

# The Poem that Makes things Happen: Diachronic Informatics, Effective Subjects and the English Common Law

Simon DeDeo

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MITH “Shared Horizons”

12 April 2013

844. JAMES HOLLIS and THEODORE PIKE were indicted for stealing, on the 15th of June, one handkerchief, value 4s., the goods of James Bernard Bernard, from his person. Mr. HONG conducted the prosecution. JAMES BERNARD BERNARD. I am a shoemaker and reside in Gray's Inn. On the 15th of June, about nine o'clock in the morning, I was in Castle-street, Bloomsbury—I heard a voice say, "You have taken my pocket." I felt and missed my handkerchief—and at the same time, turning round, I saw two persons running away. I pursued them towards Blumtree-street into Museum-street, crossed over, St. John's—and there they divided. I secured Hollis, and never lost sight of him. Pike was brought back, and my handkerchief produced.

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(Property produced and sworn to.)

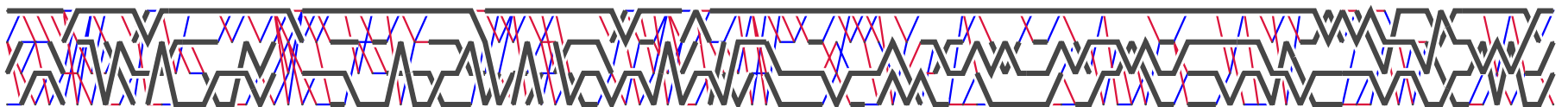
The prisoners pleaded distress.

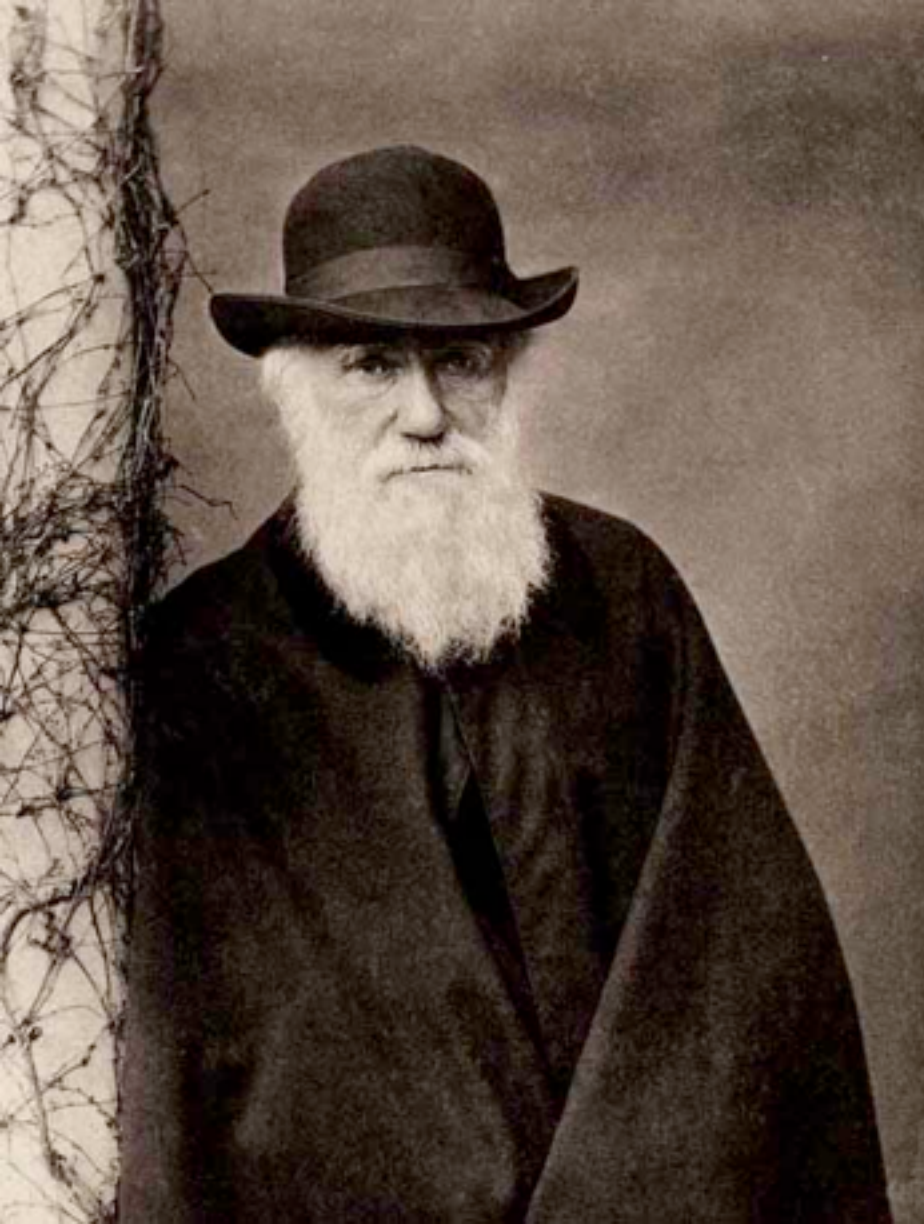
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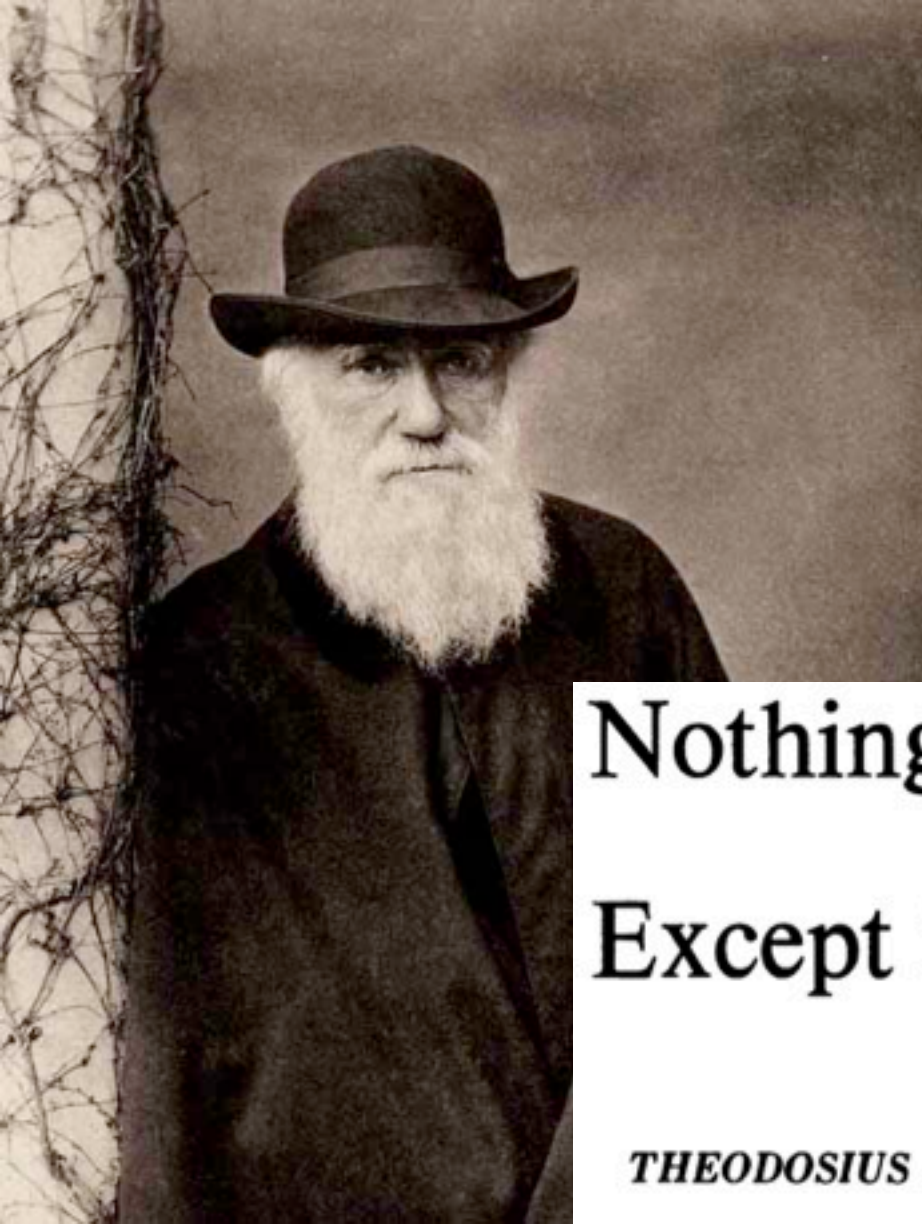
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First Middlesex Jury, before Mr. Common Sergeant.









# Nothing in Biology Makes Sense Except in the Light of Evolution

*THEODOSIUS DOBZHANSKY*

**A**S RECENTLY AS 1966, sheik Abd el Aziz bin Baz

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# phenotypic variation



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# phenotypic variation



# genetic bottleneck

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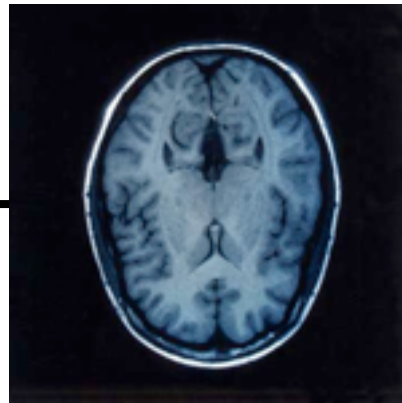
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# cognitive bottleneck

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# The Old Bailey





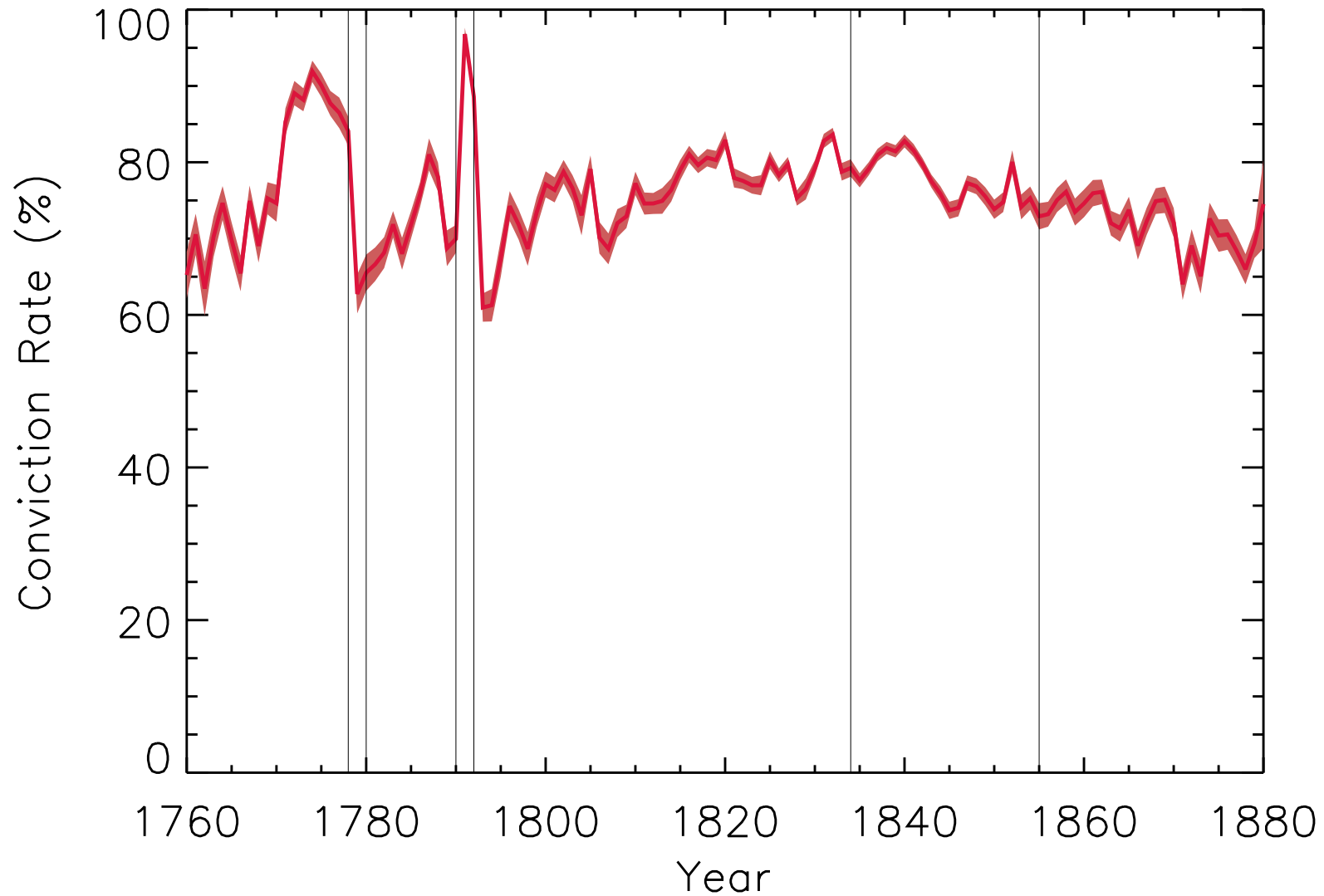
# The Old Bailey

“A courtroom is a machine for producing guilty verdicts.”  
(Tim Hitchcock)

