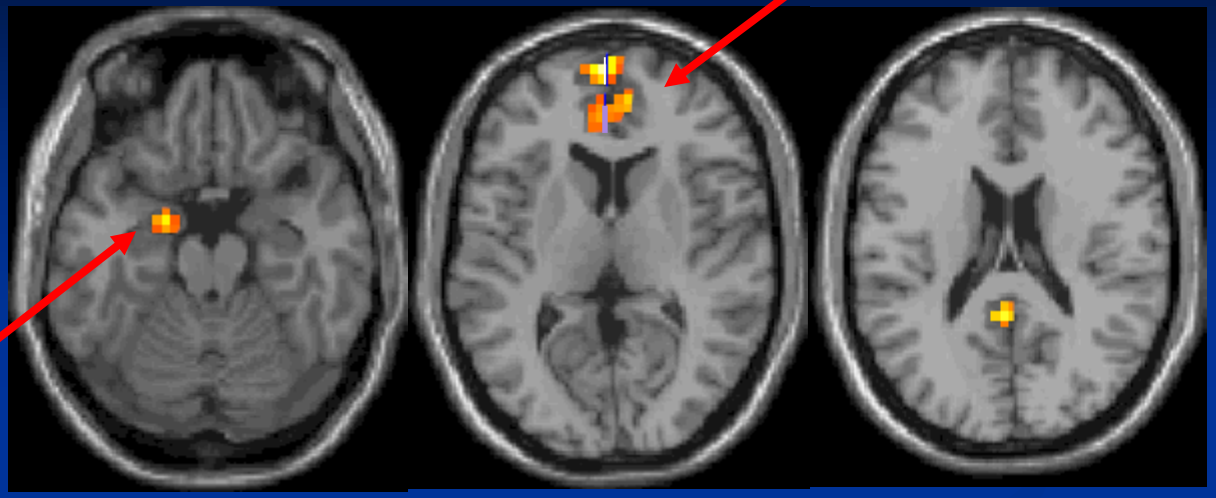
- Kiehl, Smith, Hare, Liddle, & Forster (2002)
- Neutral and negative slides
- Differences between slide types, and between psychopaths and nonpsychopaths
- Examples (Warning)

Emotional slides study

OFC

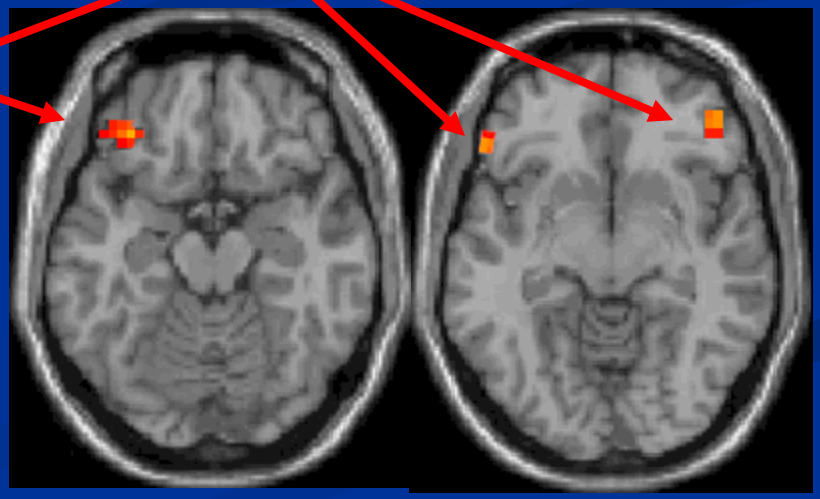
Psychopaths
TOO LITTLE

amygdala



Anterior superior
temporal gyrus

Psychopaths
TOO MUCH



(Subtraction analyses)

Some Possibilities
from R. D. Hare

- Emotional words and pictures have little neurobiological or cognitive impact on psychopaths. The systems that impart or process affect are insufficiently activated.

Some Possibilities
from R. D. Hare

- Psychopaths employ non-limbic cognitive strategies to process emotional material
- Emotional material is "not emotional" for psychopaths
  - More like a second language to them

Low Fear
Summary / Critique

- Most influential theory, great longevity, intuitive
- Lots of evidence for a fear deficit
  - What not explaining?
  - How specific to fear?
  - What underlies the fear deficit?
  - Implications for treatment?

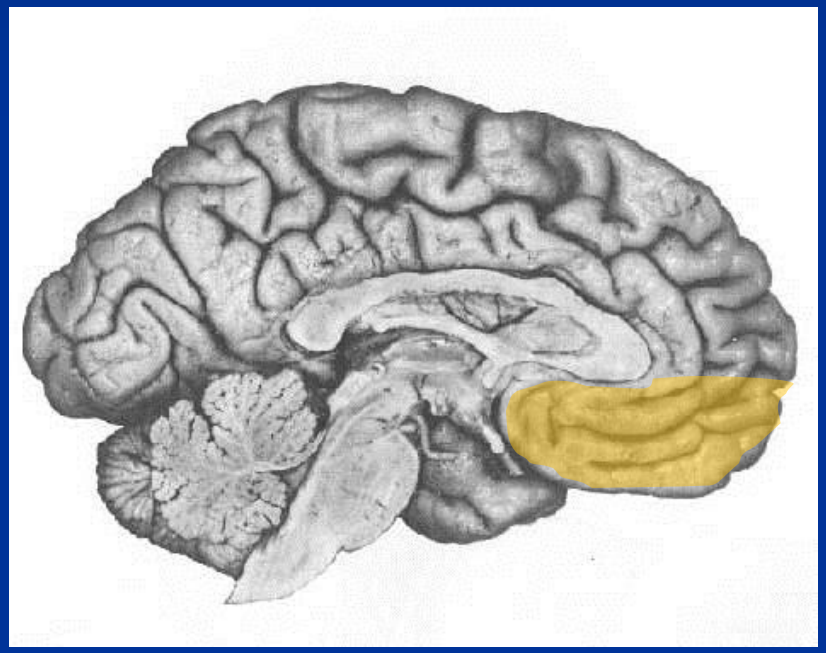
Questions

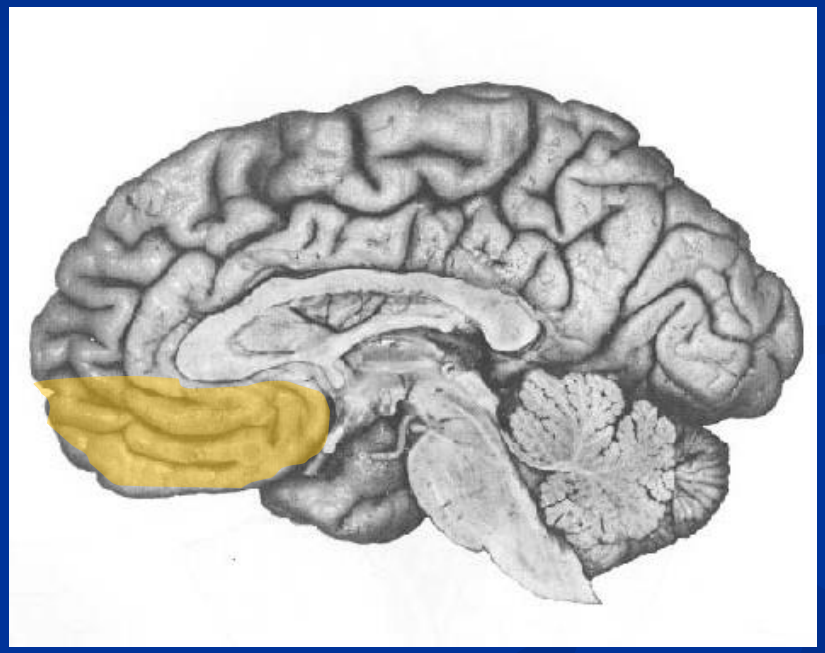
The Somatic Marker Ventromedial Prefrontal Cortex Model

Phineas Gage

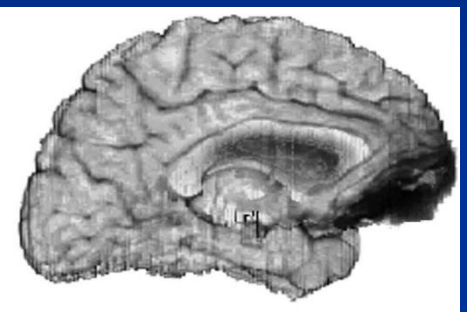
1823 - 1860

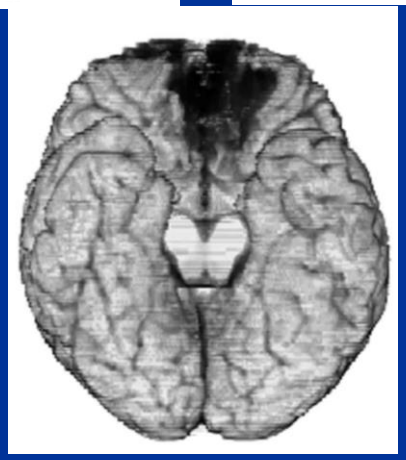
Ventromedial PFC (vmPFC)





Patient EVR: A modern Gage

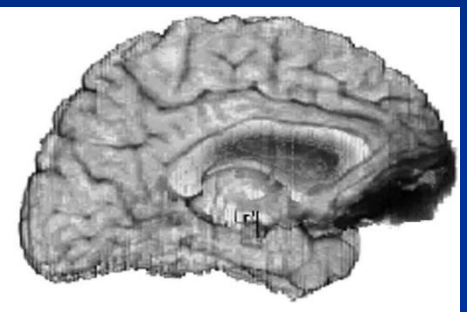


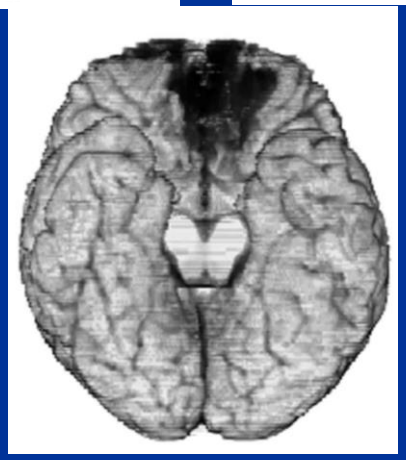


BEFORE LESION

- Chief accountant, supervisor
- Married, good father
- Respected
- Superior intelligence

Patient EVR: A modern Gage





AFTER LESION

- Bankrupt
- Divorced, remarried a prostitute, redivorced
- Estranged from family, friends
- No guilt or empathy
- Poorly modulated anger
- Poor insight
- Superior intelligence

"Pseudopsychopathy"

Psychopathy & vmPFC-related Hypotheses: Implications for Decision Making

Damasio's Somatic Marker Hypothesis Descartes' Error, 1994

Somatic markers: "When the bad outcome connected with a given response option comes into mind, however fleetingly, you experience an unpleasant gut feeling. Because the feeling is about the body, I gave the phenomenon the technical term somatic state ('soma' is Greek for body); and because it 'marks' an image, I called it a marker" (Damasio, 1994, p. 173).

Somatic markers are created during the process of education and socialization through the connection between certain types of stimuli and certain types of affective states.

Once formed, somatic markers guide behavior by focusing attention on the negative or positive outcomes of a given action and then serving "as an automated alarm signal which says: Beware of danger ahead" (p. 173) or "Go for it!" (p. 180) in the case of negative and positive affective states, respectively.

Somatic Marker Hypothesis

"The central feature of the SMH is…that emotion-related signals assist cognitive processes even when they are non-conscious." Bechara et al., 2005 (p. 159)

Somatic markers and, thus, emotions are crucial for efficient decision making (i.e., Descartes' error)

Iowa Gambling Task

Bechara, Damasio, Tranel, & Damasio, 2005

	"Bad" decks		"Good" decks	
	A	B	C	D
Gain per card	$100	$100	$50	$50
Loss per 10 cards	$1250	$1250	$250	$250
Net per 10 cards	-$250	-$250	+$250	+$250

Somatic Marker Hypothesis

Alternative mechanisms for the maladaptive performance of his patients on the card task:

(1) "They are no longer sensitive to punishment as normal subjects are, and are controlled only by reward"

(2) "They have become so sensitive to reward that its mere presence makes them overlook punishment"

(3) "They are still sensitive to punishment and reward but neither punishment nor reward contributes to the automated marking or maintained deployment of predictions of future outcomes, and as a result immediately rewarding options are favored"

Damasio, 1994 (p. 216)

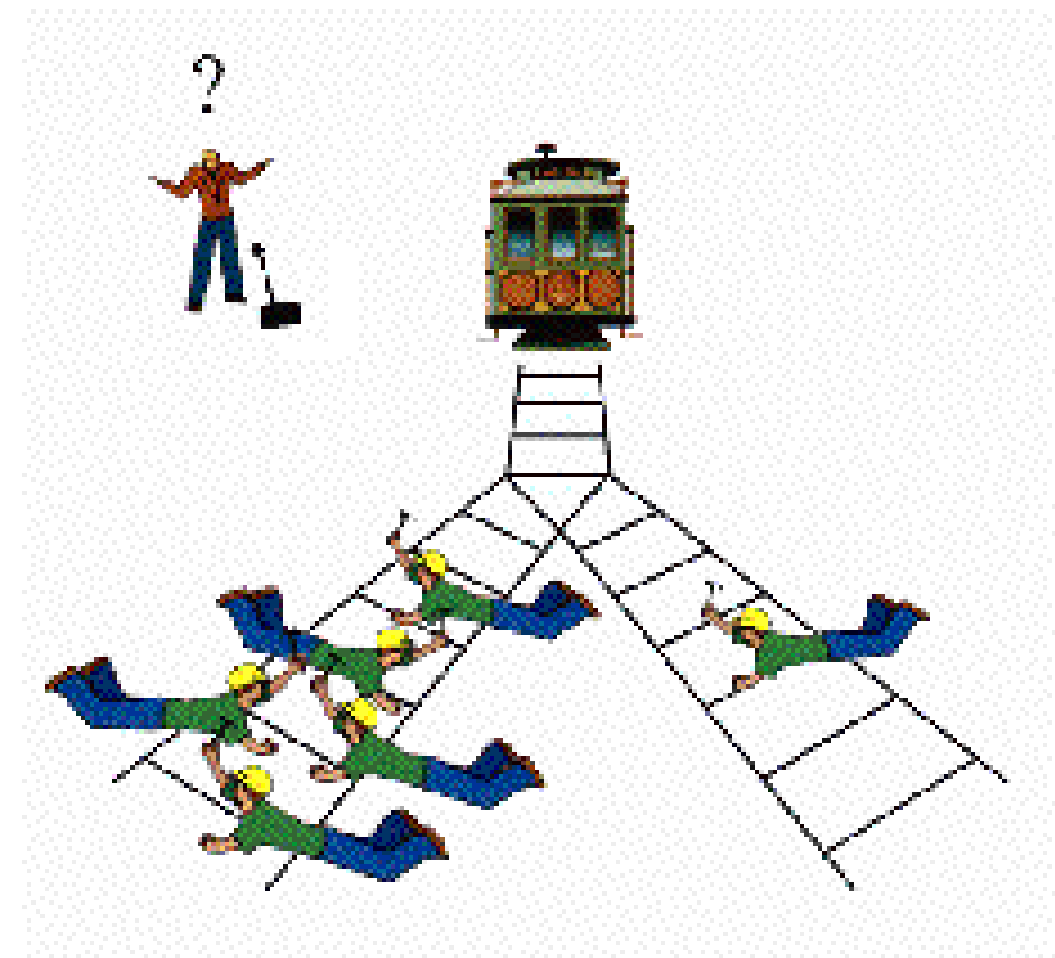
Iowa Gambling Task Performance in Psychopathic Adults

- Schmitt, Brinkley, & Newman, 1999
- Mitchell, Colledge, Leonard, & Blair, 2002
- Lösel & Schmucker, 2004

- *not just psychopathic individuals

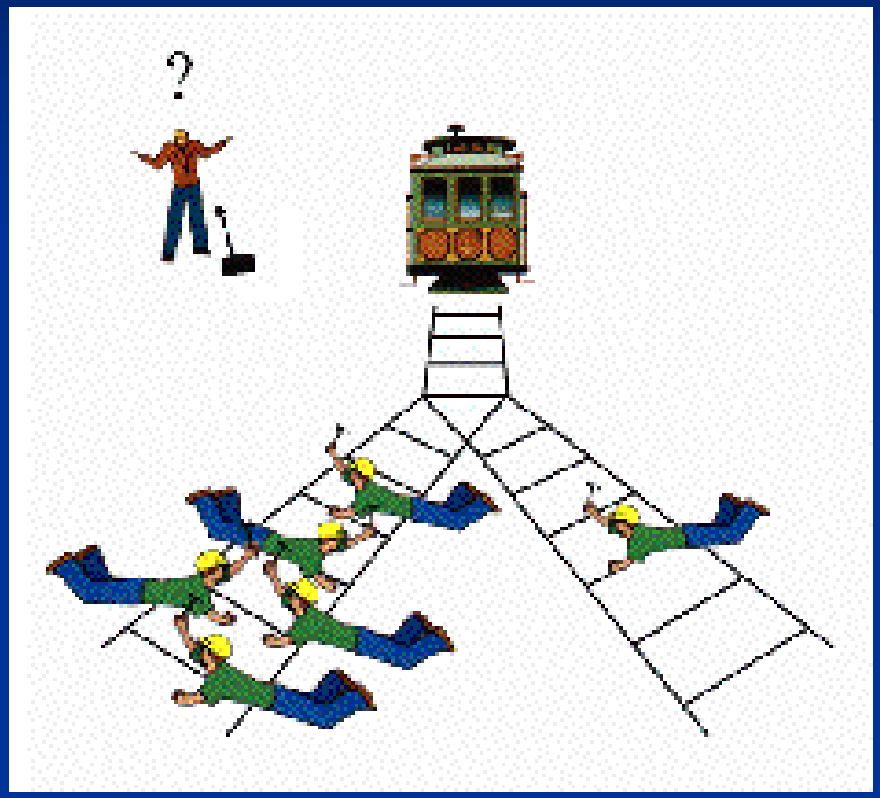
Moral Judgments in Psychopathy & vmPFC Patients

Moral dilemmas: The trolley paradox



Moral dilemmas: The trolley paradox

Moral dilemmas: The trolley paradox



"Personal Harm"

Moral dilemmas: The trolley paradox

- **"Utilitarian"**
  - Only the consequences matter
  - ➡ Push the stranger
- **"Non-utilitarian"**
  - Other considerations matter (e.g., emotion)
  - ➡ Do not push the stranger

