

Brain Research and Pedophilia:

What it means for assessment,
treatment, and policy

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The Big Questions

Is it in the brain?

Can we treat it?

Is it in the genes?

Were they born with it?

Does it run in families?

Can it change?

Are they responsible for it?

Can we prevent it?

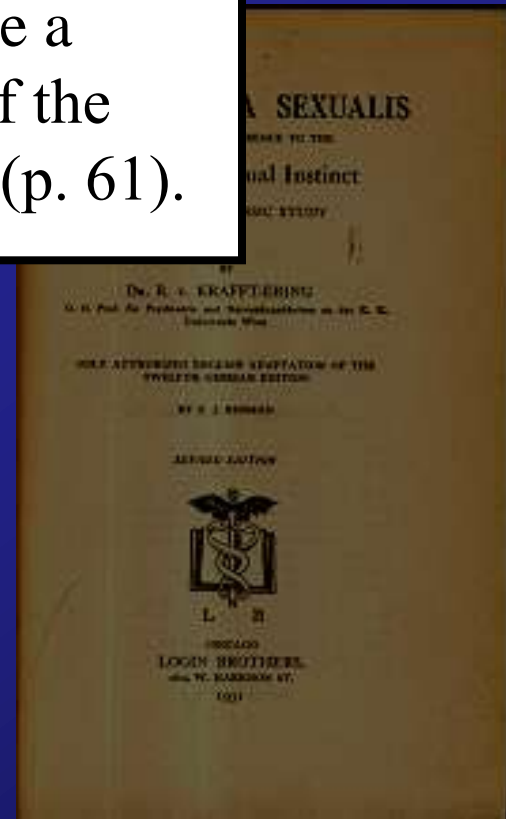
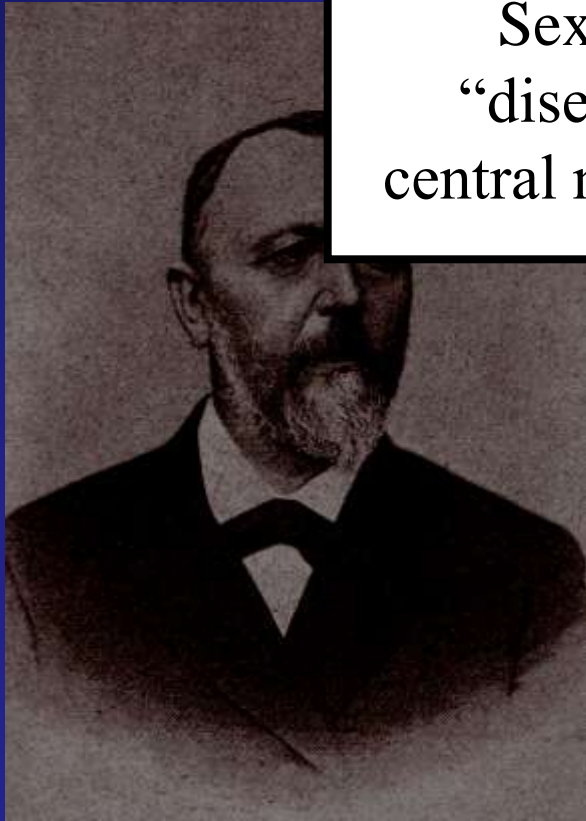
Sexual Offending and the Brain: History

1886	Founding of modern sexology
1900–2000	Large scale studies of forensic samples
1980–1999	Neuropsych testing, early imaging (CT) studies
1999	First neuroimaging study of sexual arousal
2000–	Large-scale studies of homogeneous samples
2007–2008	High-resolution studies of pedophilia published
2007	First fMRI studies of pedophilia published

Richard von Krafft-Ebing (1840–1902)

Psychopathia Sexualis (1886)

Sexual anomalies are a
“diseased condition of the
central nervous system” (p. 61).

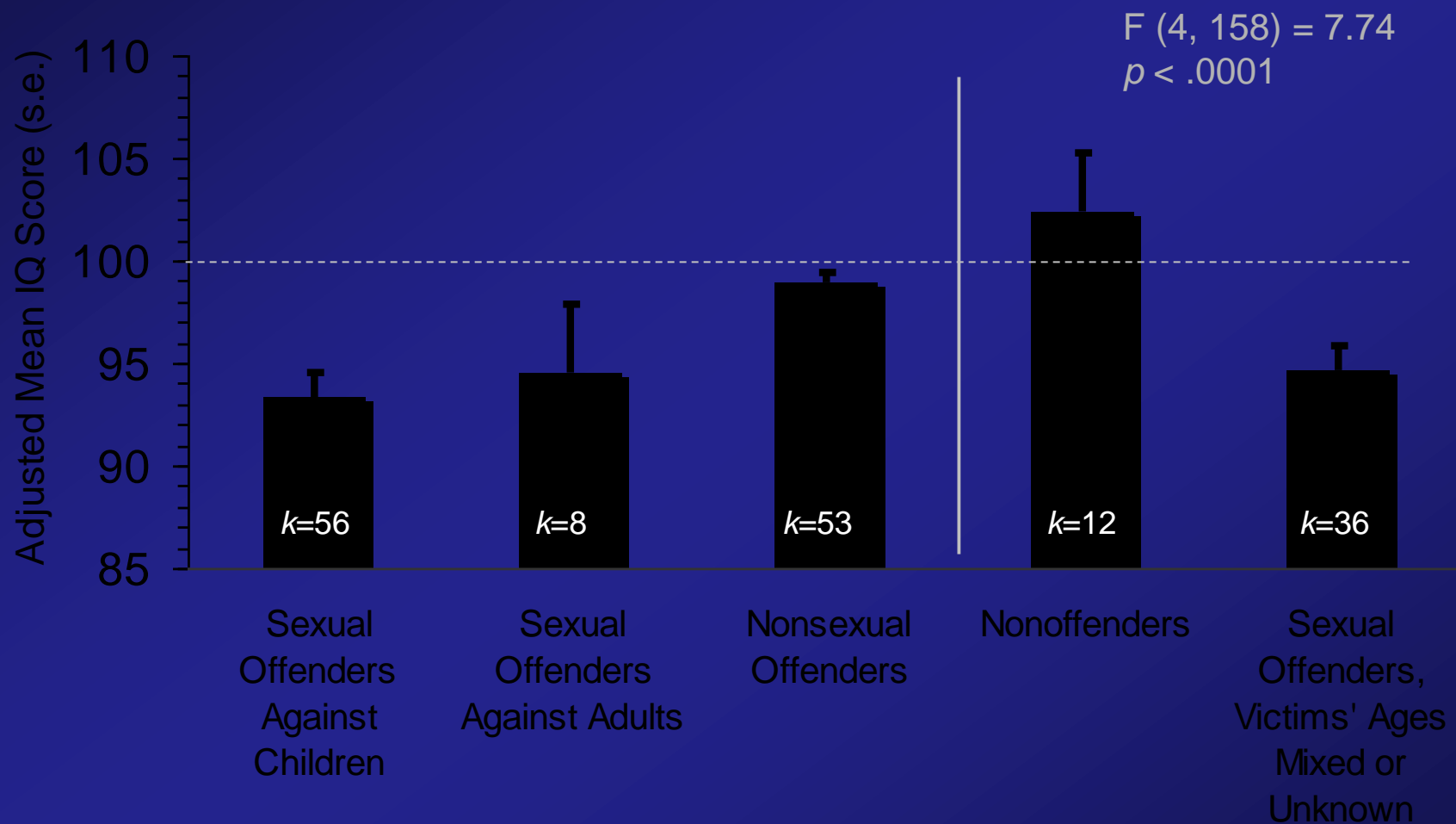


IQ Findings

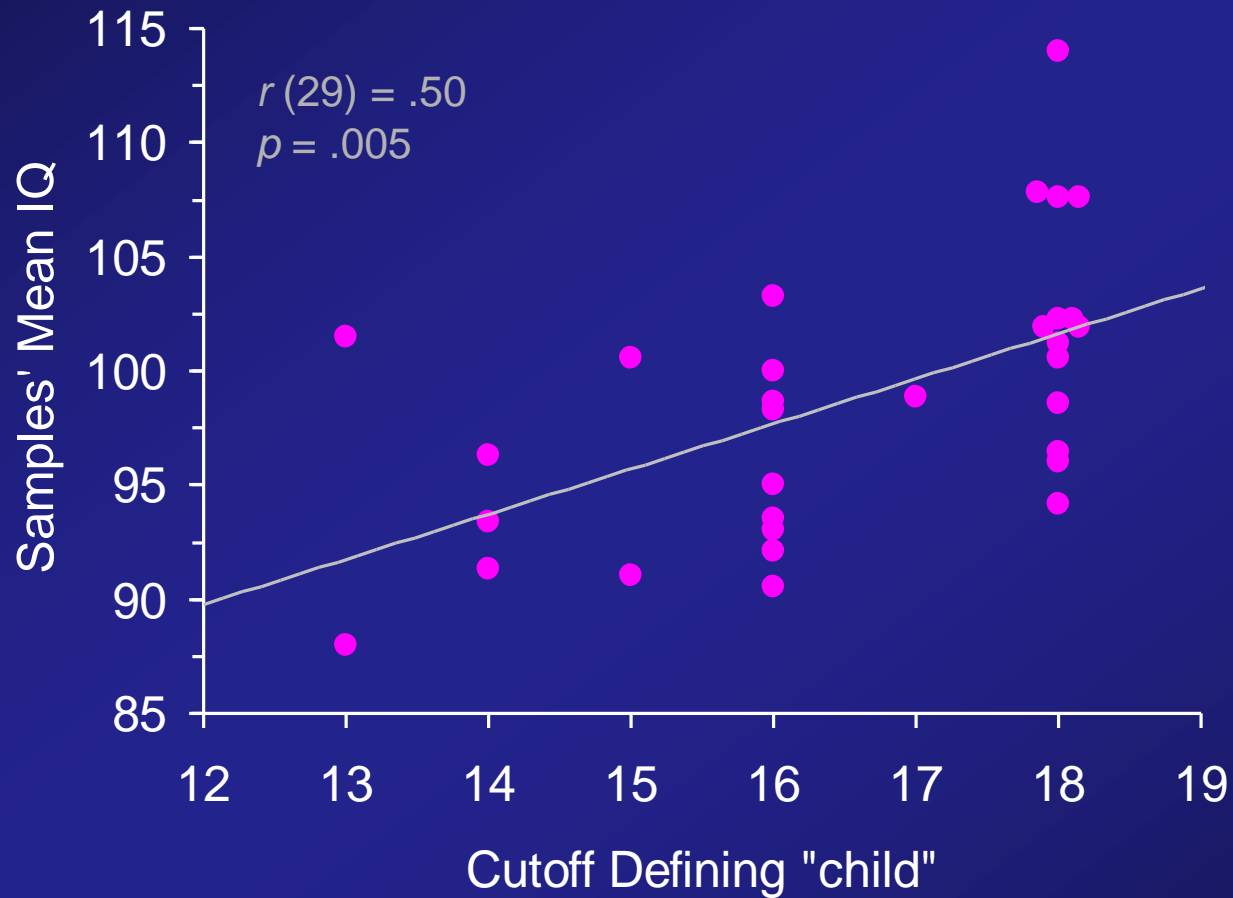
Meta-Analysis of all reports, 1931–2004

- 75 reports with IQ data
- 236 non-overlapping samples
- 25,146 cases (7,045 sexual offenders and 18,101 controls)

