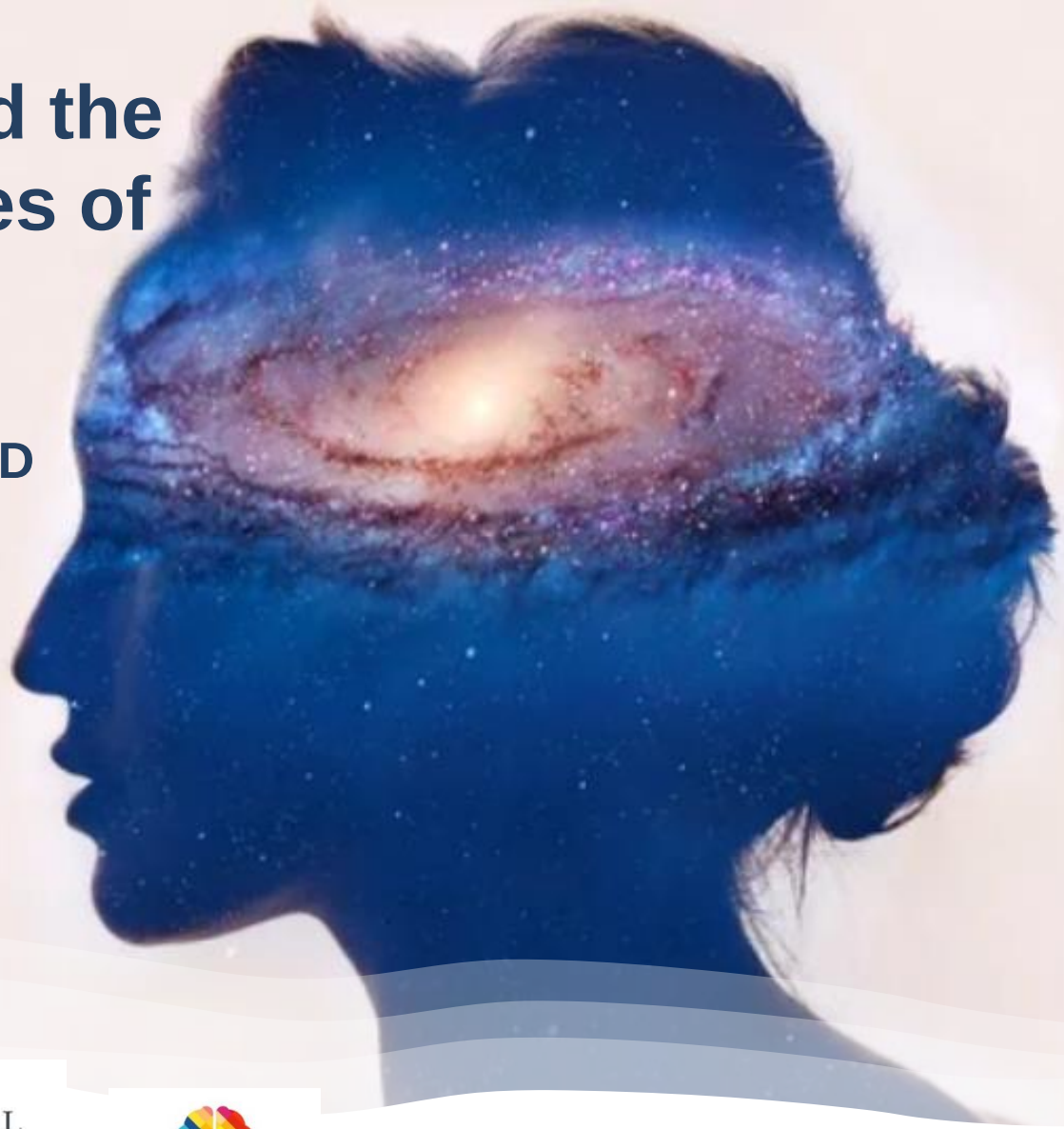
Psychology, Neuroscience, and the Enduring Mysteries of *Mens Rea*



Dr. Francis X. Shen, JD, PhD

***Guilty Minds:* A Virtual Conference on Mens Rea and Criminal Justice Reform**

Academy for Justice
Sandra Day O'Connor College of Law
September 25-26, 2020

MASSACHUSETTS GENERAL HOSPITAL
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Personal introduction: Why and how I study *mens rea*

A simple framework: How might new knowledge in psychology and neuroscience improve legal doctrine and practice concerning *mens rea*?

Research snapshot #1: Improving our guesses about what defendants were thinking

Research snapshot #2: Improving our understanding about how jurors assess what defendants were thinking (and what blame, if any, to impose)

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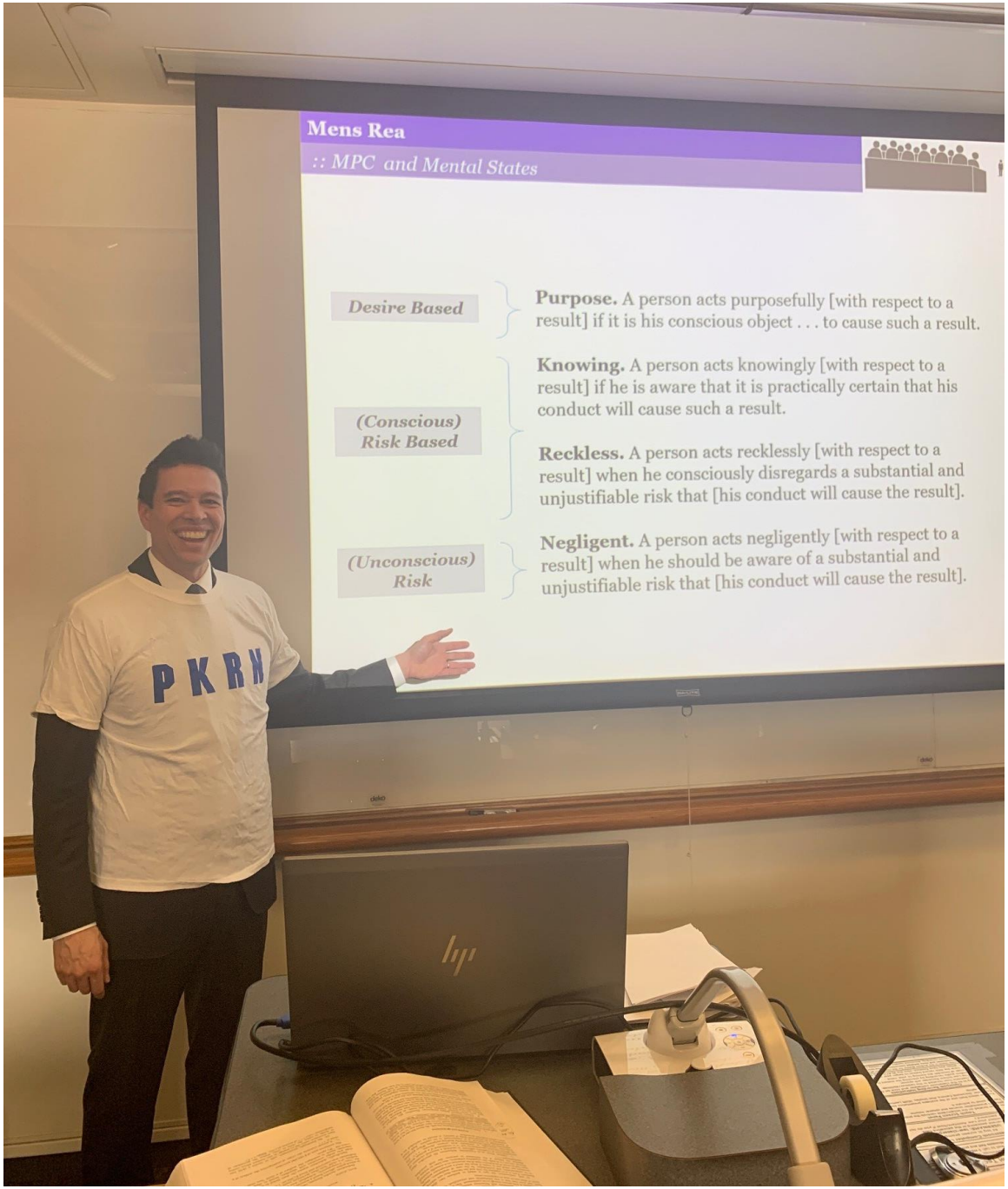
I  MENS REA.


Mens Rea
:: MPC and Mental States
Desire Based
Purpose. A person acts purposefully [with respect to a result] if it is his conscious object . . . to cause such a result.
(Conscious) Risk Based
Knowing. A person acts knowingly [with respect to a result] if he is aware that it is practically certain that his conduct will cause such a result.
Reckless. A person acts recklessly [with respect to a result] when he consciously disregards a substantial and unjustifiable risk that [his conduct will cause the result].
(Unconscious) Risk
Negligent. A person acts negligently [with respect to a result] when he should be aware of a substantial and unjustifiable risk that [his conduct will cause the result].
PKRN

Acknowledgments: This presentation draws in part on work completed in collaboration with many colleagues and the MacArthur Foundation Research Network on Law and Neuroscience *Intent & Punishment Working Group:* Richard Bonnie (Virginia), Joshua Greene (Harvard), Morris Hoffman (2nd Judicial Dist., CO), Owen D. Jones (Vanderbilt), René Marois (Vanderbilt), Stephen J. Morse (UPenn), & Kenneth Simons (Boston Univ.)