Psychopathy & vmPFC-related hypotheses
Koenigs et al., 2011

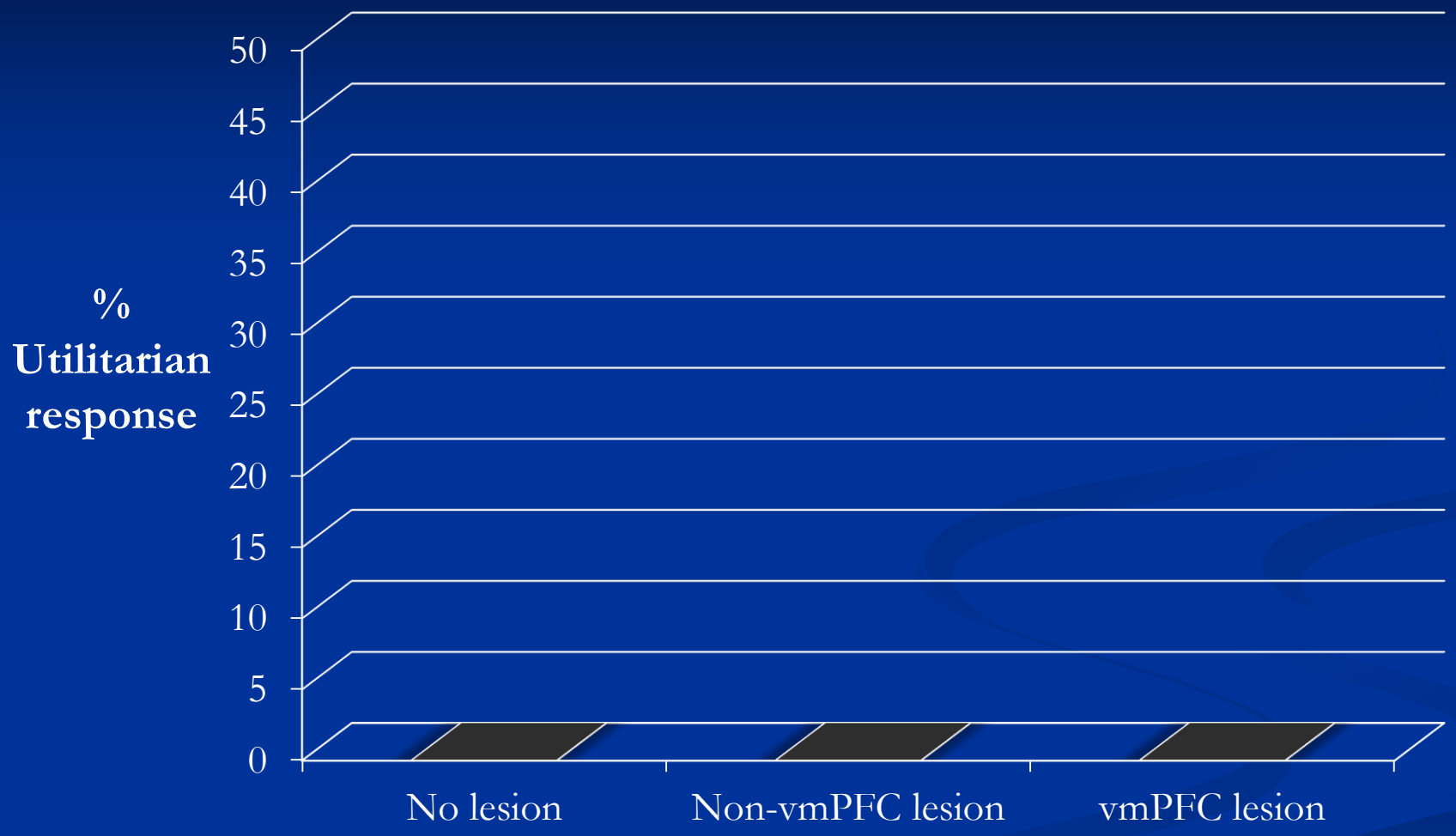
- Laboratory investigations comparing social/emotional decision-making between psychopaths and vmPFC lesion patients

- Hypothesis: Primary, but not secondary, psychopaths will resemble vmPFC lesion patients on tests of social/emotional decision-making

Primary vs. Secondary Psychopathy

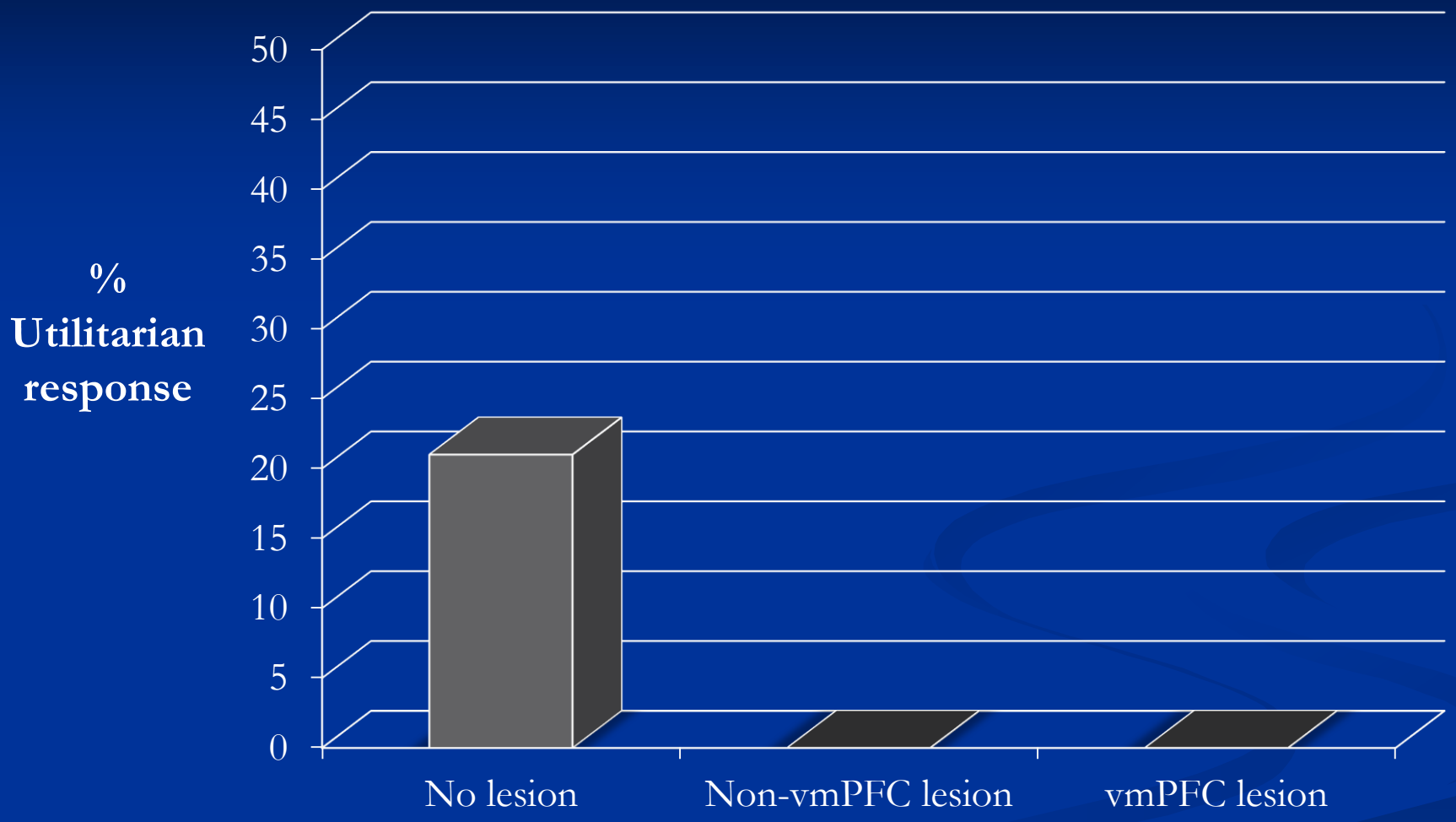
- Primary
  - Dysfunction in affective/attentional mechanisms
  - Low anxiety
  - Consistent neurobiological defect?
- Secondary
  - Consequence of dysregulated affect, weak executive function, adverse environmental or social factors?
  - High anxiety
  - Do not necessarily expect consistent neurobiological defect

Neurological patient data



Koenigs et al., *Nature*, 2007

Neurological patient data



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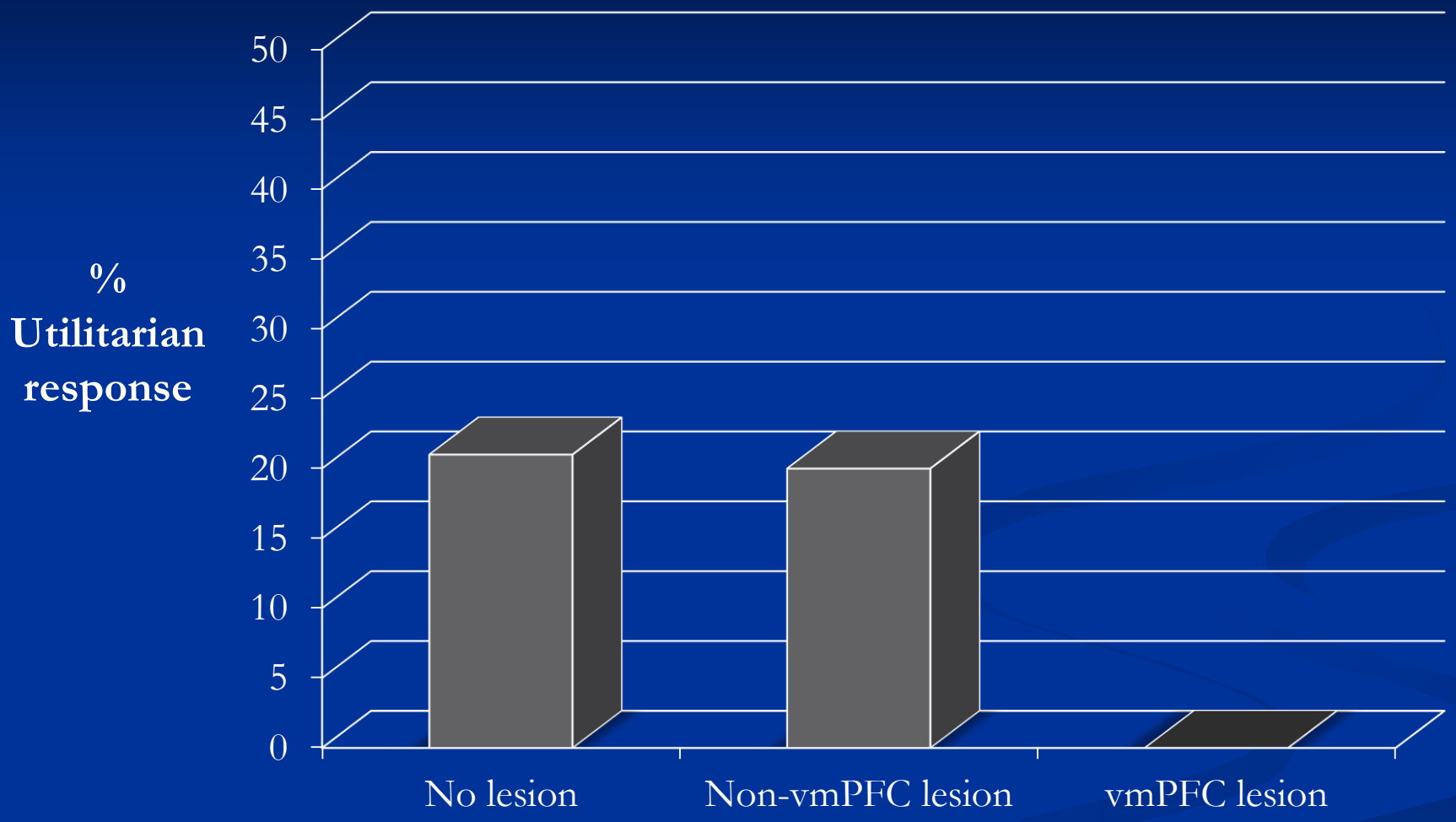

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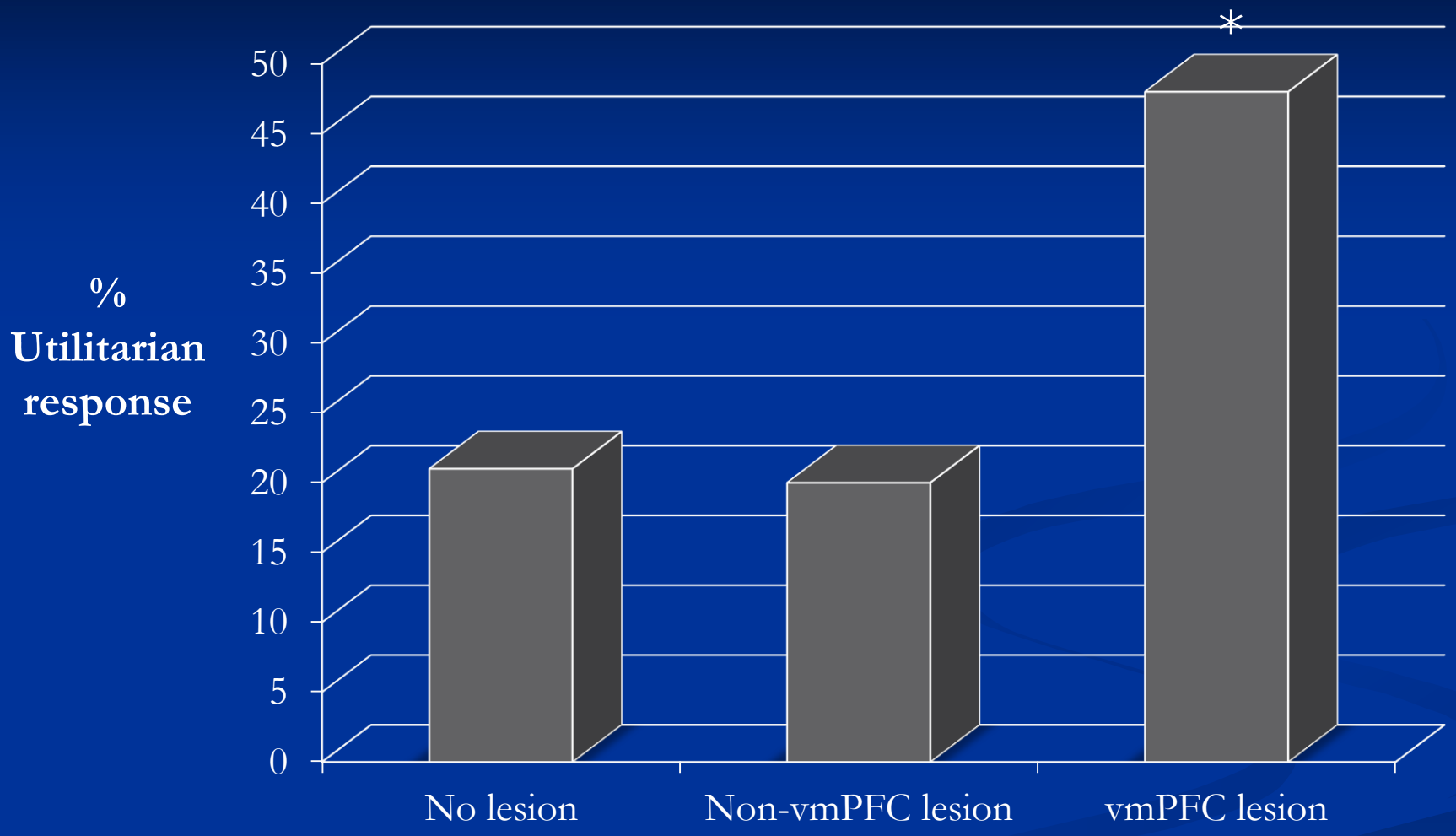
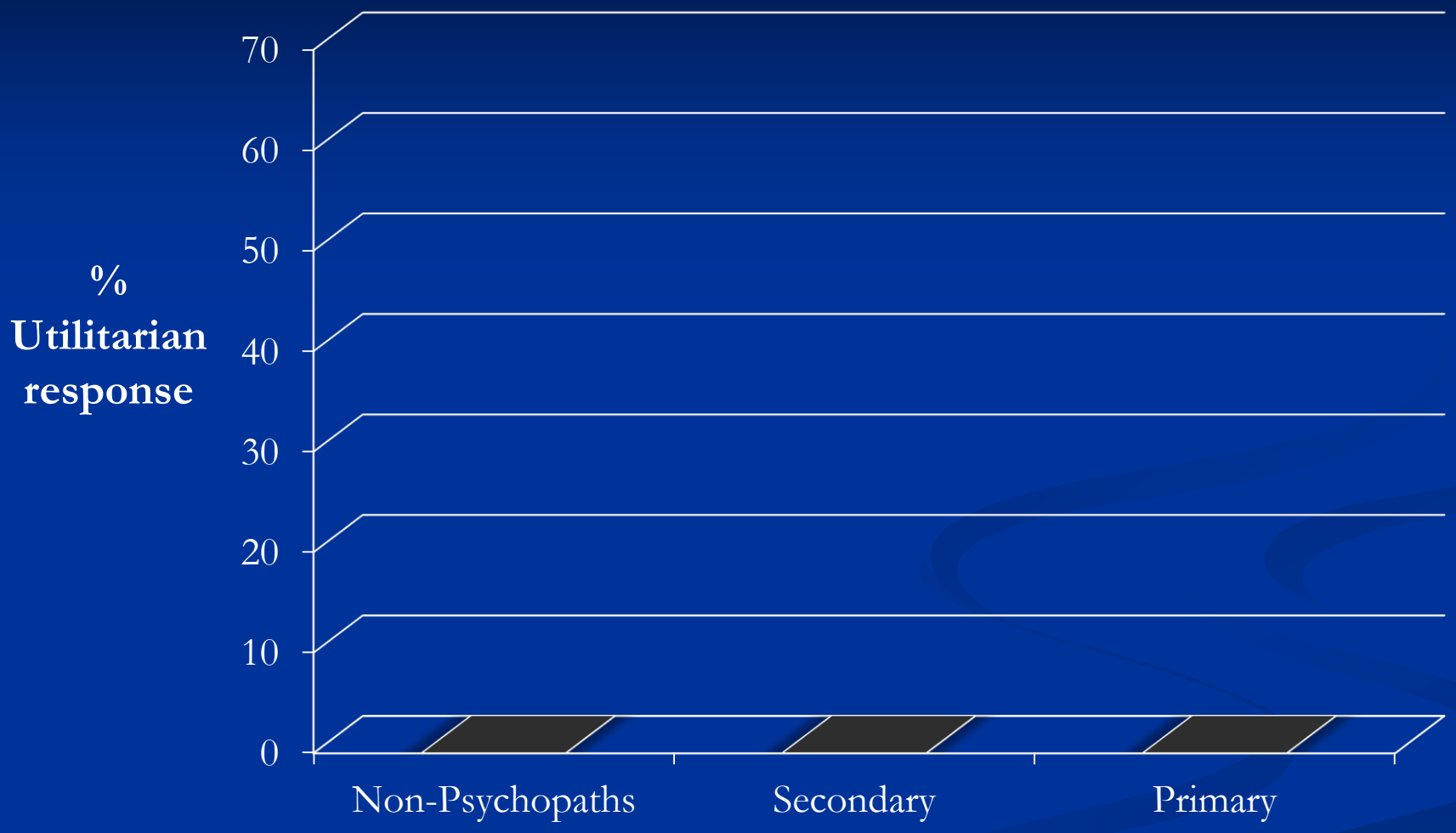