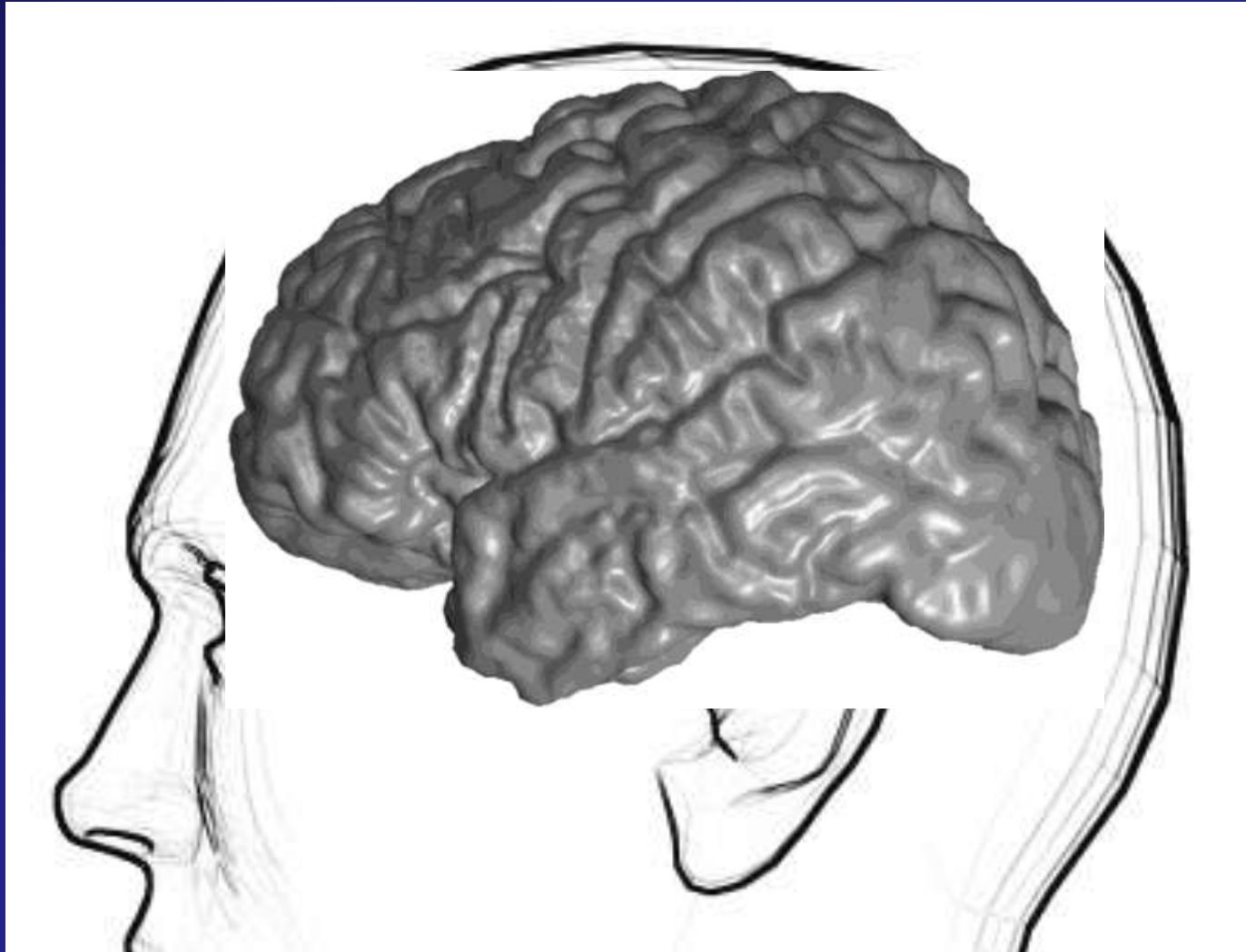
IQ of Adult Samples by Victims' Age Group



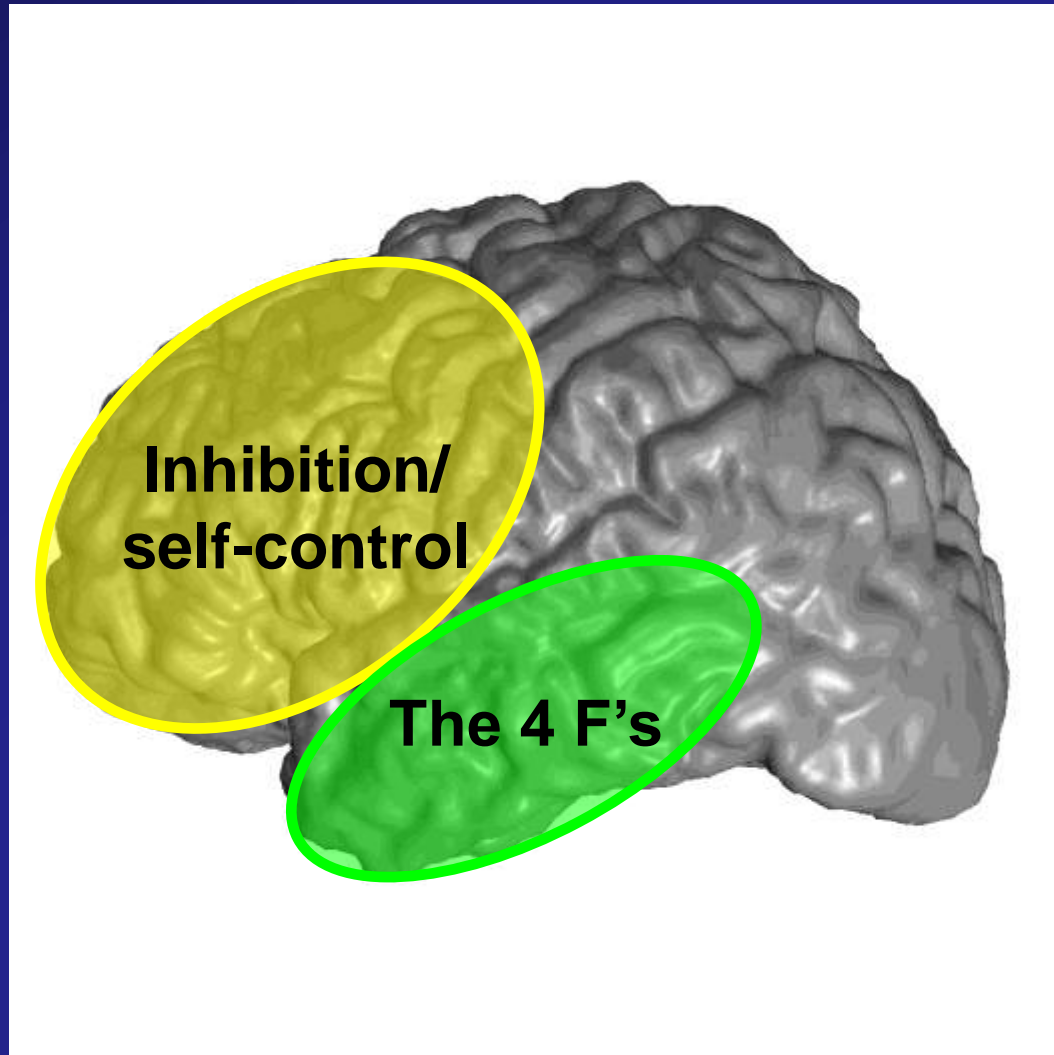
IQ by Definition of "Child" Victim



Frontal Lobe vs. Temporal Lobe Theories



Frontal Lobe vs. Temporal Lobe Theories



Neuropsychological Batteries

Halstead-Reitan Battery

Yeudall (1977)

Yeudall et al. (1979)

Langevin et al. (1985)

Langevin et al. (1988)

Langevin et al. (1989)

Rapists

Heterogeneous

Sadists

Sexual killers, aggressives

Exhibitionists

Luria-Nebraska Battery

Graber et al. (1982)

Scott et al. (1984)

Hucker et al. (1986)

Hucker et al. (1988)

Langevin et al. (1988)

Galski et al. (1990)

Heterogeneous

Offenders vs. children, adults

Pedophiles

Sadists, sexual aggressives

Sexual killers, aggressives

Heterogeneous

Neuropsychological Batteries

Indications of general impairment.
No reliable localization.

Individual Neuropsychological Tests

Trail-Making

Bowden (1987)
Cohen et al. (2002)
Dolan et al. (2002)
Knox-Jones (1994)
Langevin et al. (1989)
Stone & Thompson (2001)
Tarter et al. (1983)
Yeudall et al. (1987)

Controlled Oral Word Assoc.

Cohen et al. (2002)
Dolan et al. (2002)
Gillespie & Mckenzie (2000)
Knox-Jones (1994)
Rubenstein (1992)
Stone & Thompson (2001)
Yeudall et al. (1987)

Wisconsin Card Sort

Cohen et al. (2002)
Dolan et al. (2002)
Kruger & Schiffer (2011)
Miller (1997)
Rubenstein (1992)
Stone & Thompson (2001)
Westergren (2002)
Yeudall et al. (1987)

Wechsler Memory Scale

Dolan et al. (2002)
Knox-Jones (1994)
Langevin et al. (1989)
Rubenstein (1992)
Tarter et al. (1983)

Williams Verbal Learning Test

Abracen et al. (1991)
Baker (1985)
O'Carroll (1989)
Yeudall et al. (1986)

Finger-Tapping

Knox-Jones (1994)
Langevin et al. (1989)
Tarter et al. (1983)
Yeudall et al. (1986)

Stroop

Cohen et al. (2002)
Dolan et al. (2002)
Stone & Thompson (2001)
Gillespie & Mckenzie (2000)

Bender Gestalt Test

Lewis et al. (1979)
Yeudall et al. (1986)

Individual Neuropsychological Tests

Indications of general impairment.
(Methodological confound?)
No reliable localization.

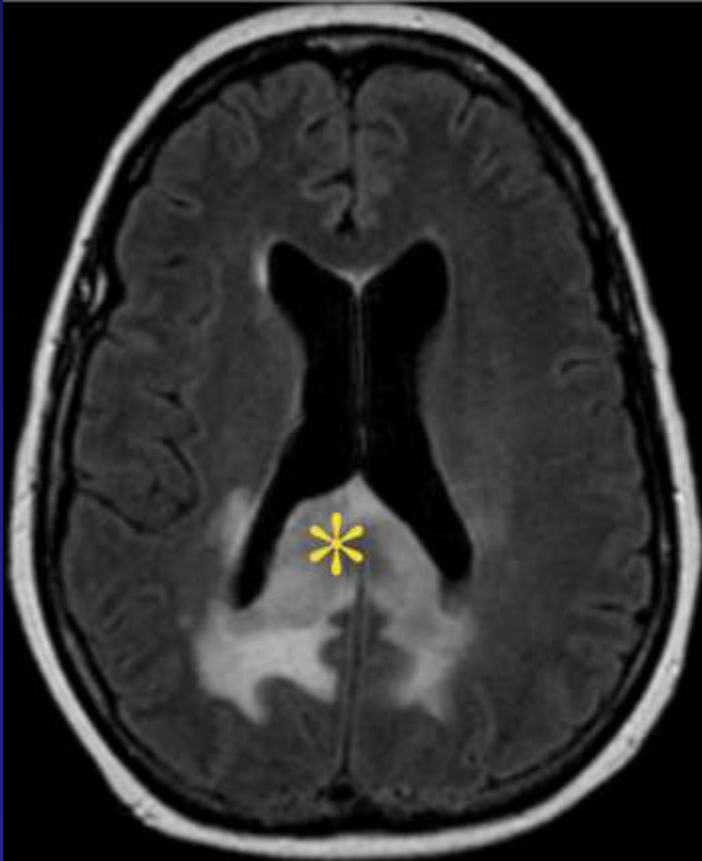
Early Brain Imaging

CT studies

Graber et al. (1982)	Offenders vs. women, children
Langevin et al. (1985)	Sadists, nonsadistic offenders
Hucker et al. (1986)	Pedophiles
Hendricks et al. (1988)	Offenders vs. children
Hucker et al. (1988)	Sadists, nonsadistic vs. women
Langevin et al. (1988)	Incest offenders
Langevin et al. (1989)	Pedophiles
Wright et al. (1990)	Offenders vs. women, pedophiles, incest offenders, nonsex offenders