The MacArthur Foundation Research Network on

Law and Neuroscience

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The *Research Network on Law and Neuroscience*, supported by the John D. and Catherine T. MacArthur Foundation, addresses a focused set of closely-related problems at the intersection of neuroscience and criminal justice: 1) determining the law-relevant mental states of defendants and witnesses; 2) assessing a

SEARCH GO

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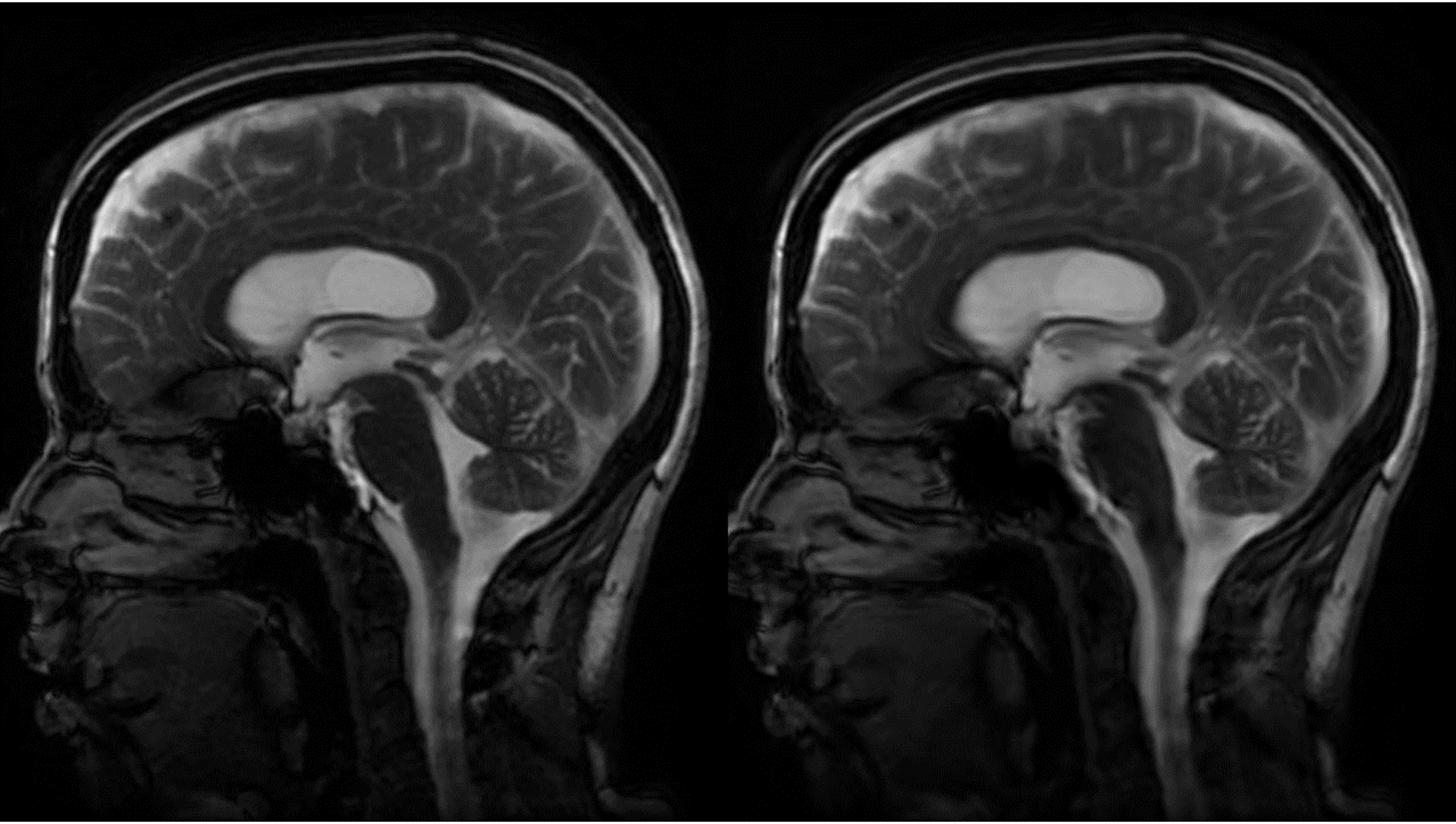

Image source: I Terem, WW Ni, M Goubran, M. Salmani Rahimi, G. Zaharchuk, KW Yeom, ME Moseley, M Kurt, S.J. Holdsworth. **Revealing sub-voxel motions of brain tissue using phase-based amplified MRI (aMRI).** Magnetic Resonance in Medicine, 80(6):2549-2559 (2018).

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What was D thinking?

~= How was D's brain processing information *at the time of the alleged offense*?

What D says he/she was thinking at the time + **D's behavior** at the time

Intuitions (both accurate and inaccurate, biased and unbiased) about how ***people like D*** generally think/act.

NEW SCIENCE

Scientific data on how ***people like D*** generally think/act, and how the brains of ***people like D*** generally process information.

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To determine if mental disorder negates mens rea, one must simply ask, using straightforward common sense to provide an answer, if the defendant's disordered mental state actually indicates that mens rea was not formed on the occasion. . . .

. . . mental disorder may not necessarily be inconsistent with formation of mens rea, but evidence of disorder may help bolster the defendant's claim that he did not form it. . . .

the crucial issue is to determine what the defendant's actual mental state was and to compare that mental state to the mental state required by the crime charged. Of course, the lurking problem is that it is sometimes very difficult to determine a defendant's mental state at the time of the crime. . . .

Stephen J. Morse & Morris B. Hoffman, *The Uneasy Entente Between Legal Insanity and Mens Rea: Beyond* Clark v. Arizona, 97 J. Crim. L. & Criminology 1071, 1087 (2007)

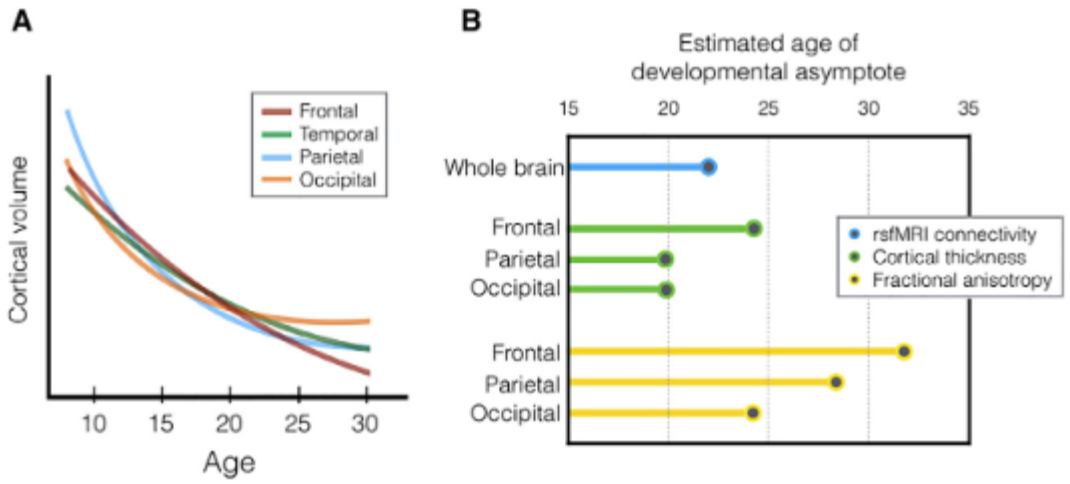


Figure 1. Regional and Methodological Variance in Neurodevelopmental Indices

(A) Trajectories of cortical gray matter volume adjusting for total brain volume. Trajectories are schematized from data reported in Ostby et al. (2009).

(B) Ages of developmental asymptote for connectivity and structural data. Resting-state functional connectivity (rsfMRI) data from Dosenbach et al. (2010) and the other measures reflect data reported in Tamnes et al. (2010). Note that the operationalization of "asymptote" varies by study.

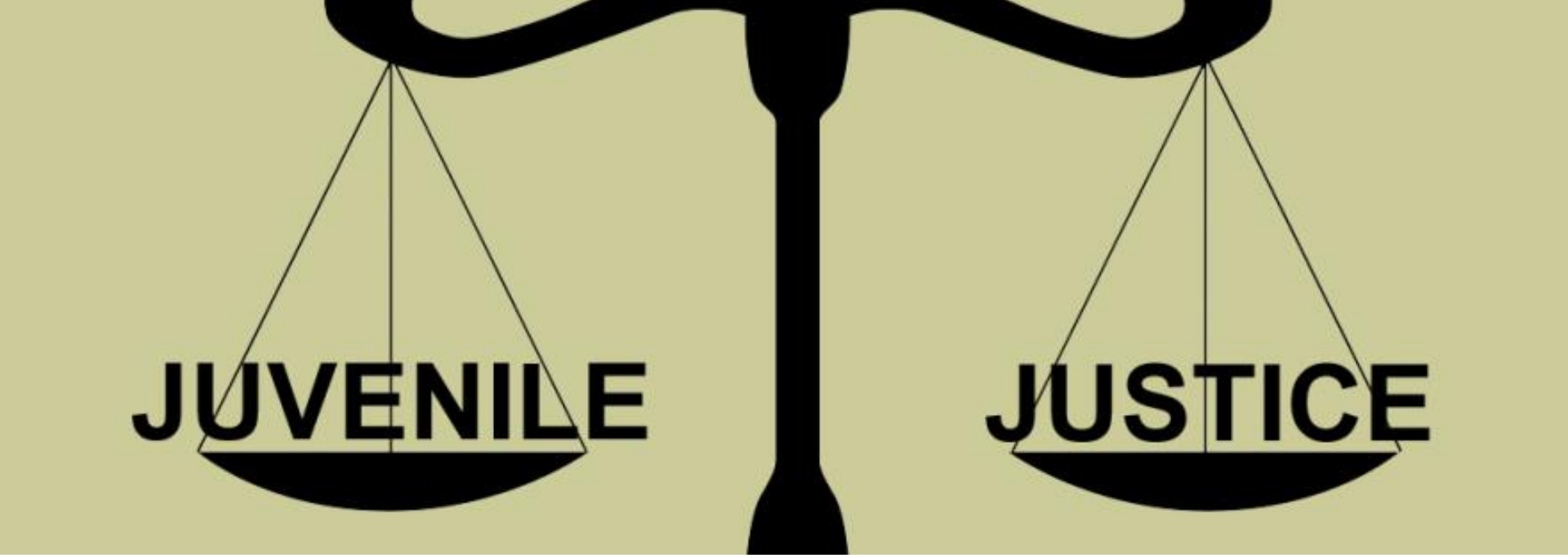
Searching for Signatures of Brain Maturity: What Are We Searching For?