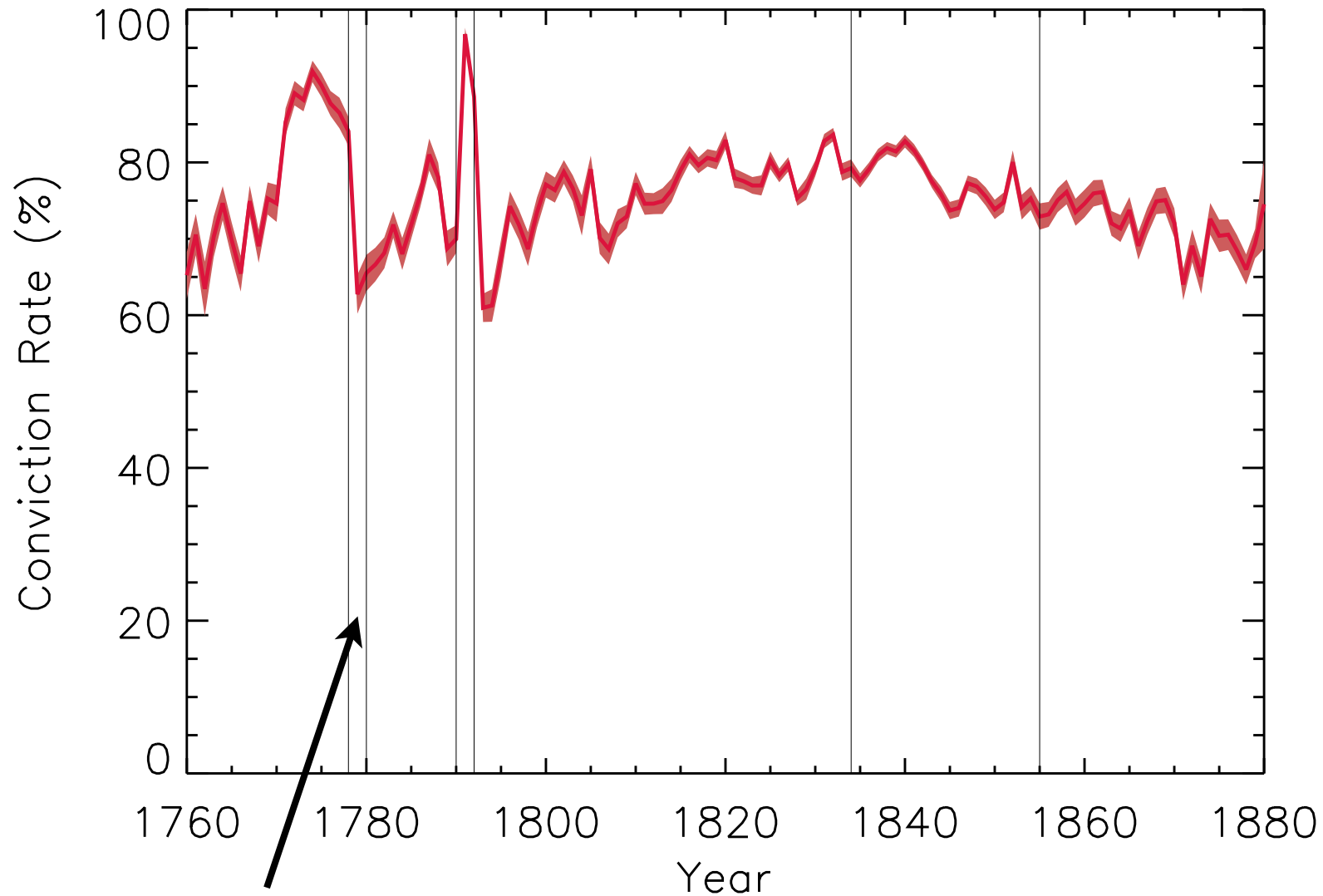




# A Brief History of London's Courts



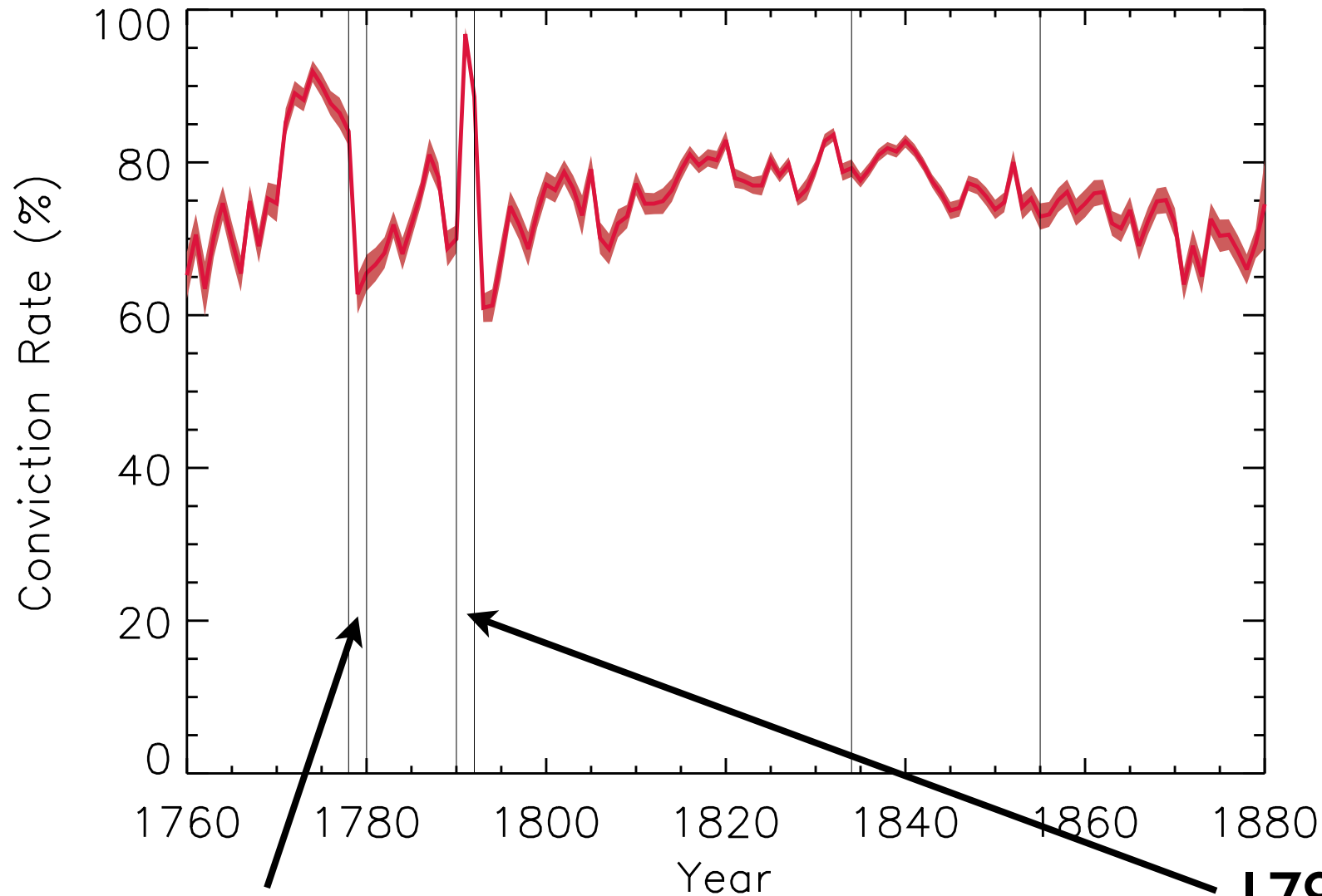
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John Wilkes mandates  
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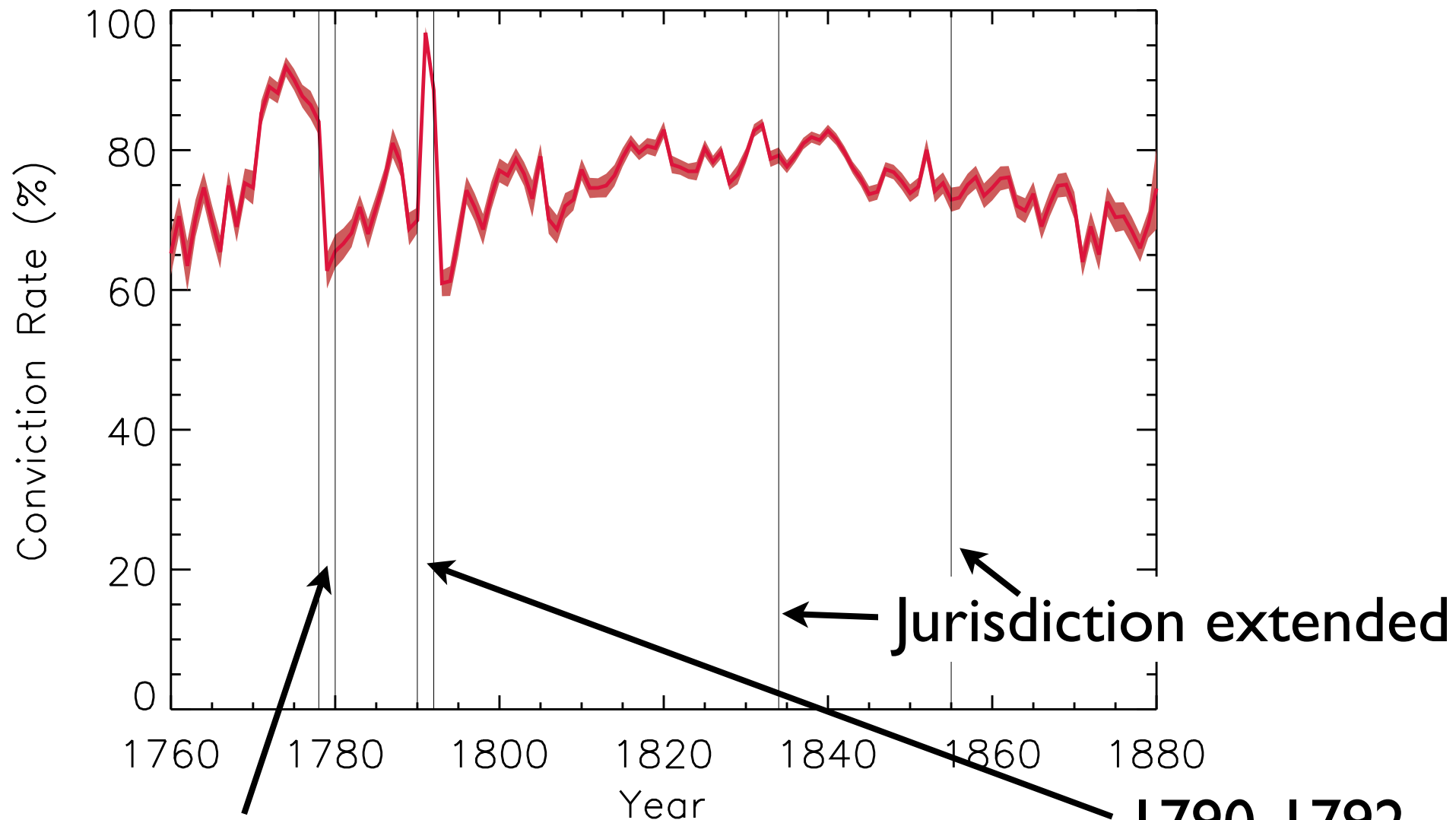
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1790-1792  
Censorship

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Jurisdiction extended

# Evolution





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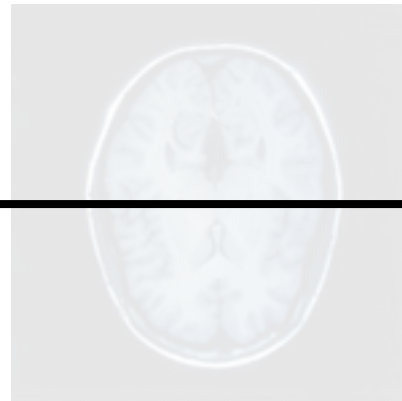
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# The Trial of John Ince

## January 1805

Mrs. CHAMBERLAIN sworn. - Q. What is your husband's name? - A. Edward Chamberlain, a bricklayer; the prisoner is a servant to Mr. Stapleton, I have always bought sand of Mr. Stapleton; the prisoner came with the sand, and delivered it; he came another time with the receipt, I gave him eleven shillings for the load of sand, and he gave me the receipt; I gave him half a guinea in gold and a sixpence; I am positive he is the man I paid the money to.

WILLIAM STAPLETON sworn. - I am a coal-merchant and sandman ; a load of sand was sent to Mrs. Chamberlain by her order, this man with another took the load of sand; in consequence of his being in the habit of receiving money, and appropriating it to his own use, he was ordered to receive no more, and this load of sand being on my books, I sent my young man to receive the money; I found Mrs. Chamberlain had paid for it.

Q. When was this that you first found it out? - A. Three or four days after Christmas-day; after he was detected, I interrogated him; he acknowledged having received it, and not paying it to me, together with several others.

Prisoner's defence. My master trusted me to carry out a dozen bills a little while before; I called on that lady at one time, she was not at home, and then I called again, she paid me the money.

GUILTY, aged 51.

Confined one week in Newgate, and whipped in the jail .

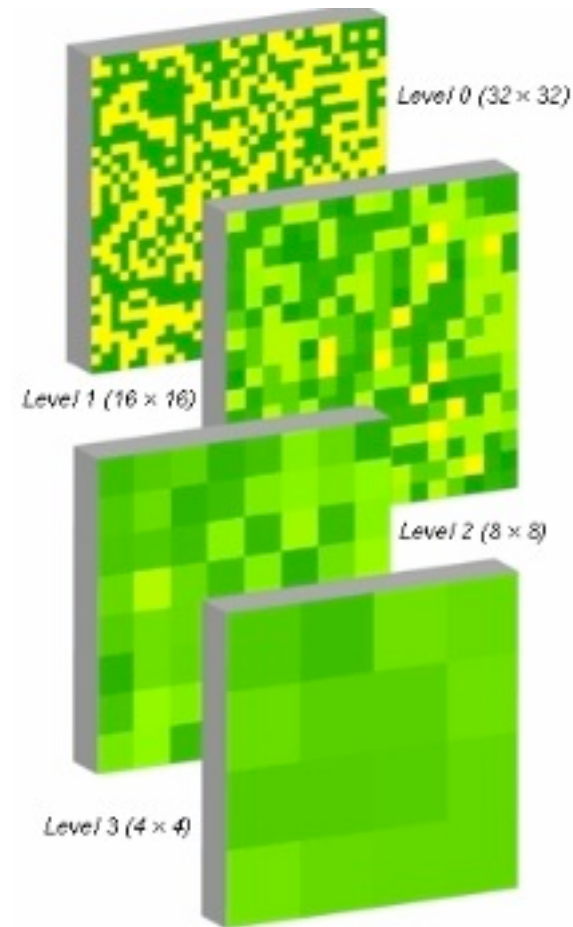
# 90% of Physics Since 1950 in One Slide

condensed matter  
quantum field theory  
Navier-Stokes & turbulence  
statistical physics  
information theory

Fine-grained  
descriptions



Coarse-grained  
descriptions





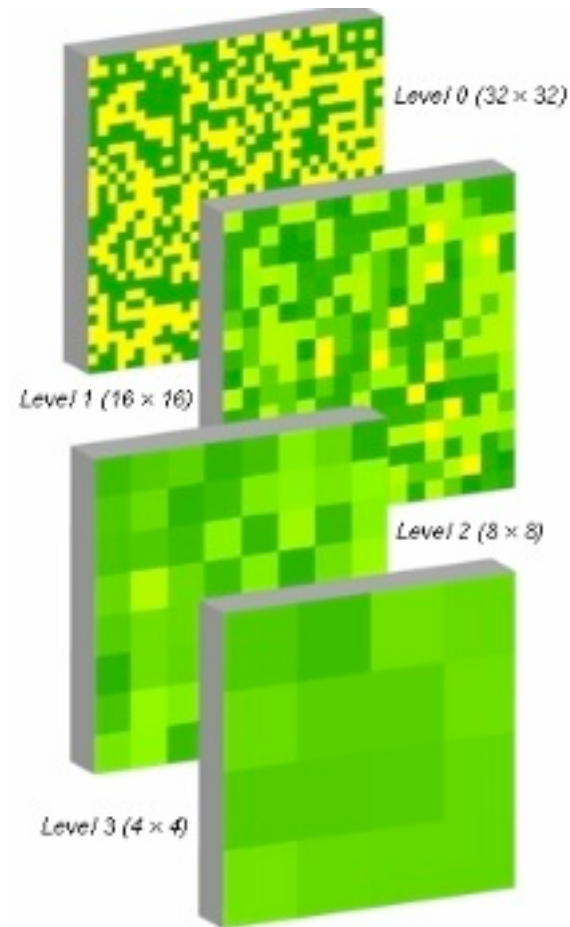
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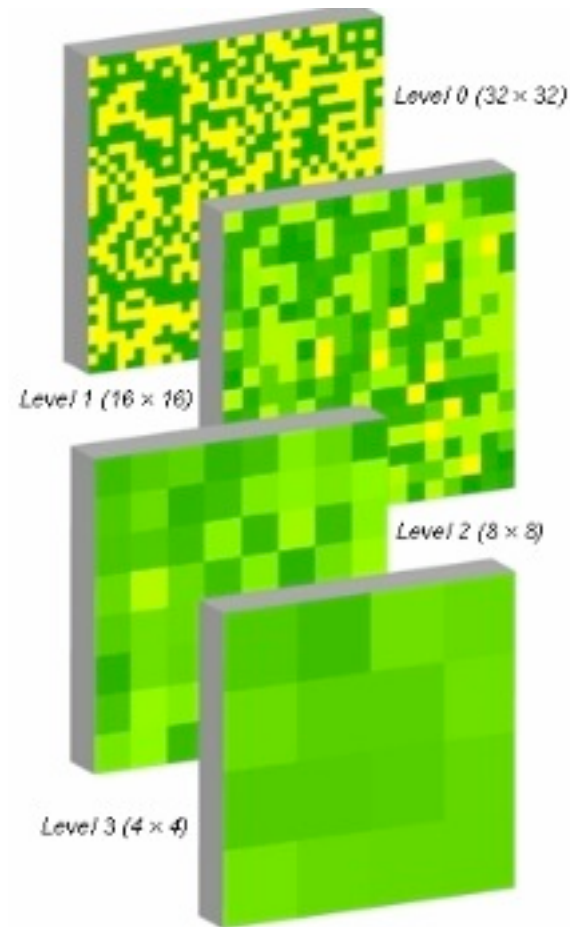
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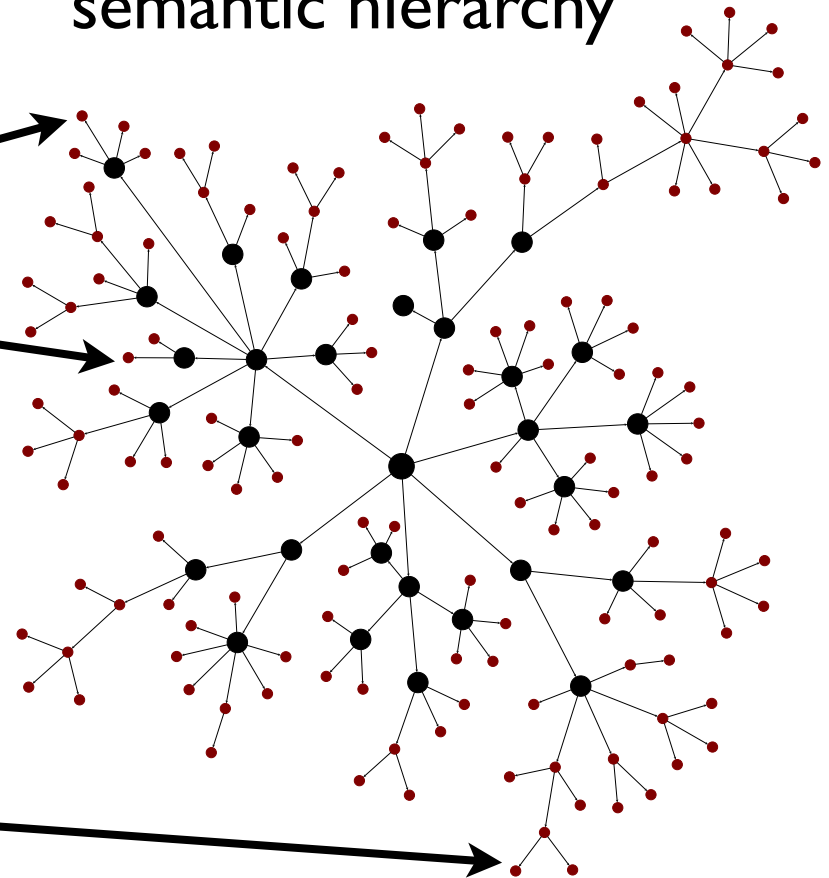
Coarse-grained  
descriptions