Early Brain Imaging

CT studies

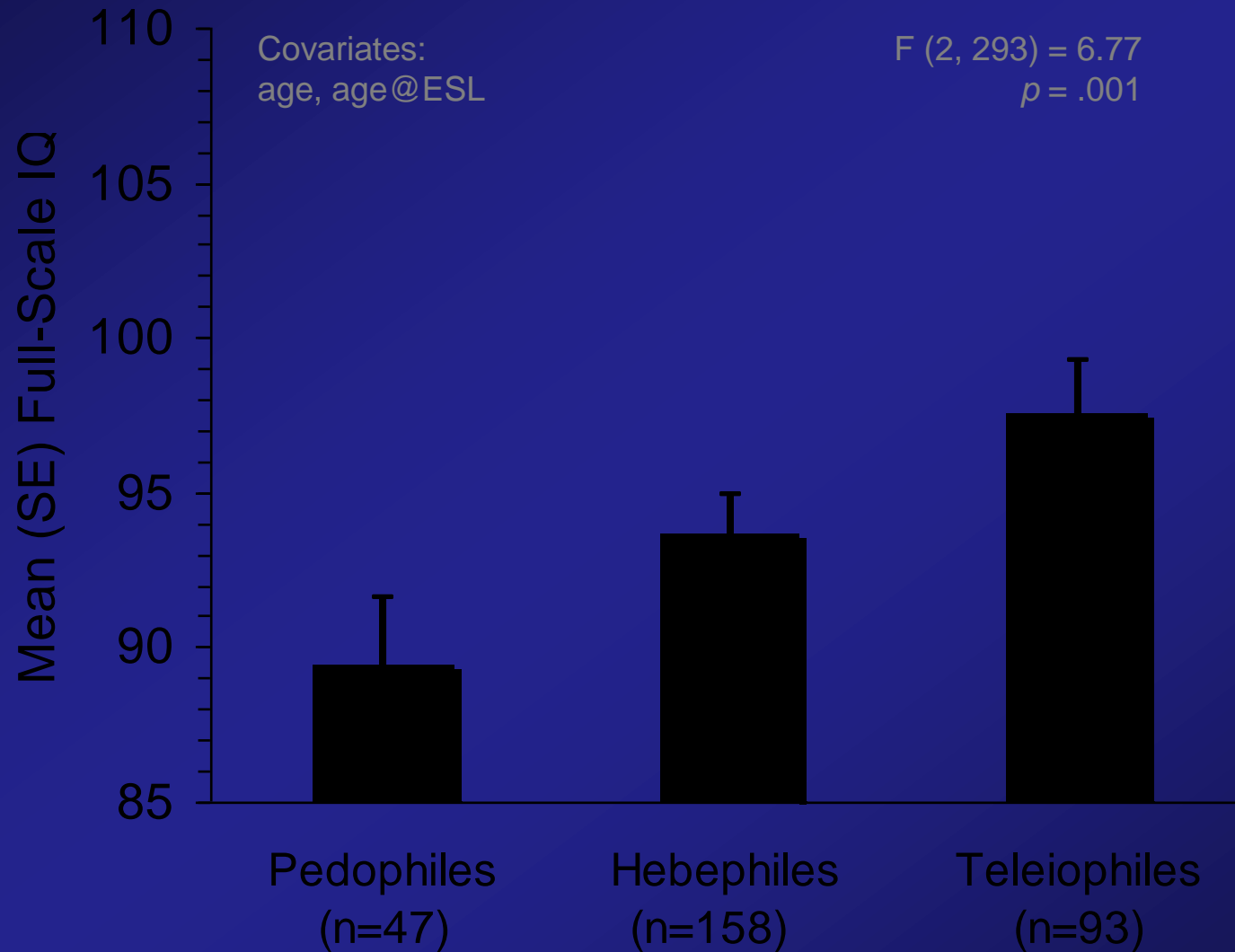


Early Brain Imaging

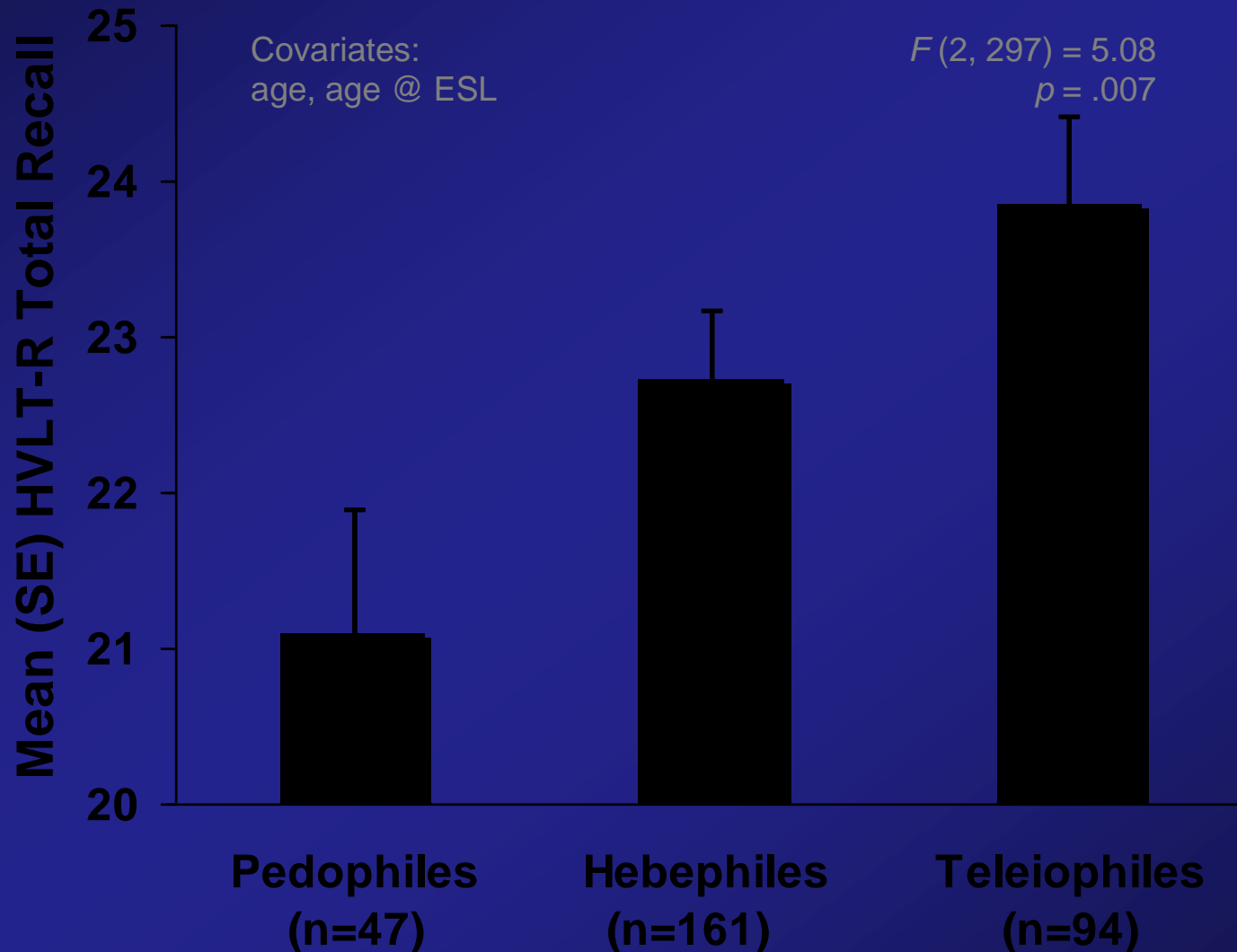
Indications of diffuse neuropathy.
No reliable localization.

Contemporary Neuropsychology and Biometrics

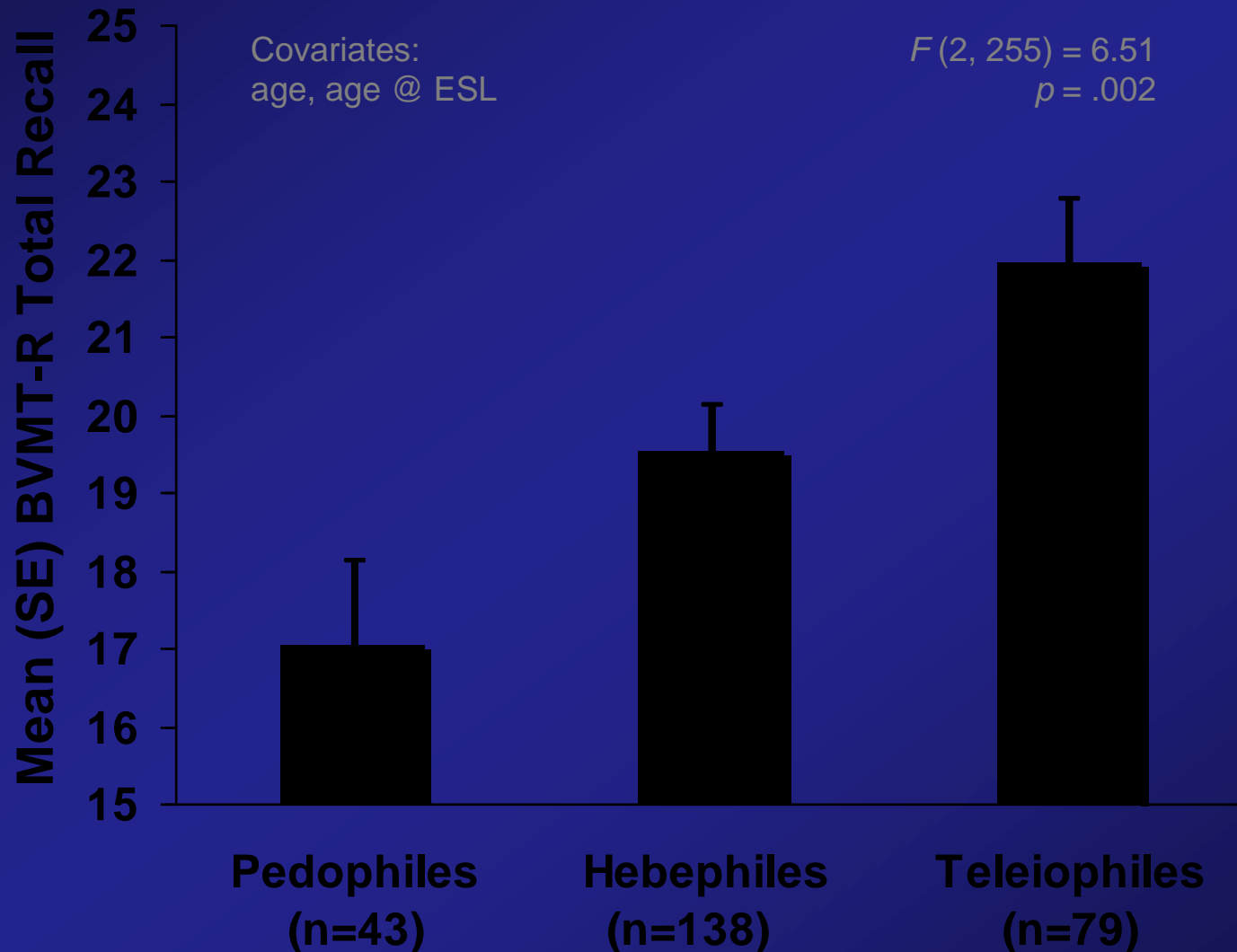
Intelligence Quotient (IQ)