Neuron
NeuroView

Leah H. Somerville[1,*]
[1]Department of Psychology and Center for Brain Science, Harvard University, Cambridge, MA 02138, USA
*Correspondence: somerville@fas.harvard.edu
http://dx.doi.org/10.1016/j.neuron.2016.10.059

Evidence of continued neurobiological maturation through adolescence is increasingly invoked in discussions of youth-focused policies. This should motivate neuroscientists to grapple with core issues such as the definition of brain maturation, how to quantify it, and how to precisely translate this knowledge to broader audiences.

https://www.cell.com/neuron/pdf/S0896-6273(16)30809-1.pdf



. . . [a] one-size-fits-all approach to mens rea is not only inconsistent with scientific evidence that the cognitive processes of adolescents differ from those of adults, but also undermines the purpose of mens rea when applied to juvenile offenders. As a result, I argue that the mens rea standard as applied to juveniles should be recalibrated to account for what is now known about adolescent development.

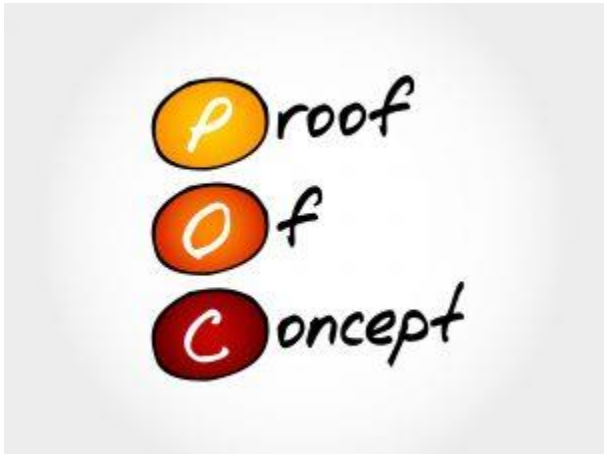
Jenny E. Carroll, *Brain Science and the Theory of Juvenile Mens Rea*, 94 N.C. L. Rev. 539, 541 (2016)

At least one study suggests that "knowing" and "reckless" are in fact distinct brain states.

Predicting the knowledge–recklessness distinction in the human brain

Iris Vilares[a,b,1], Michael J. Wesley[c,1], Woo-Young Ahn[d], Richard J. Bonnie[e], Morris Hoffman[f], Owen D. Jones[g,h], Stephen J. Morse[i], Gideon Yaffe[j,2], Terry Lohrenz[b], and P. Read Montague[a,b,2]

[a]Wellcome Trust Centre for Neuroimaging, University College London, London WC1N 3BG, United Kingdom; [b]Virginia Tech Carilion Research Institute, Virginia Tech, Roanoke, VA 24016; [c]Department of Behavioral Science, University of Kentucky College of Medicine, Lexington, KY 40506; [d]Department of Psychology, Ohio State University, Columbus, OH 43210; [e]Institute of Law, Psychiatry and Public Policy, University of Virginia, Charlottesville, VA 22903; [f]Second Judicial District (Denver), State of Colorado, Denver, CO 80202; [g]Vanderbilt Law School, Vanderbilt University, Nashville, TN 37203; [h]Department of Biological Sciences, Vanderbilt University, Nashville, TN 37203; [i]University of Pennsylvania Law School, University of Pennsylvania, Philadelphia, PA 19104; and [j]Yale Law School, Yale University, New Haven, CT 06511



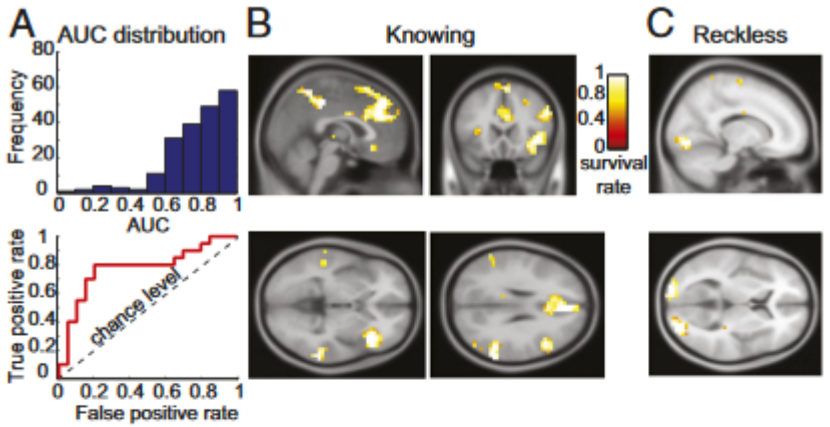


Fig. 2. The K/R distinction, for the Search-First condition. These results were obtained based on the brain state at the time that the contraband risk is revealed (suitcases shown), when the contraband risk is presented after the search risk (Search-First condition, $n = 20$). (*A*, *Top*) Distribution of cross-validated areas under the curve (AUCs). AUC values close to 1 indicate "perfect" classification, whereas those close to 0.5 suggest random classification. Forty iterations of a fivefold cross-validated EN regression were performed, resulting in the 200 AUC calculations plotted in the histogram (mean out-of-sample AUC = 0.79). (*Bottom*) Example of one receiver-operating characteristic (ROC) curve obtained, from which an AUC is drawn. The dashed line represents a "curve" from a model that would perform at chance level (hence the area under this "curve" is 50%, i.e., the AUC would be 0.5). ROC curves consistently above this dashed line are associated with AUC values higher than 0.5. (*B*) Areas predictive of being in a knowing situation ($P_{contr} = 1$). Represented is the (signed) survival rate for the voxels. The "signed survival rate" for a voxel is the proportion of times this voxel was used in the EN classifier (i.e., got coefficient values different from zero), multiplied by the sign of the average beta value for this voxel (see *Supporting Information* for details). Hence, absolute survival rate values closer to 1 mean that the voxel "survives" most of the cross-validated runs of the EN algorithm, indicating that this voxel is relevant in distinguish a knowing ($P_{contr} = 1$) from a reckless ($P_{contr} = 0.2$) situation. Voxels with a negative signed survival rate are shown, indicating regions predictive of being in the knowing situation (the base group in our model). (*C*) Areas predictive of being in a reckless situation ($P_{contr} = 0.2$; voxels with a positive survival rate). Each voxel's (signed) survival rate is overlaid on a sagittal (*B*, *Top Left*, $x = 2$; *C*, *Top*, $x = 14$), coronal (*B*, *Top Right*, $y = 20$), or axial (*B*, *Bottom*, $z = -2$ *Left*, $z = 26$ *Right*; *C*, $z = 6$) section of a 152-participant average T1 SPM brain template (minimum survival rate for the cluster's peak voxel of 0.5). The xjView program was used to display all of the brain figures.

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Trends in Neurosciences

Science & Society

The Emerging Neuroscience of Third-Party Punishment

Frank Krueger[1,2,‡,*] and Morris Hoffman[3,4,5]

Although it is far too early to say that cognitive neuroscience will have any direct impact on how we sentence criminals, patterns are nevertheless emerging that suggest a neural framework for punishment that could one day have important legal and social consequences.

Krueger and Hoffman propose a theory of punishment that involves three related brain networks:

1) A "salience network" – to determine whether the 3rd party has violated a norm ("Did a bad thing happen here?")

2) A "default mode network" – to integrate information about the harm caused to the victim and the mental state of the offender, in order to arrive at an assessment of blame or no blame. ("Is someone to blame for this bad thing?")

3) A "central executive network" – to consider many contextual details in order to arrive at an actual punishment decision. ("How much should this guy be punished?")

A theory about how the brain arrives at punishment decisions:

"On a neural level, evaluation of harms engaged brain areas associated with affective and somatosensory processing, whereas mental state evaluation primarily recruited circuitry involved in mentalization. Harm and mental state evaluations are integrated in medial prefrontal and posterior cingulate structures, with the amygdala acting as a pivotal hub of the interaction between harm and mental state. This integrated information is used by the right dorsolateral prefrontal cortex at the time of the decision to assign an appropriate punishment through a distributed coding system."

Behavioral/Cognitive

Parsing the Behavioral and Brain Mechanisms of Third-Party Punishment

Matthew R. Ginther,[1,2] Richard J. Bonnie,[3] Morris B. Hoffman,[4] Francis X. Shen,[5] Kenneth W. Simons,[6] Owen D. Jones,[2,7,8,9] and René Marois[9,10]

[1]Neuroscience Graduate Program, Vanderbilt University, Nashville, Tennessee 37203, [2]Vanderbilt Law School, Nashville, Tennessee 37203, [3]Institute of Law, Psychiatry and Public Policy, University of Virginia School of Law, Charlottesville, Virginia 22903, [4]District Judge, Second Judicial District (Denver), State of Colorado, Denver, Colorado 80202, [5]Department of Law, University of Minnesota, Minneapolis, Minnesota 55455, [6]Department of Law, University of California, Irvine School of Law, Irvine, California 92697, [7]Departments of Law and Biological Sciences, Vanderbilt University, Nashville, Tennessee 37203, [8]Director, MacArthur Foundation Research Network on Law and Neuroscience, [9]Center for Integrative and Cognitive Neuroscience, and [10]Department of Psychology, Vanderbilt University, Nashville, Tennessee 37240

The way our brains assess the defendant's mental state (e.g. intentional action vs. unintentional action) affects our emotional circuitry.

When we think the defendant acted intentionally, graphic descriptions of the harm raise amygdala activity and affect amygdala connectivity with lateral prefrontal cortex. But when we think the defendant did not act intentionally, the same emotional circuitry is not activated.