# Semantic Classification

Sentence — Parts of Speech Tagging — Stemming  
— Identification of Semantic Class — Coarse-graining of tree

semantic hierarchy



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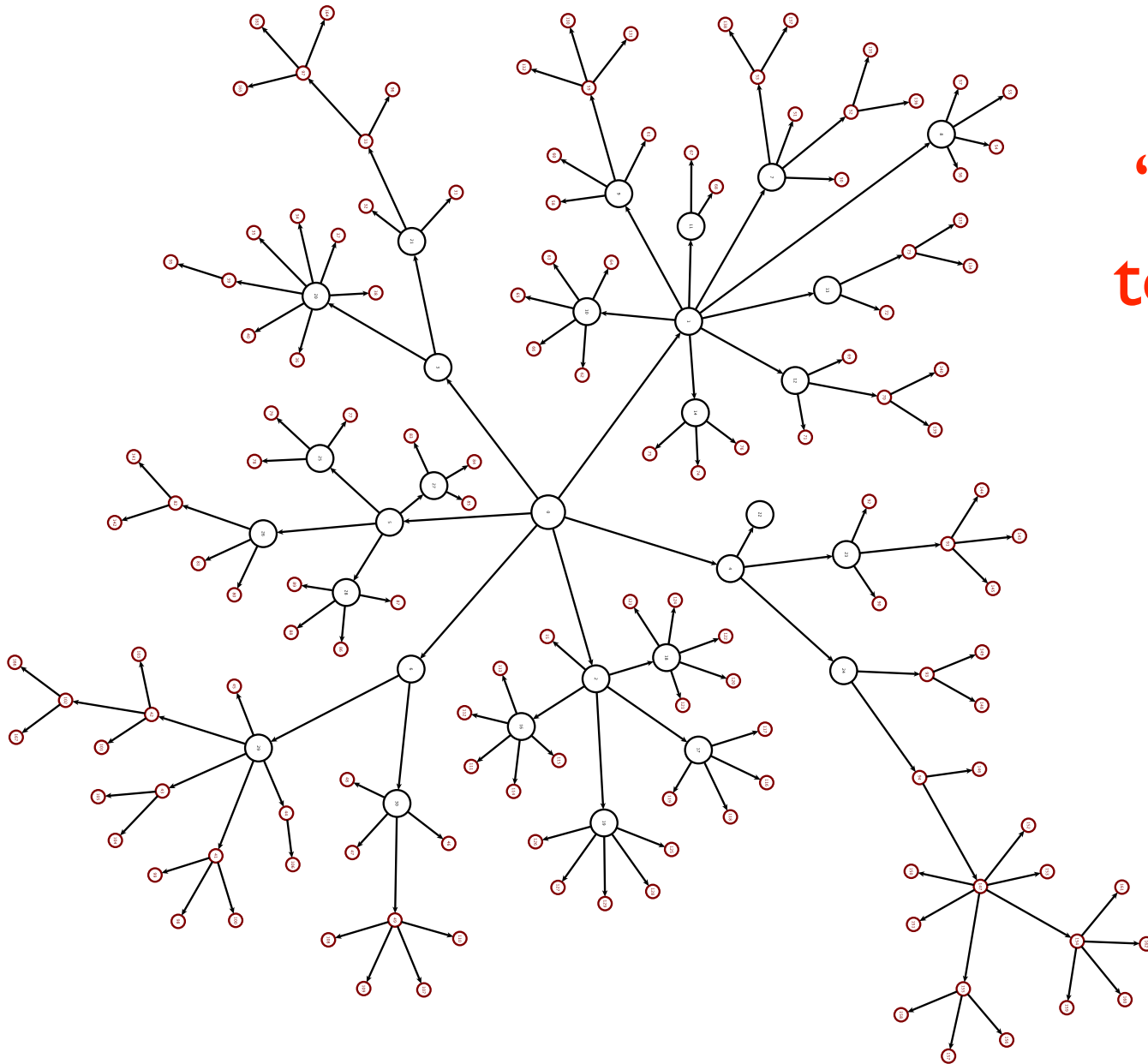
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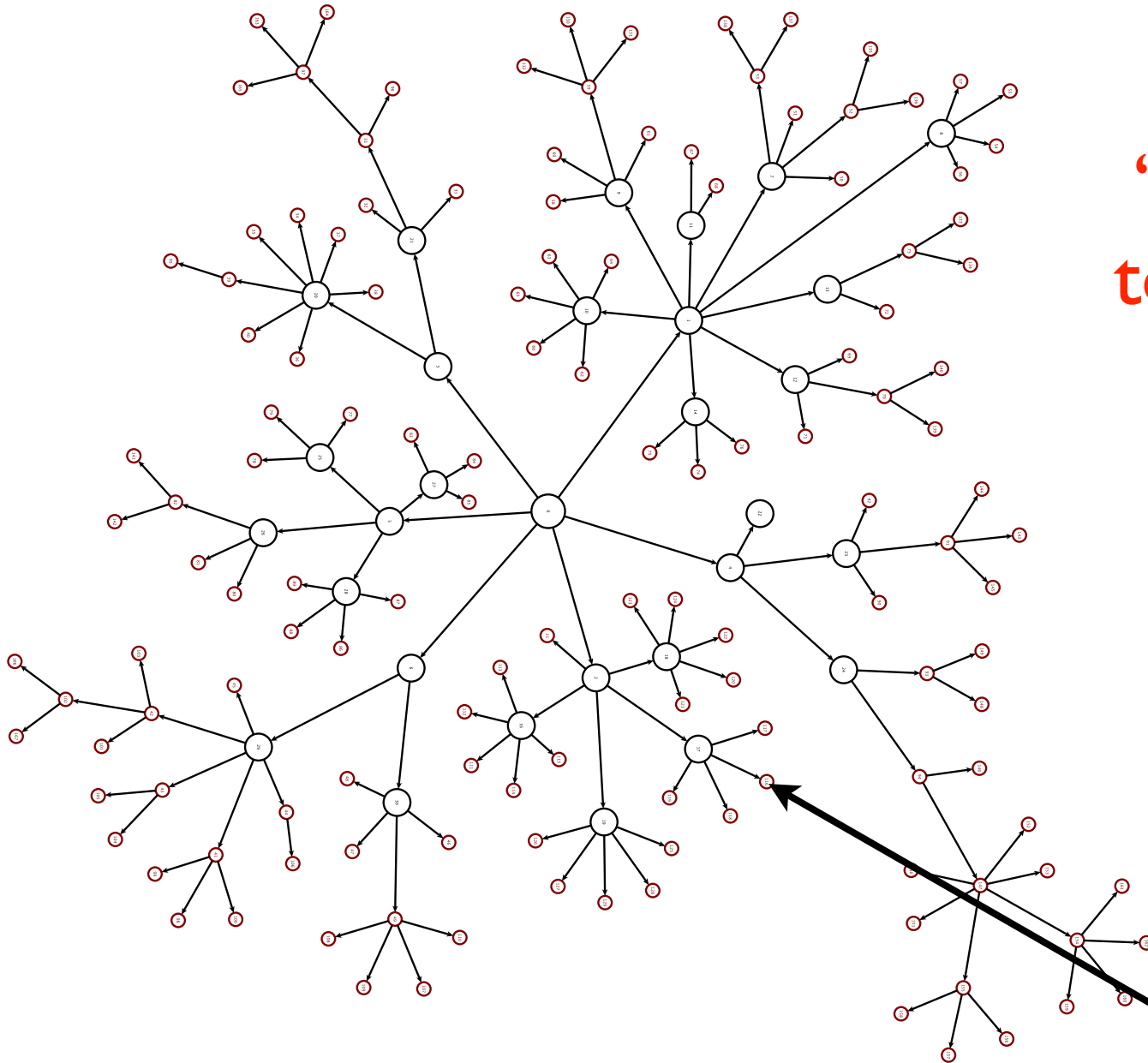


# Coarse-Grained Semantics



“I was surprised  
to see my friend”

# Coarse-Grained Semantics

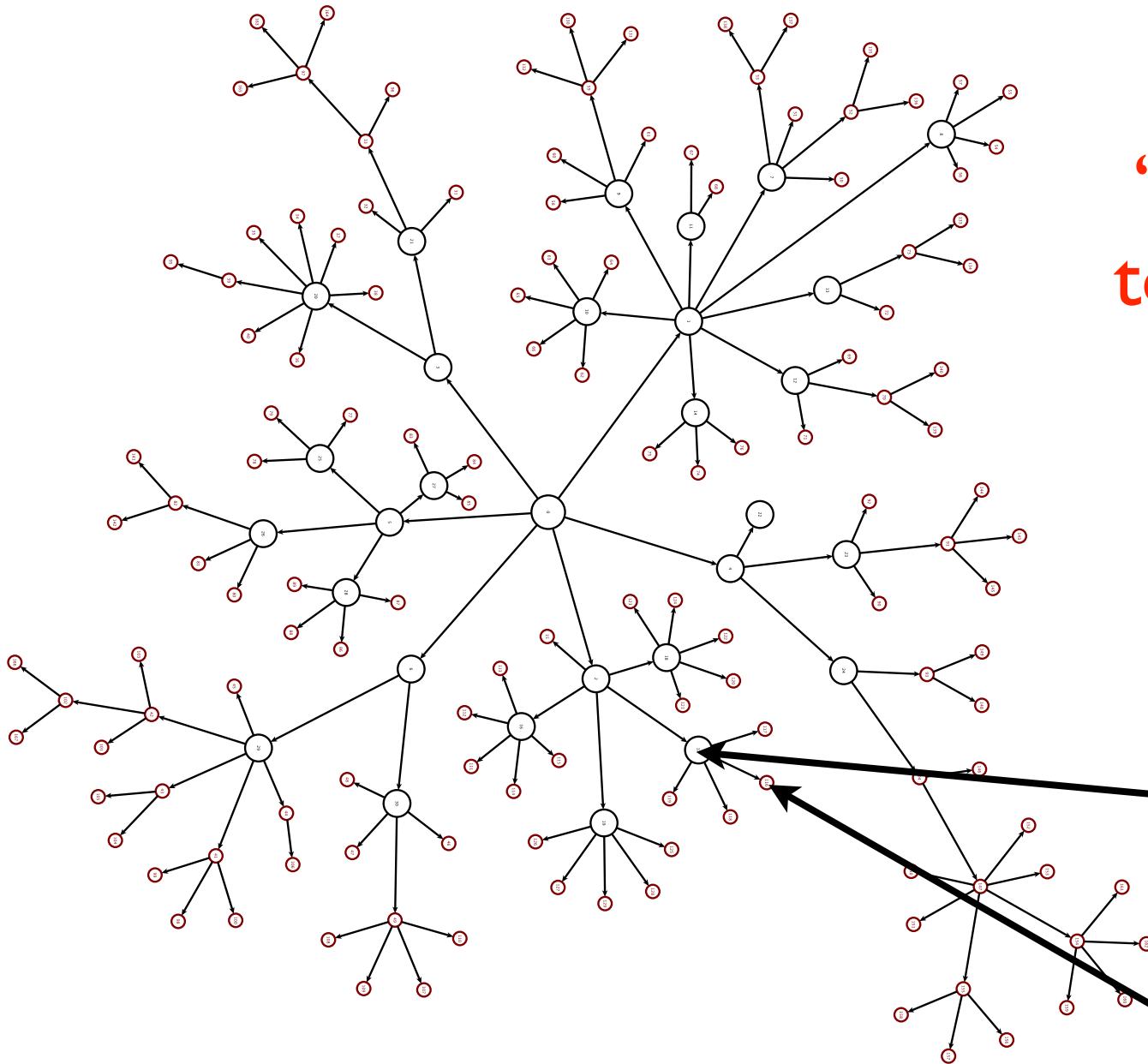


“I was surprised  
to see my friend”

Social Affections

890. “friend”

# Coarse-Grained Semantics



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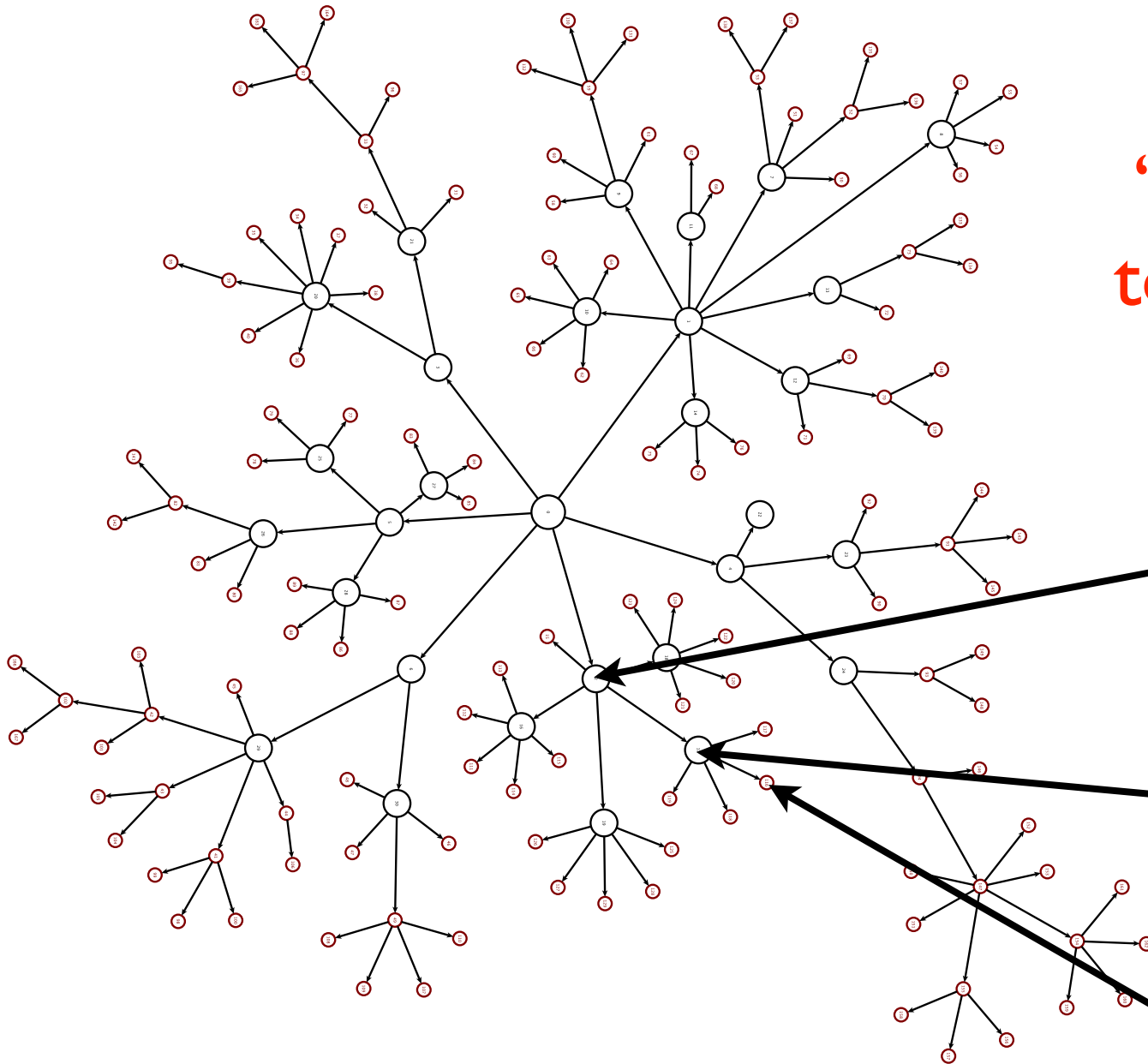
Sympathetic  
Affections

Social Affections



# Coarse-Grained Semantics

“I was surprised to see my friend”