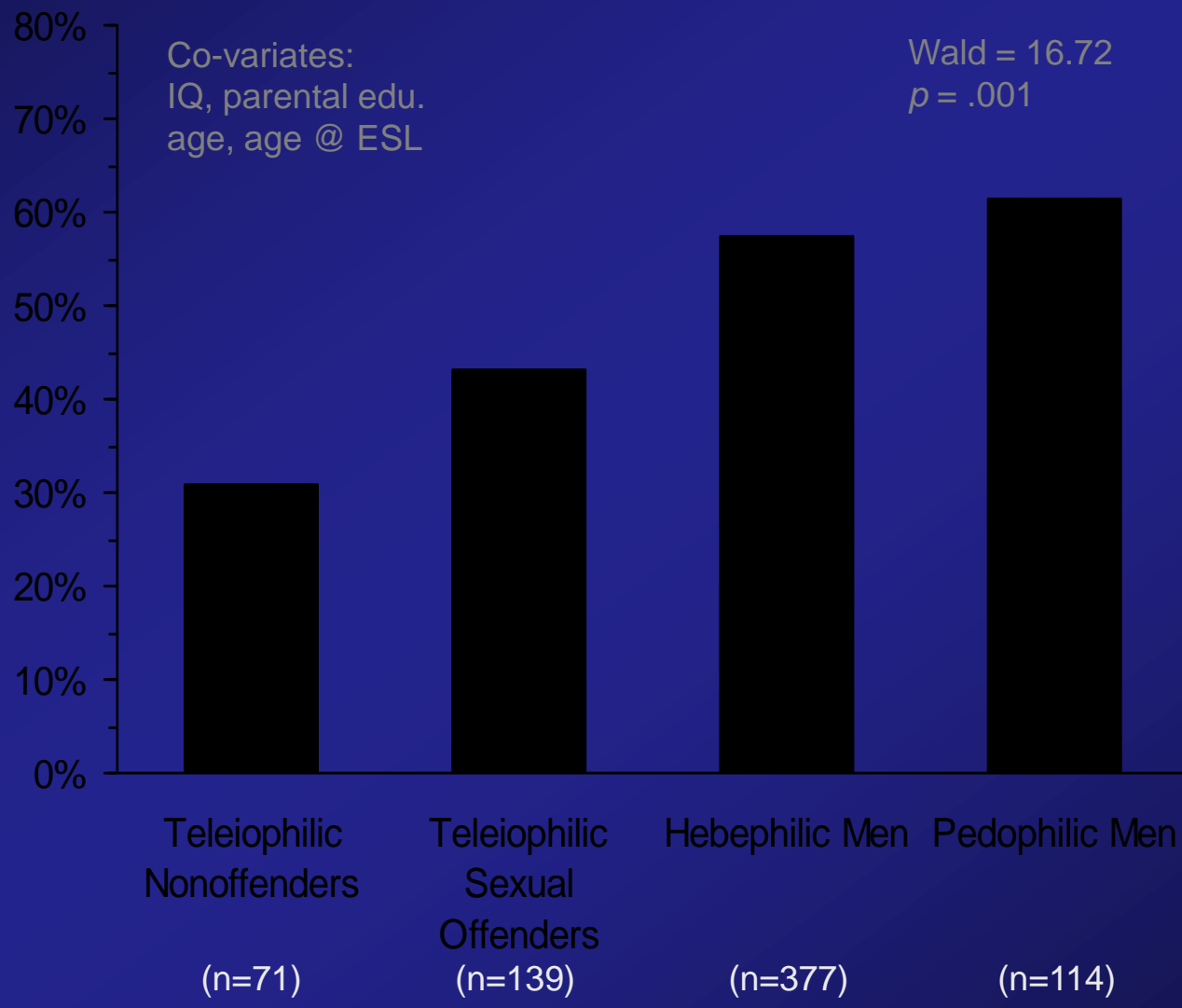
Verbal Memory by Phallometric Group



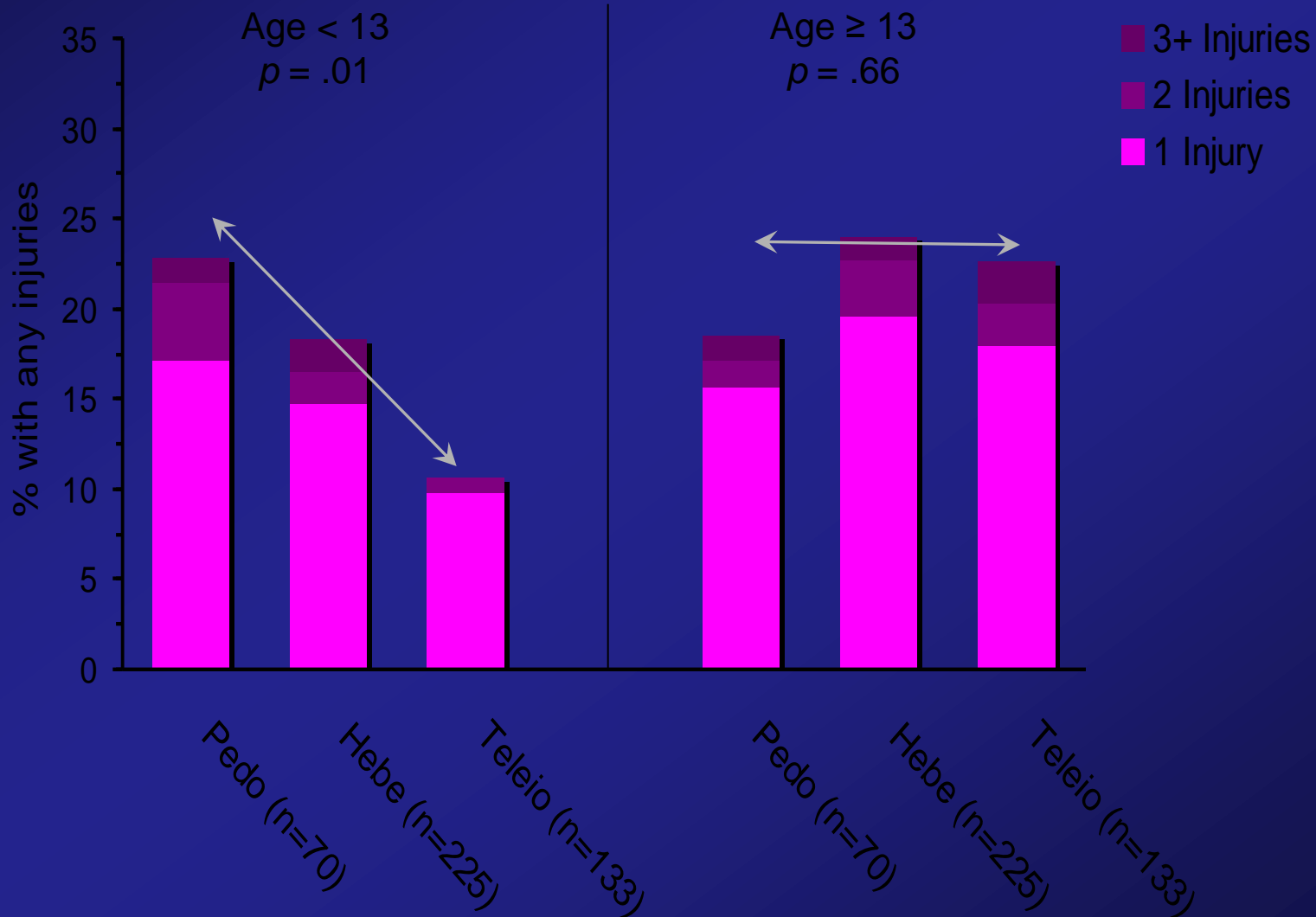
Visuospatial Memory by Phallometric Group



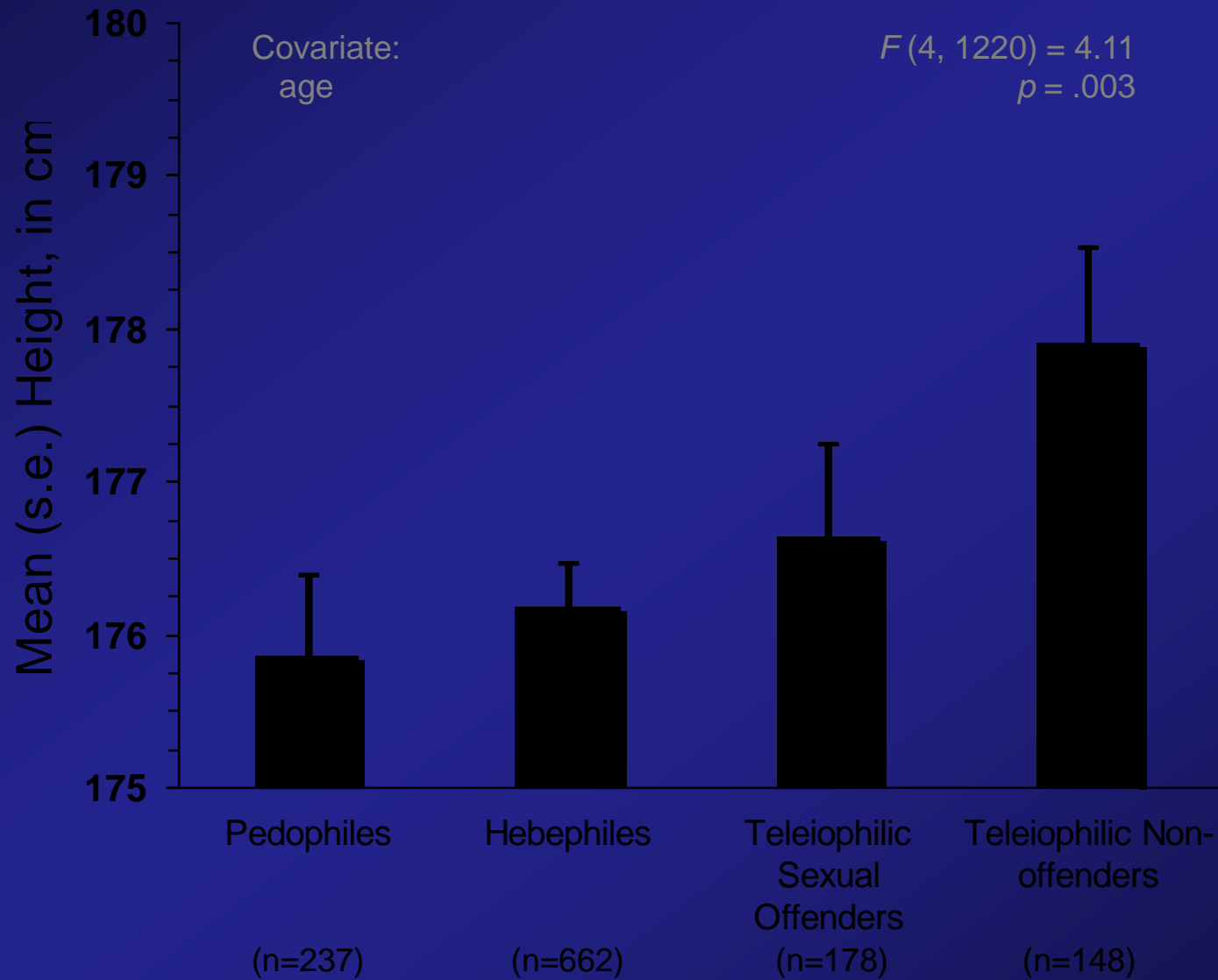
Proportions Failing or in Special Ed. by Group