ARTICLES

nature neuroscience

Corticolimbic gating of emotion-driven punishment

Michael T Treadway[1,2,10], Joshua W Buckholtz[3,10], Justin W Martin[3], Katharine Jan[4], Christopher L Asplund[5], Matthew R Ginther[6], Owen D Jones[6–8] & René Marois[9]

Determining the appropriate punishment for a norm violation requires consideration of both the perpetrator's state of mind (for example, purposeful or blameless) and the strong emotions elicited by the harm caused by their actions. It has been hypothesized that such affective responses serve as a heuristic that determines appropriate punishment. However, an actor's mental state often trumps the effect of emotions, as unintended harms may go unpunished, regardless of their magnitude. Using fMRI, we found that emotionally graphic descriptions of harmful acts amplify punishment severity, boost amygdala activity and strengthen amygdala connectivity with lateral prefrontal regions involved in punishment decision-making. However, this was only observed when the actor's harm was intentional; when harm was unintended, a temporoparietal-medial-prefrontal circuit suppressed amygdala activity and the effect of graphic descriptions on punishment was abolished. These results reveal the brain mechanisms by which evaluation of a transgressor's mental state gates our emotional urges to punish.

https://www.nature.com/articles/nn.3781/

Holding *mens rea* constant, our psychological mechanisms for blame / punishment factor in the offender's character traits.

For instance, "we are likely to blame more severely a drug-addicted high school dropout who knocks down ten rural mailboxes with a baseball bat than an A-student who is on the chess team who engages in the same act."

BLAMING AS A SOCIAL PROCESS: THE INFLUENCE OF CHARACTER AND MORAL EMOTION ON BLAME

JANICE NADLER*

https://www.jstor.org/stable/23216756

Harm: The vice-president of a company went to the chairman of the board and said, “We are thinking of starting a new program. It will help us increase profits, but it will also harm the environment.” The chairman of the board answered, “I don't care at all about harming the environment. I just want to make as much profit as I can. Let's start the new program.” They started the new program. Sure enough, the environment was harmed.

82% of subjects say that the chairman brought about the bad side effect intentionally

Help: The vice-president of the company went to the chairman of the board and said, “We are thinking of starting a new program. It will help us increase profits, and it will also help the environment.” The chairman of the board answered, “I don't care at all about helping the environment. I just want to make as much profit as I can. Let's start the new program.” They started the new program. Sure enough, the environment was helped. (Knobe, 2003a, p. 191).

77% of subjects say that the chairman did <u>not</u> bring about the good side effect intentionally

Knobe, J. (2003a). Intentional action and side-effects in ordinary language. Analysis, 63, 190-194

"We report the first empirical investigation into intentionality ascriptions made by professional judges, which finds (i) that professionals are sensitive to the moral valence of outcome type, and (ii) that the worse the outcome, the higher the propensity to ascribe intentionality. The data shows the intentionality ascriptions of professional judges to be inconsistent with the concept of mens rea supposedly at the foundation of criminal law."

ELSEVIER

Contents lists available at ScienceDirect

Cognition

journal homepage: www.elsevier.com/locate/cognit

COGNITION

Original Articles

Mens rea ascription, expertise and outcome effects: Professional judges surveyed

Markus Kneer[a,*], Sacha Bourgeois-Gironde[b]

[a] Department of History and Philosophy of Science, University of Pittsburgh, 4200 Fifth Avenue, 15260 Pittsburgh, United States
[b] Department of Economics, Université Panthéon-Assas, 12 place du Panthéon, 75005 Paris, France

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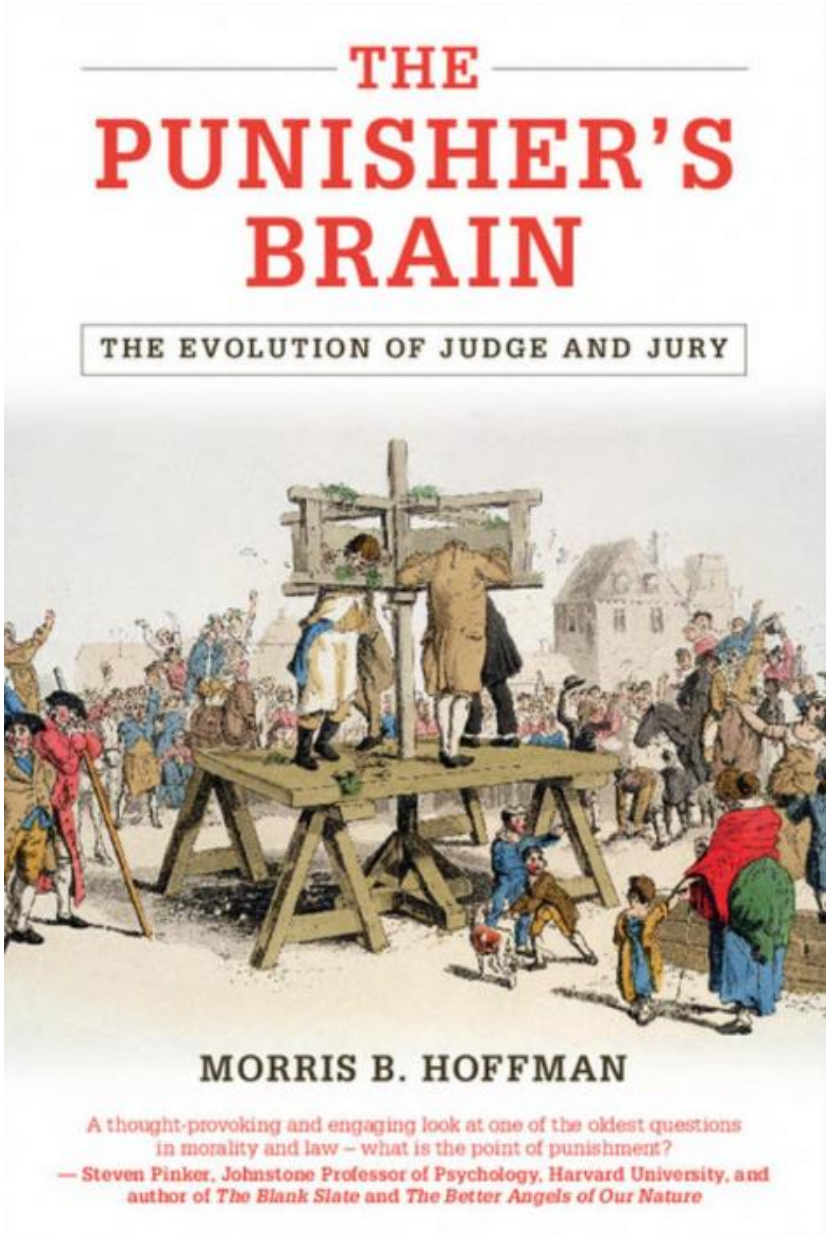

NYU
NEW YORK UNIVERSITY
LAW REVIEW

SORTING GUILTY MINDS

FRANCIS X. SHEN,[α] MORRIS B. HOFFMAN,[β] OWEN D. JONES,[χ]
JOSHUA D. GREENE,[δ] & RENÉ MAROIS[ε]

VANDERBILT LAW REVIEW

The Language of Mens Rea

Matthew R. Ginther[a]
Francis X. Shen[β,γ]
Richard J. Bonnie[δ]
Morris B. Hoffman[ε]
Owen D. Jones[ζ]
René Marois[η]
Kenneth W. Simons[θ,ι]

Decoding Guilty Minds:
How Jurors Attribute Knowledge and Guilt

Matthew R. Ginther,[1] Francis X. Shen,[2] * Richard J. Bonnie,[3]
Morris B. Hoffman,[4] Owen D. Jones,[5] & Kenneth W. Simons[6,7]

JNeurosci
THE JOURNAL OF NEUROSCIENCE

Parsing the Behavioral and Brain Mechanisms of Third-Party Punishment

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HASTINGS LAW JOURNAL

MINORITY MENS REA:
RACIAL BIAS AND CRIMINAL MENTAL STATES

Francis X. Shen [α]

Motivation

:: *MPC and Mental States*

Desire Based

Purpose. A person acts purposefully [with respect to a result] if it is his conscious object . . . to cause such a result.

Motivation

:: *MPC and Mental States*

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(Conscious) Risk Based

Knowing. A person acts knowingly [with respect to a result] if he is aware that it is practically certain that his conduct will cause such a result.

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Reckless. A person acts recklessly [with respect to a result] when he consciously disregards a substantial and unjustifiable risk that [his conduct will cause the result].

(Unconscious) Risk

Negligent. A person acts negligently [with respect to a result] when he should be aware of a substantial and unjustifiable risk that [his conduct will cause the result].

Motivation

:: MPC and Mental States – COVID-19 Version

Desire Based

Purpose. John has been tested and diagnosed with COVID-19. John is not happy with his neighbor for parking his car in John's driveway. John decides to walk over to his neighbor's yard and cough on the neighbor in order to try and give him the virus. The neighbor contracts COVID-19.

(Conscious) Risk Based

Knowing. John has been tested and diagnosed with COVID-19. John is not happy with his neighbor for parking his car in John's driveway. John decides to walk over to his neighbor's yard and yell at him, standing just inches away. While yelling, John coughs on the neighbor. The neighbor contracts COVID-19.

Reckless. John has a very high fever of 102 degrees, and is having trouble breathing. John has been tested for COVID-19, but does not have his results back yet. John is not happy with his neighbor for parking his car in John's driveway. John decides to walk over to his neighbor's yard and yell at him, standing just inches away. While yelling, John coughs on the neighbor. The neighbor contracts COVID-19.