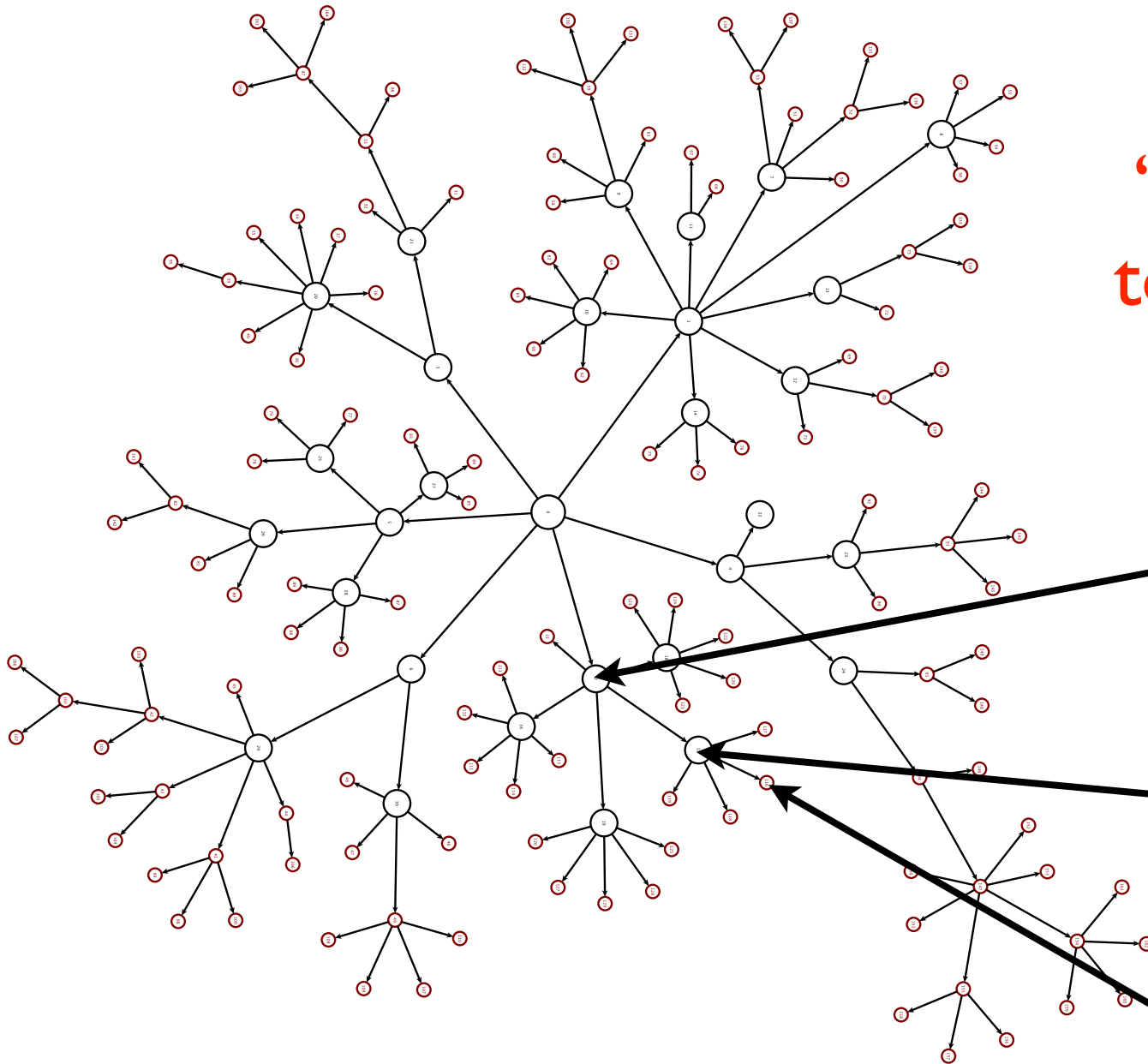
Affections

Sympathetic Affections

Social Affections

# Coarse-Grained Semantics

“I was surprised to see my friend”



Affections

Sympathetic  
Affections

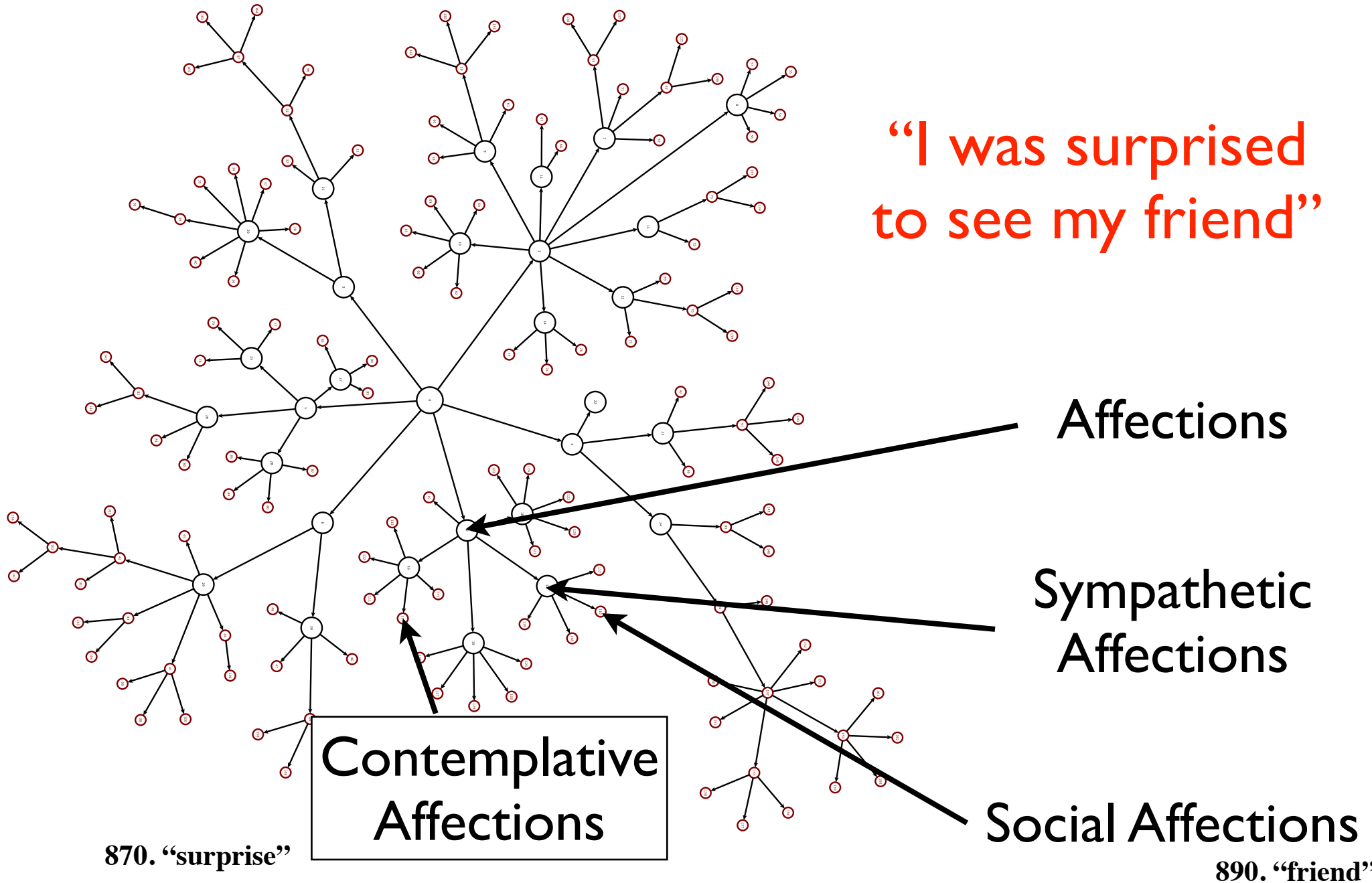
Social Affections

870. “surprise”

890. “friend”

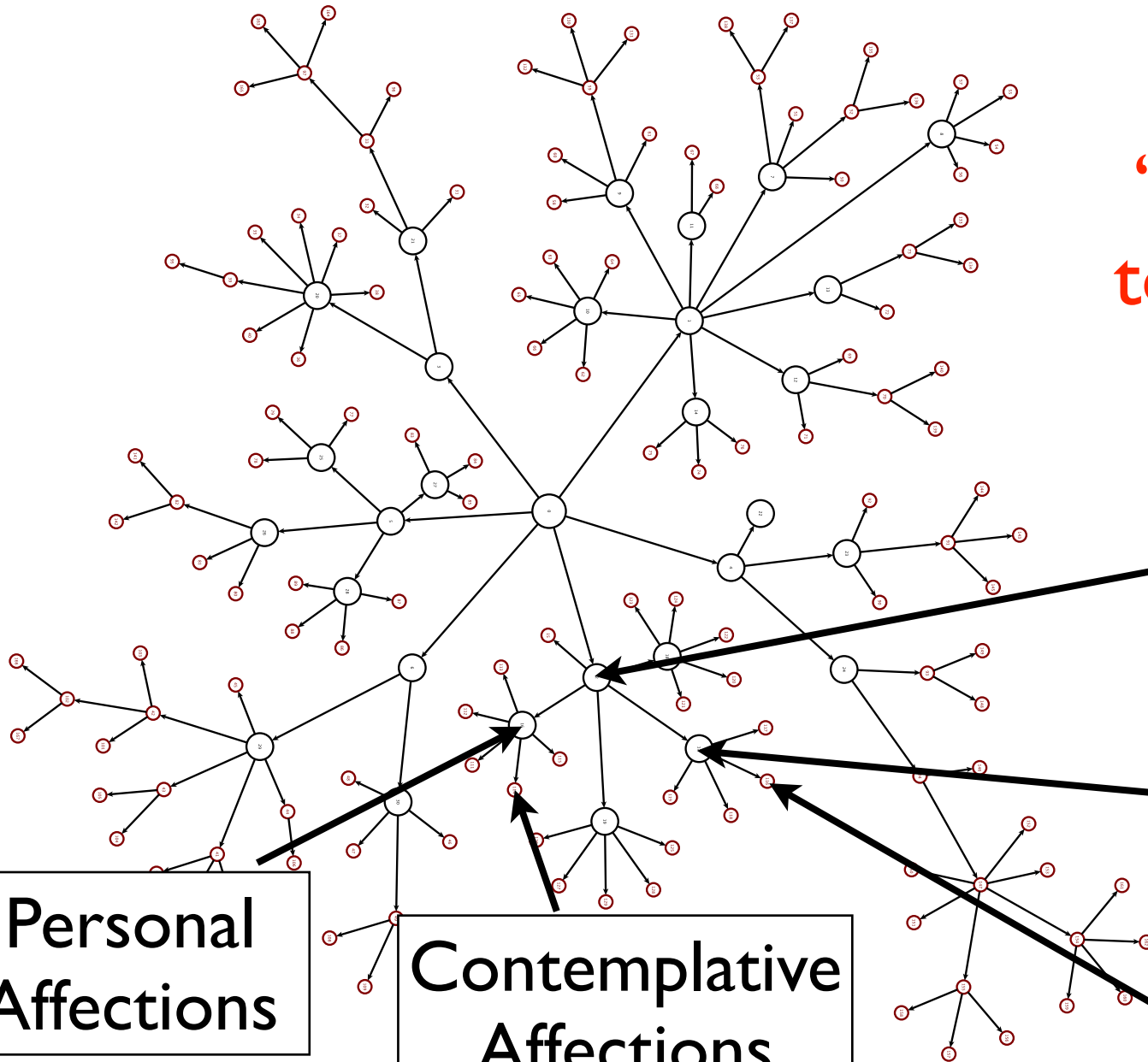
# Coarse-Grained Semantics

“I was surprised to see my friend”



# Coarse-Grained Semantics

“I was surprised to see my friend”



Affections

Sympathetic  
Affections

Social Affections

Personal  
Affections

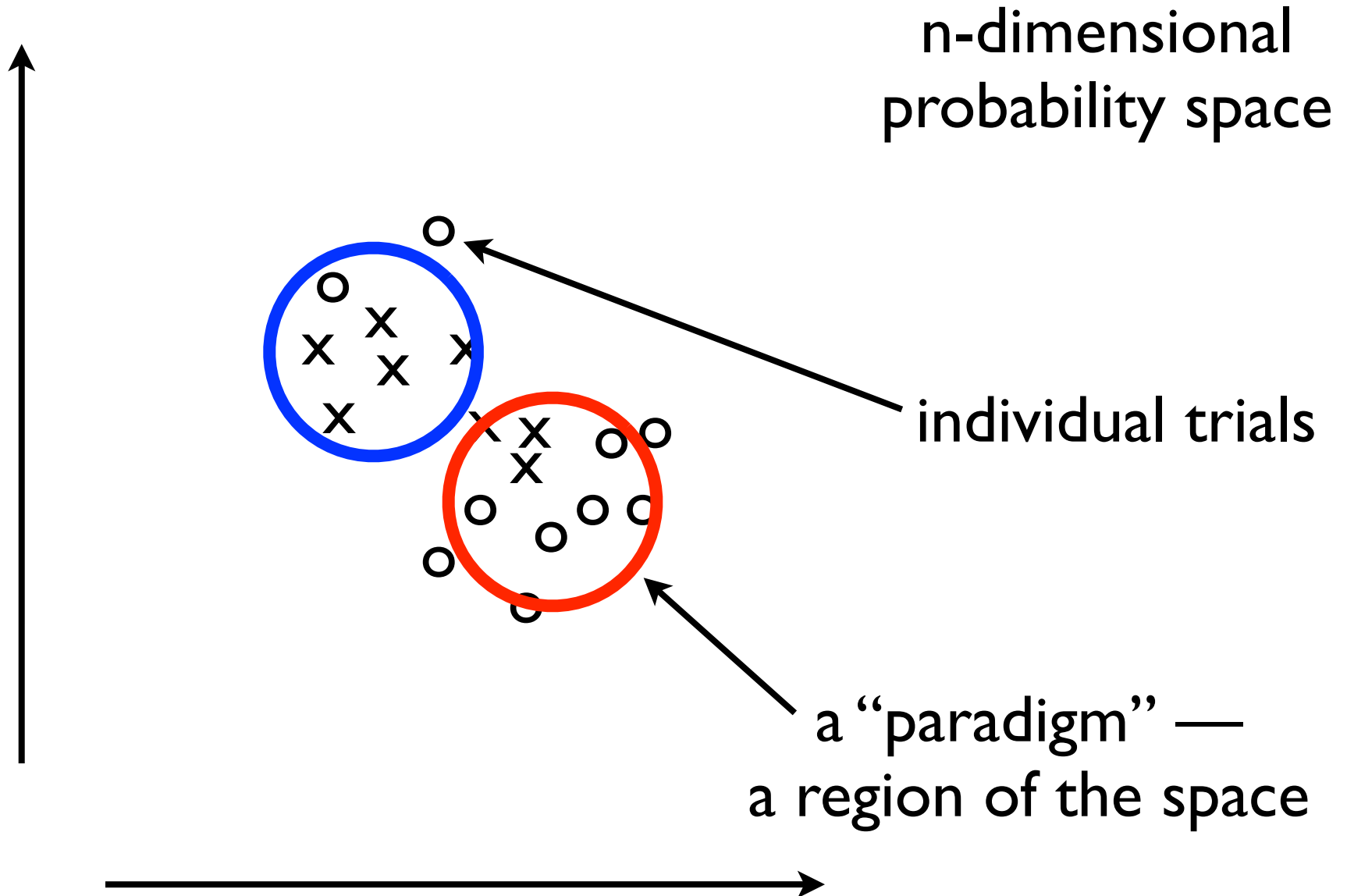
Contemplative  
Affections

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# Patterns of Meaning



# Skein (1760–1870)

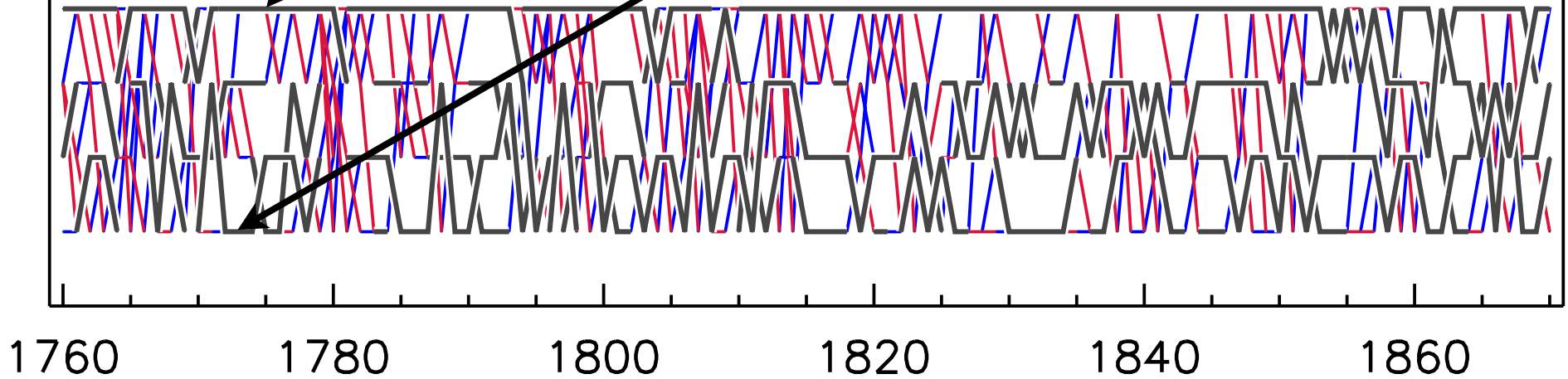
Blue: prospective alignment

Red: retrospective alignment

Black: total alignment

Most Common Paradigm

Rarest Paradigm



# Skein (1760–1870)

Blue: prospective alignment

Red: retrospective alignment

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(Legal–Historical Context)