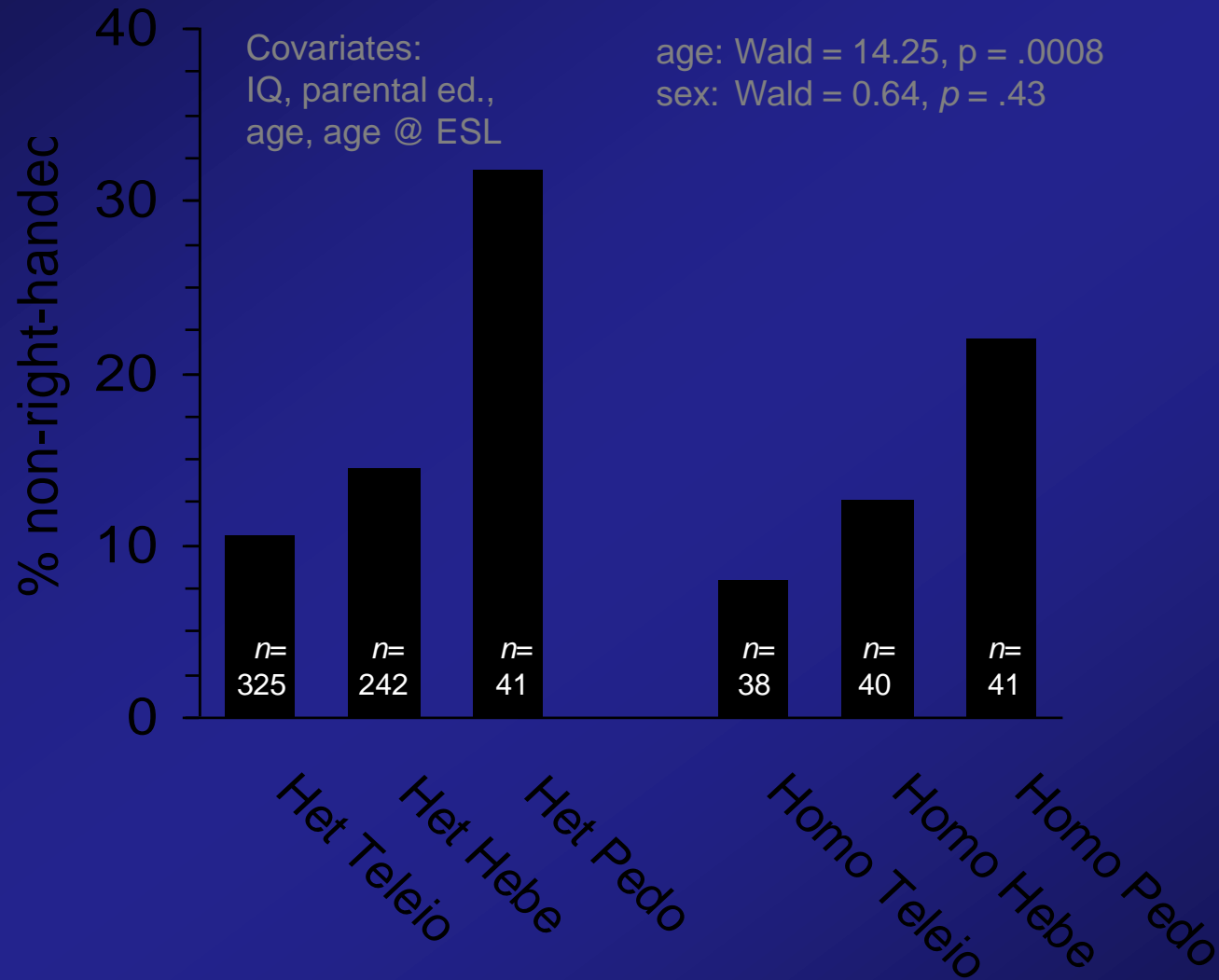
Accidents Causing Unconsciousness



Physical Height



Handedness in Pedophilia and Hebephilia



Summary

Pedophilic men demonstrate:

- Lower IQs
- Lower scores on memory tests
- More frequent grade failure
- Less physical height
- Less right-handedness

Consistent indications of general impairment in:

*large samples of
homogeneous offenders (pedophiles) with
phallometric data.*

Are Brain Differences Observable *Directly*?



Schiltz et al. (2007)

<u>Study</u>	<u>Theory</u>	<u>Prediction</u>	<u>Subjects</u>	<u>VBM Analysis</u>
Schiltz et al. (2007)	limbic	“temporal”	15 pedophiles 15 community controls	small volume corrected

Schultz et al. (2007)

Study

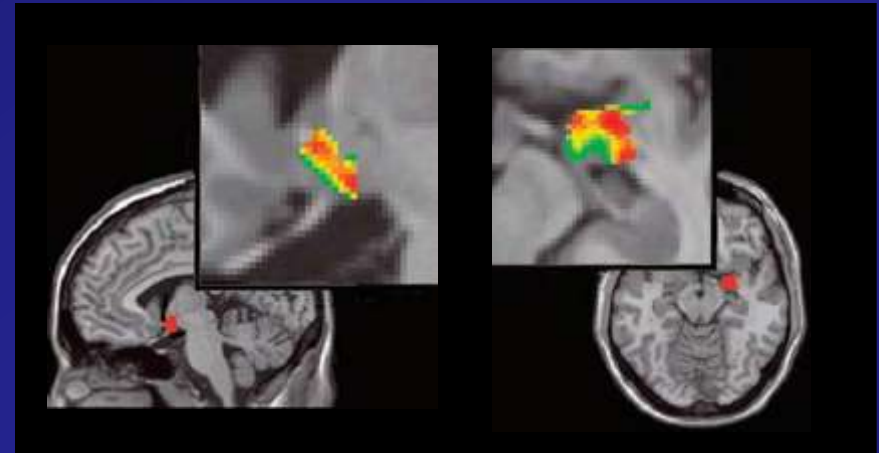
Theory

Prediction

Schultz
et al.
(2007)

limbic

“temporal”



Schiffer et al. (2007)

Study

Theory

Prediction

Subjects

VBM Analysis

Schiffer
et al.
(2007)

OCD/
impulsivity

frontal

18 pedophiles
24 community
controls

small volume
corrected

Schiffer et al. (2007)

Study

Theory

Prediction

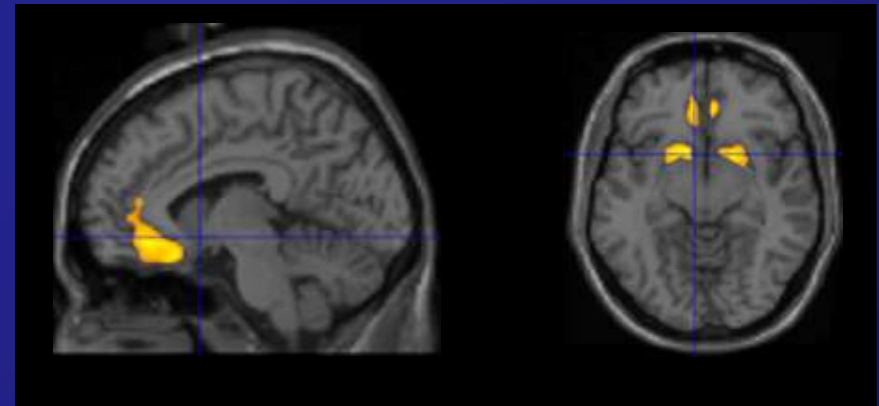
Subjects

VBM Analysis

Schiffer
et al.
(2007)

OCD/
impulsivity

frontal



Junk Data or Blind Monks?



Cantor et al. (2008)

Study

Theory

Prediction

Subjects

VBM Analysis

Cantor
et al.
(2008)

atheoretical

none

65 pedophiles
62 nonsexual
offenders

whole brain
volume
corrected

Procedures

Sexological Measures

Phallometry

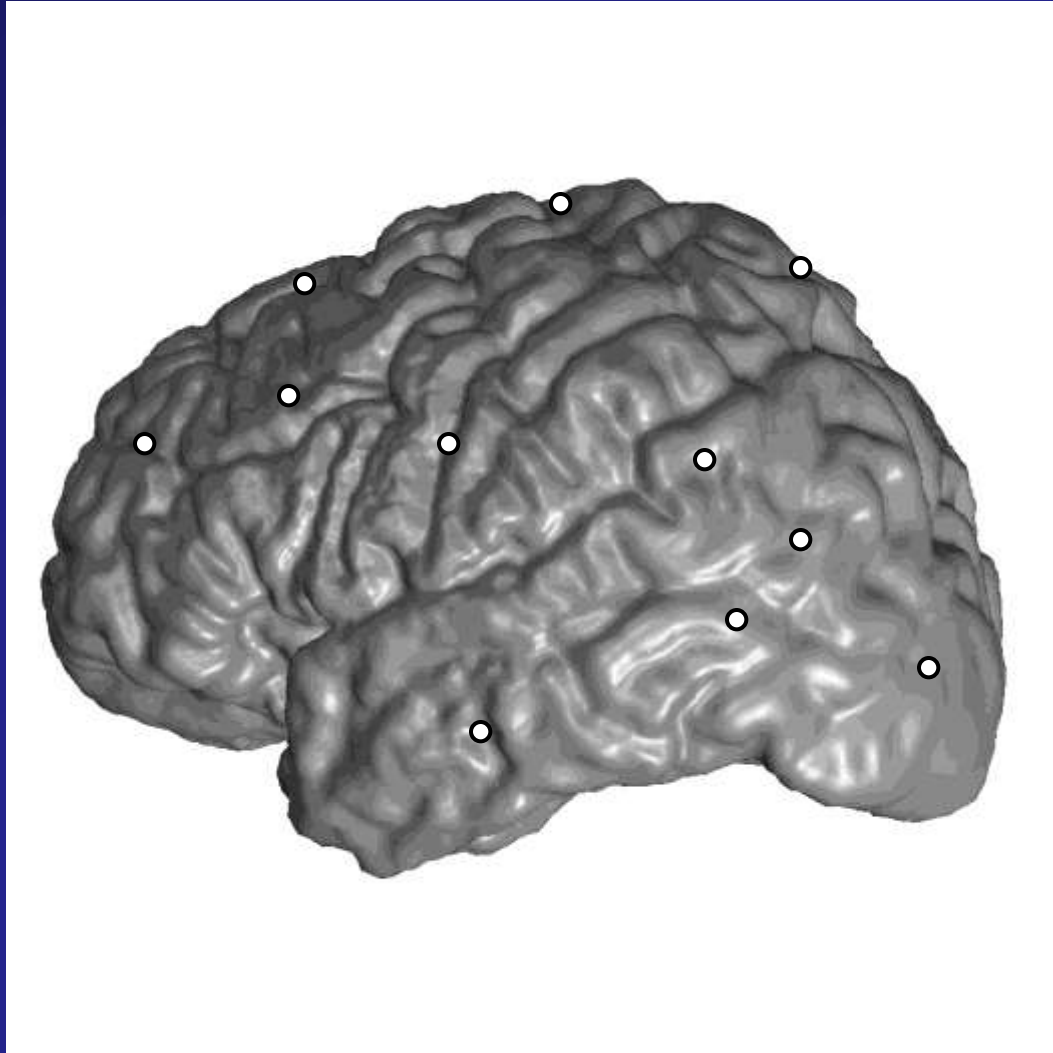
Self-report,
offense history

MRI Measures

Automated parcellation

Voxel-based morphometry
(VBM)

What's a "voxel"?