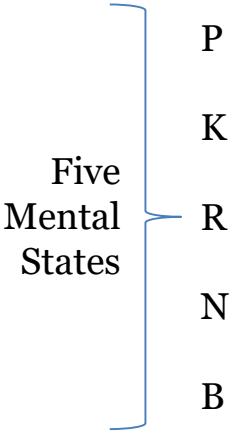
(Unconscious) Risk

Negligent. John has a very high fever of 102 degrees, and is having trouble breathing. But he genuinely thinks he just has a little cold, and doesn't give it a second thought. John is not happy with his neighbor for parking his car in John's driveway. John decides to walk over to his neighbor's yard and yell at him, standing just inches away. While yelling, John coughs on the neighbor. The neighbor contracts COVID-19.

1) To what extent do people *rank order* these 4 categories, by punishment, in the order the MPC prescribes?

2) To what extent do people – either naturally or with jury instructions – *accurately sort* mental states into the 4 categories of the MPC?

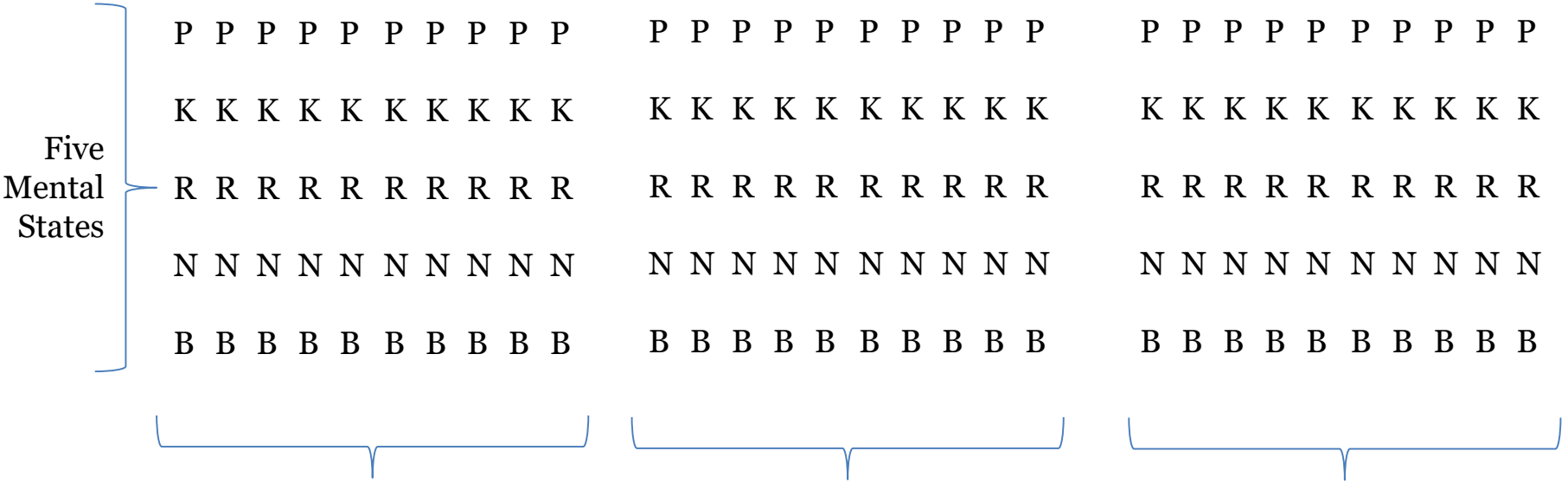
5 Scenarios (P, K, R, N, B) Per Theme (Fact Pattern)



5 Scenarios (P, K, R, N, B) Per Theme (Fact Pattern)

x 30 Unique Themes

= *150 Unique Scenarios*



Low Harm
(e.g. John spills coffee on victim's mail)

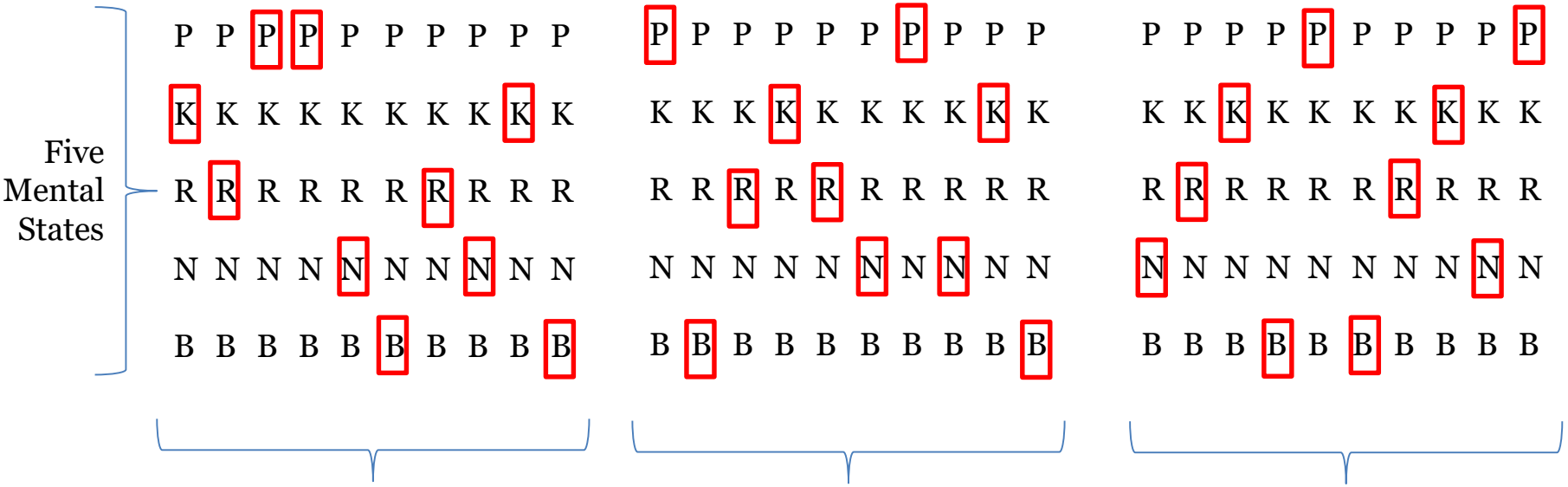
Medium Harm
(e.g. John throws full soda can at victim's face, breaking his nose)

High Harm
(e.g. John starts avalanche that kills two people)

First, subjects assigned to one of 16 unique protagonists:

John, age 18	Jamal, age 18	Emily, age 18	Lakisha, age 18
John, age 24	Jamal, age 24	Emily, age 24	**Lakisha, age 24**
John, age 48	Jamal, age 48	Emily, age 48	Lakisha, age 48
John, age 64	Jamal, age 64	Emily, age 64	Lakisha, age 64

Second, subjects randomly shown 30 unique scenarios (each with the same protagonist)



Low Harm
(e.g. Lakisha spills coffee on victim's mail)

Medium Harm
(e.g. Lakisha throws full soda can at victim's face, breaking his nose)

High Harm
(e.g. Lakisha starts avalanche that kills two people)

First sentence *(identical within theme)*

Sets the context

Second sentence *(varies by PKRN + B)*

Signals John's mental state

Third sentence *(identical within themes)*

Sets the harm

First sentence *(identical within theme)*

Sets the context

Second sentence *(varies by PKRN + B)*

Signals John's mental state

Third sentence *(identical within themes)*

Sets the harm

Table 2. Language Used To Signal John's Mental State In Scenarios

1. **Purposefully** (consciously intends the specific harm)
    a. Decides to (achieve the specific harm)
    b. Intends (or with the intention of)
    c. Desires that
    d. Wants to
    e. Chooses to
2. **Knowingly** (similar language as Purposefully, but with contextual clarification that John doesn't separately *intend* the harm that occurs; he is instead aware that acting to fulfill his separate intention *will certainly cause* (100% certain) the harm that does happen)
    a. Practically certain that [the harm will occur]
    b. Aware that [the harm] will almost certainly occur
    c. Almost positive that [the harm will occur]
    d. Virtually certain that [the harm will occur]
    e. Understands that [the harm] is almost guaranteed to occur
3. **Recklessly** (very heavily discounts or disregards the risk)
    a. Aware there is a substantial risk [the harm might occur], but chooses to ignore it.
    b. Realizes it is very likely [the harm might occur], but decides to act anyway
    c. Conscious of the likelihood [of the harm], but simply doesn't care
    d. Understands that harm could easily happen, but decides to risk it.
    e. Knows there is a good chance that [the harm will occur], but chooses to act anyway.
4. **Negligently** (objective risk flagged in scenario; emphasis on subjective ignorance of risk)
    a. Carelessly
    b. Wasn't paying attention
    c. Hurriedly (made clear through context)
    d. Without even noticing
    e. Overlooks
5. **Blamelessly** (wherein harm results from:)
    a. Despite being as careful as he could, accidentally
    b. [Act is involuntary]
    c. Unavoidably
    d. Through an honest mistake
    e. Inadvertently [causes harm] despite his best efforts.

Illustration: Varying Mental State Within A Single Theme

1) Start with sentence #1 (held constant)

Every year Emily holds a fourth of July party at her home where she invites her friends and family to enjoy her food and her fireworks.

2) Add sentence #2 (randomly selected from 1 of 5 options):

Purposeful
Emily aims a firework so that it will explode right next to Ryan's head, with the desire of injuring him in retaliation for a previous dispute between them.

Knowing
Emily aims a firework so that it will explode right next to Ryan's head in order to scare him, practically certain that Ryan will be injured as a result.

Reckless
Emily aims a firework so that it will explode right by Ryan's head in order to scare him, realizing there is some risk that Ryan might be injured.

Negligent
Emily aims a firework so that it will explode right by Ryan's head in order to scare him, overlooking the real chance that Ryan would be injured.

Blameless
Despite being as careful as she could when setting off the firework, a sudden gust of wind results in Emily accidentally setting the firework off right in Ryan's direction.

3) Finish with sentence #3 (held constant)

The firework Emily set off explodes next to Ryan's head, bursting his eardrum and making him unable to hear in that ear for several months.