Koenigs et al., *Nature*, 2007

Inmate data



Koenigs et al., *Social, Cognitive, & Affective Neuroscience, 2011*

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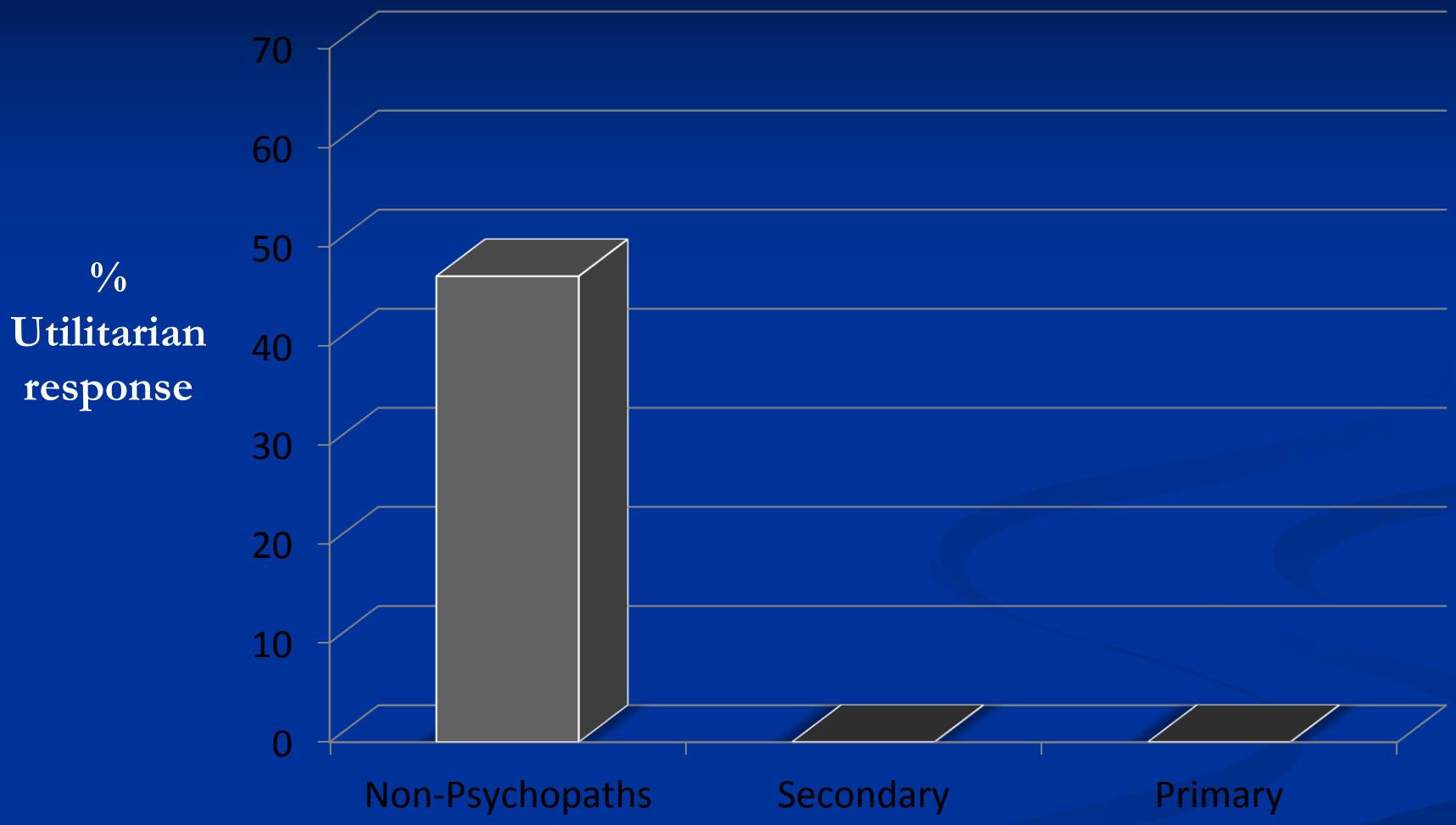

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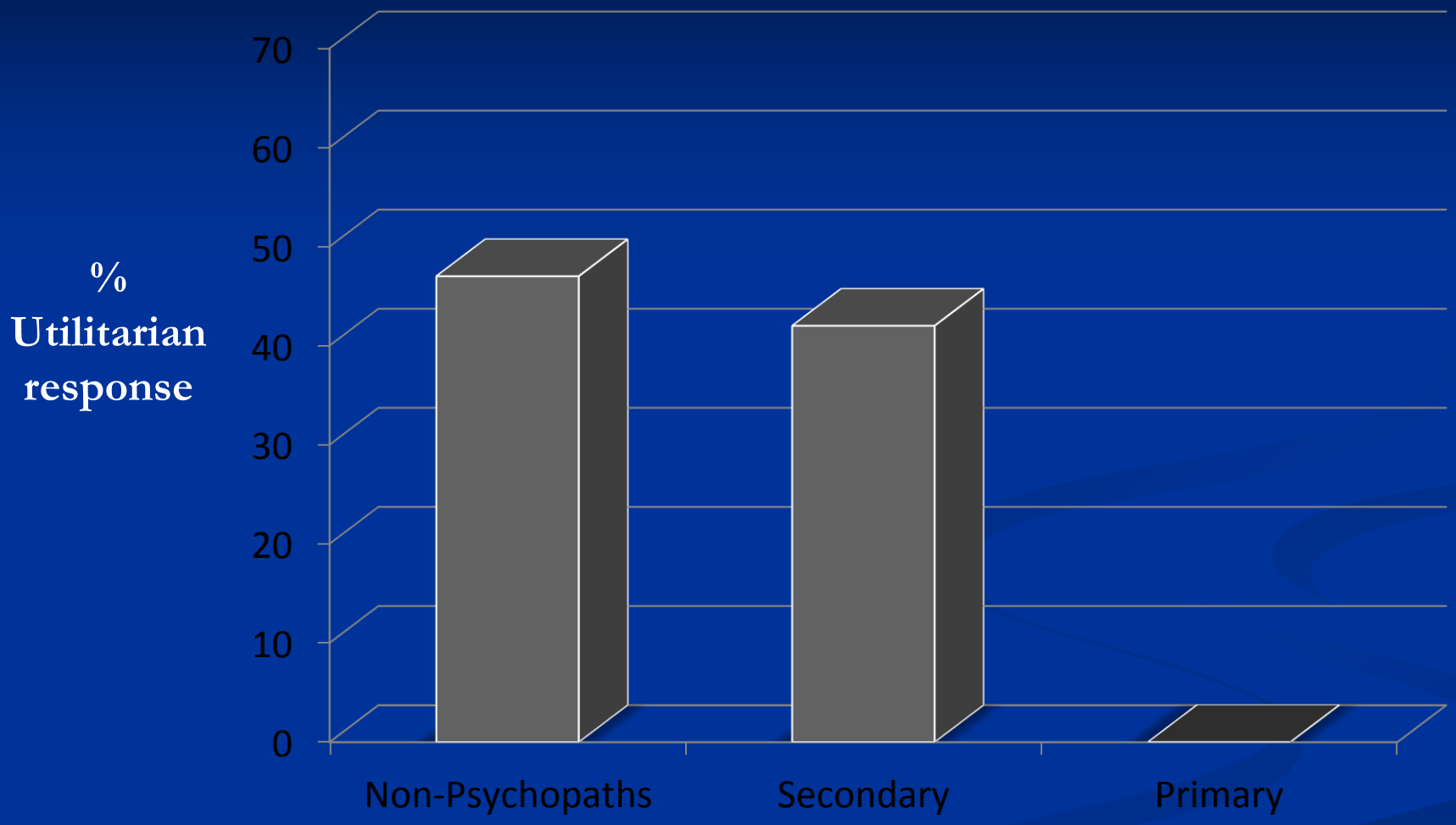

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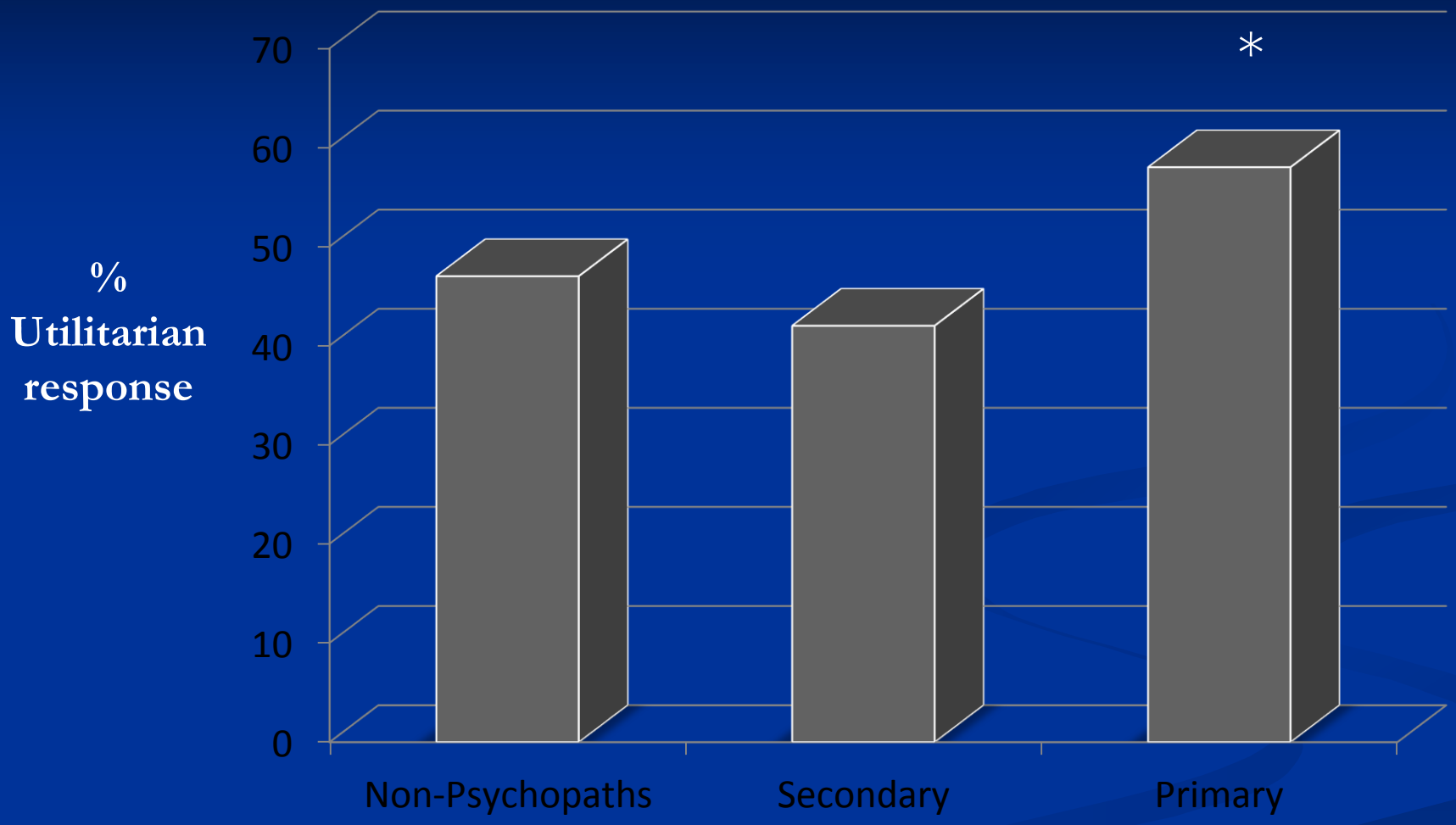

Koenigs et al., *Social, Cognitive, & Affective Neuroscience, 2011*

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Psychopaths Behave Like Stroke Victims

JULY 2, 2010 | ISSUE 46•26

A University of Wisconsin study found that when prisoners exhibiting psychopathic tendencies played decision-making games, they used the same strategies as people who had suffered strokes or brain tumors. What do *you* think?

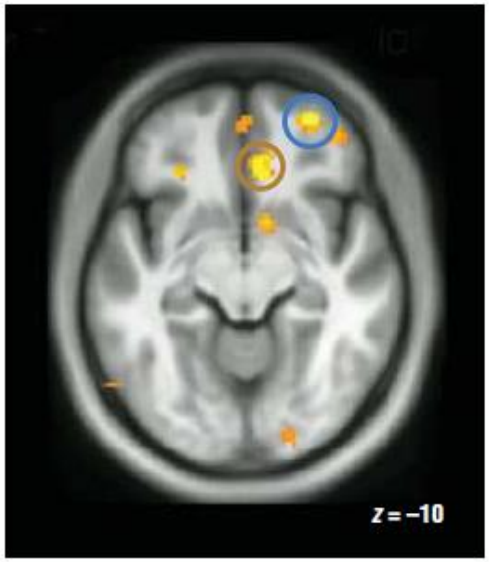
Jenny Blumberg
Systems Analyst
"I've seen enough *Law & Order* and *House* to tell you my personal bullshit theory on this."

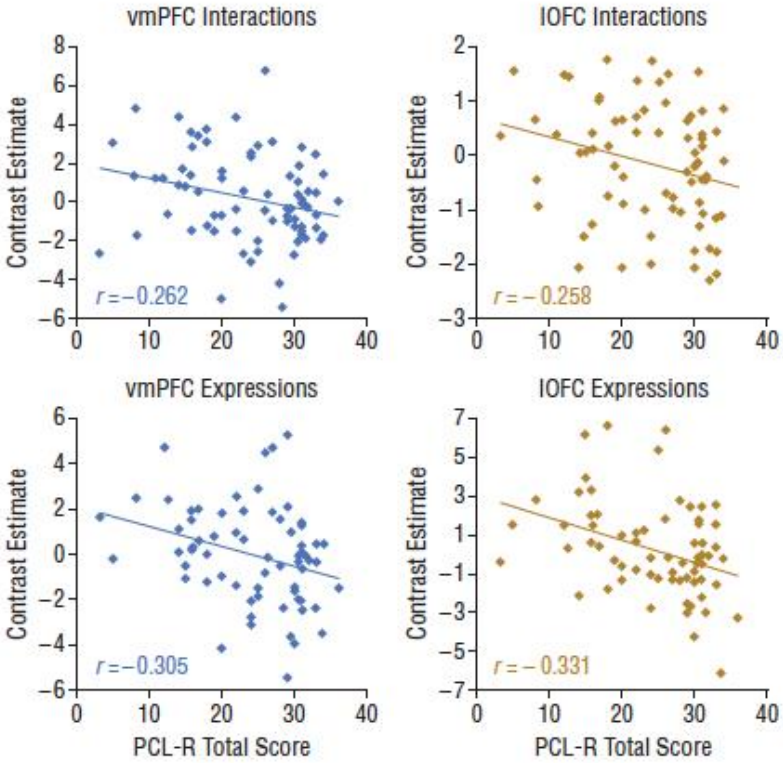
Will Lind
Cost Clerk
"To get a conclusive result you're going to have to test the brains of psychopaths and stroke victims when they're cutting people up."

Kevin Feltes
Doffer
"Stroke victims always try to get the railroads and utilities first, though. Those are the safest bets."

Brain Imaging and Moral Decision Making in Psychopathy

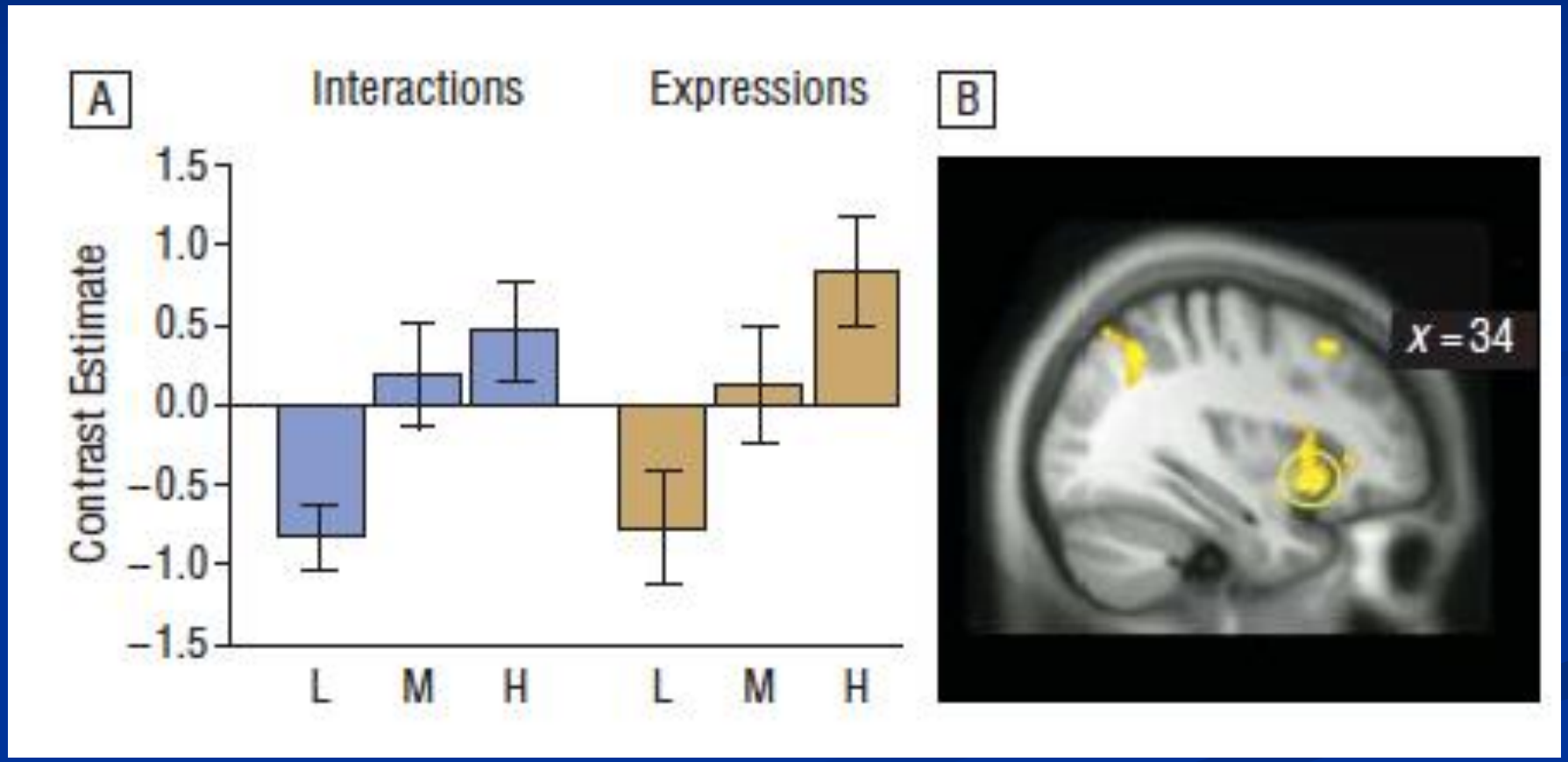
Decety, Skelly & Kiehl, 2013





Decety, Skelly & Kiehl, 2013

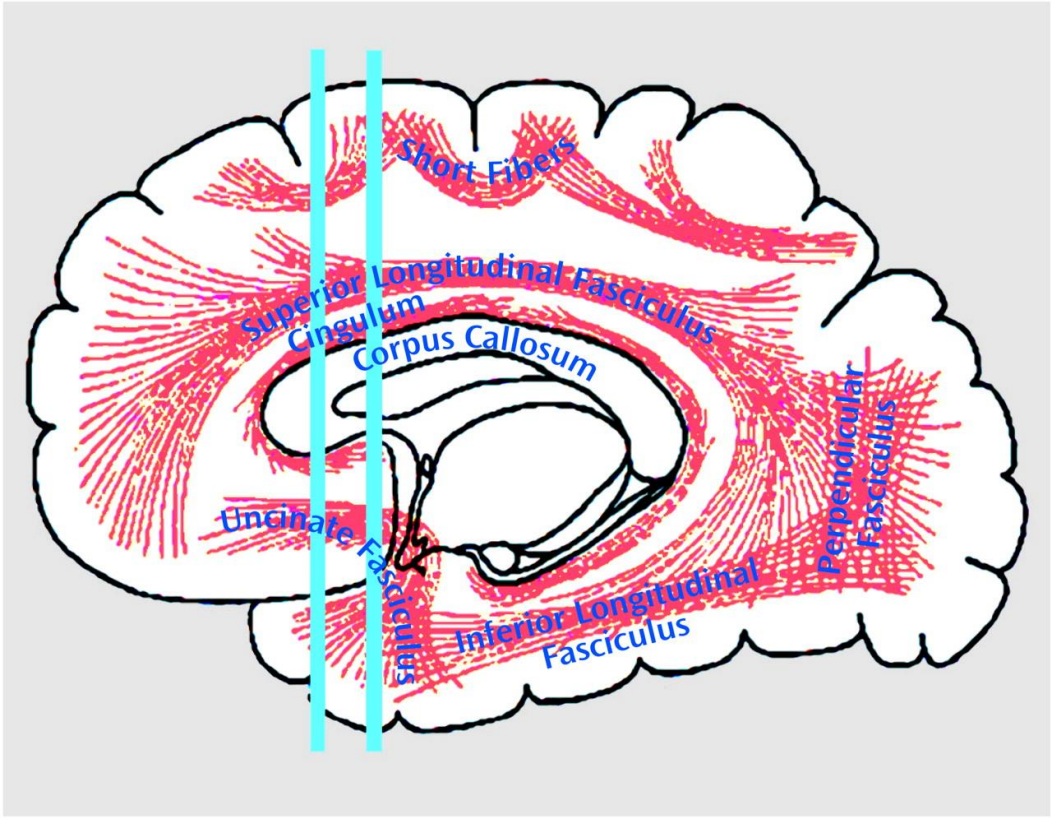
Right Anterior Insular Cortex



*PCL-R differences shown in Figure A are primarily due to Factor 1 scores

Possible Neural Substrates

- Uncinate Fasciculus – white matter tracts between limbic and medial frontal cortex (including amygdala to vmPFC)



Violence Inhibition Mechanism
Blair, 1995

A cognitive mechanism which, when activated by non-verbal communications of distress (i.e., sad facial expression, the sight and sound of tears), initiates a withdrawal response; a schema will be activated predisposing the individual to withdraw from the attack.