Subjects

Patients

$n = 65$ sexology patients

Recruited from the Kurt Freund Laboratory (CAMH, Toronto)

Controls

$n = 62$ nonsexual offenders

Recruited from federal and provincial parole/probation offices

Exclusion criteria

<18 years age

>300 lbs weight

Ever suffered traumatic brain injury

Ever diagnosed with schizophrenia

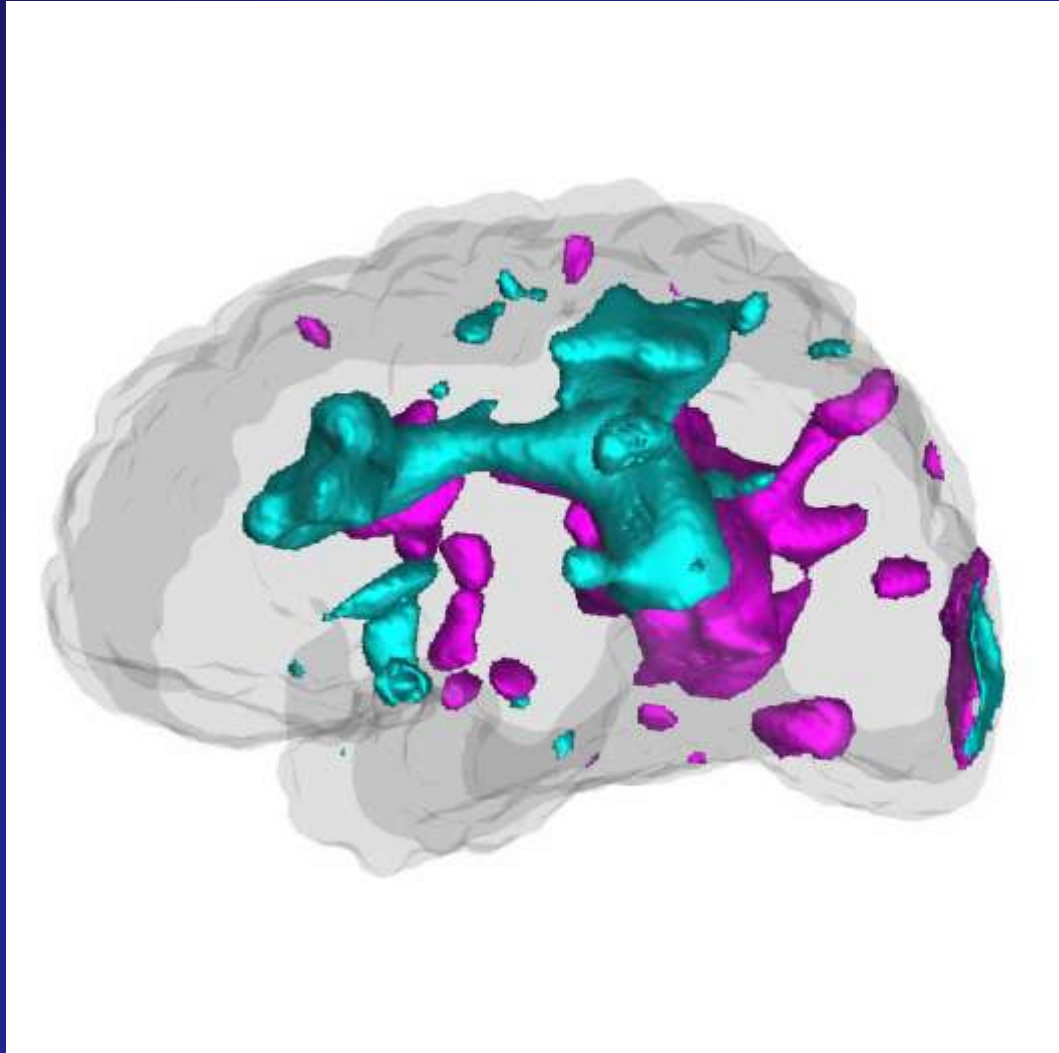
Ever employed grinding metal

Any other metal object in body, counterindicating MRI

Subjects

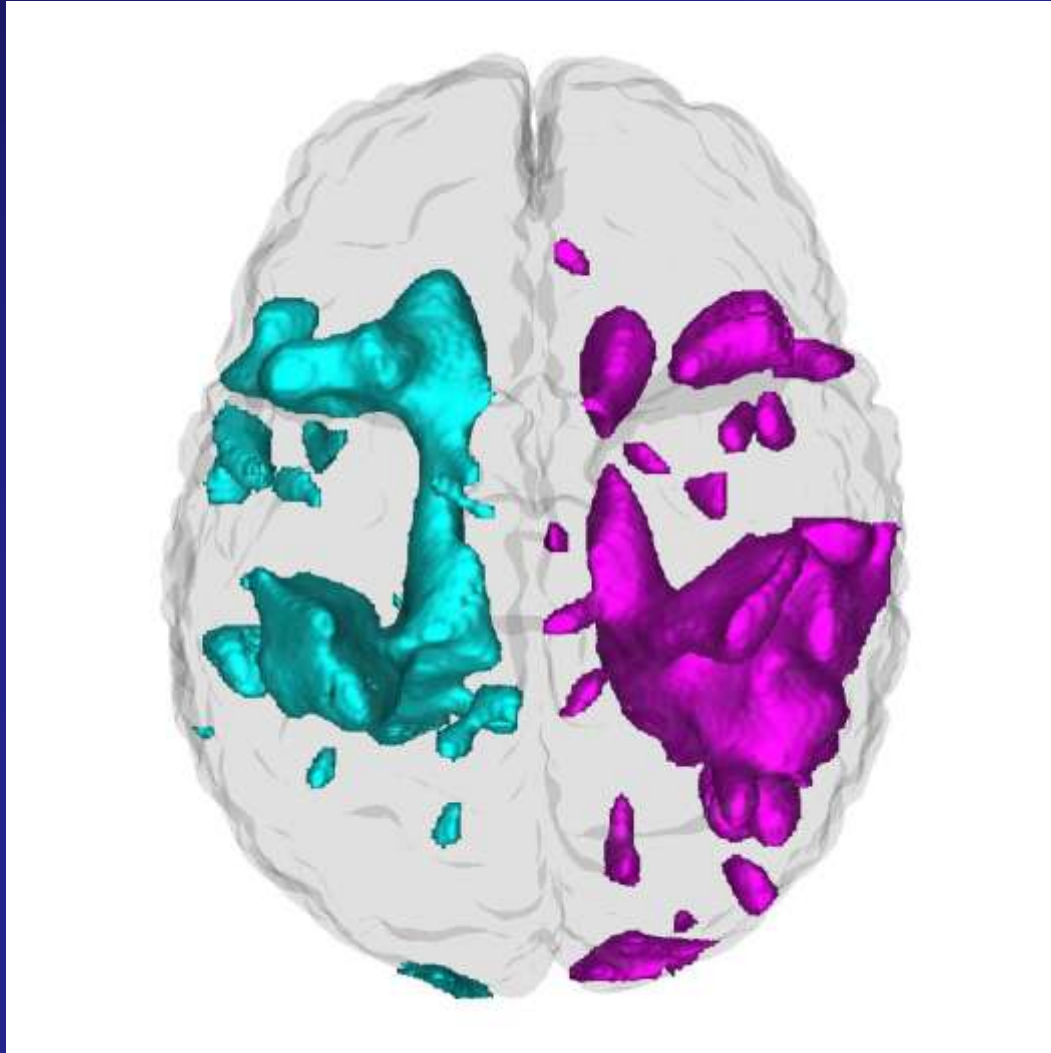
Characteristic	Patients	Controls	Comparison	<i>p</i>
Age	36.4 (13.5)	36.9 (9.4)	$t(125) = -0.23$.82
Full-Scale IQ	96.2 (15.3)	96.3 (11.5)	$t(125) = -0.03$.98
Education	12.2 (3.0)	12.1 (2.8)	$t(125) = 0.20$.84
CAGE alcohol screen	1.1 (1.4)	2.1 (1.6)	$t(125) = -3.8$.0003
% non-right-handed	23.1%	14.5%	$\chi^2(1) = 1.52$.22

VBM of Pedophilic vs. Nonsexual Offender Men

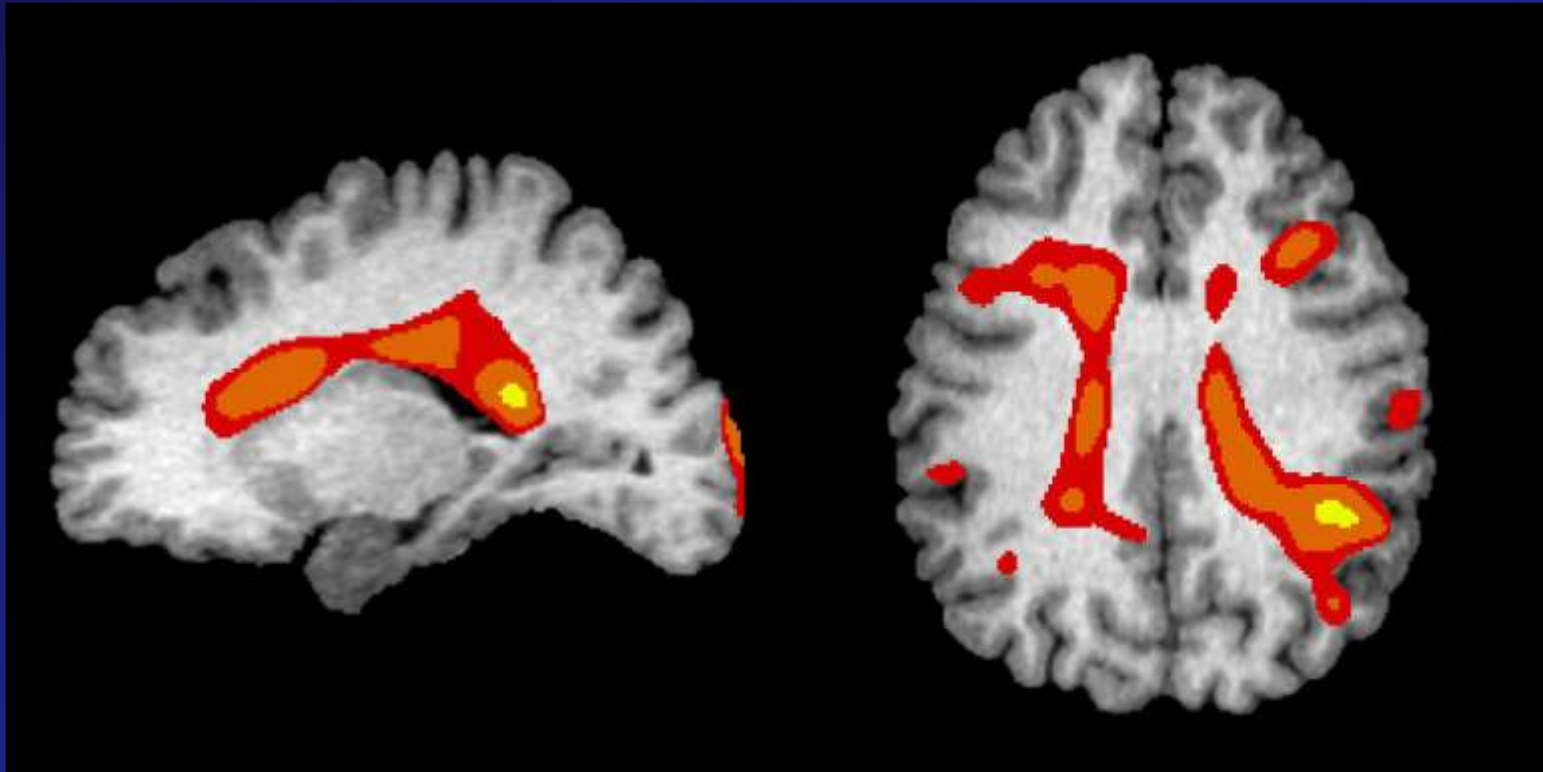


From: Cantor, Kabani, Christensen, Zipursky, Barbaree, et al. (2008). *Journal of Psychiatric Research*, 42, 167–183.