Illustration: Varying Mental State Within A Single Theme

Sentence 1 of 3	Mental State in Scenario	Sentence 2 of 3	Sentence 3 of 3
John is doing carpentry work on his house, which abuts a public mountain bike trail.	Purposeful	Angry at the mountain bikers for making too much noise when biking past his house, one day while carrying a large armload of planks, John desires to injure some bikers and drops some of the planks on to the bike trail.	Two bikers passing by at that moment hit the planks, crash as a result, and are seriously injured.
	Knowing	While carrying wood planks, John drops some onto the trail and doesn't pick them up because he wants to start the carpentry work, even though he is practically certain that in doing so bikers will hit the planks and be injured.	
	Reckless	While carrying wood planks, John drops some onto the trail and doesn't pick them up because he wants to start the carpentry, even though he is aware that there is a substantial risk that bikers will hit the planks and be injured.	
	Negligent	One day while John is carrying wood planks from his shed to his workshop in order to begin building a new set of steps for his house, he drops some of the wood planks onto the bike trail without noticing.	
	Blameless	One day while John is carefully carrying wood planks from his shed to the backyard where he is building a wood porch, a sudden strong gust of wind causes John to inadvertently drop several planks, despite his best efforts not to.	

Outcome variable: On a scale from 0–9, with 0 being no punishment and 9 being extreme punishment, how much should John be punished for his behavior?

Figure 1. Average Punishment Ratings For Purposeful, Negligent, and Blameless Scenarios (Plotted By Harm Level Ranking of Theme)

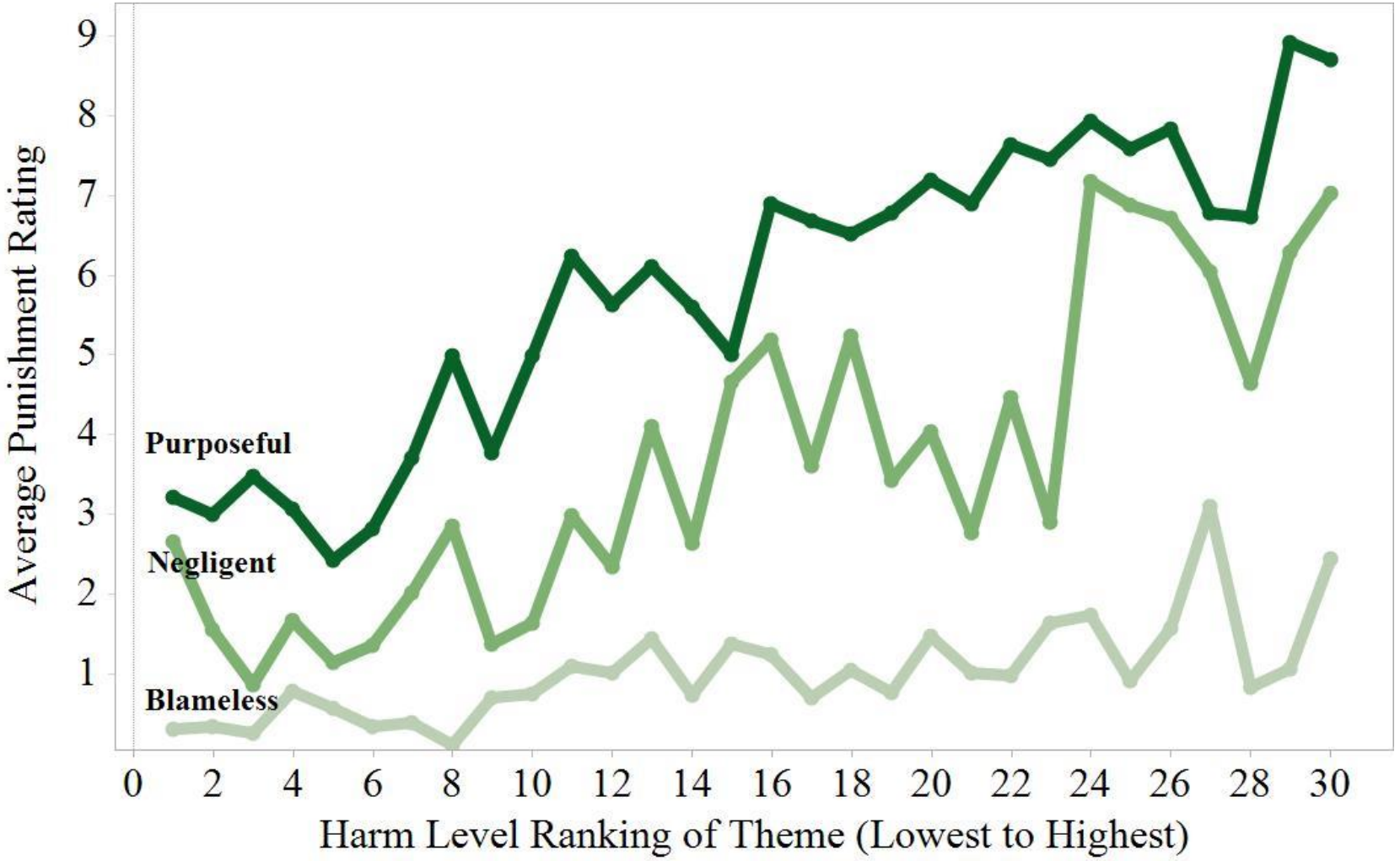
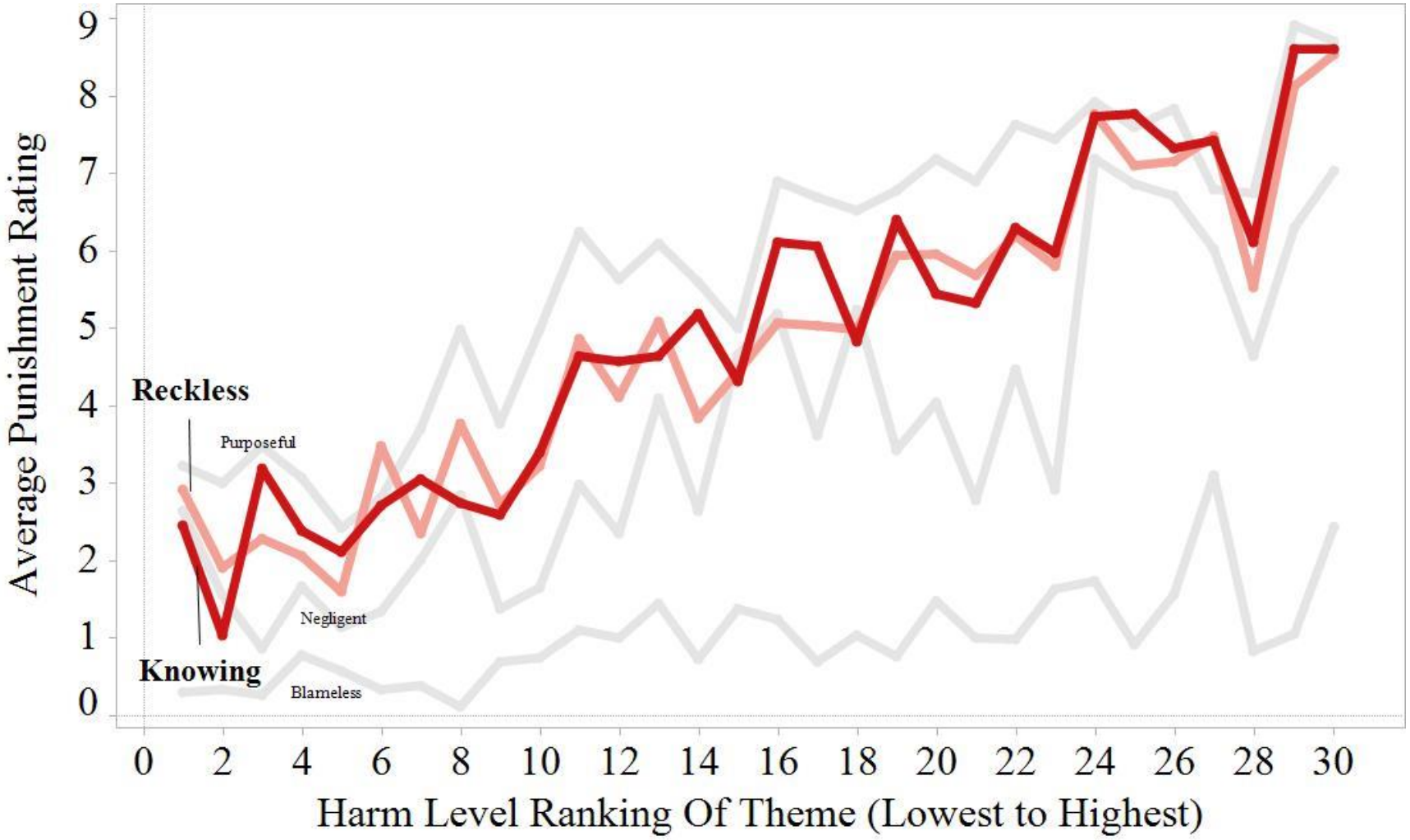


Figure 2. Average Punishment Ratings For Knowing and Reckless Scenarios (Plotted By Harm Level Ranking of Theme)



Results

:: *Experiment 4 – Sorting Task*

John is attending a football game and is seated behind a row of fans. Angry at the fans who are in front of him because they keep standing up and blocking his view of the game, John wants to hit one of them with his water bottle, and throws his full water bottle at the fans in front of him. The water bottle glances off one of the fellow fan's arms, without doing any damage.

Please select from the options below the definition that best matches John's mental state in this scenario:

- ○ Purposefully. A person acts "purposefully" when his conscious objective is to cause the specific result.
- ○ Knowingly. A person acts "knowingly" when he is aware that his conduct is practically certain to cause the result.
- ○ Recklessly. A person acts "recklessly" when he consciously disregards a substantial and unjustified risk that a result will occur or that a circumstance exists.
- ○ Negligently. A person acts "negligently" when, through a gross deviation from the standard of care that a reasonable person would exercise, he fails to perceive a substantial and unjustified risk that a result will occur or that a circumstance exists.
- ○ Blamelessly. A person acts "blamelessly" even though he may have caused harm, if he lacked any of the culpable mental states defined above.