*Linked to Amygdala-OFC interactions (Blair, 2008)

Somatic Marker Summary

- Acquired Somatic Markers appear to rely on vmPFC
- Somatic Markers assist decision making by directing attention to key, affective elements of a decision
- Somatic Markers may make some actions difficult to take even when we are not conscious of the reasons
- May guide us away from risky decisions (IGT) and those causing human suffering (VIM), from treating people unfairly, and from proactive aggression
- Such "unconscious" guidance may be essential for regulation when attention is allocated elsewhere

*Note. Powerful alternative to low-fear model

Questions

Attention Bottleneck / Impaired Integration Model

Response Modulation Models

Gorenstein & Newman, 1980

Perseveration

Patterson & Newman, 1993

Reflection versus disinhibition

MacCoon, Wallace & Newman, 2004

Top-down / bottom-up interactions affecting

Context-appropriate balance of attention (CABA)

Baskin-Sommers, Curtin & Newman, 2011

Attention Bottleneck

Bencic & Newman, 2014 (under review)

Impaired Integration

Response Modulation Hypothesis

- Psychopaths are characterized by a ***response modulation*** deficit that interferes with their ability to use secondary or non-dominant information to inform and regulate goal-directed behavior.

- ***Response modulation*** is "a complex process involving temporary suspension of a dominant response set and a brief concurrent shift of attention from the organization and implementation of goal-directed responding to its evaluation." (Patterson & Newman, p. 717)

*example

Relation to Clinical Conceptualizations of Psychopathy

Cleckley's Semantic Deficit Hypothesis

The psychopath "has a serious and subtle abnormality or defect at deep levels disturbing the integration and normal appreciation of experience…"

- Cleckley (1976, p. 388)

Other clinical observations

Shapiro

Neurotic Styles, 1965

- The psychopath is characterized by "an insufficiency of active integrative processes…" which causes him to remain "oblivious to the drawbacks or complications that would give another pause and might otherwise give him pause as well."

  Shapiro (1965, p. 149)

Evaluating Psychopathy
Diagnostic Issues

- Hare's Psychopathy Checklist-Revised (PCL-R)
  - 20 items; scored 0, 1, 2
    - 30 - 40 psychopathic offenders
    - 0 - 20 non-psychopathic controls
- Inmates between the ages of 19 and 45
- Intelligence scores of 70 or greater
- No psychotic disorders or psychotropic medications
- Inmates from minimum, medium, and maximum security prisons
- Groups are matched on age, education, intelligence, anxiety, general performance*
- Gender / Race issues

Card Playing Task

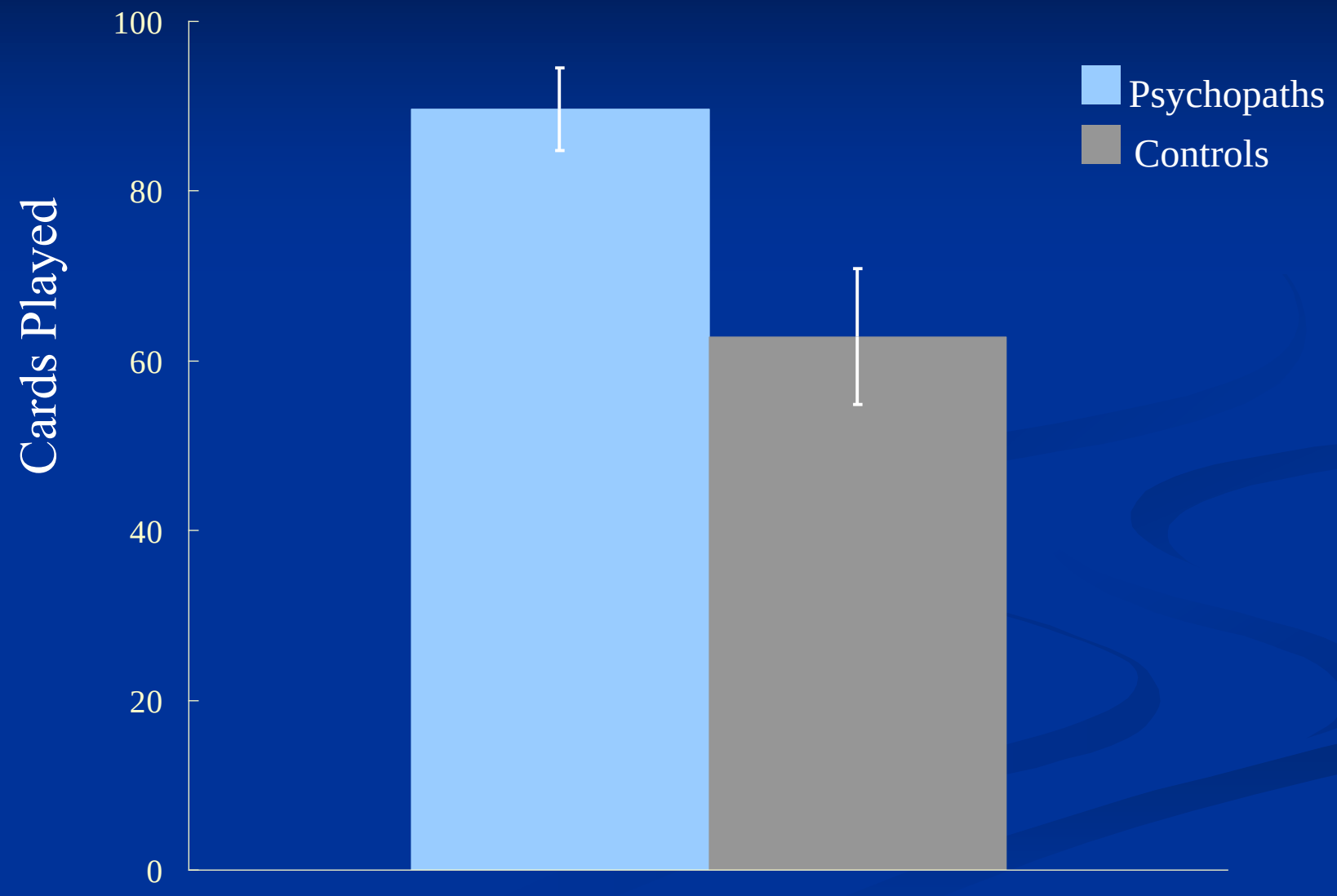
Newman, Patterson & Kosson

Journal of Abnormal Psychology, 1987

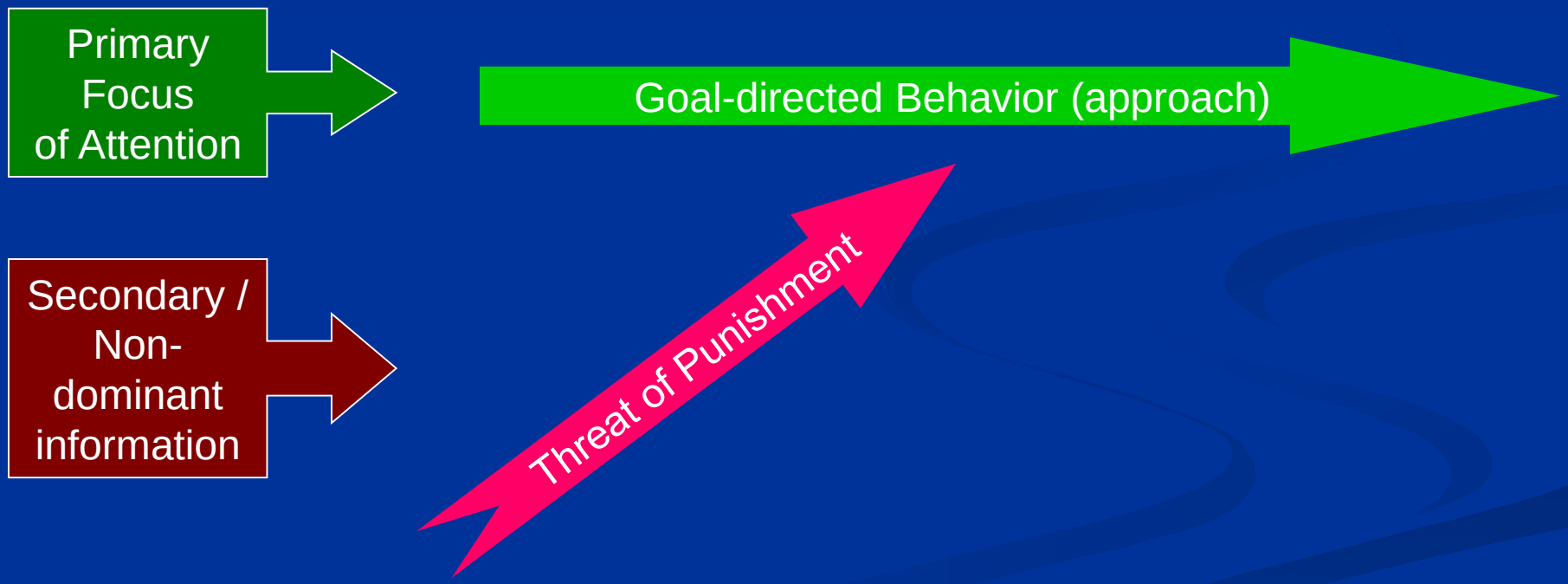
J	Q	J	K	A	K	8	Q	A	K	90%
K	Q	K	2	A	J	A	Q	5	K	80%
4	K	J	A	9	Q	J	3	K	A	70%
Q	J	6	10	K	5	J	J	A	8	60%
A	K	3	J	9	7	2	J	K	4	50%
9	6	J	4	A	9	5	7	Q	J	40%
8	3	2	J	6	A	3	6	10	K	30%
2	8	10	3	K	A	10	8	5	2	20%
Q	8	3	8	2	10	6	9	8	4	10%
3	2	2	5	8	7	4	9	6	7	0%

Card Playing Task

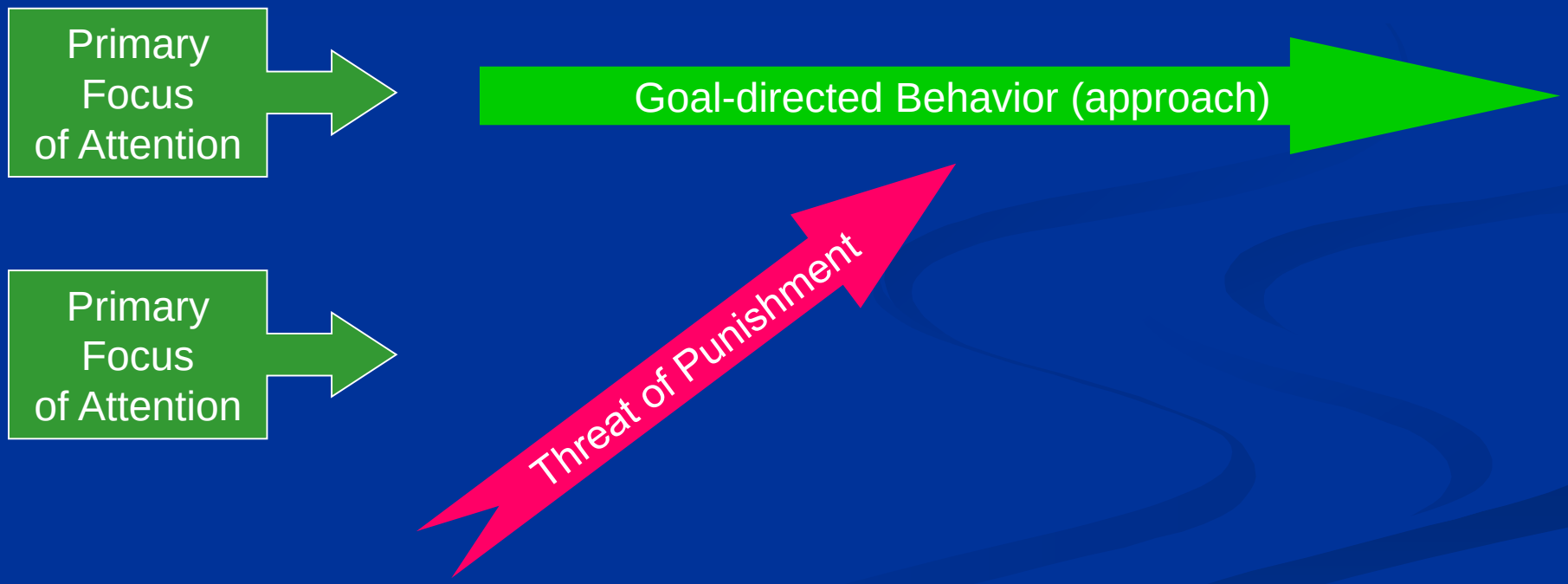
Newman, Patterson & Kosson, 1987



Typical Confounding of Attentional Focus & Motivational Priorities



Un-Confounding
Attentional Focus & Motivational Priorities



General Hypothesis

To the extent that the psychopathic deficit involves impaired integration of secondary information, then:

The principal behavioral, cognitive, affective, and neural correlates of psychopathy will be moderated by their focus of attention (i.e., by altering what is primary and secondary).

Passive Avoidance Learning

(insensitivity to secondary inhibitory cues)

CONDITION

STIMULUS	RESPONSE	REW - PUN
S+	YES	WIN
	NO	---
S-	YES	LOSE
	NO	---

Newman & Kosson, 1986

CONDITION

STIMULUS	RESPONSE	REW - PUN	PUN ONLY
S+	YES	WIN	---
	NO	---	LOSE
S-	YES	LOSE	LOSE
	NO	---	---

Newman & Kosson, 1986

1 second; inter-
trial interval

86

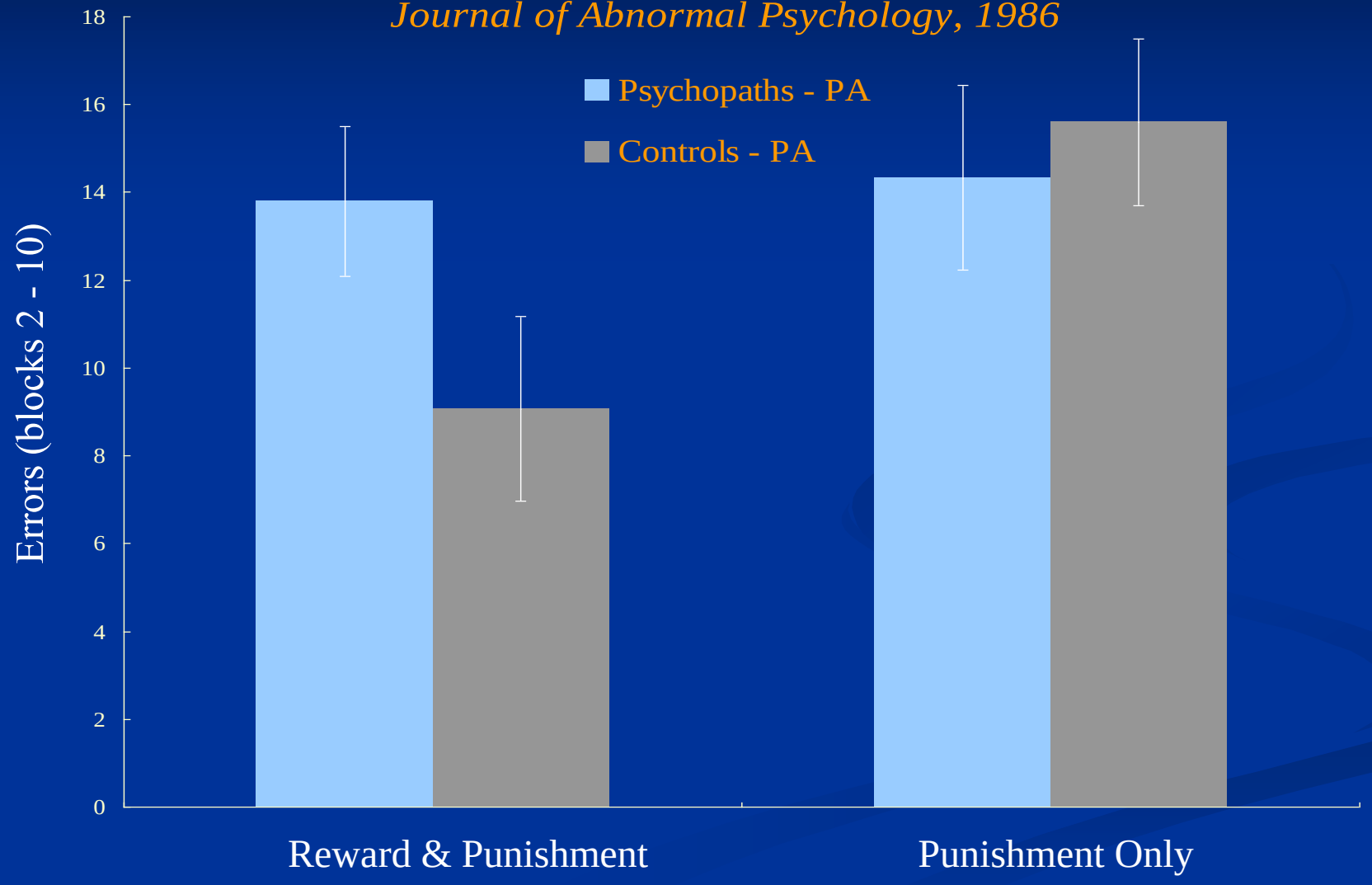
3 seconds; stimulus presentation
& possible response

Correct,
You win 10 cents!