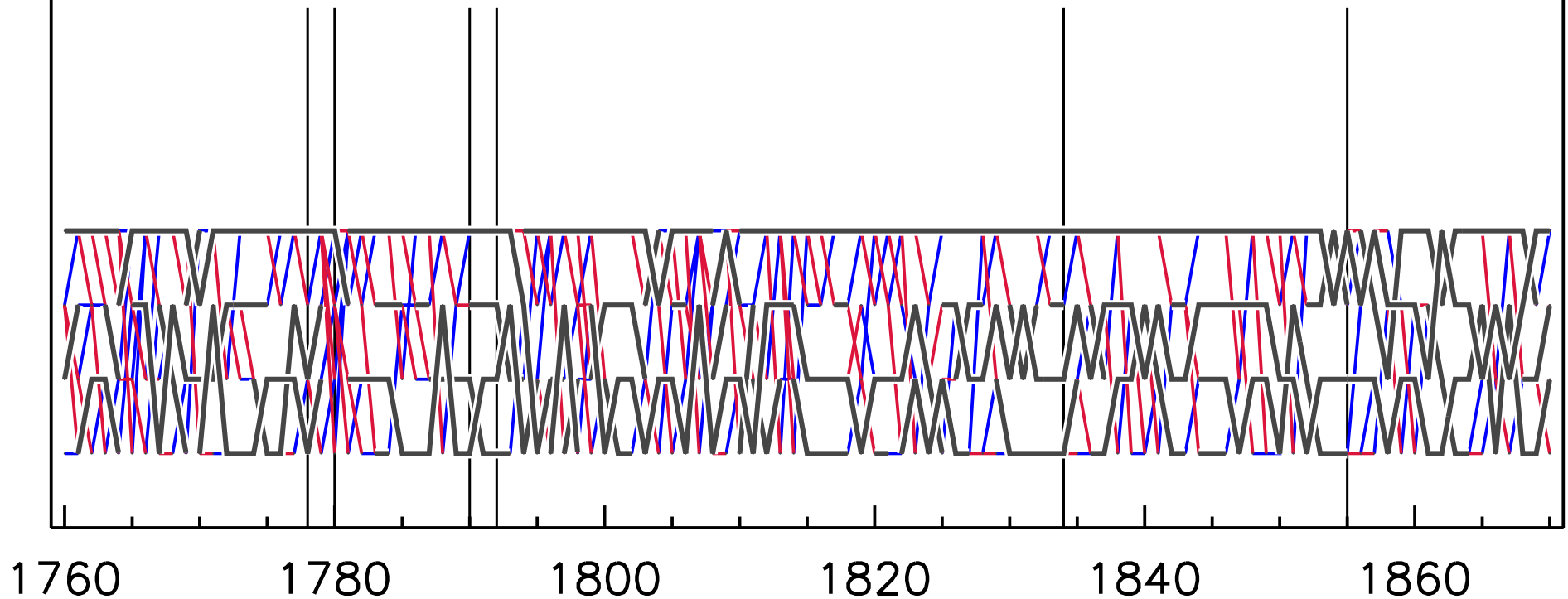
1778: Transcripts "true, fair and perfect"

1780: Gordon Riots

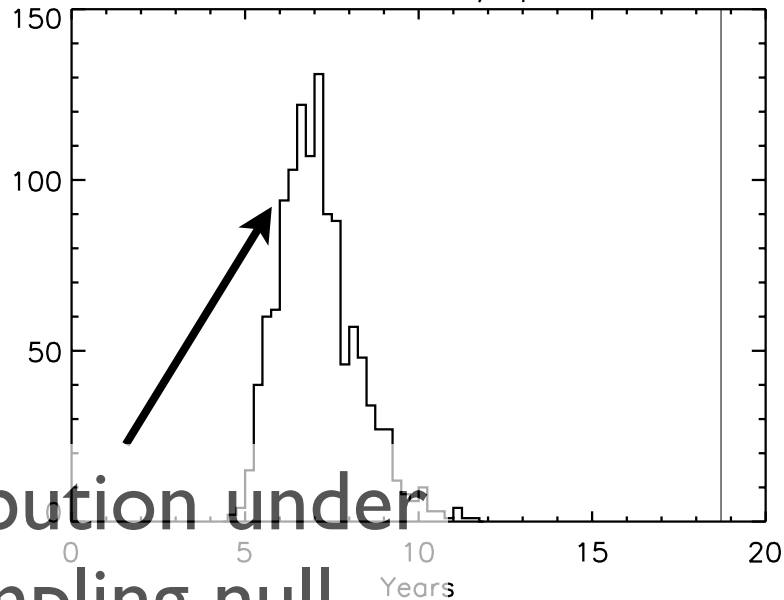
1790–1792: Partial Censorship of Record

1834: Jurisdiction Enlarged

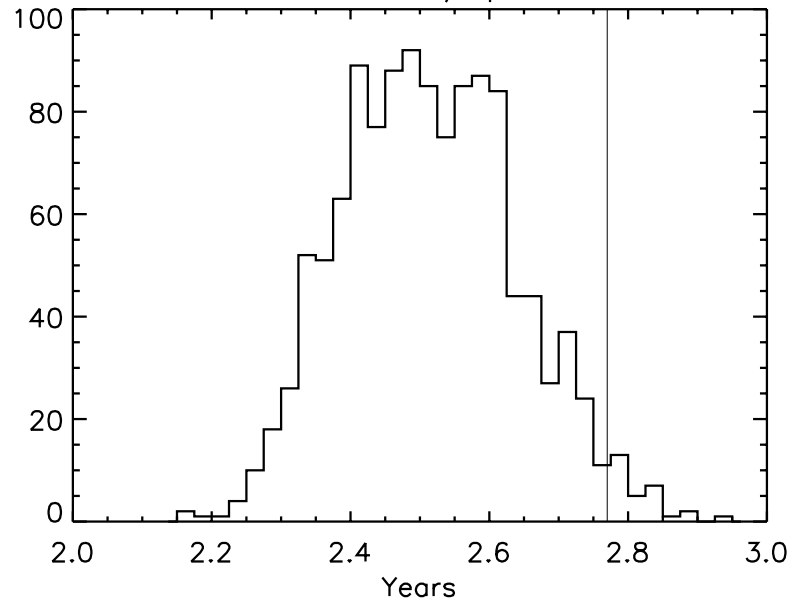
1855: Major Felonies Only



TOP RUN LENGTH /  $p < 10^{-3}$

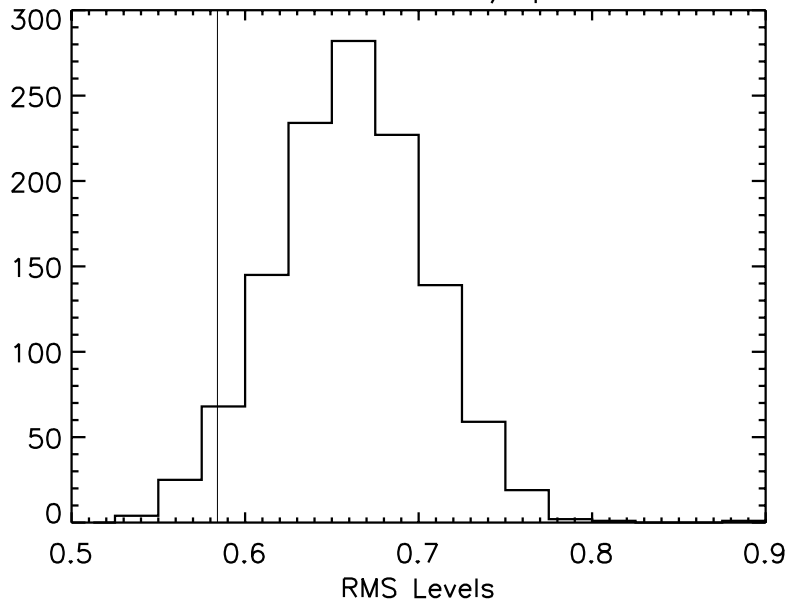


OTHER RUN LENGTH /  $p = 0.0265340$

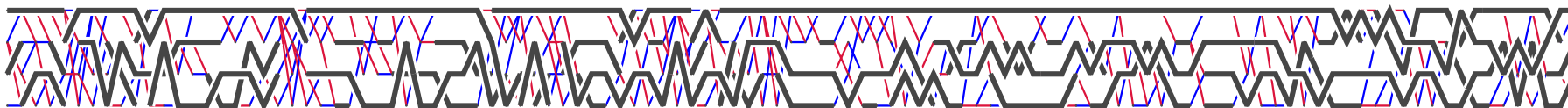
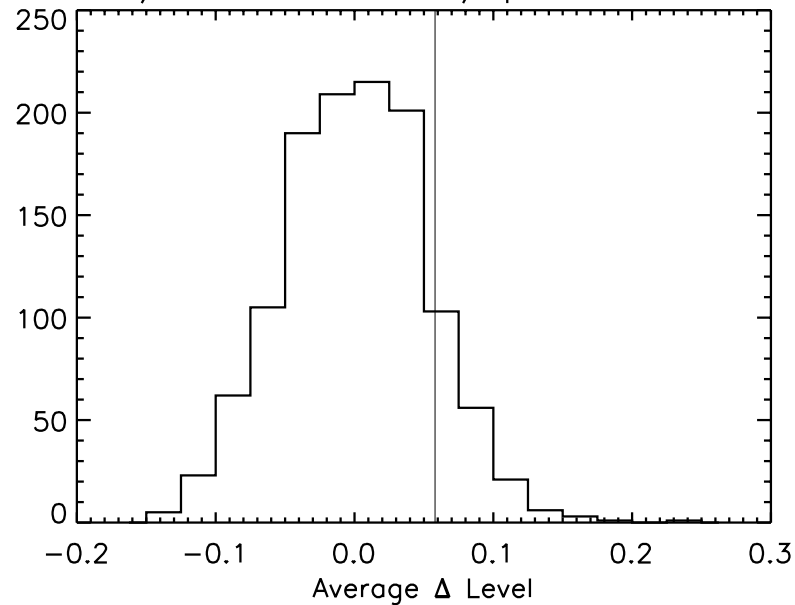