Next >>

Table 6. Sorting Success Rate In Experiment 4 ("Can Subjects Distinguish Between Mental States?"), By Mental State

	Correct Mental State: **Purposeful**	Correct Mental State: **Knowing**	Correct Mental State: **Reckless**	Correct Mental State: **Negligent**	Correct Mental State: **Blameless**
Subject chose: **Purposeful**	**78%**	8%	5%	2%	0%
Subject chose: **Knowing**	14%	**50%**	42%	5%	1%
Subject chose: **Reckless**	5%	29%	**40%**	31%	3%
Subject chose: **Negligent**	2%	10%	12%	**48%**	8%
Subject chose: **Blameless**	1%	2%	1%	15%	**88%**

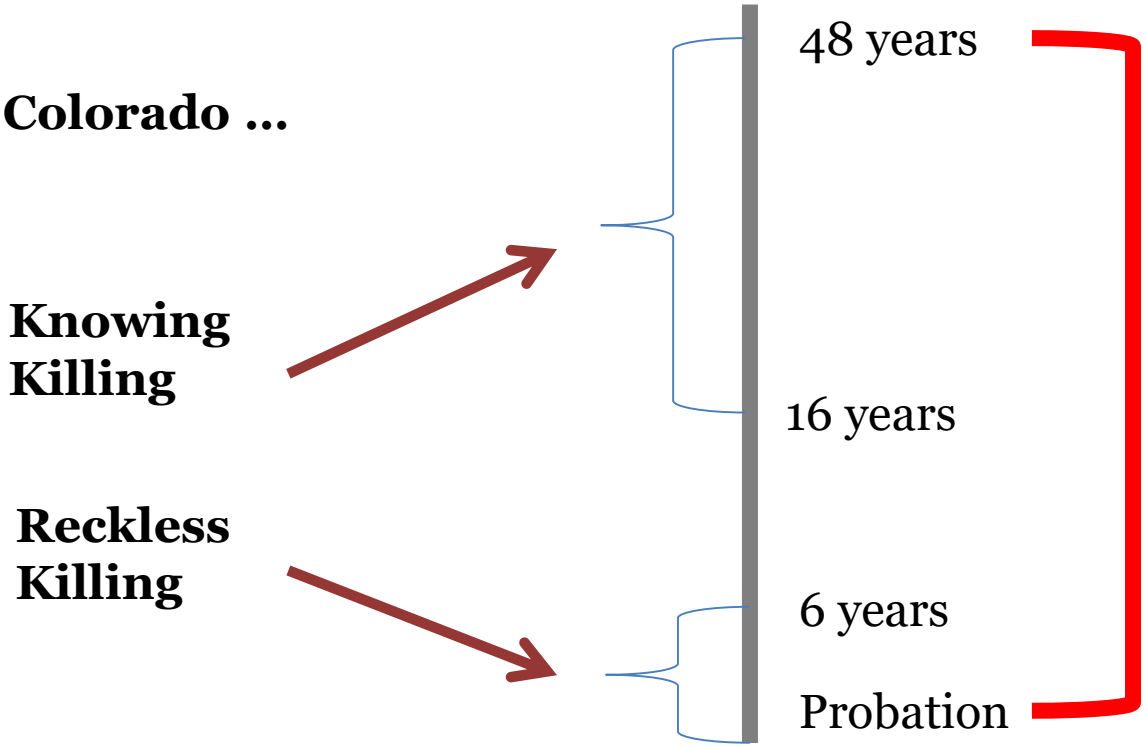
Implications of First Study

:: Sentencing

Does Knowing vs. Reckless matter?

Often, no.

***But*, in Colorado …**



Language of *Mens Rea*

:: *New Experiments*

1. Will different MPC definitions affect results?

a. Eliminated "consciously disregards" language from the R definition.

b. Removed the "unjustified" language from the N definition.

2. Which signaling language (from original study) is most effective at communicating mental states?

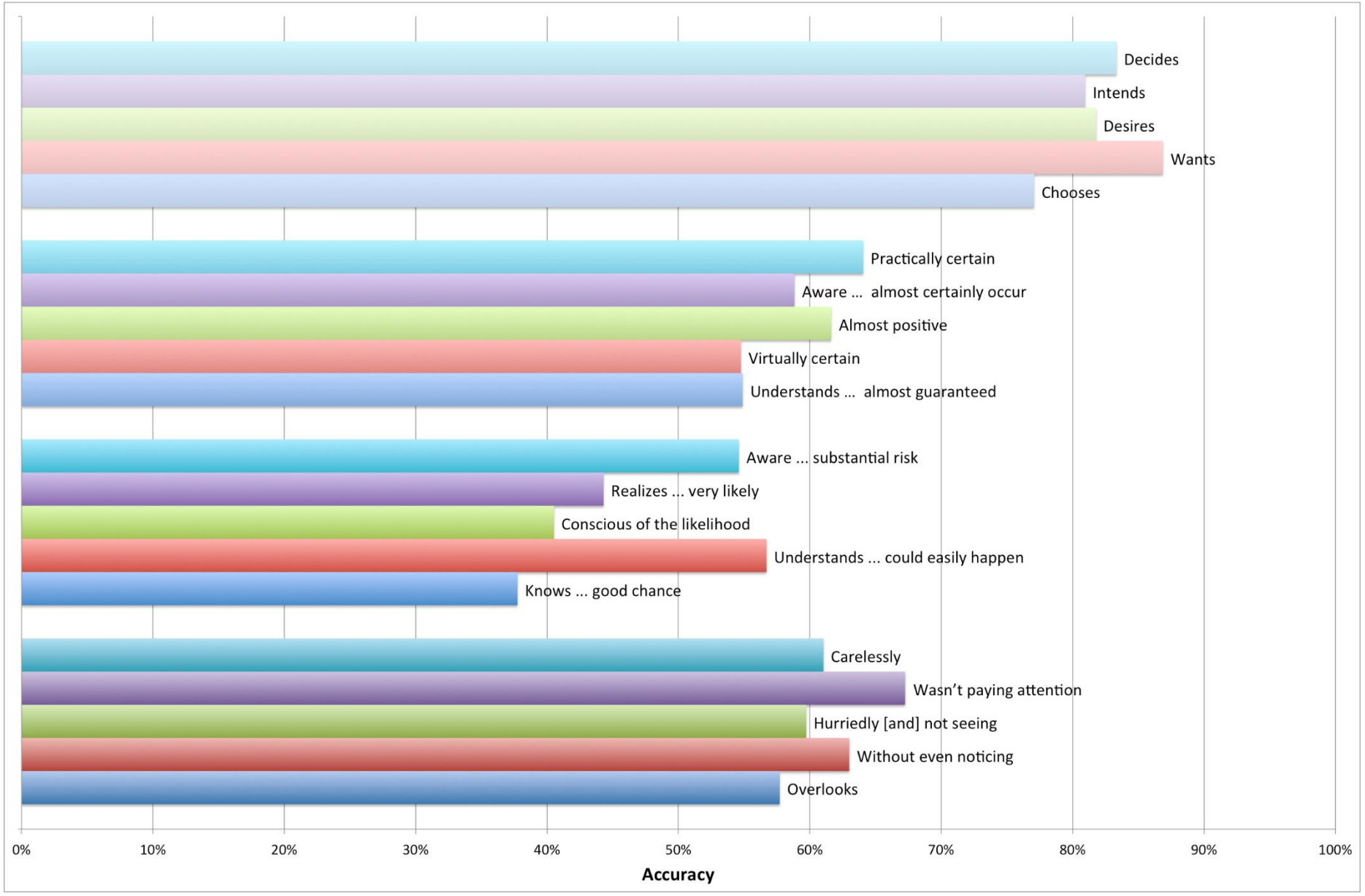
Re-ran experiments with systematic variation of signaling language (9 themes).

3. Can the signaling of Reckless be better communicated through different words?

Introduced new definitions of recklessness

Implications & Next Steps

:: *New Results: Signal Variant Studies*



Implications & Next Steps

:: New Results: Signal Variant Studies (Table 8)

	Original Accuracy	New Accuracy	Change
Purposeful	78%	80%	+ 2%
Knowing	50%	58%	+ 8%
Reckless	40%	45%	+ 5%
Negligent	48%	60%	+ 12%