1 second, response feedback
(high/low tone; poker chips)

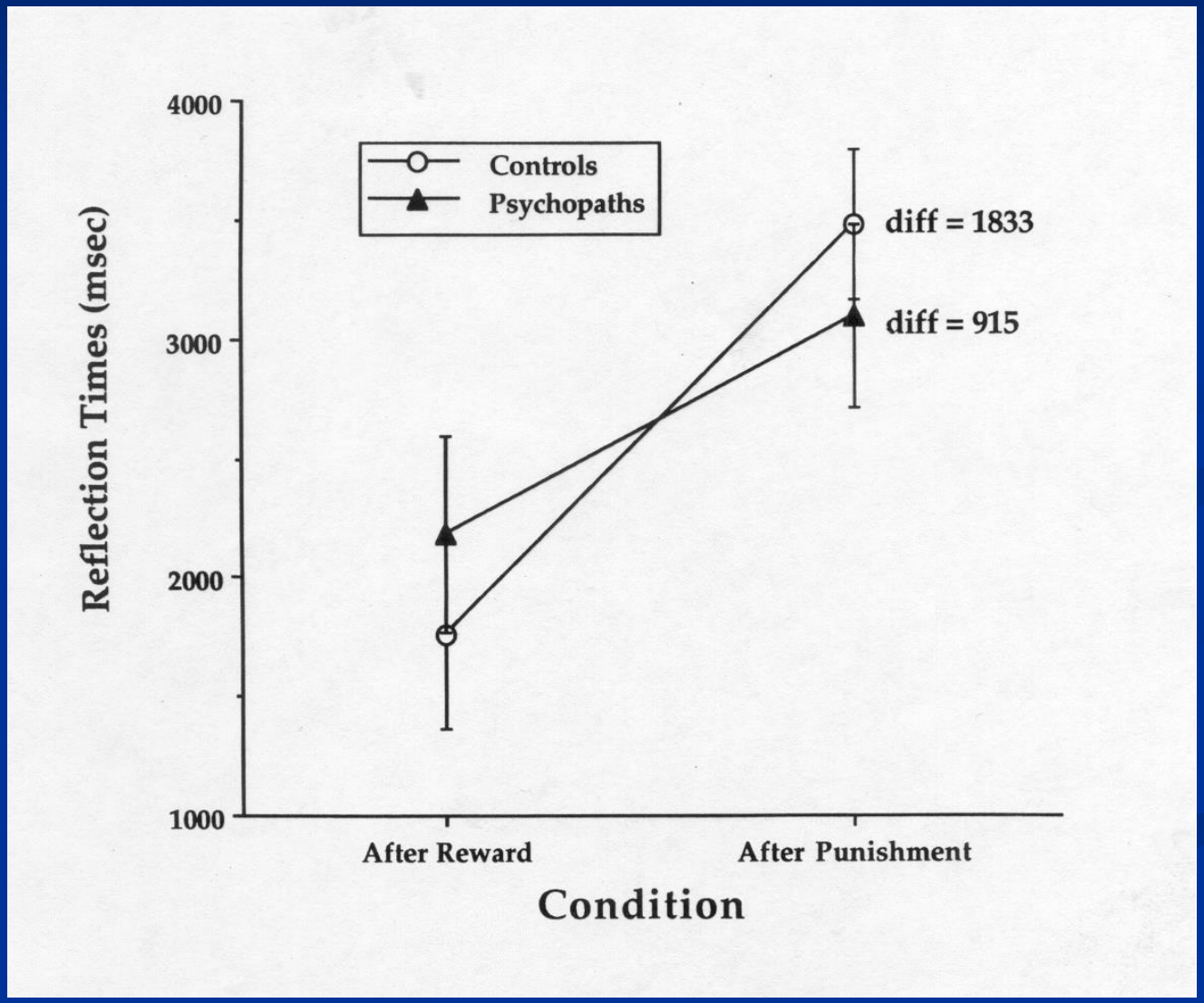
1 second; inter-
trial interval

Passive Avoidance Learning
Newman & Kosson
Journal of Abnormal Psychology, 1986



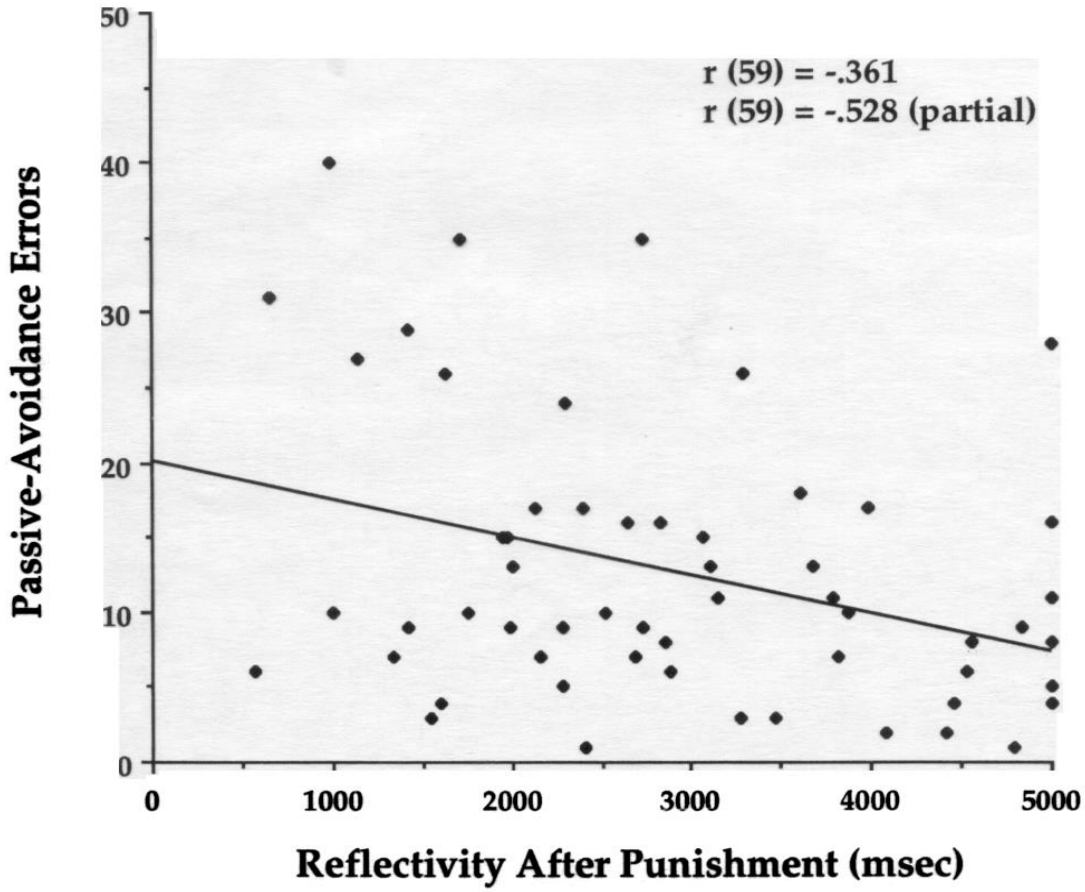
Response Modulation and Reflectivity

Newman et al., 1990



Response Modulation and Reflectivity

Newman et al., 1990



Newman, Patterson, Howland, & Nichols (1990)

Response Modulation Model

Dominant Response Set

(allocation of attentional & motor resources)

Arousal

("automatic" call for processing & increase in "arousal")

Response Modulation

(Reflection)

(Disinhibition)

Information Processing Consequences

(predictive cues)

(effective responses)

Fear-Potentiated Startle under Threat-focus and Alternative-focus Conditions

(insensitivity to secondary threat/fear cues)

Newman, Curtin, Bertsch, & Baskin-Sommers

Biological Psychiatry, 2010

Baskin-Sommers, Curtin, & Newman

Psychological Science, 2011

Newman, Curtin, Bertsch, & Baskin-Sommers
Biological Psychiatry, 2010

Participants viewed a series of letter cues, each presented for 400ms in three conditions

In all conditions, letter cues were either UPPER or lower case and colored red or green.

In all conditions, electric shocks were administered on some trials following red letters (20%), but never to green letters (0%).

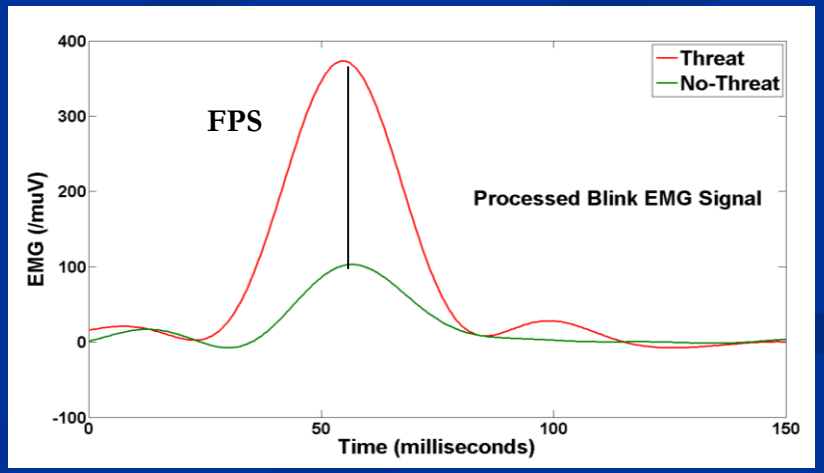
= Startle Probe = Shock

3 CONDITIONS	n	B	n	B	c	b	. . .
Threat focus Color	Threat	NoThreat	Threat	Threat	NoThreat	NoThreat	
Alternative focus/ Case (low load)	Lower	Upper	Lower	Upper	Lower	Lower	
Alternative focus/ 2-back (high load)	NoMatch	NoMatch	Match	Match	NoMatch	Match	

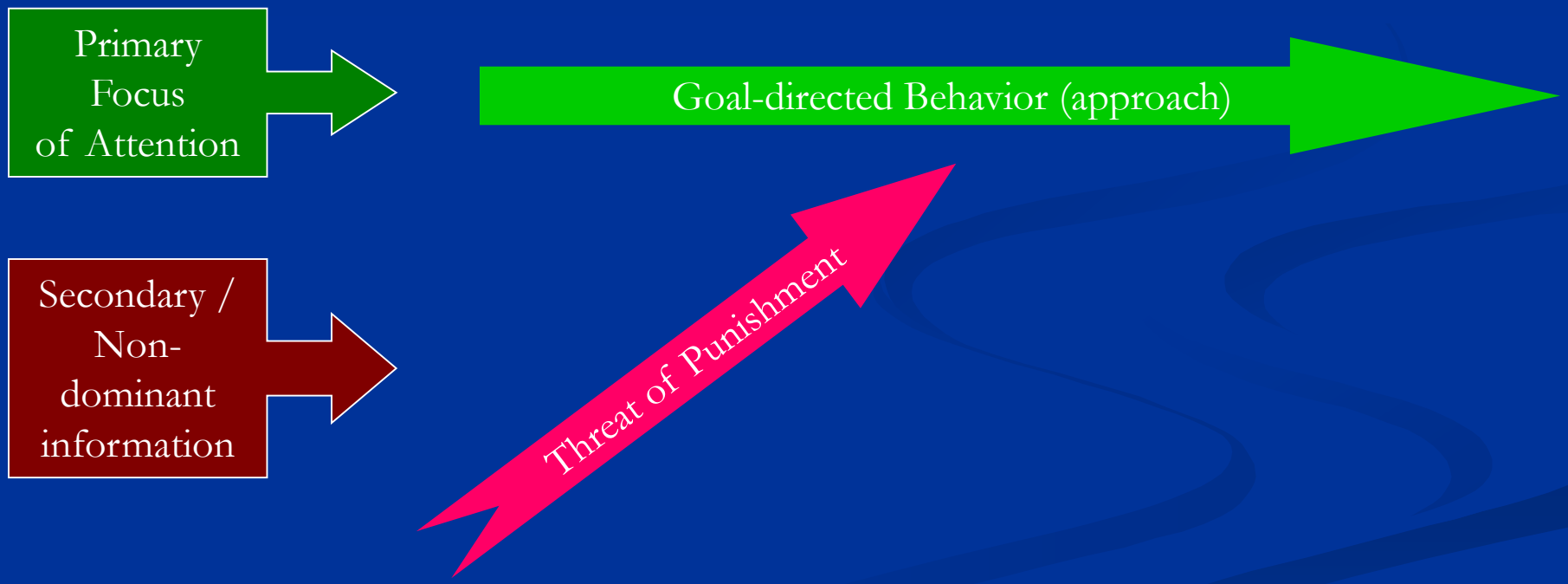
Fear Potentiated Startle

A sudden loud noise elicits a startle response that can be measured using eye-blink magnitude

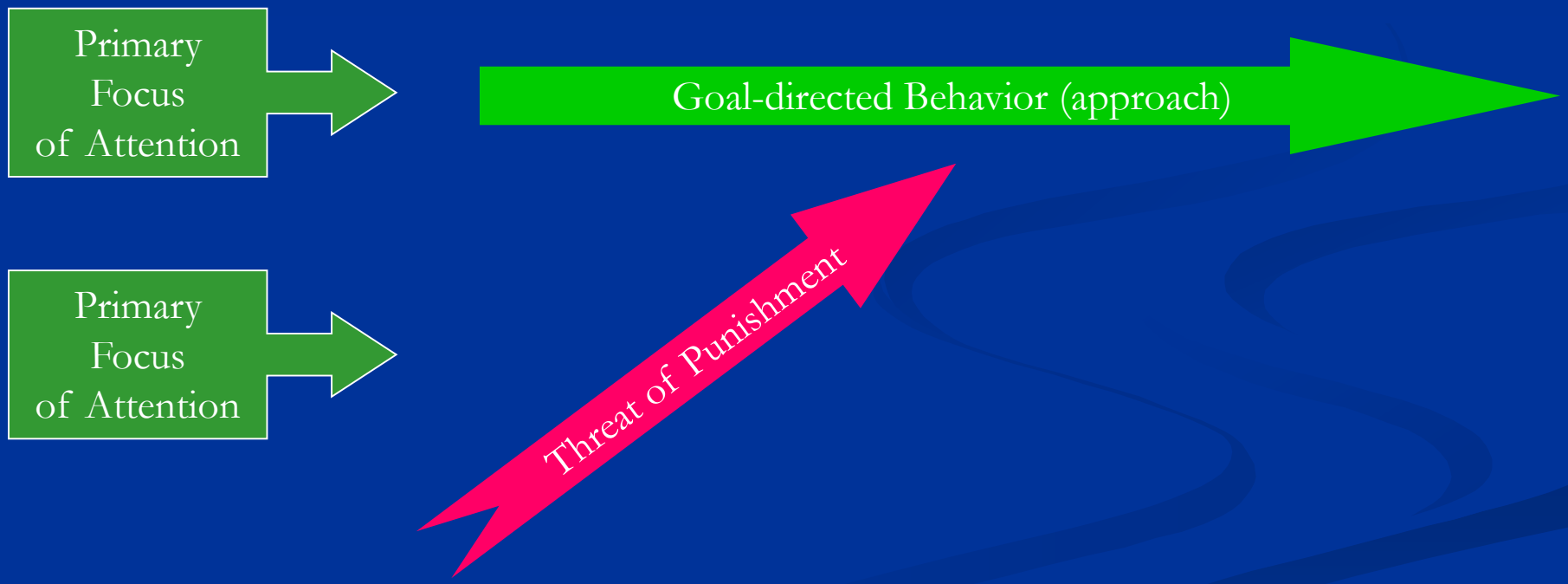
A person's fear response may be measured using: Fear Potentiated Startle (FPS) = Threat Blink – Non-threat blink



Typical Confounding of Attentional Focus & Motivational Priorities



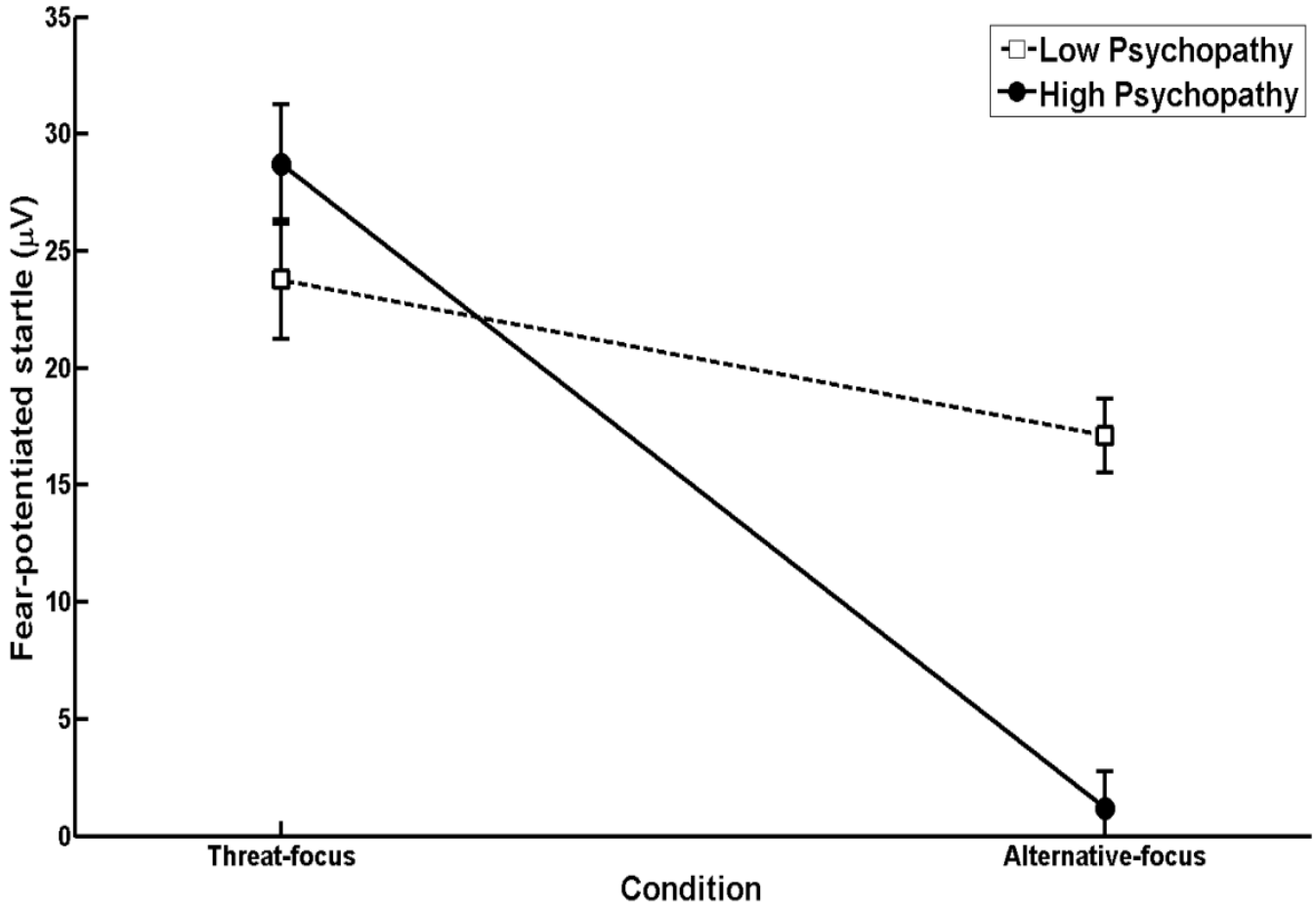
Un-Confounding
Attentional Focus & Motivational Priorities



Instructed Fear Conditioning

Newman, Curtin, Bertsch, & Baskin-Sommers

Biological Psychiatry, 2010



Larson, Baskin-Sommers, Stout, Balderston, Curtin, Shultz, Kiehl, & Newman
Cognitive, Affective, and Behavioral Neuroscience, 2013