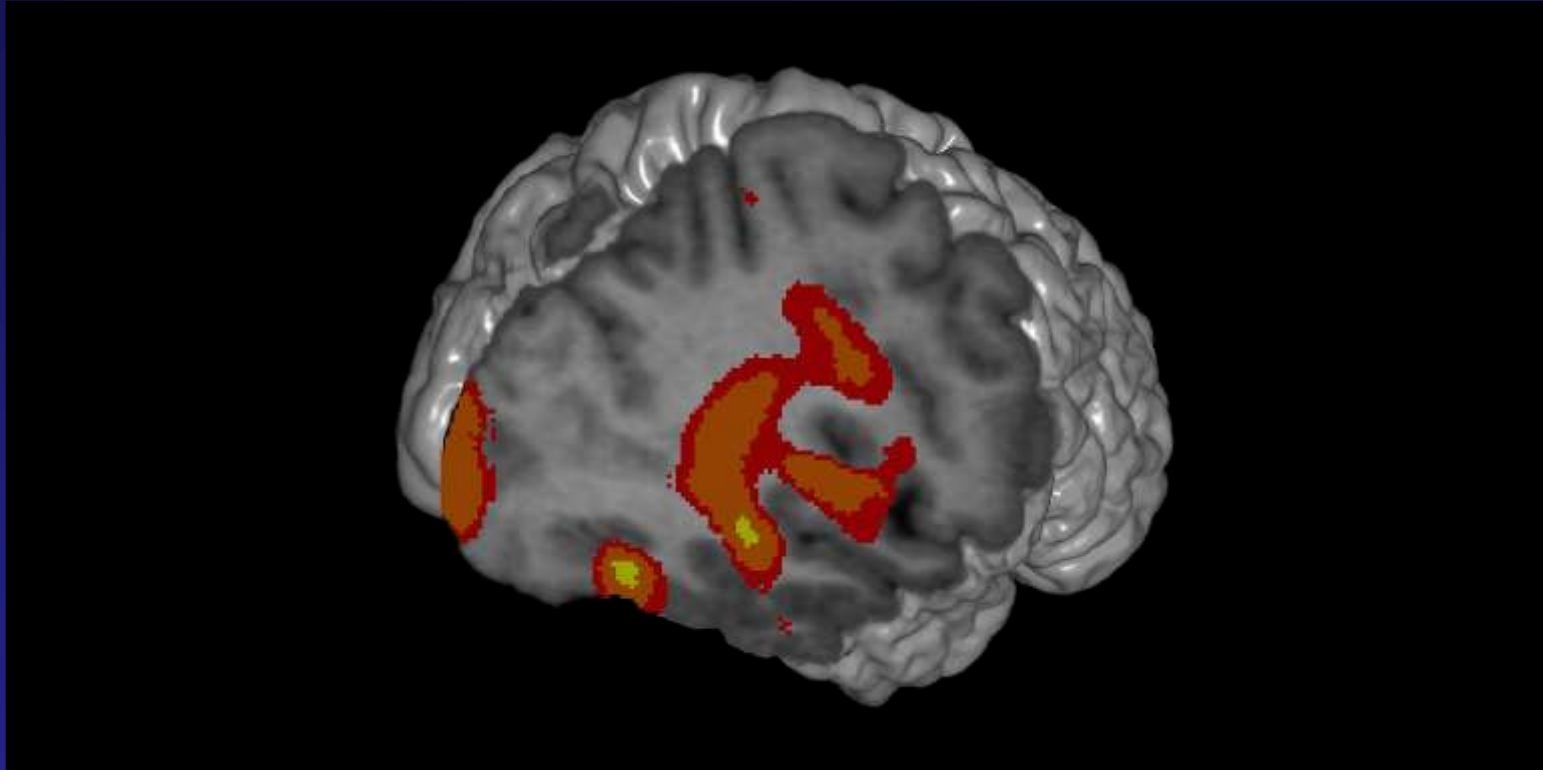
VBM of Pedophilic vs. Nonsexual Offender Men



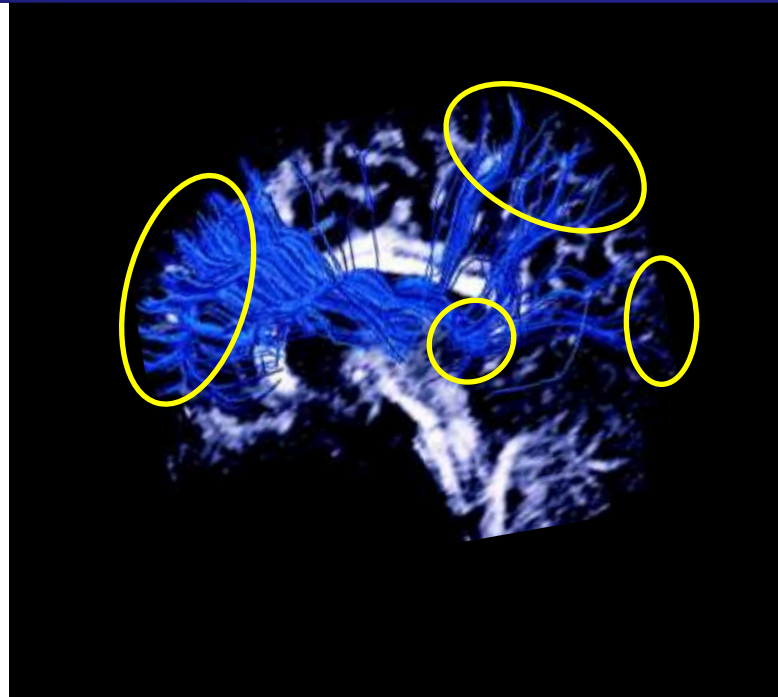
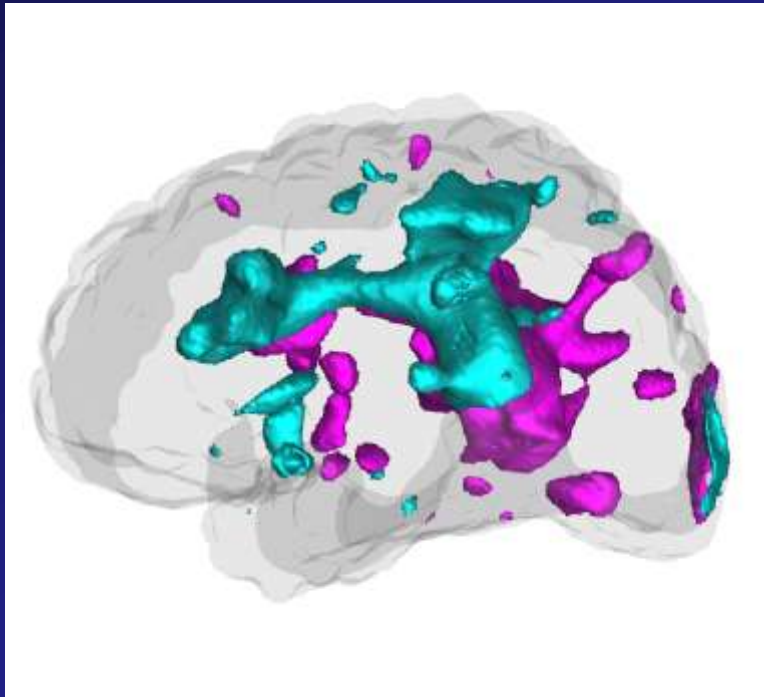
Superior Occipitofrontal Fasciculus



(right) Arcuate Fasciculus



But, what does this *mean*?



Middle Frontal Gyrus

(Ferretti et al., 2005; Garavan et al., 2000; Gizewski et al., 2006; Karama et al., 2002; Montosori et al., 2003; Rauch et al., 2000)

Insula and Opercula

(Garavan et al., 2000; Gizewski et al., 2006; Karama et al., 2002; Park et al., 2001; Stoléru et al., 1999)

Sup./Inf. Parietal Lobules

(Beauregard et al., 2001; Bocher et al., 2001; Ferretti et al., 2005; Mouras et al., 2003; Stoléru et al., 2003)

Occipital Cortex

(Beauregard et al., 2001; Bocher et al., 2001; Ferretti et al., 2005; Garavan et al., 2000; Mouras et al., 2003; Park et al., 2001)

But, what does this *mean*?

1. Humans have multiple social instincts.
2. In typical men, multiple grey matter regions are networked together to identify socially significant stimuli and evoke the species-typical response:
 - Nurturance, parenting
 - Obedience, imitation
 - Sexual arousal, courtship
 - Competition, combat
 - Escape
 - ...etc.
3. In pedophiles, the white matter tissue is underdeveloped and connects the wrong stimulus to the wrong response.

?

Towards Understanding the Contradictions

Study

Theory

Prediction

Subjects

VBM Analysis

Why didn't Schiltz and Schiffer find white matter?

Why didn't Cantor find grey matter?

Towards Understanding the Contradictions

<u>Study</u>	<u>Theory</u>	<u>Prediction</u>	<u>Subjects</u>	<u>VBM Analysis</u>
Schiltz et al. (2007)	limbic	“temporal”	15 pedophiles 15 community controls	small volume corrected
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Cantor et al. (2008)	atheoretical	unbiased	65 pedophiles 62 nonsexual offenders	whole brain volume corrected

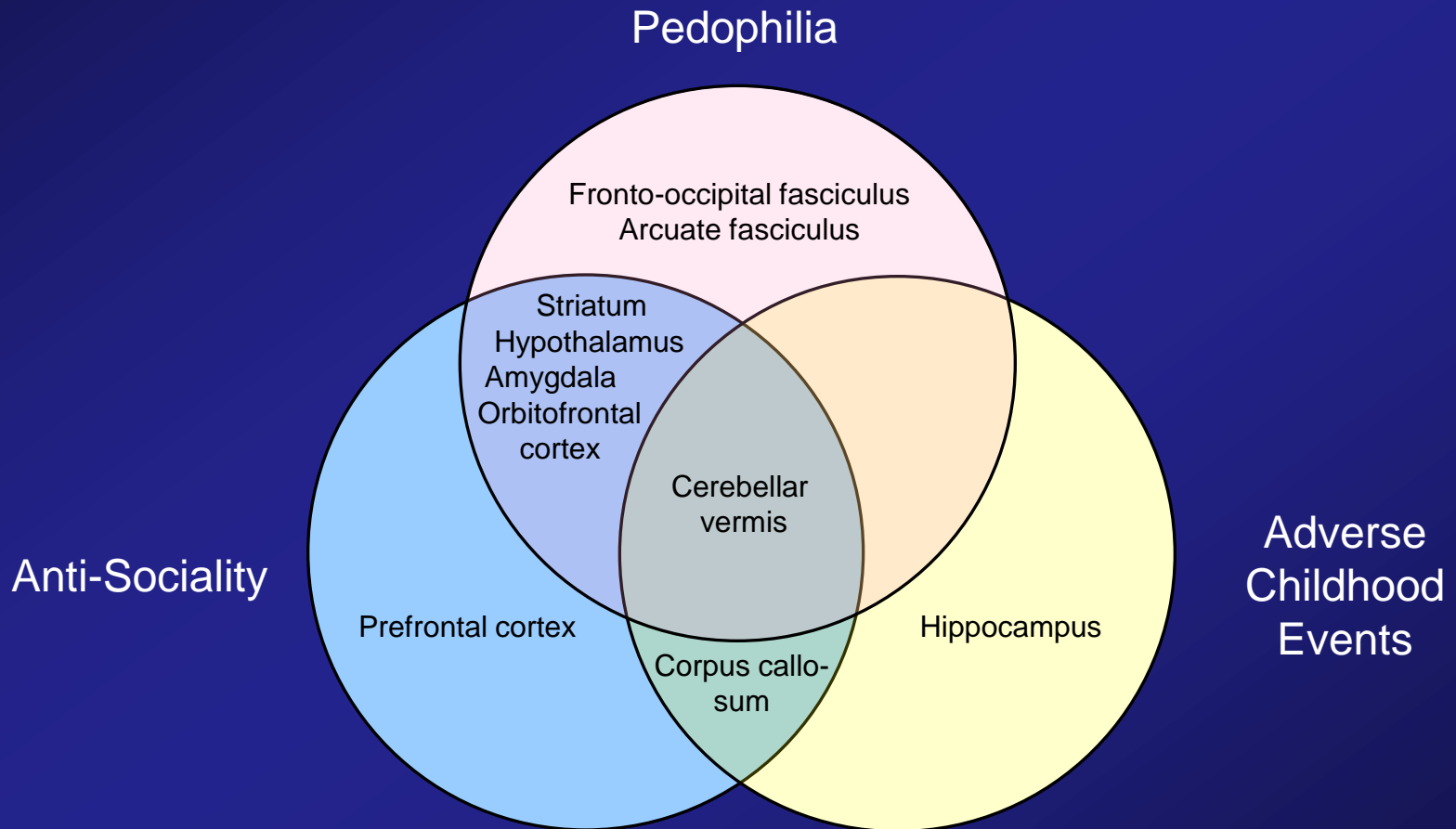
Towards Understanding the Contradictions

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Towards Understanding the Contradictions

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Towards Understanding the Contradictions



So, can an MRI detect pedophilia?

Yes, in groups.

But...there is still disagreement over which anatomy.