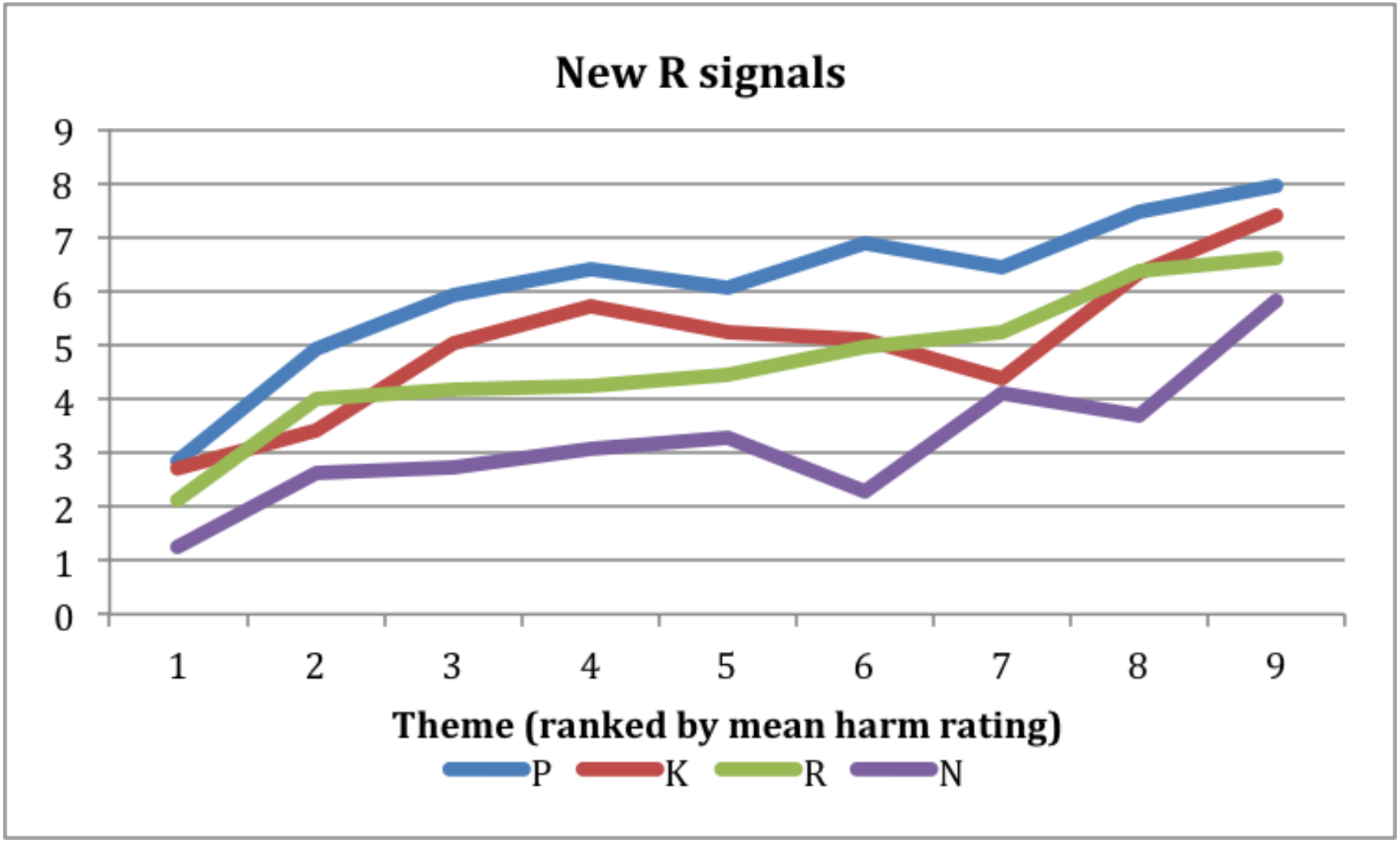
Implications & Next Steps

:: New Results: Signal Variant Studies (Table 7)

	Original Accuracy	New Accuracy	Change
Aware there is a substantial risk that [the harm will occur].	52%	65%	+ 13%
Realizes ~~**it is very likely**~~ **there is some risk** that [the harm will occur].	42%	70%	+ 28%
Conscious of the ~~**likelihood**~~ **real risk** that [the harm will occur].	39%	53%	+ 14%
Understands that [the harm could easily happen].	54%	52%	- 2%
~~**Knows**~~ **Recognizing** there is a good chance that [the harm will occur].	39%	56%	+ 17%

Implications & Next Steps

:: New Results: Signal Variant Studies



Decoding Guilt Minds

:: *Circumstance Elements*

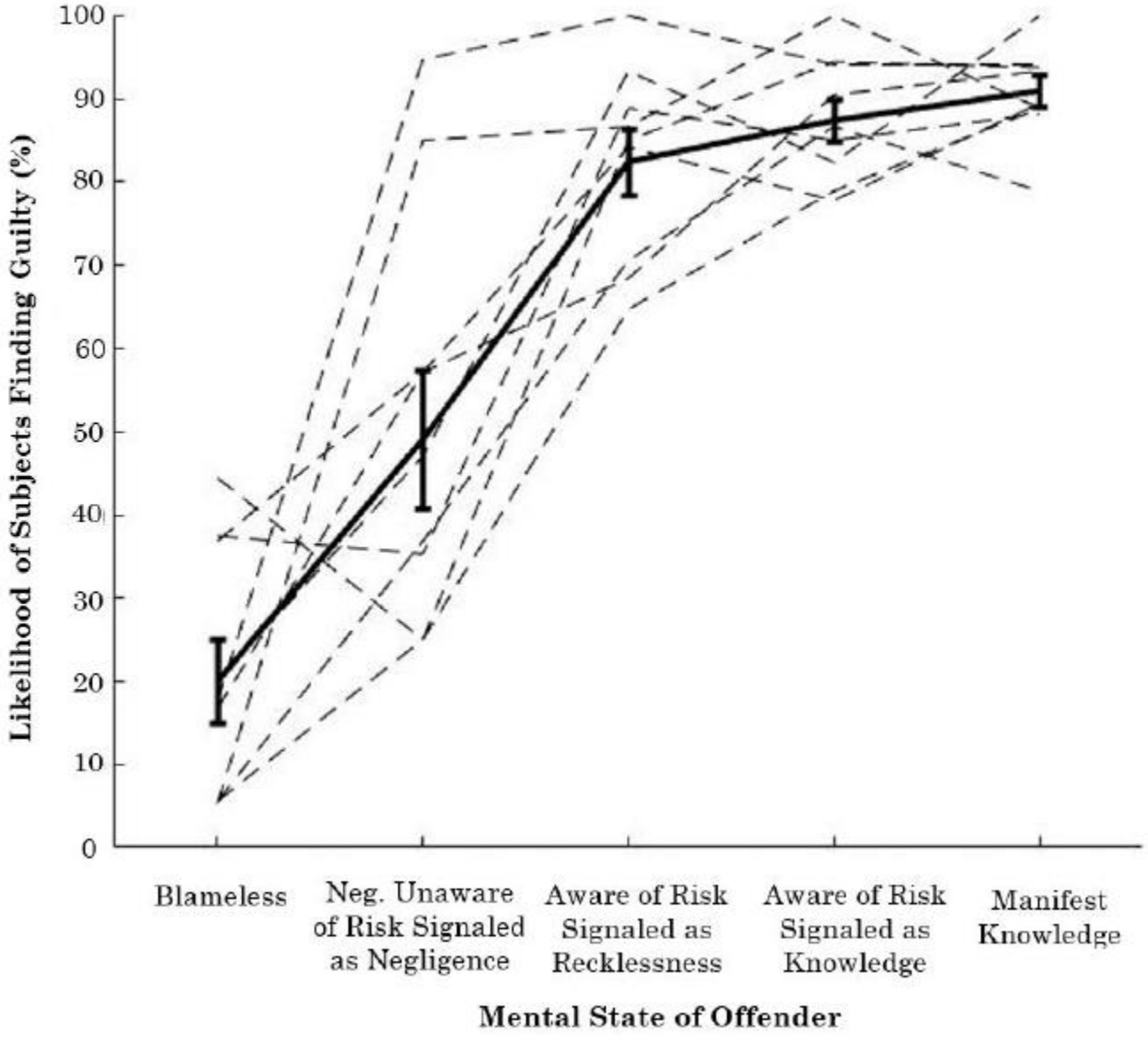
Basic Fact Pattern	*Attendant Circumstance*
Drug Trafficking: John is accused of driving a car over the border with drugs in the trunk.	Did John know that the drugs were in his trunk?
Theft by Receiving: John is accused of buying goods that were stolen.	Did John know that the goods were stolen?
Sale of Alcohol to Underage Person: John is accused of selling alcohol to an underage person.	Did John know that the person was underage?
Statutory Rape: John is accused of having sex with an underage person.	Did John know that the person was underage?
Tattoo of a Minor: John is accused of giving a tattoo to a minor.	Did John know that the person was a minor?
Illegal Hiring: John is accused of hiring a person not authorized to work in the United States.	Did John know that the person was not authorized to work in the United States?
Harboring a Fugitive: John is accused of harboring a fugitive.	Did John know that the individual was a fugitive?
Insurance Fraud: John is accused of filing a false claim.	Did John know that the submitted claim contained false information?
Unlawful Carrying of Loaded Firearm: John is accused of carrying a loaded firearm in public.	Did John know that the firearm was loaded?

TABLE 5: APPLYING MPC MENTAL STATE DEFINITIONS WHEN MENTAL STATE IS EXPLICITLY SIGNALED

Scenarios	*Subject Chose:*			
	Knowing	Reckless	Negligent	Blameless
Manifest Knowledge	76%	16%	6%	1%
Aware of Risk Signaled as Knowledge	67%	21%	12%	0%
Aware of Risk Signaled as Recklessness	18%	58%	24%	0%
Negligently Unaware of Risk Signaled as Negligence	1%	20%	63%	16%
Blameless	2%	5%	16%	78%

Decoding Guilt Minds

:: *Circumstance Elements*



What was D thinking?

~= How was D's brain processing information *at the time of the alleged offense*?

What D says he/she was thinking at the time + **D's behavior** at the time

---

Intuitions (both accurate and inaccurate, biased and unbiased) about how ***people like D*** generally think/act.

Scientific data on how ***people like D*** generally think/act, and how the brains of ***people like D*** generally process information.

Intuitions (both accurate and inaccurate, biased and unbiased) about how ***this individual D*** generally thinks/acts.

Scientific data on how ***this individual D*** generally thinks/acts, and how ***D's brain*** generally processes information.

What was D thinking?

~= How was D's brain processing information *at the time of the alleged offense*?

NEW SCIENCE

What D says he/she was thinking at the time + **D's behavior** at the time

---

NEW SCIENCE

Intuitions (both accurate and inaccurate, biased and unbiased) about how ***people like D*** generally think/act.

NEW SCIENCE

Scientific data on how ***people like D*** generally think/act, and how the brains of ***people like D*** generally process information.

NEW SCIENCE

Intuitions (both accurate and inaccurate, biased and unbiased) about how ***this individual D*** generally thinks/acts.

NEW SCIENCE

Scientific data on how ***this individual D*** generally thinks/acts, and how ***D's brain*** generally processes information.

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