distribution under  
sampling null

VARIANCE OF RUN RANGE /  $p = 0.0373134$

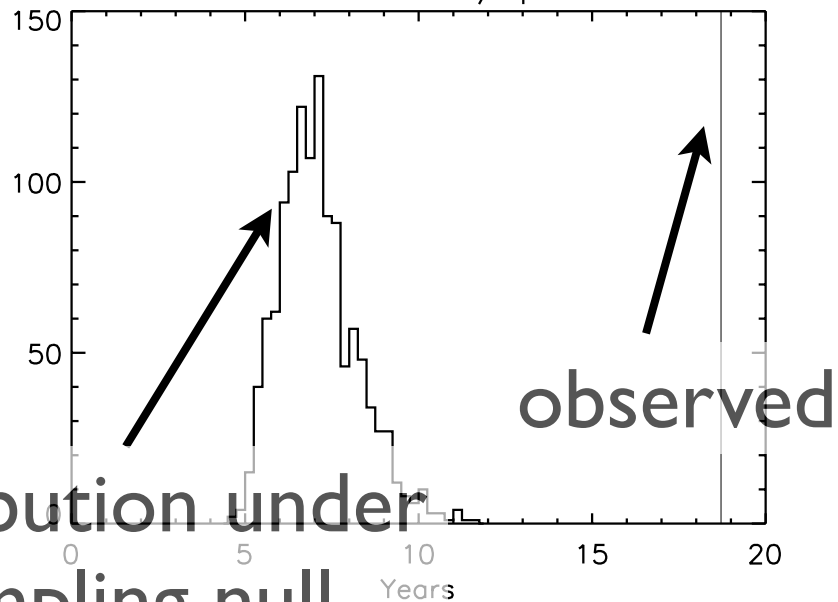


UP/DOWN RUN BIAS /  $p = 0.120232$



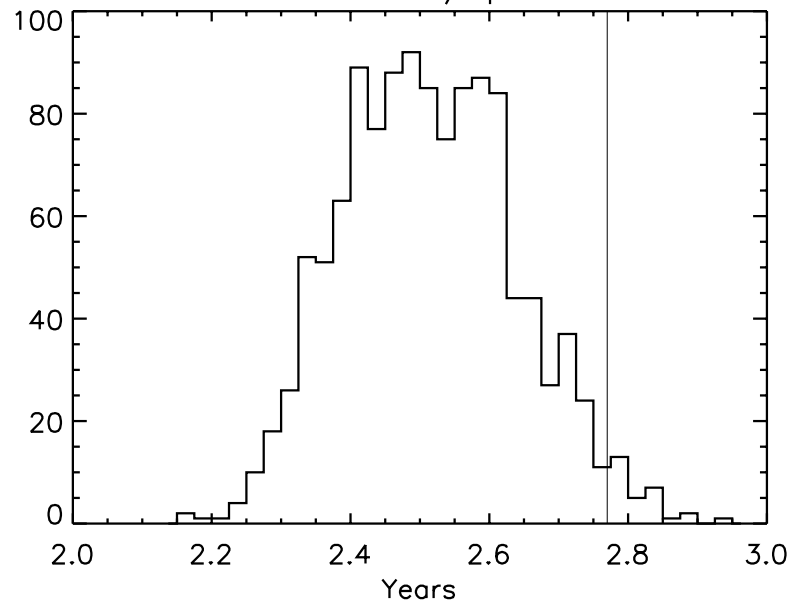


TOP RUN LENGTH /  $p < 10^{-3}$

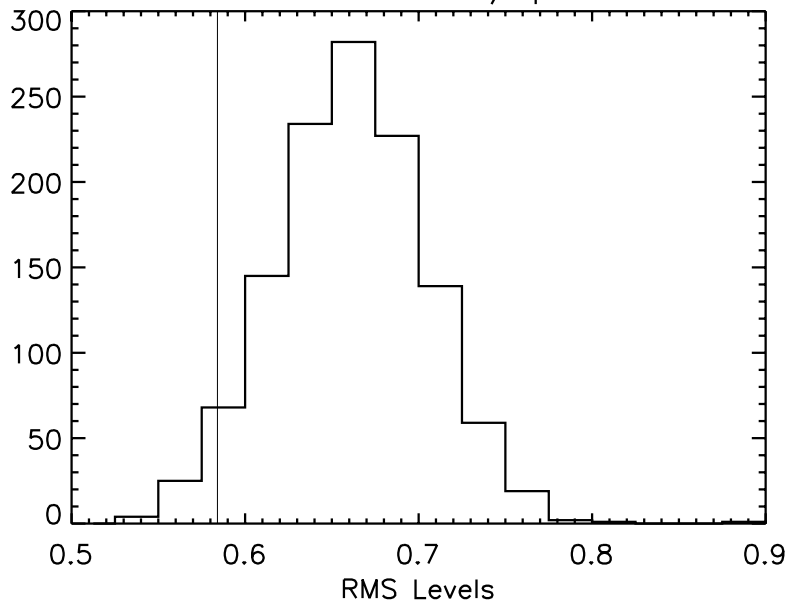


distribution under  
sampling null

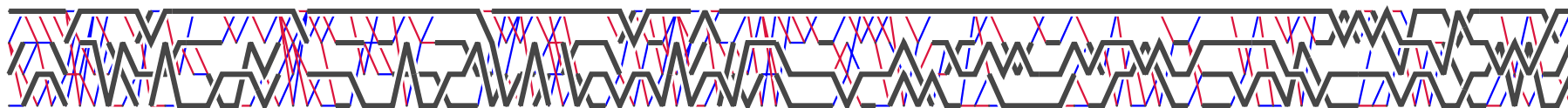
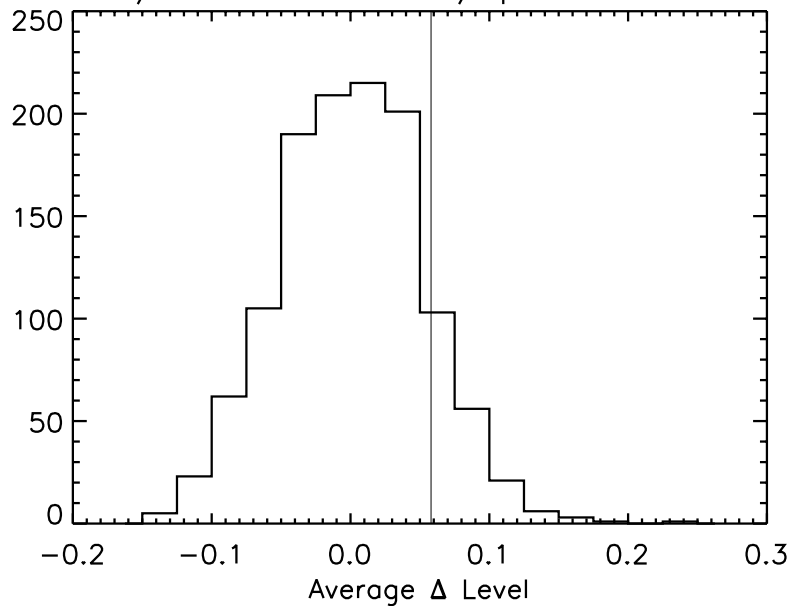
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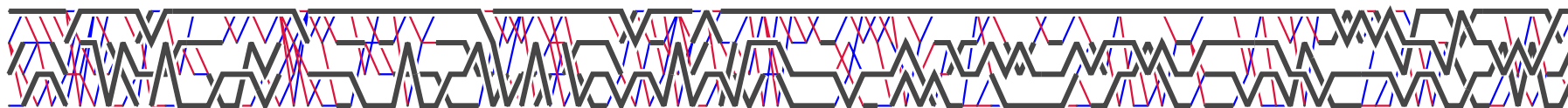
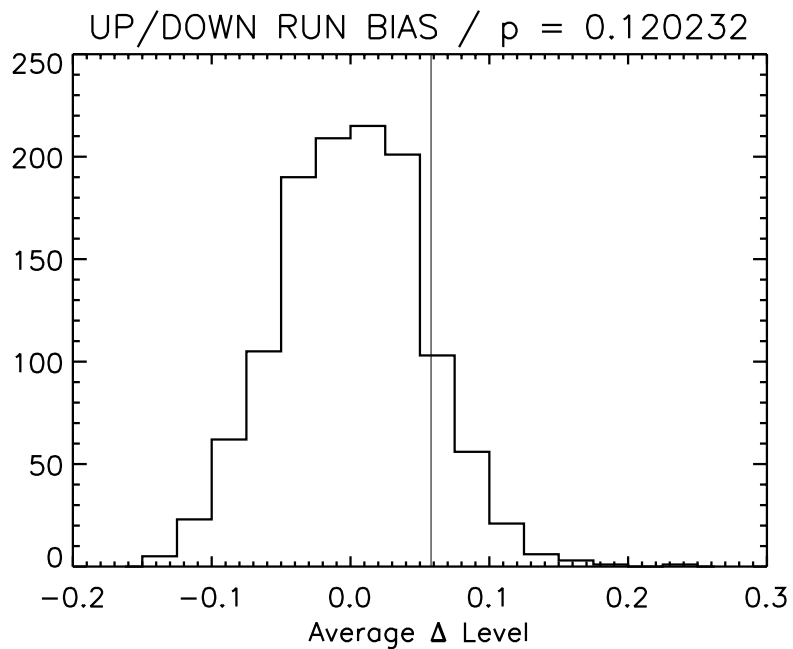
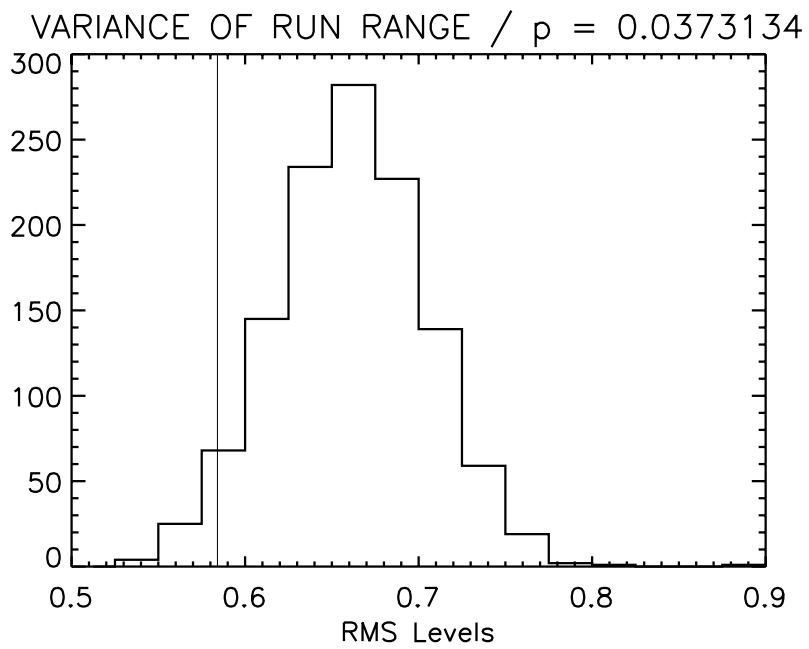
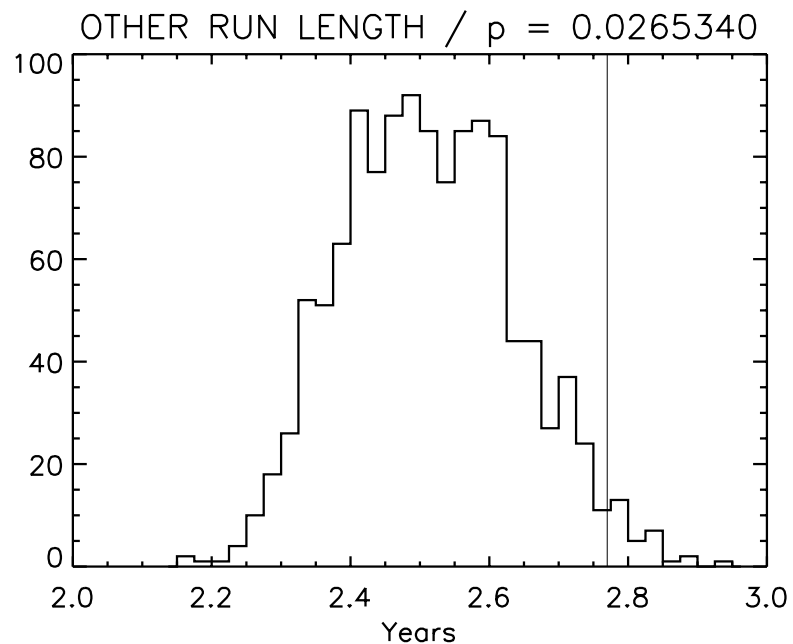
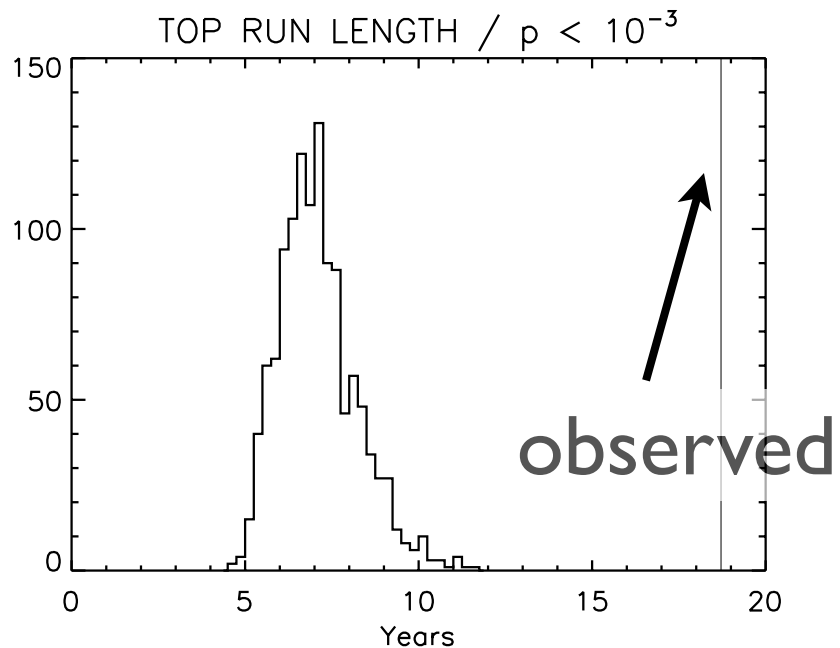


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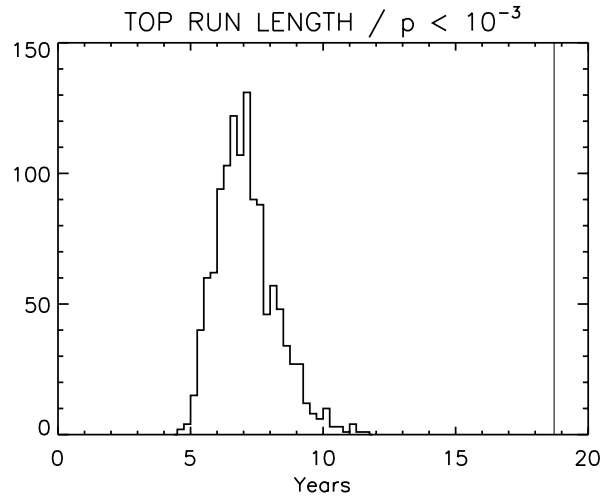


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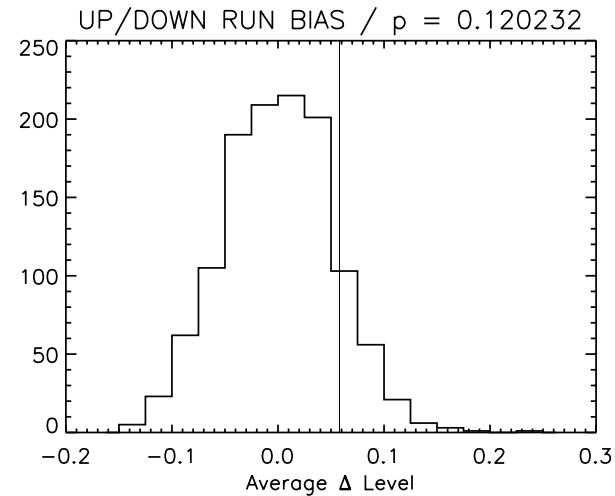
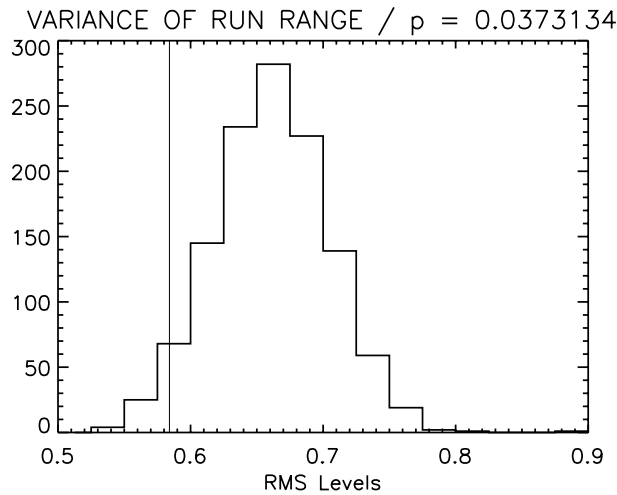
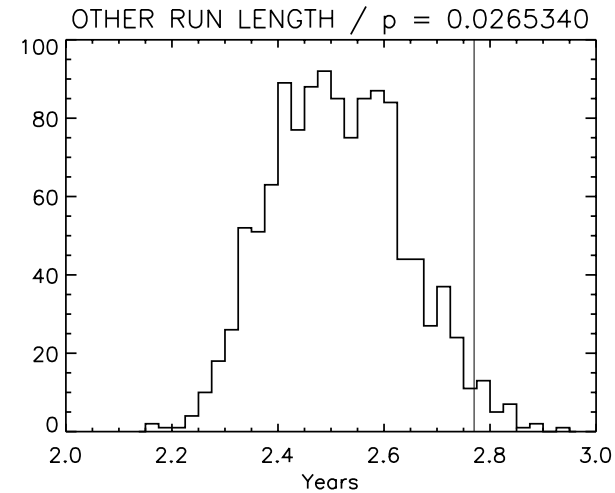




# persistence of “dominant” paradigms

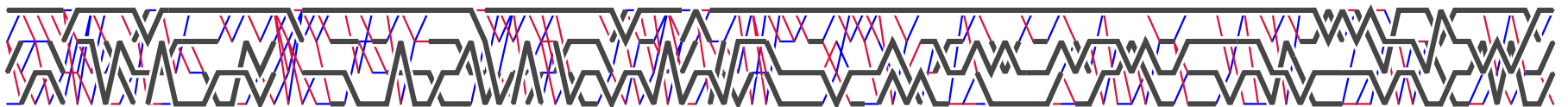


# persistence of “marginal” paradigms

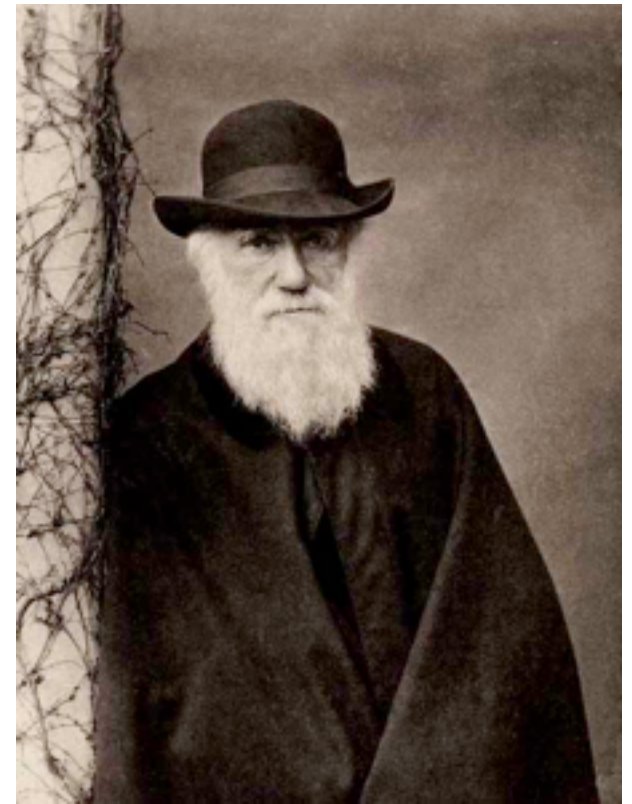
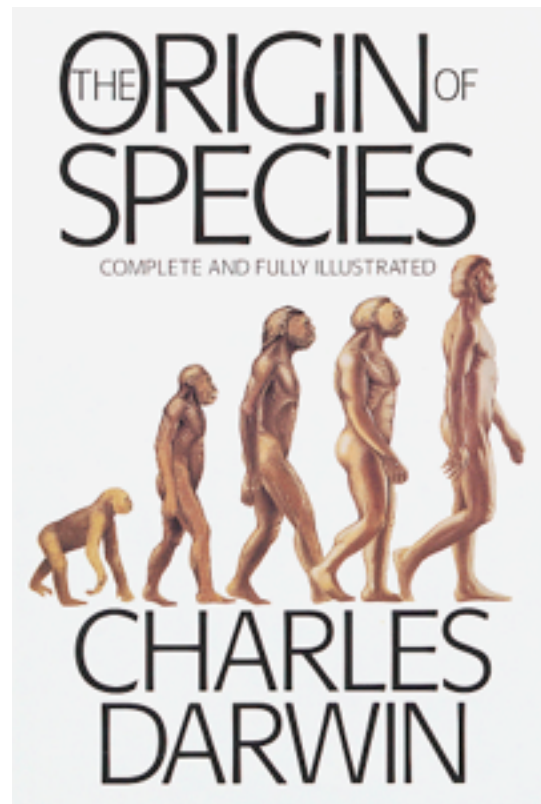


stability of ordering

mode of change (N.D.)