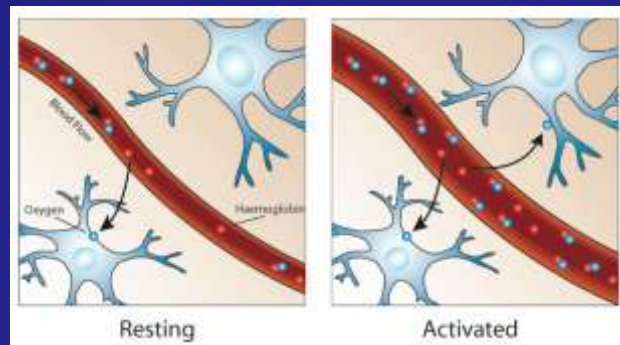
No (or not yet), in individuals.

But...there is also *functional* brain scanning (fMRI).

functional MRI (fMRI)

Subject performs two+ tasks, including a control task.

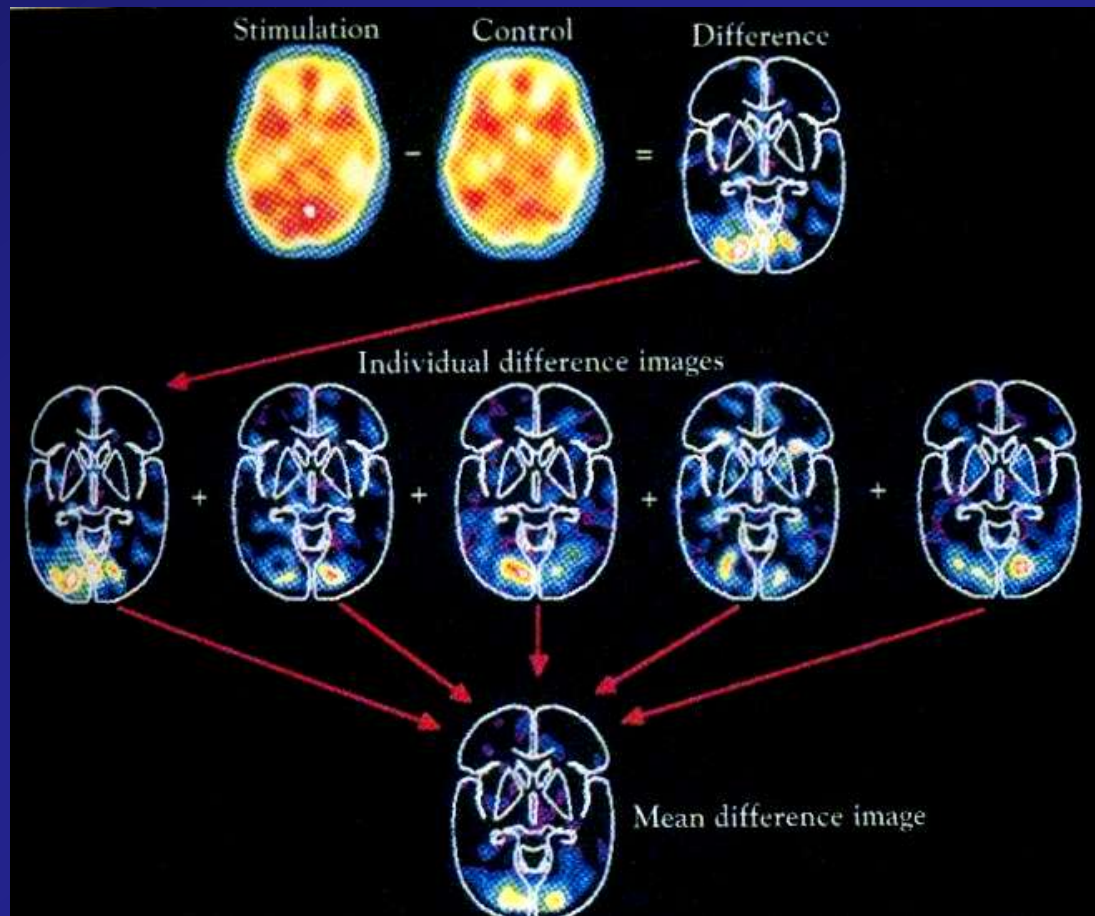
Higher bloodflow = higher activity



Stuart Clare, FMRIB

functional MRI (fMRI)

Subject performs two+ tasks, including a control task.
Use “subtractive” statistics to compare activity between tasks.



functional MRI (fMRI)

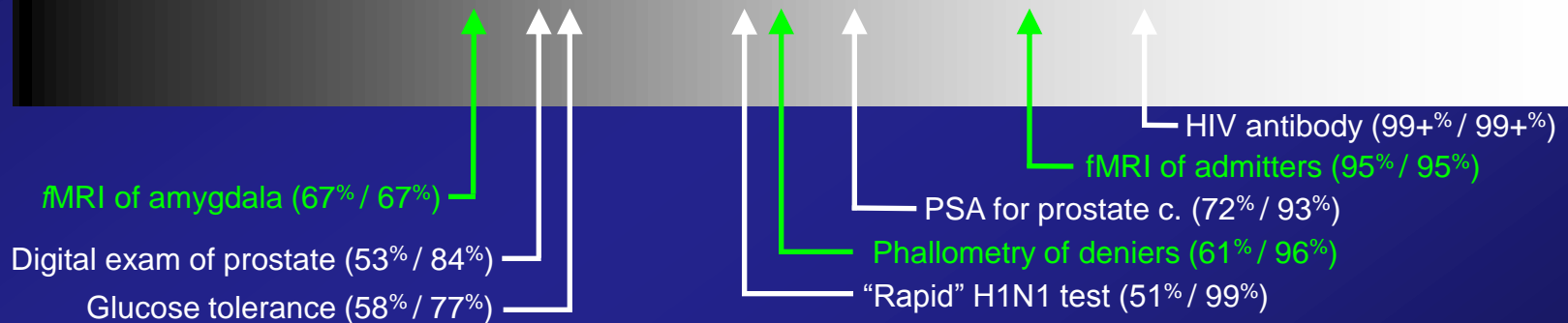
Subject perform two+ tasks, including a control task.

Use “subtractive” statistics to compare activity between tasks.

<u>Study</u>	<u>Anatomy</u>	<u>Subjects</u>	<u>Results</u>
Walter et al. (2007)	whole brain	pedophiles, healthy controls	pedophiles respond analogously to controls
Schiffer et al. (2008a)	whole brain	homosexual pedophiles, healthy gay men	pedophiles respond analogously to controls
Schiffer et al. (2008b)	whole brain	heterosexual pedophiles, heterosexual controls	no pedophilic responses
Poeppl et al. (2011)	whole brain	pedophiles, nonsexual offenders	pedophiles respond analogously, but > controls
Sartorius et al. (2008)	amygdala center	homosexual pedophiles, heterosexual controls	amygdala responded analogously
Ponseti et al. (in press)	empirical subset of brain	diverse pedophiles, diverse controls	88% sensitivity and 100% specificity

So, can fMRI detect arousal to child stimuli?

Research ⇒ Clinical ⇒ Screening ⇒ Evidence



Summary

- Overall features suggest early (*pre-natal*) origins
- Pedophilic *brain structure slightly different* from typical
- Brain differences *not consistent with what changes* with therapy, surgery, or current stem cell research
- Pedophilic brain “*lights up*” in same pattern as non-pedophiles
- Pedophiles respond to stimuli of children rather than adults

The Big Questions

Is it in the brain?

Can we treat it?

Is it in the genes?

Were they born with it?

Does it run in families?

Can it change?

Are they responsible for it?

Can we prevent it?

The Public's Fears

My Fears

My Hopes

What if...?

fMRI provides the next increment in accuracy of diagnosing pedophilia and is employed only within the bounds of contemporary professional ethics:

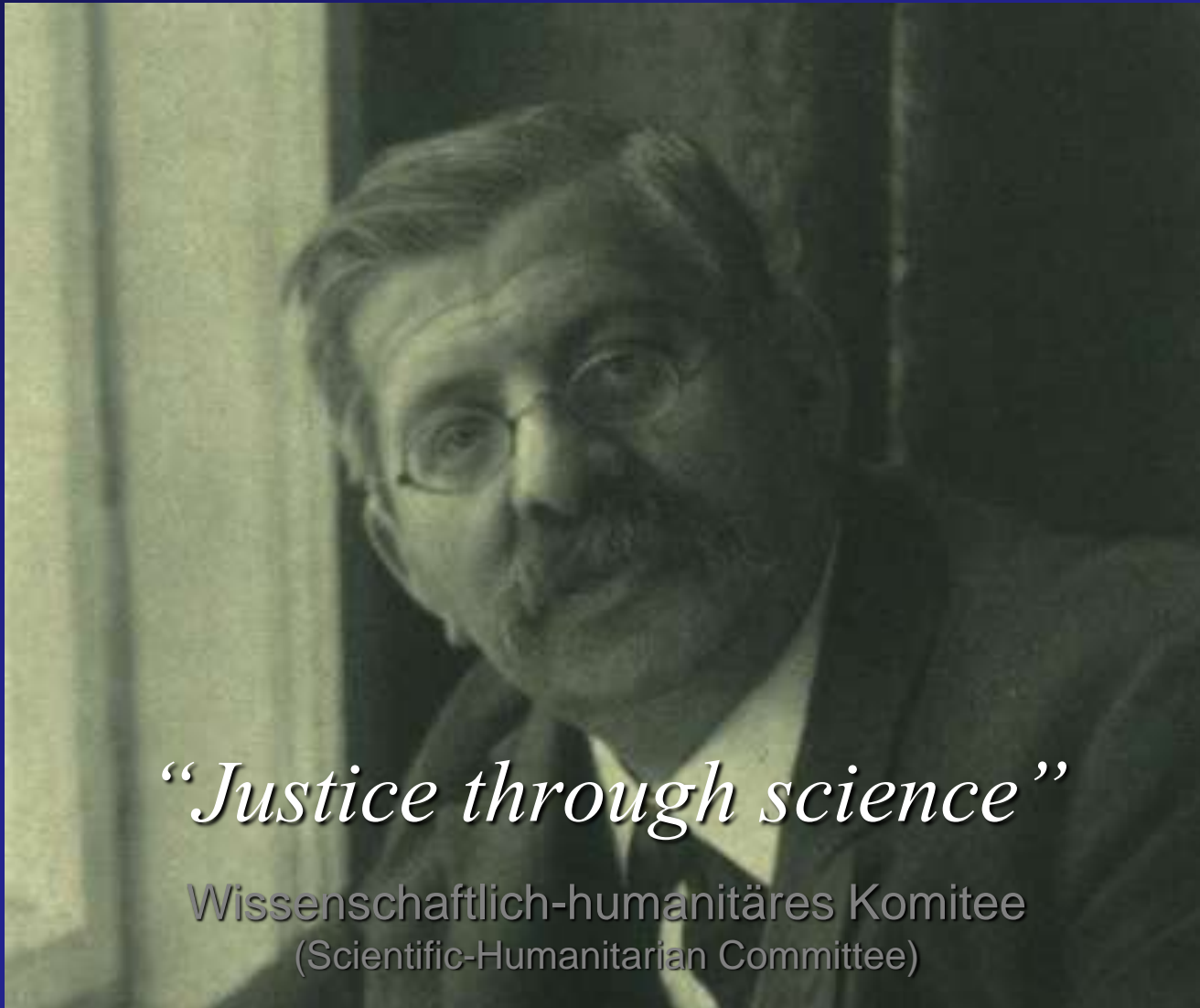
- Informed Consent
- Confidentiality

With continued research, we pinpoint the prenatal process that goes awry.

Perhaps: A *general* prenatal health factor already known to interfere with normal growth of both body and brain...

Instead of preventing a second offense,
we can prevent *the first* offense.

Magnus Hirschfeld (1868–1935)



“Justice through science”

Wissenschaftlich-humanitäres Komitee
(Scientific-Humanitarian Committee)

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