Right amygdala

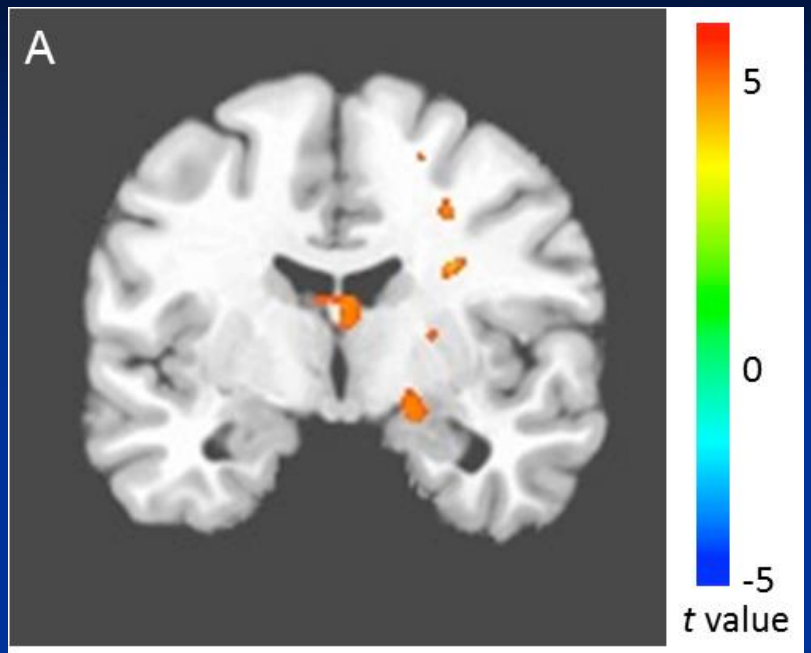
(TLRC)X= 20, Y= -6, Z= -13

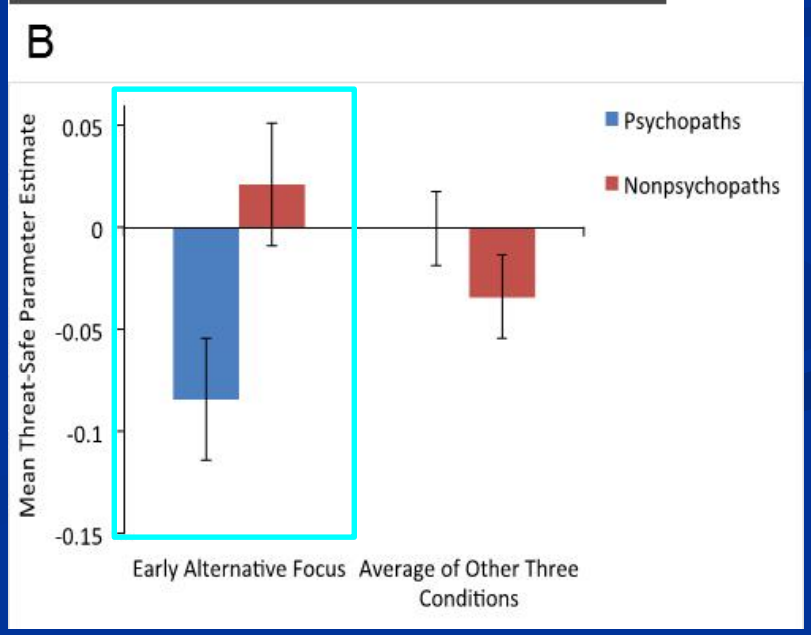
EARLY ALTERNATIVE FOCUS CONDITION

- Psychopaths displayed significantly LESS amygdala activation than non-psychopaths

AVERAGE of OTHER THREE CONDITIONS

- There was no difference between groups in amygdala activation

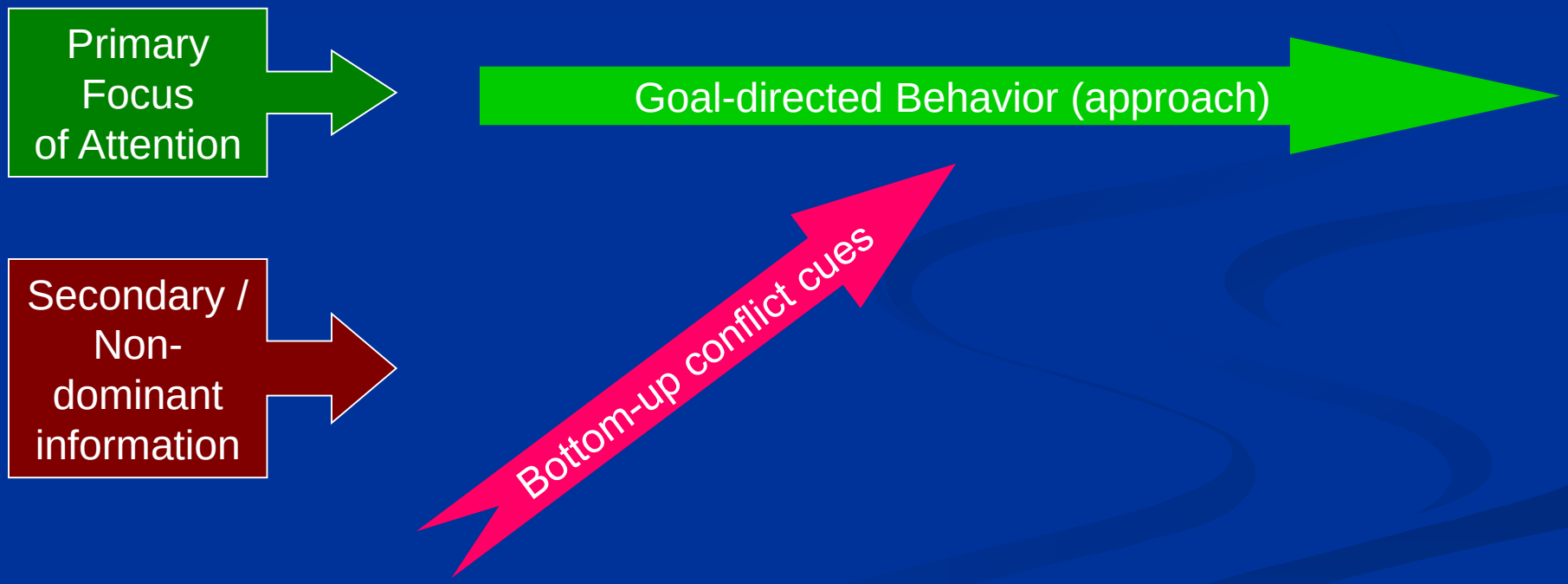




Non-Traditional Stroop Tasks

Insensitivity to secondary conflict cues

Un-Confounding
Attentional Focus & Motivational Priorities



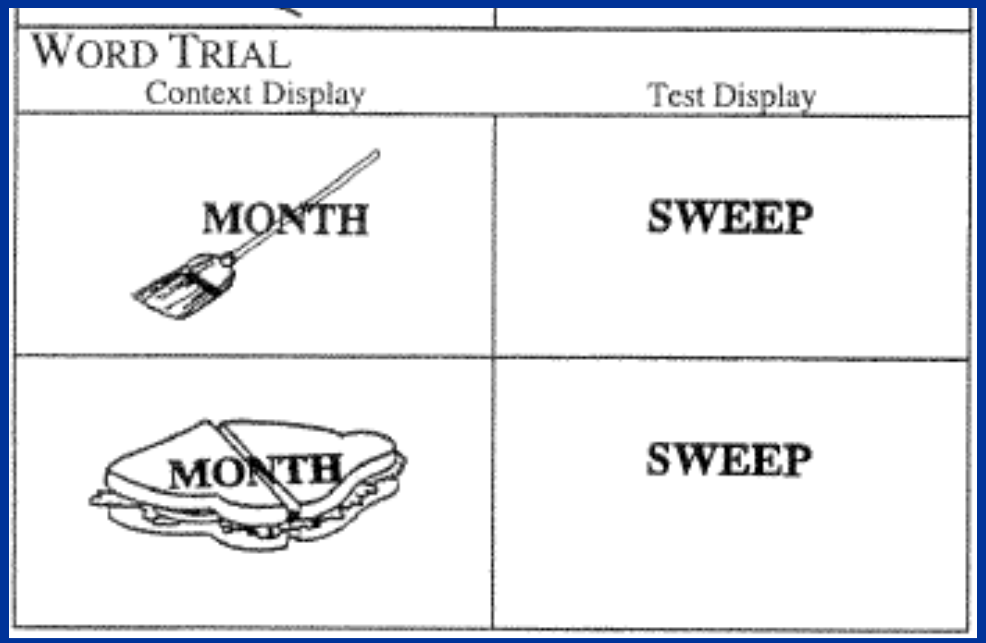
Non-Traditional Stroop Tasks

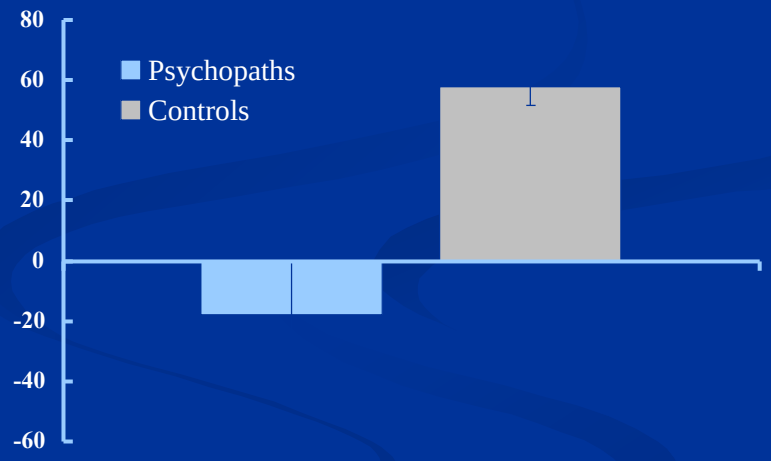
Newman, Schmitt, & Voss, 1997

Hiatt, Schmitt, & Newman, 2004 (2)

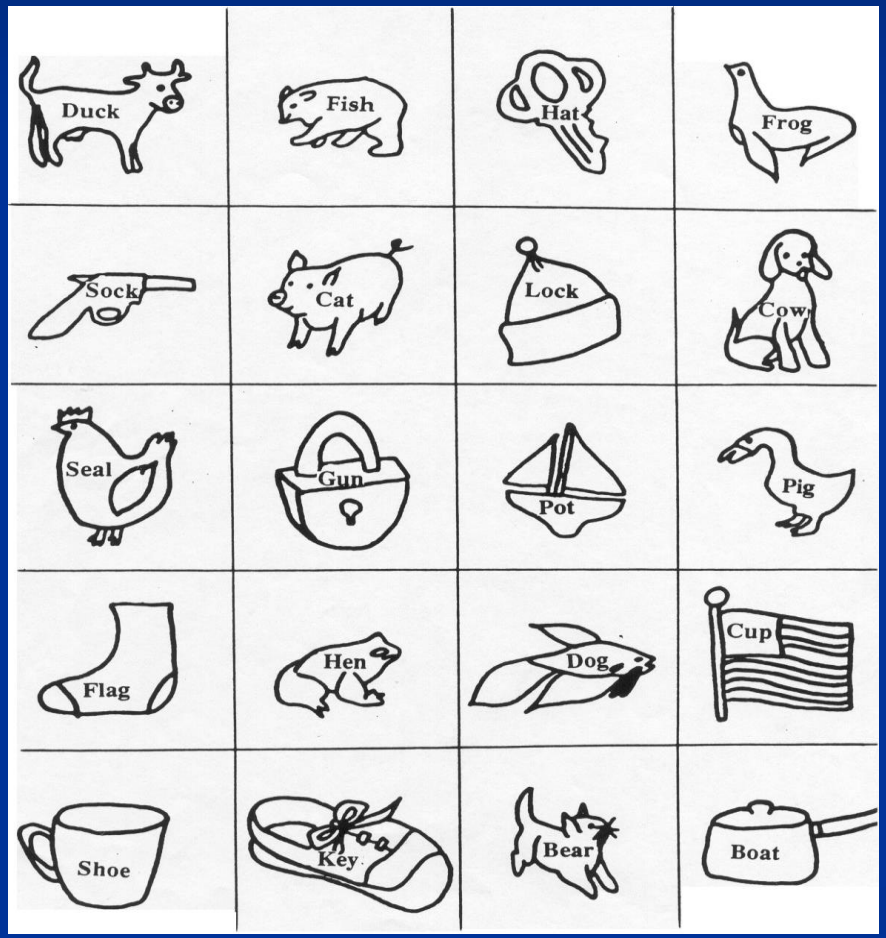
Vitale et al., 2005

Vitale et al., in press (2)

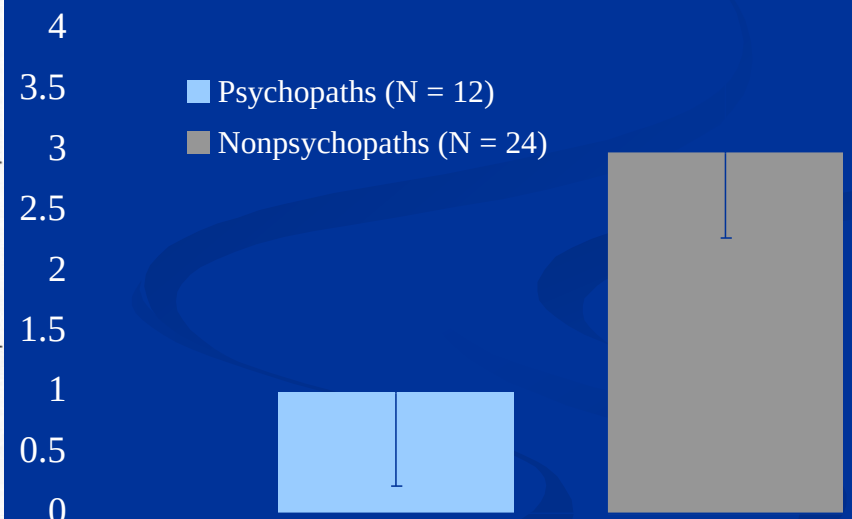




Non-Traditional Stroop Tasks

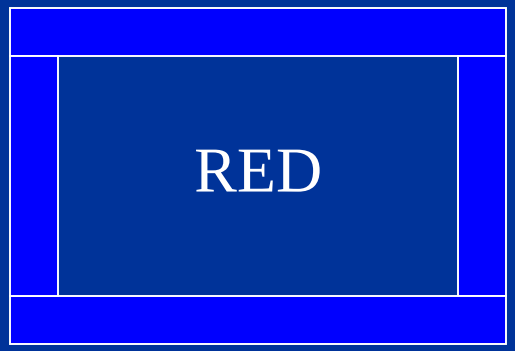


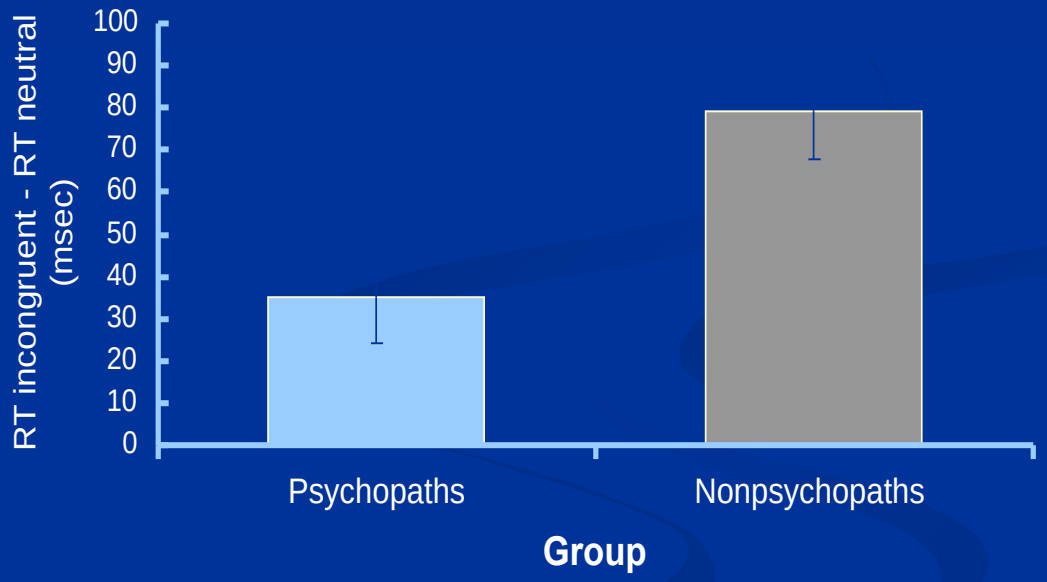
Hiatt, Schmitt & Newman, 2004
Neuropsychology



Box Stroop Task

Hiatt, Schmitt & Newman, 2004





Newman, Schmitt, & Voss, 1997

Hiatt, Schmitt, & Newman, 2004 (2)

Vitale et al., 2005

Vitale et al., in press (2)

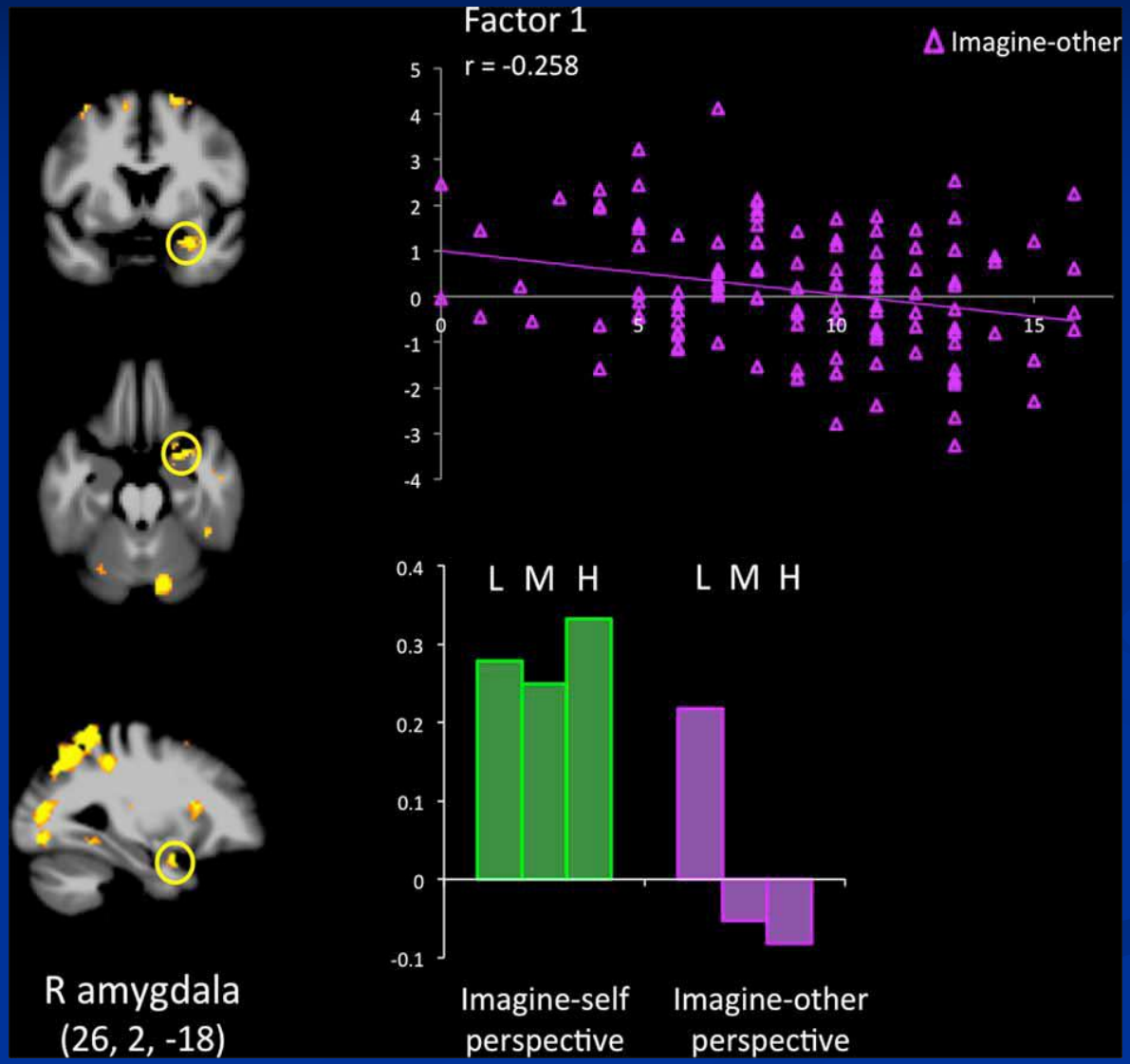
Brain-related Empathy Responses

Insensitivity to pain and suffering

Perspective taking in psychopathy
Decety, Cehn, Harenski, & Kiehl, 2013

- PCL-R assessed inmates viewed stimuli depicting bodily injuries while adopting an imagine-self versus imagine other perspective
  - Imagine self: high psychopathy was associated with typical response in brain network involved in empathy for pain.
  - Imagine other: psychopathy was associated with an atypical pattern of brain activation involving abnormal connectivity from anterior insula and amygdala to OFC and vmPFC.