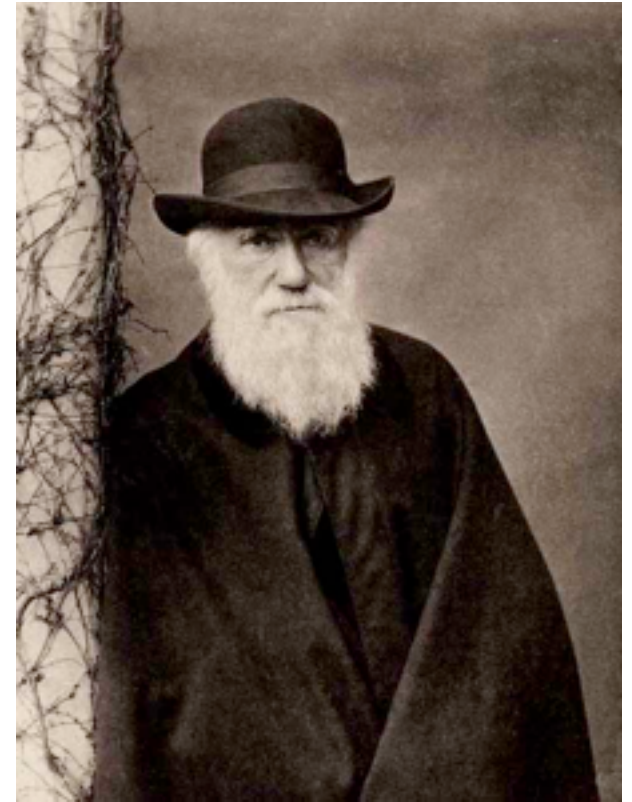
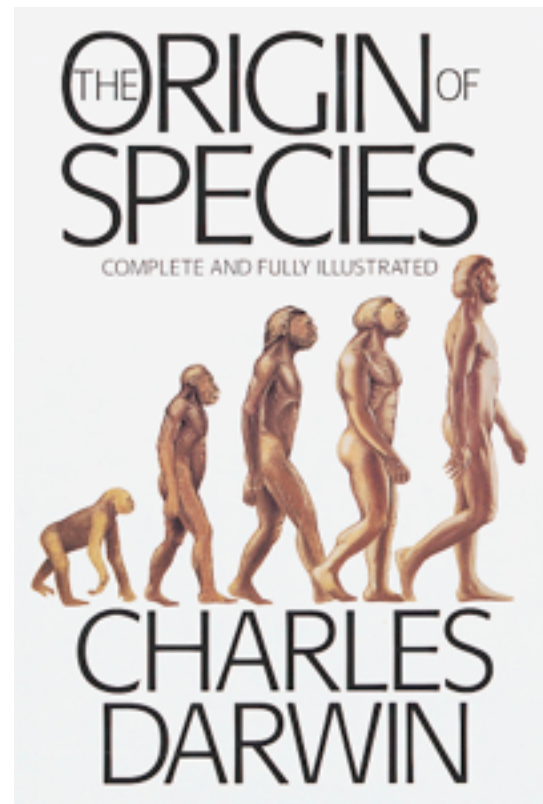


# Selection





# Selection

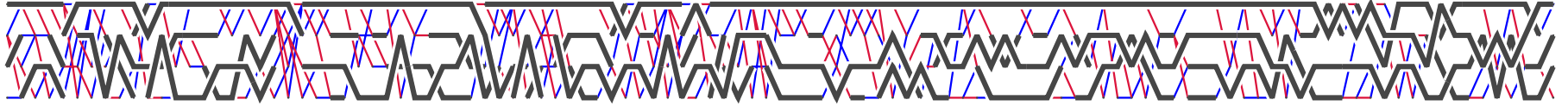


## The neutral theory of molecular evolution

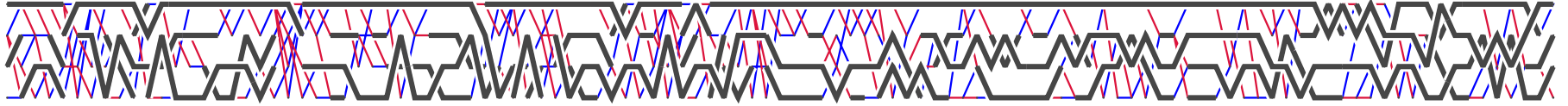
Motoo Kimura

# Drift

# Evolutionary Selection

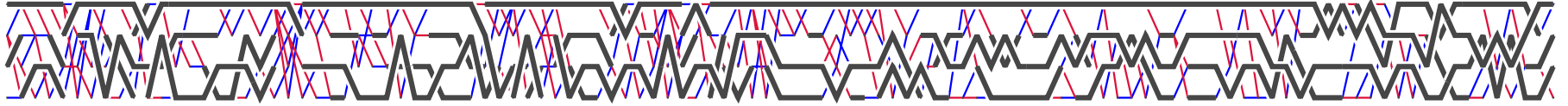


# Evolutionary Selection



“s” : *selection coefficient*

# Evolutionary Selection

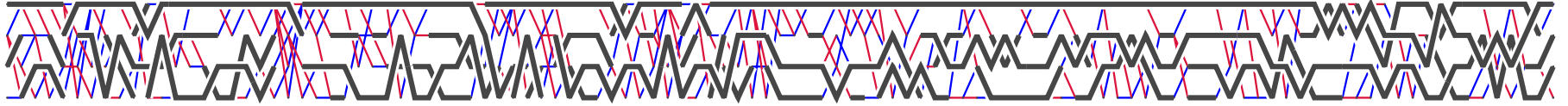


“s” : *selection coefficient*

The fraction by which one phenotype  
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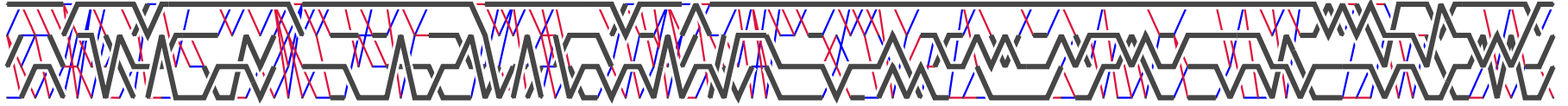


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Systems

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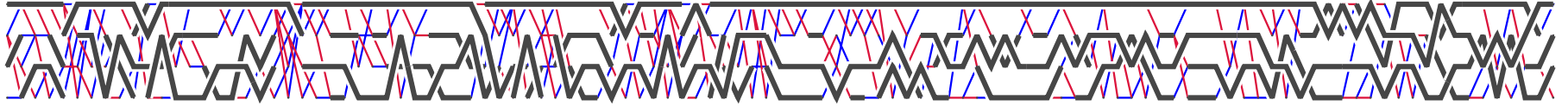
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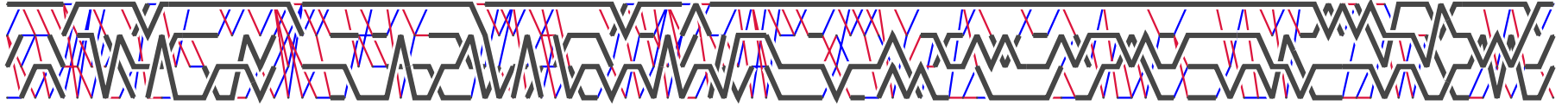
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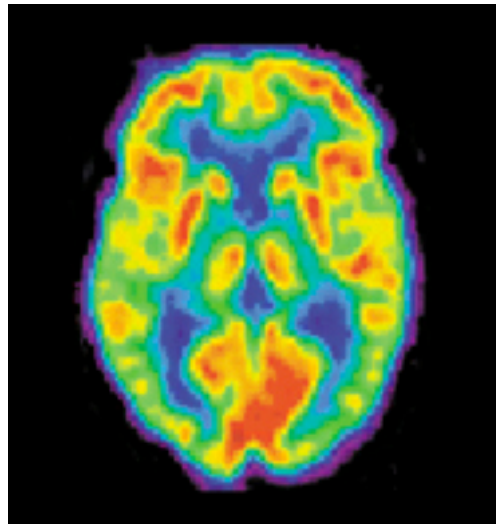
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Systems

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Cultural  
Systems

[to date unknown]

# Cognition







844. JAMES HOLLIS and THEODORE PIKE were indicted for stealing, on the 15th of June, one handkerchief, value 4s., the goods of James Bernard Bernard, from his person.—Mr. HONE conducted the prosecution.

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JOHN CAREY. I am a shoemaker, and live in Plumtree-street. I was passing from Museum-street to Drury-lane, and saw Pike running with a handkerchief in his hand. I joined in the pursuit—and when he ran across, he threw it into a shop-door. I picked it up, and gave it to the prosecutor—he was stopped directly.

(Property produced and sworn to.)

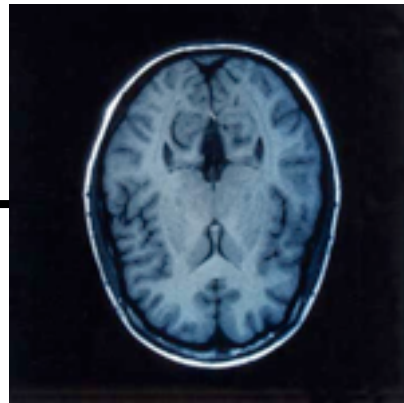
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HOLLIS—GUILTY. Aged 14.

PIKE—GUILTY. Aged 15.

Transported for Life.

First Middlesex Jury, before Mr. Common Sergeant.



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# Cognition in the Social World

What matters is not (just) what you know

What matters is *how* and *how well* you know it

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What matters is not (just) what you know

What matters is *how* and *how well* you know it



“I got there first.”

BUT

“I am uncertain whether you know whether I got there first.”

# Cognition in the Social World





# Cognition in the Social World





# Cognition in the Social World



## **Interactive epistemology I: Knowledge\***

**Robert J. Aumann**

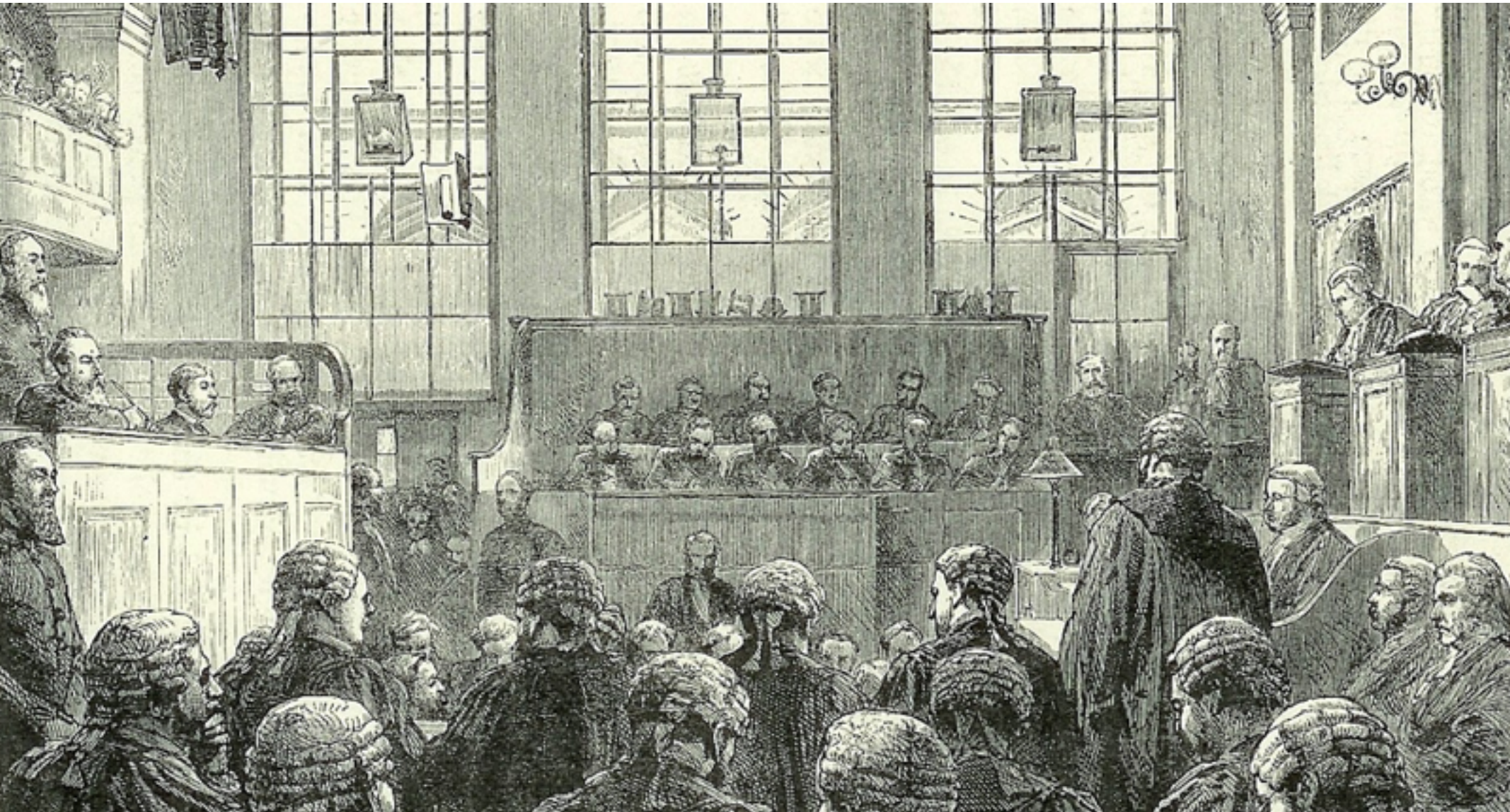
Center for Rationality and Interactive Decision Theory, The Hebrew University,  
Feldman Building, Givat Ram, 91904 Jerusalem, Israel (e-mail: [raumann@math.huji.ac.il](mailto:raumann@math.huji.ac.il))

**Abstract.** Formal Interactive Epistemology deals with the logic of knowledge and belief when there is more than one agent or “player.” One is interested not only in each person’s knowledge about substantive matters, but also in his knowledge about the others’ knowledge. This paper examines two parallel



# The Natural History of Information

What information does the trial itself contain about the verdict?



What information does the transcript itself contain about the verdict?



How does knowledge of the transcript increase a participant's prediction accuracy?



# Agents and Angels

Real-World Agent

Bayesian Angel



# Sharpening the Question

What information does the transcript itself contain about the verdict?



How does knowledge of the transcript increase an **ideal agent's** prediction accuracy?



# The True and the Useful

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Forming correct beliefs  
(within a model) about  
the data to hand

a “solved” and  
(nearly) axiomatized  
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Predicting the Future

an ongoing,  
trillion-dollar  
venture

# “Fictitious Hindsight”

## A New Method for Measuring Predictability

Insight: you don't have to be able to predict the system itself to estimate its predictability

elaborate cognitive  
skills (fundamentally  
unknowable)

modeled by  
→

post-selection  
of local  
maxima

# “Fictitious Hindsight”

An empirical hypothesis

elaborate cognitive  
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# “Fictitious Hindsight”

An empirical hypothesis

elaborate cognitive skills (fundamentally unknowable)

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post-selection of local maxima



# “Fictitious Hindsight”

An empirical hypothesis

elaborate cognitive skills (fundamentally unknowable)