Decety, Cehn, Harenski, & Kiehl, 2013



Reduced spontaneous but relatively normal deliberate vicarious representations in psychopathy

Meffert, Gazzola, den Boer Bartels, & Keysers, 2013

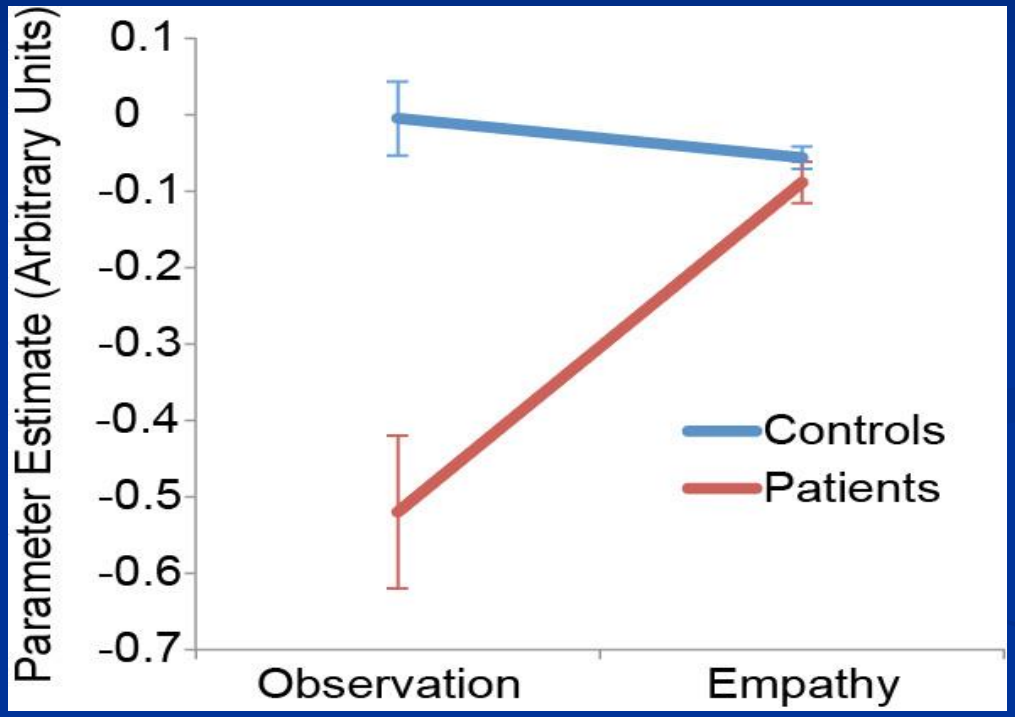
- Viewed video clips of emotional hand interactions
- Brain regions involved in experiencing these interactions were not spontaneously activated as strongly in the psychopathic group while viewing the clips
- This group difference was markedly reduced when participants were instructed to feel with the actors in the video
- Psychopathy involves "reduced spontaneous vicarious activations" but relatively normal deliberate activations

Reduced spontaneous but relatively normal deliberate vicarious representations in psychopathy

Meffert, Gazzola, den Boer Bartels, & Keysers, 2013

Reduced spontaneous but relatively normal deliberate vicarious representations in psychopathy

Meffert, Gazzola, den Boer Bartels, & Keysers, 2013



"Our results suggest that psychopathy is not a simple incapacity for vicarious activations but rather reduced spontaneous vicarious activations co-existing with relatively normal deliberate counterparts"

Specific Summary Regarding Attention Moderation

Psychopaths' deficits in

- Passive avoidance learning
- Conflict monitoring (modified Stroop and Flanker tasks)
- Fear potentiated startle / Emotion modulated startle
- Amygdala activation
- Electrodermal reactivity (Arnett et al., JPSP, 1997)
- Empathy related brain activation (Meffert et al., 2013; Decety et al., 2013
- Facial Affect Recognition (Dadds et al., 2006)

are all moderated by their focus of attention.

That is, all of the deficits appear and disappear depending depending upon whether the critical stimuli are intrinsic, or peripheral to, psychopaths' primary focus of attention.

Growing Consensus about the Importance of Attention

- *"Whereas most people automatically anticipate the consequences of their actions, automatically feel shame for unkind deeds, automatically understand why they should persist in the face of frustration, automatically distrust propositions that seem too good to be true, and are automatically aware of their commitments to others, psychopaths may only become aware of such factors with effort" (Newman, 1998; p. 84).*

- *"psychopaths and children with high levels of CU traits do not have a true deficit in the explicit component of fear-recognition. Rather, in support of Newman's response modulation hypothesis (Newman et al., 2010), they have a deficit in orienting their attention to fear-related social-stimuli…as a result of an underactive baso-lateral amygdala and, thus, neither respond to these cues appropriately nor learn their social significance." (Moul, Kilcross & Dadds, 2012).*

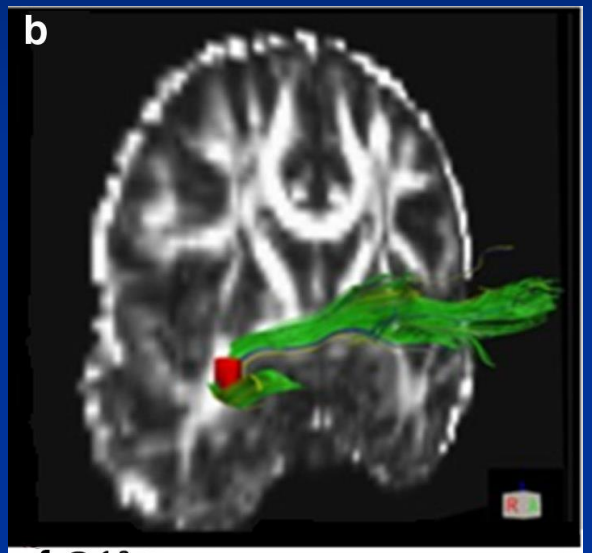
- *"Our results suggest that psychopathy is not a simple incapacity for vicarious activations but rather reduced spontaneous vicarious activations co-existing with relatively normal deliberate counterparts" (Meffert et al., 2013).*

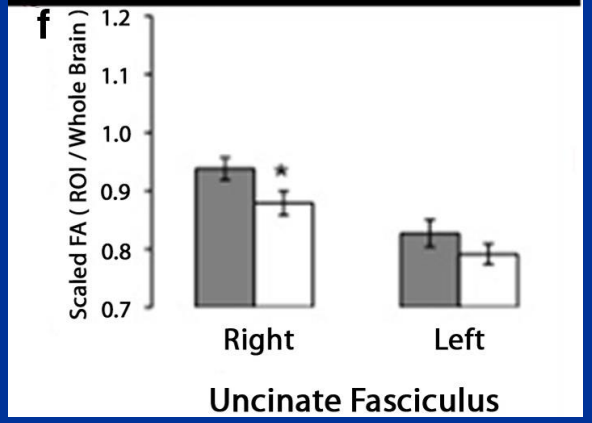
Neurobiology of Response Modulation

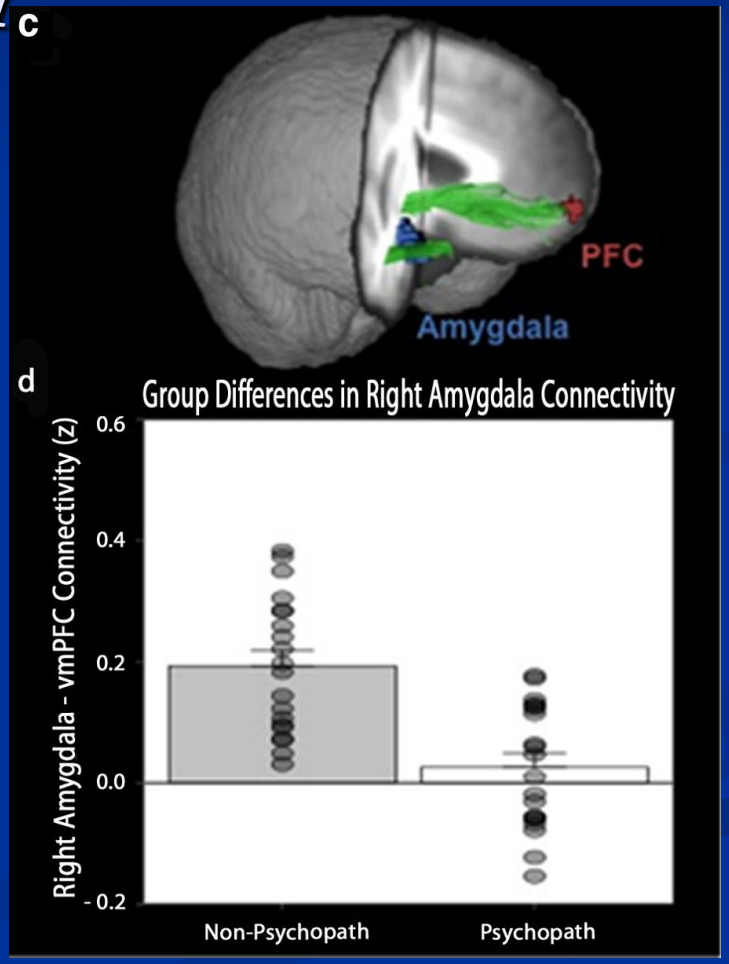
Alternative Neural Mechanisms

- Attention bottleneck (Marois & colleagues, 2006, 2011)
- Re-orienting system dysfunction (Corbetta & colleagues, 2002, 2008)
- Basolateral amygdala and redirection of attention (Moul & colleagues, 2012)
- Neural connectivity and the integration of information processing resources (Bencic & Newman, 2014).

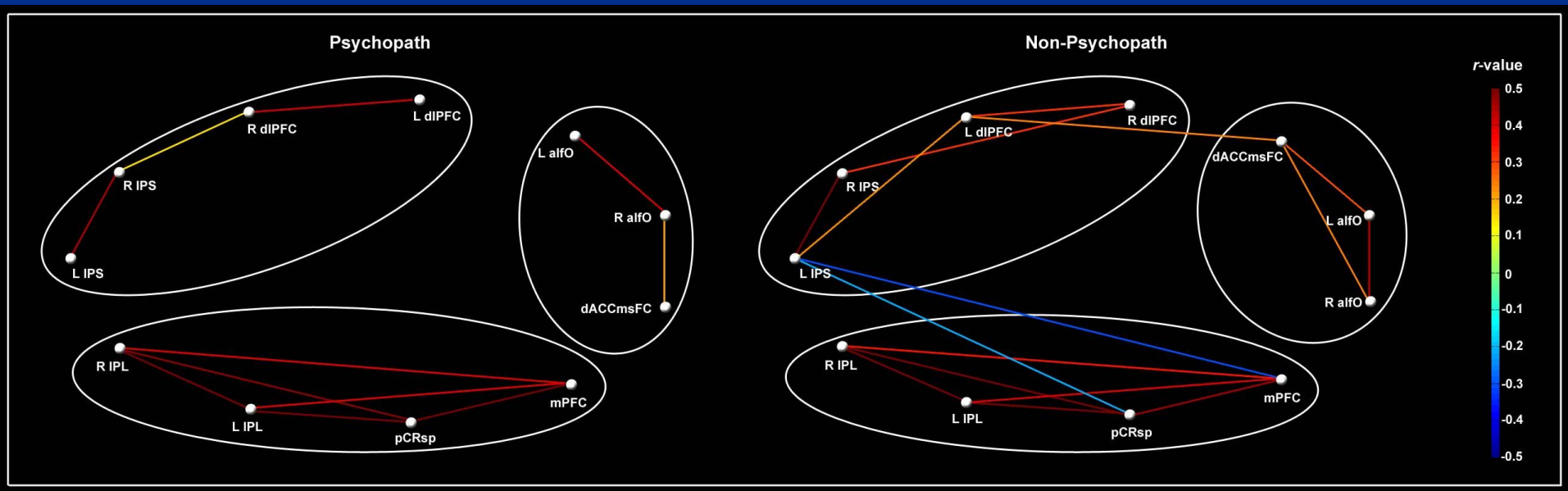
Reduced Prefrontal Connectivity in Psychopathy
Motzkin, Newman, Kiehl, & Koenigs, 2011





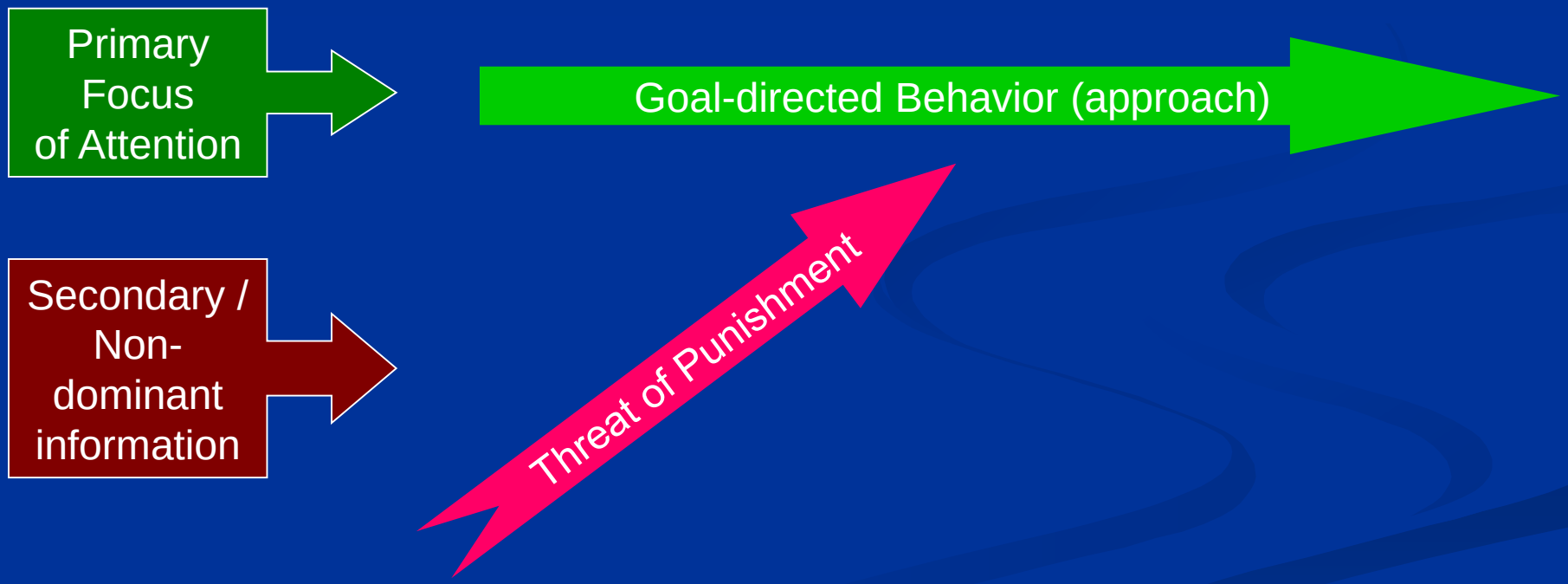


Psychopathy: Reduced connectivity in multiple large scale networks



Philippi et al., in prep

Typical Confounding of Attentional Focus & Motivational Priorities



Lykken, 1995: Low Fear Hypothesis
Damasio, 1994: Somatic Marker Hypothesis
Bencic & Newman, 2014: Impaired Integration Hypothesis

Distal cause		Proximal cause
Amygdala Dysfunction →	Poor fear conditioning →	Poor Passive Avoidance
vmPFC Dysfunction →	Weak somatic markers →	Poor Decision Making /Violence Inhibition
Reduced Connectivity →	Impaired integration →	Poor Self-Regulation

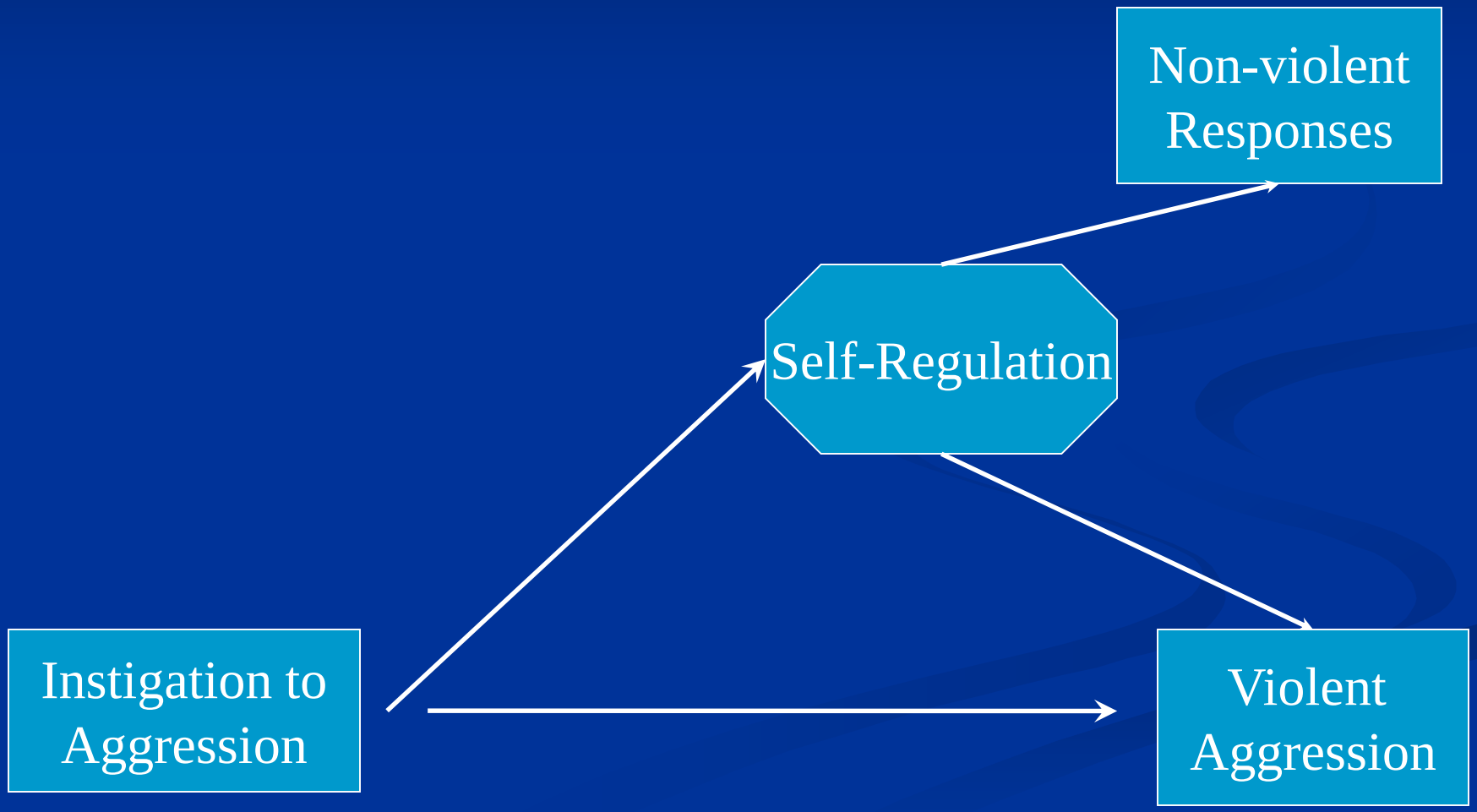
Implications for Self-Regulation & Decision Making

Self-Regulation

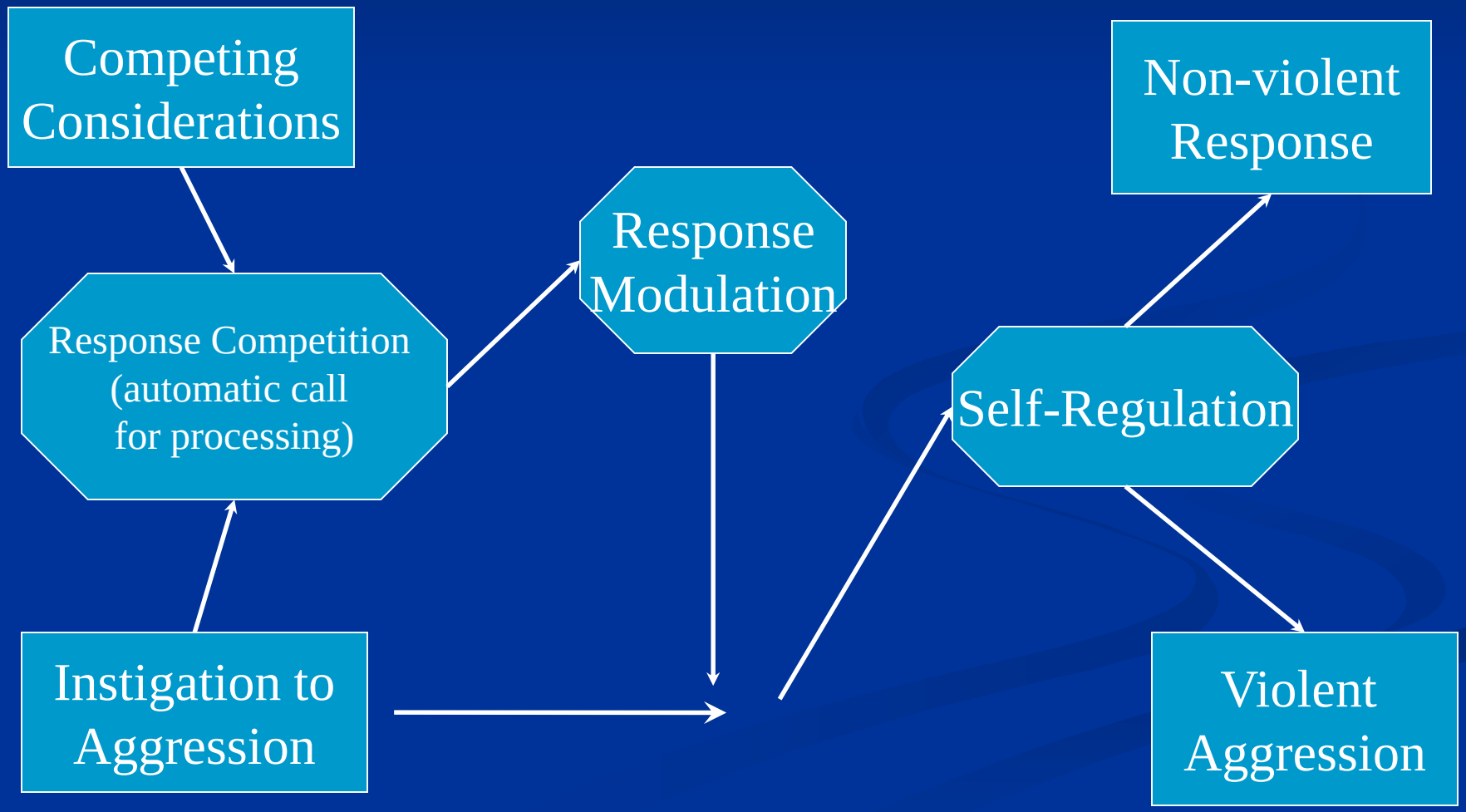
Kanfer & Gaelick (1986)

- Self-regulation involves the effortful monitoring, evaluating, and, if necessary, modification of behavior. Self-regulation is especially important in novel situations and when habitual or dominant responses are not optimal. (versus automatic)

Self-Regulation of Aggression

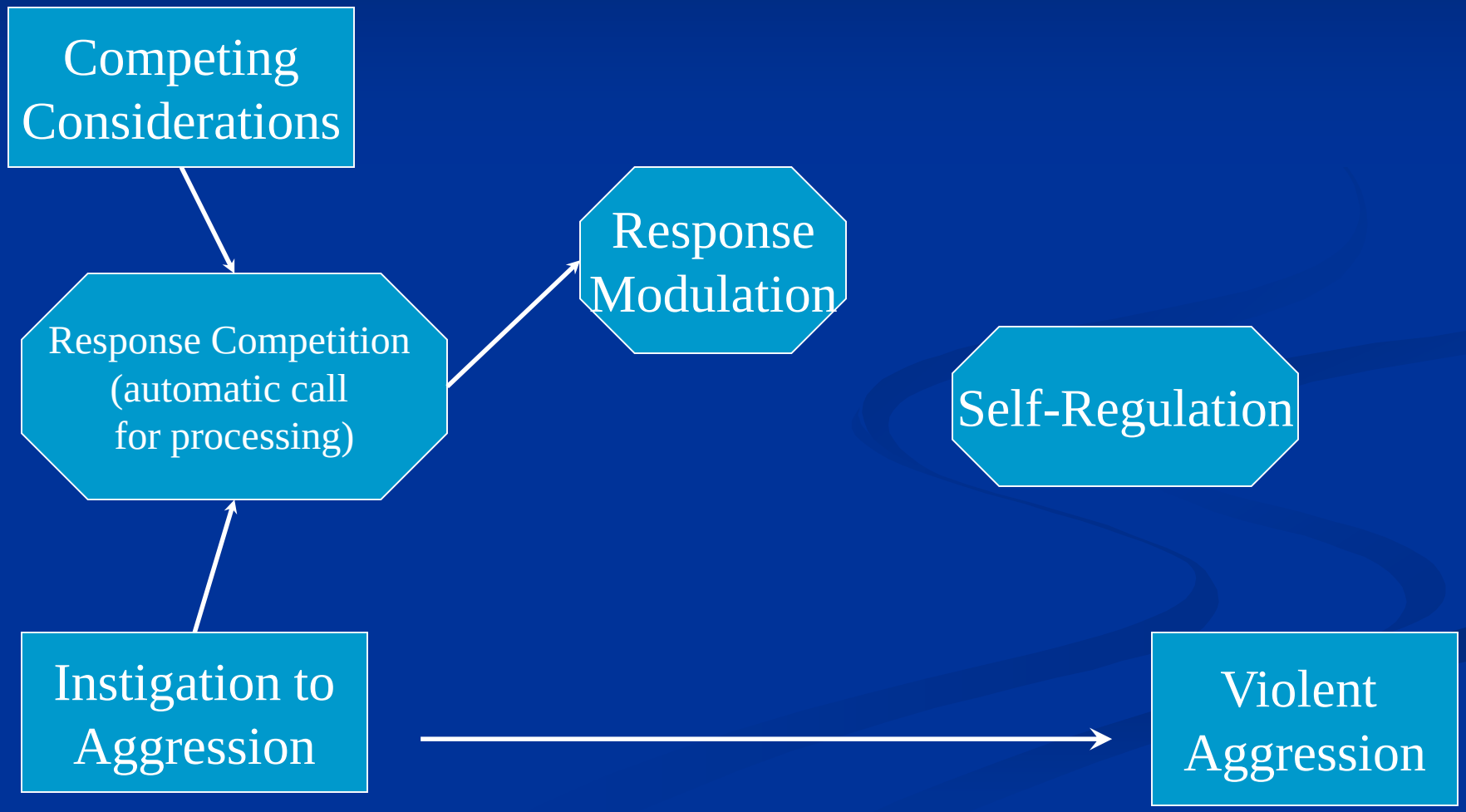


Self-Regulation of Aggression



What about Psychopathy?

Self-Regulation of Aggression



Psychopathy & Decision Making

"In the normal person, the whim or the half-formed inclination to do something is the beginning of a complex process, although, if all is well, it is a smooth and automatic one" (p. 140).

"the cognition of impulsive people is characterized by an insufficiency of active integrative processes that is comparable to the insufficiency of integrative processes on the affective side... (The psychopath remains) oblivious to the drawbacks or complications that would give another person pause and might otherwise give him pause as well" (p. 147-9).

Implications for Treatment & Prevention?

Cognitive Remediation

Baskin-Sommers, Curtin & Newman, 2014

- Targeted treatments based on etiology

	Deficient Mechanism	Change in Deficit
Psychopathy	Attention to Contextual Information (ATC)	Notice and make use of important information
Externalizing	Affective Cognitive Control (ACC)	Act rather than over-react in emotional situations

PRIMARY QUESTION OF PILOT: Is it possible to change disorder-specific deficits, demonstrate the specificity of change, and demonstrate the generalization of change to other relevant laboratory measures?

Study Design

Selection

- All substance dependent prisoners

Randomization

- Half Match/Half Mismatch

2 Pre Sessions

- Psychophysiology and behavior (assess mechanisms)

6 Training Sessions

- 3 computerized tasks per treatment (train in mechanism-based process)

2 Post Sessions

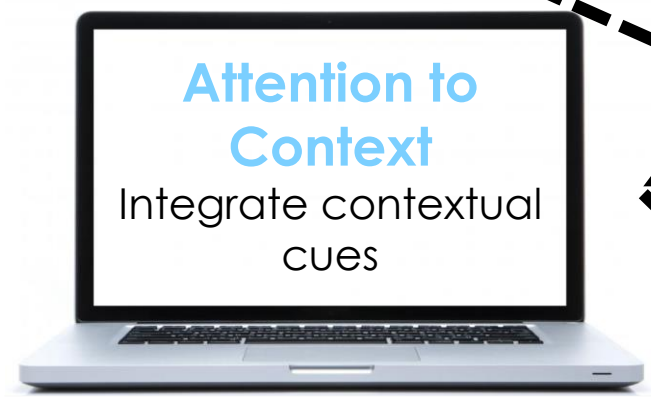
- Same as Pre

Study: Design and Hypotheses Review

Syndrome: **Psychopathy** | **Externalizing**

Lab Deficit: **Poor Attention to Context** (behavior and psychophysiology) | **Poor Affective Cognitive Control** (behavior and psychophysiology)

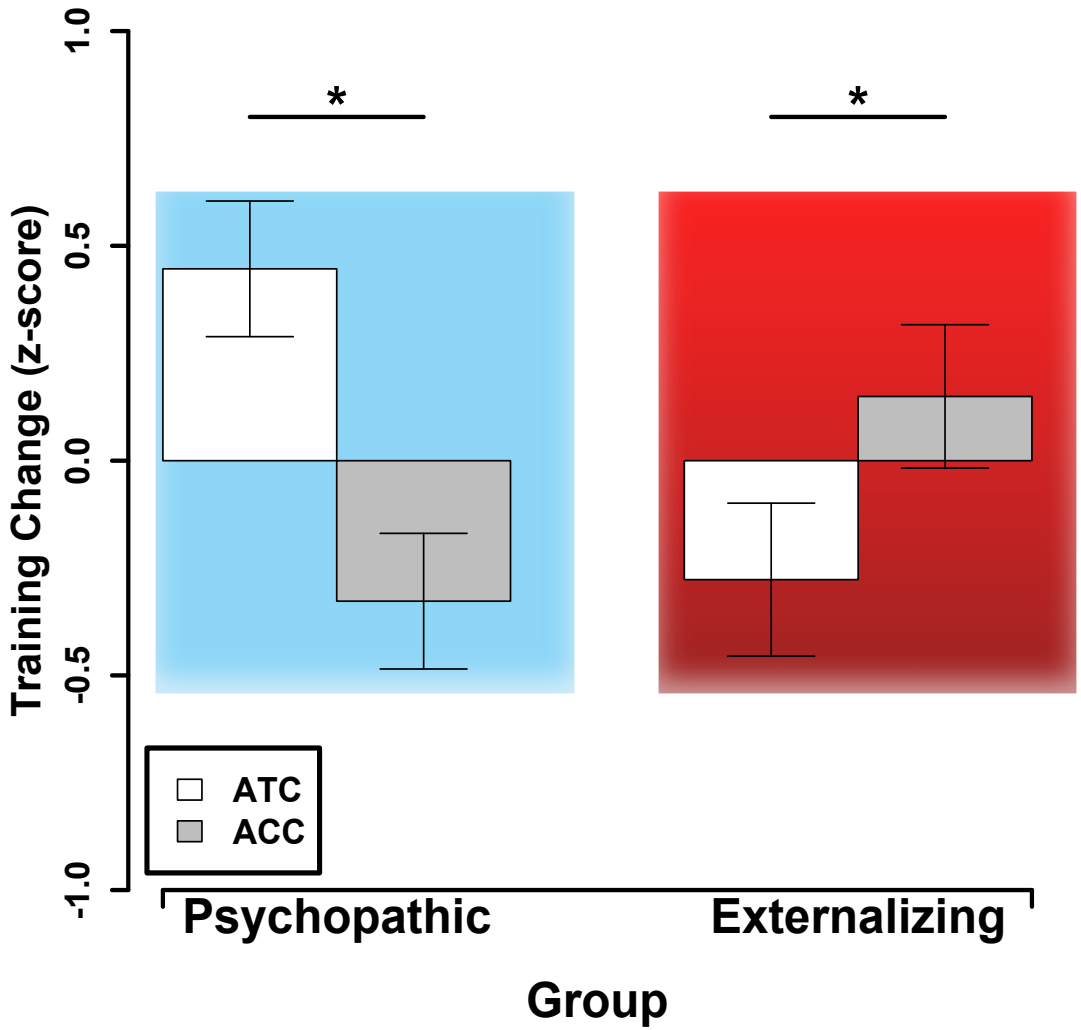
Treatment Focus:



Reduce the Lab Deficit | **Minimal Change in the Lab Deficit** | **Reduce the Lab Deficit**

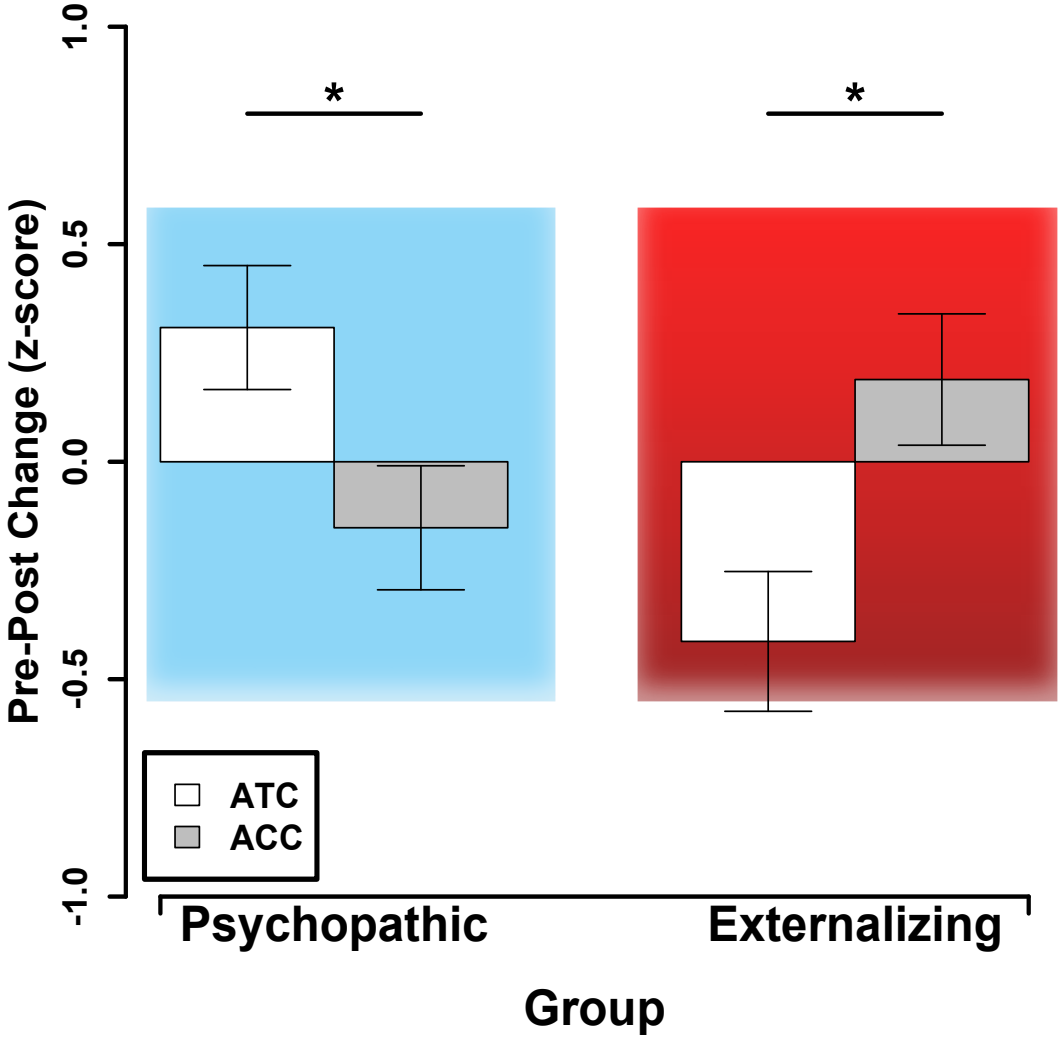
Baskin-Sommers, Curtin & Newman, 2014

Results of Training



Baskin-Sommers, Curtin & Newman, 2014

Generalization of Change to Pre-Post Measures



Summary & Conclusions

- Psychopathy involves a severe and costly problem that needs to be better understood and treated. It is essential to distinguish psychopathy from other externalizing disorders
- Psychopaths' failure to re-orient attention undermines their processing of important affective and inhibitory information.
- Failure to process contextual information (i.e., obliviousness) precludes the "automatic" initiation of self-regulation and sound decision making.
- Virtually all of psychopaths' etiologically relevant laboratory deficits <u>are moderated by</u> focus of attention.
- Cognitive skills training to promote "attention to context" can improve the psychopath's sensitivity to peripheral affective and inhibitory information <u>in the laboratory</u>.
- Further research is needed to identify the neural underpinnings of psychopaths' failure to re-orient attention and make use of important context information.

Thank you!