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post-selection of local maxima

the “reality principle”:  
among nearby models, will choose most likely



# “Fictitious Hindsight”

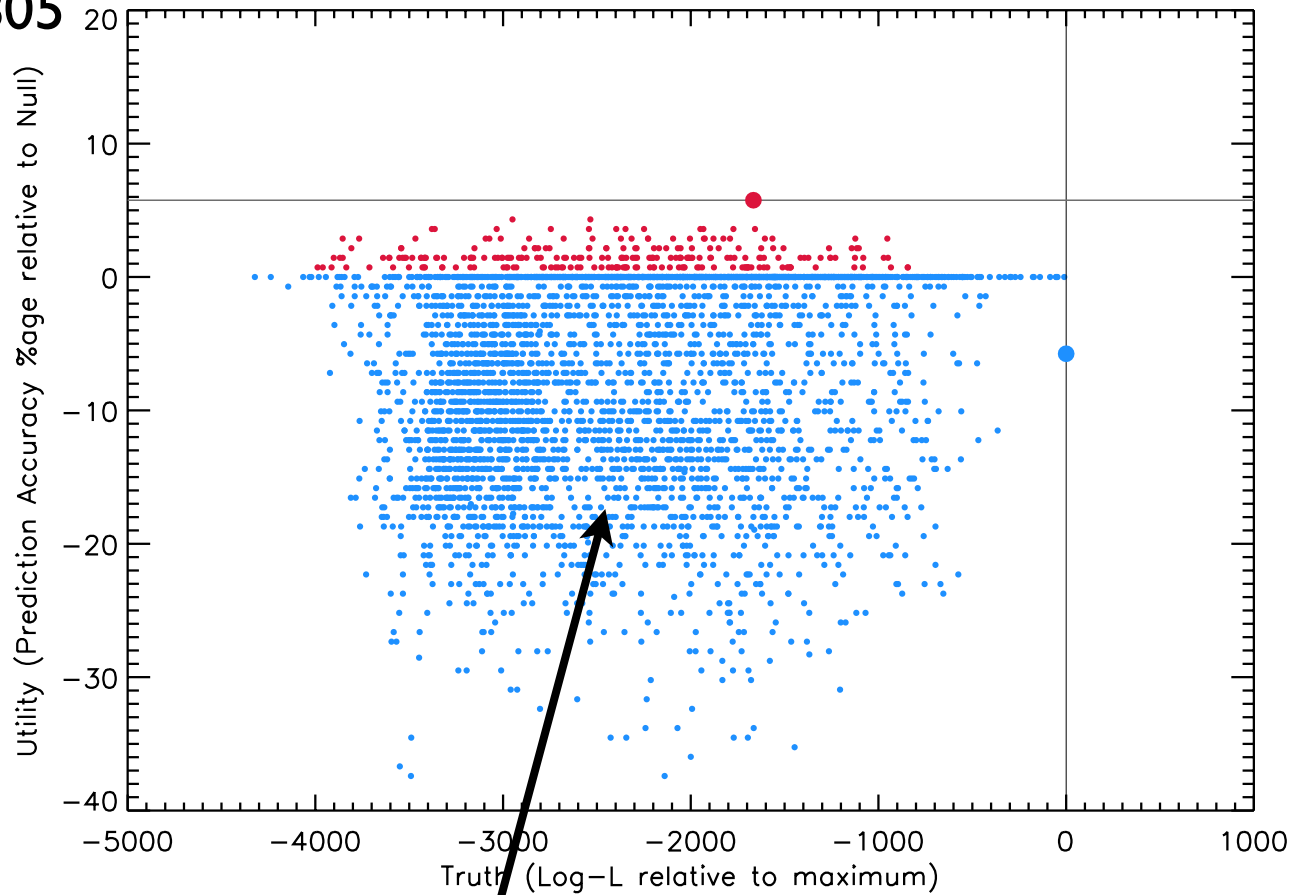
An empirical hypothesis

can be combined with any generative model  
(e.g., pairwise max-ent / Ising-type)

suggests experimental tests for real-world tasks

# Fictitious Hindsight

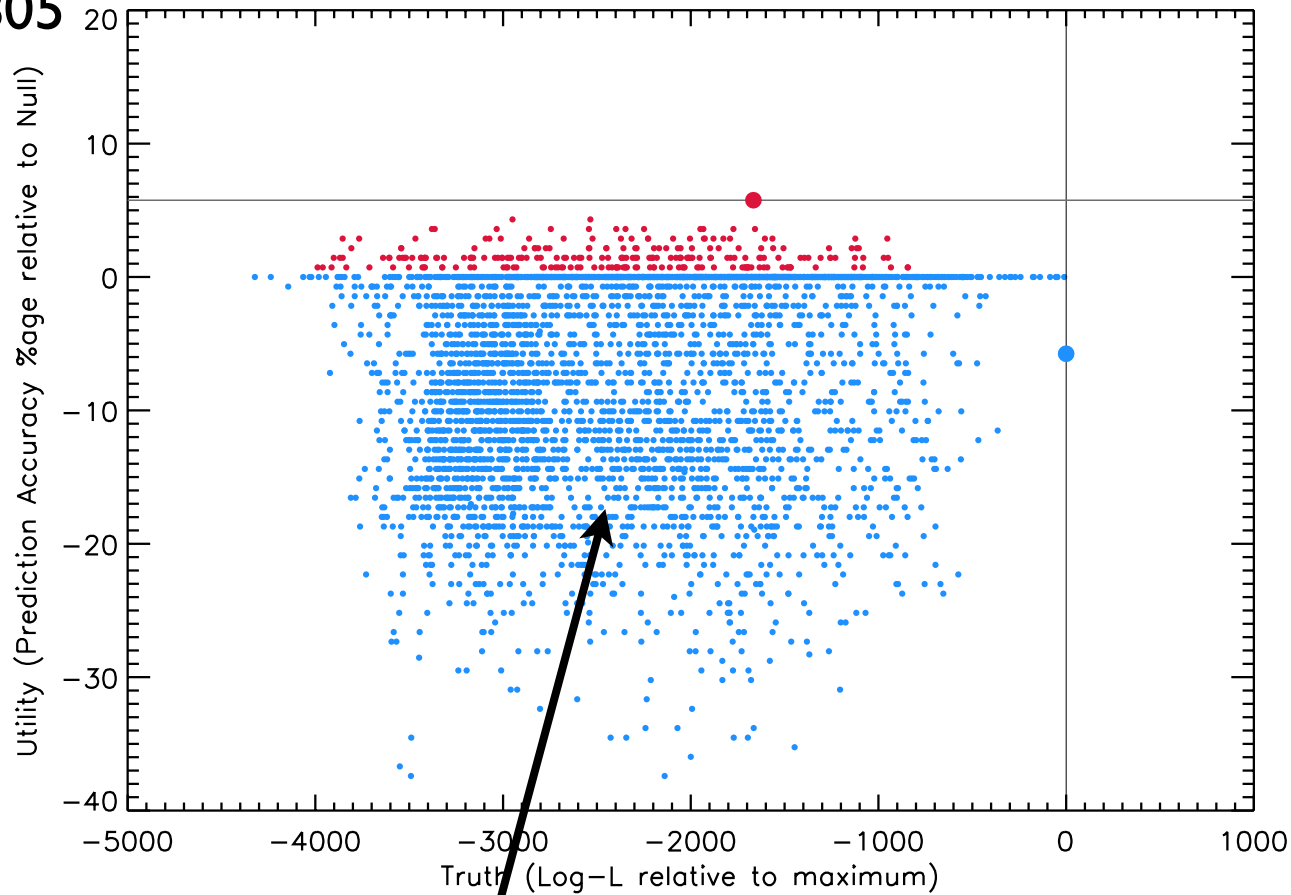
Knowability of trial outcomes in 1806, given complete knowledge of 1805



each point a local maximum

# Fictitious Hindsight

Knowability of trial outcomes in 1806, given complete knowledge of 1805



**1805**

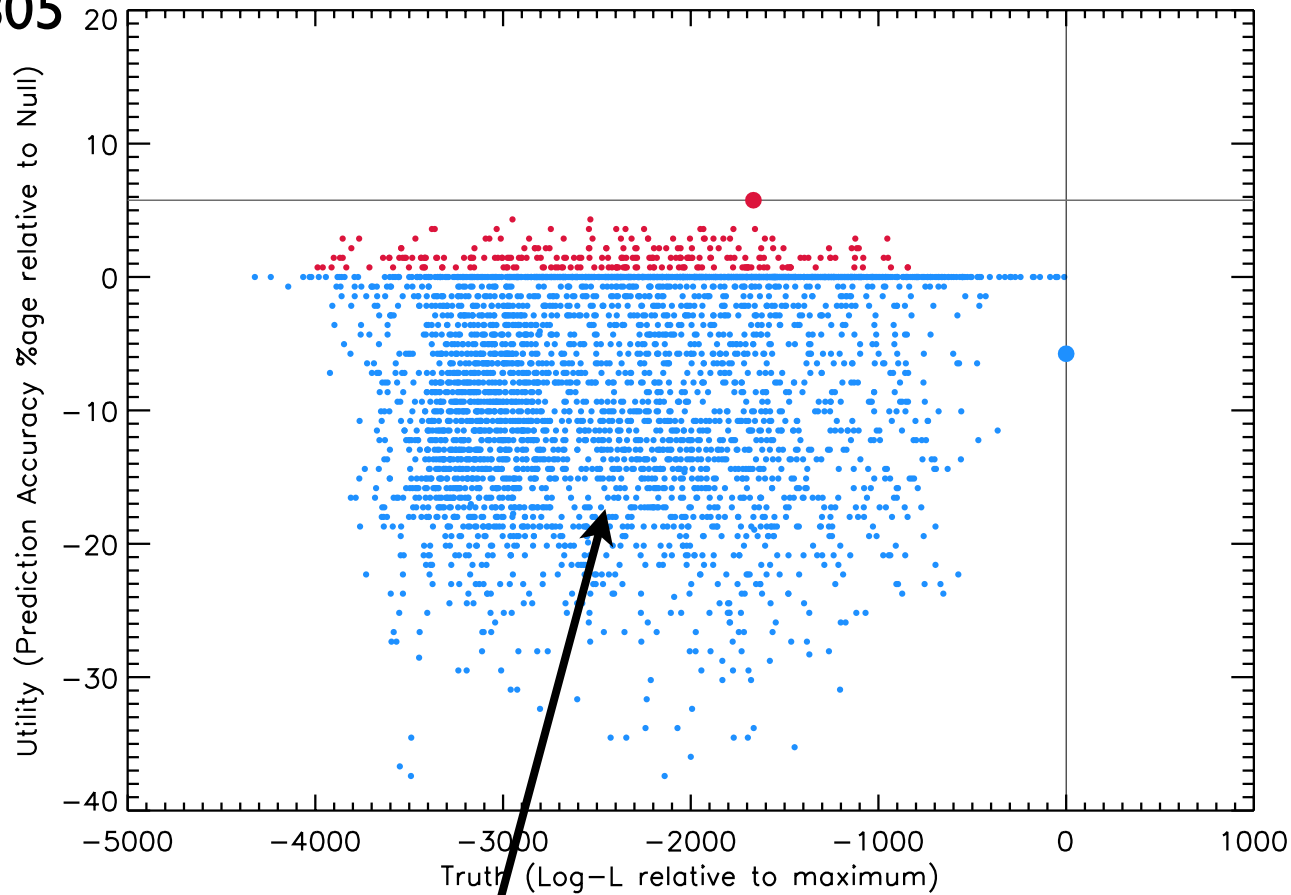
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# Fictitious Hindsight

Knowability of trial outcomes in 1806, given complete knowledge of 1805

1806



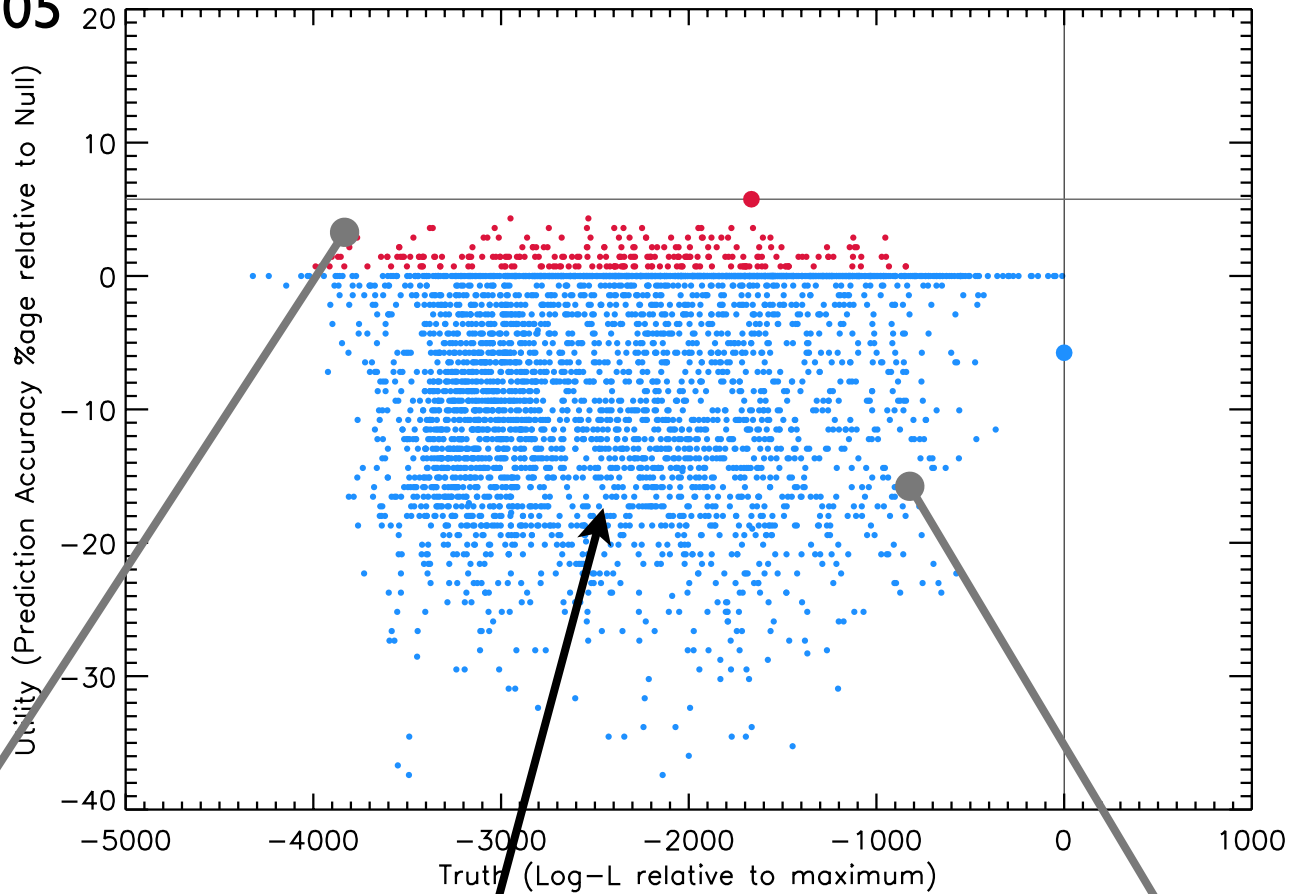
1805

each point a local maximum

# Fictitious Hindsight

Knowability of trial outcomes in 1806, given complete knowledge of 1805

1806



“false but useful”

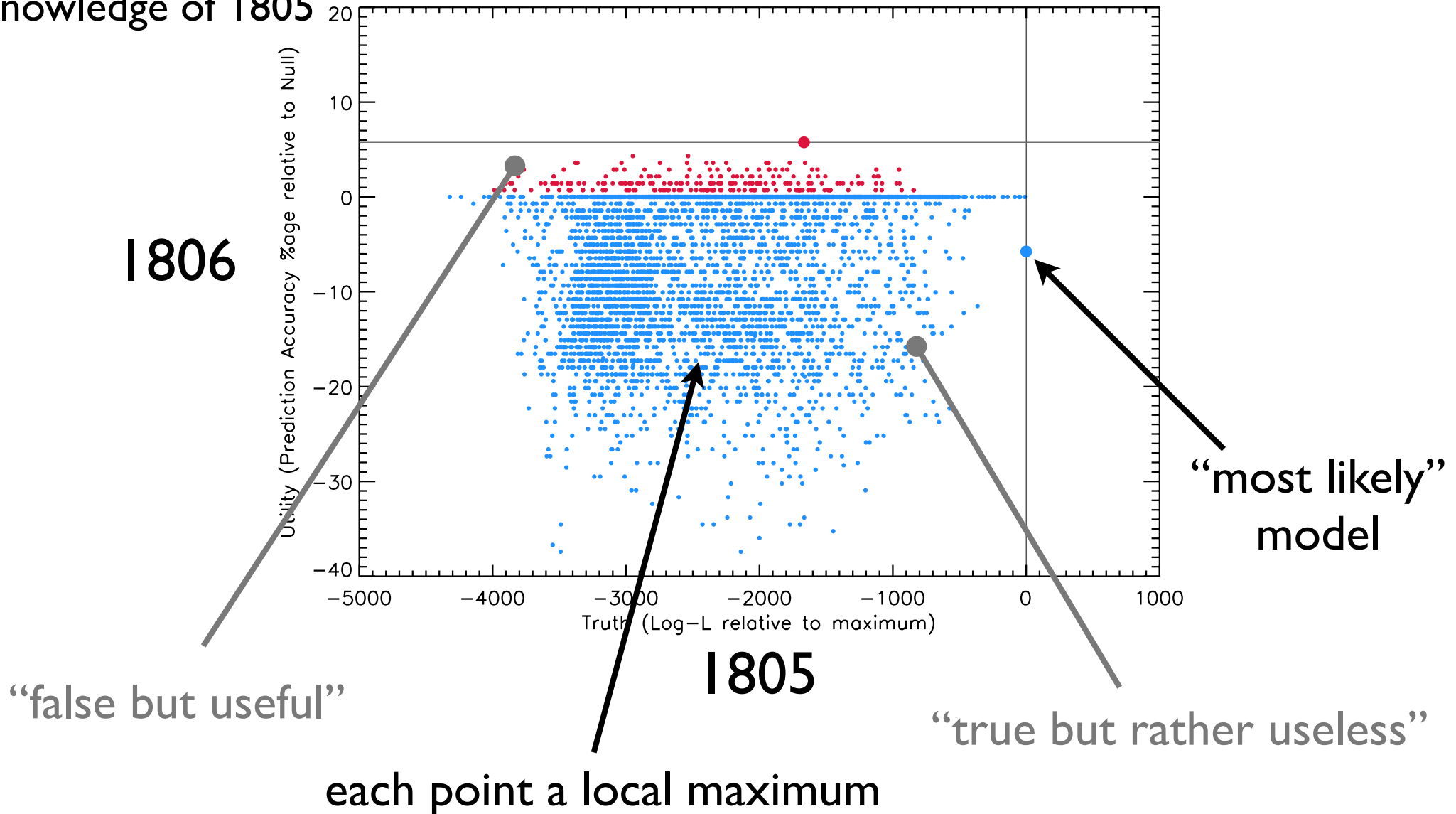
1805

“true but rather useless”

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# Fictitious Hindsight

Knowability of trial outcomes in 1806, given complete knowledge of 1805

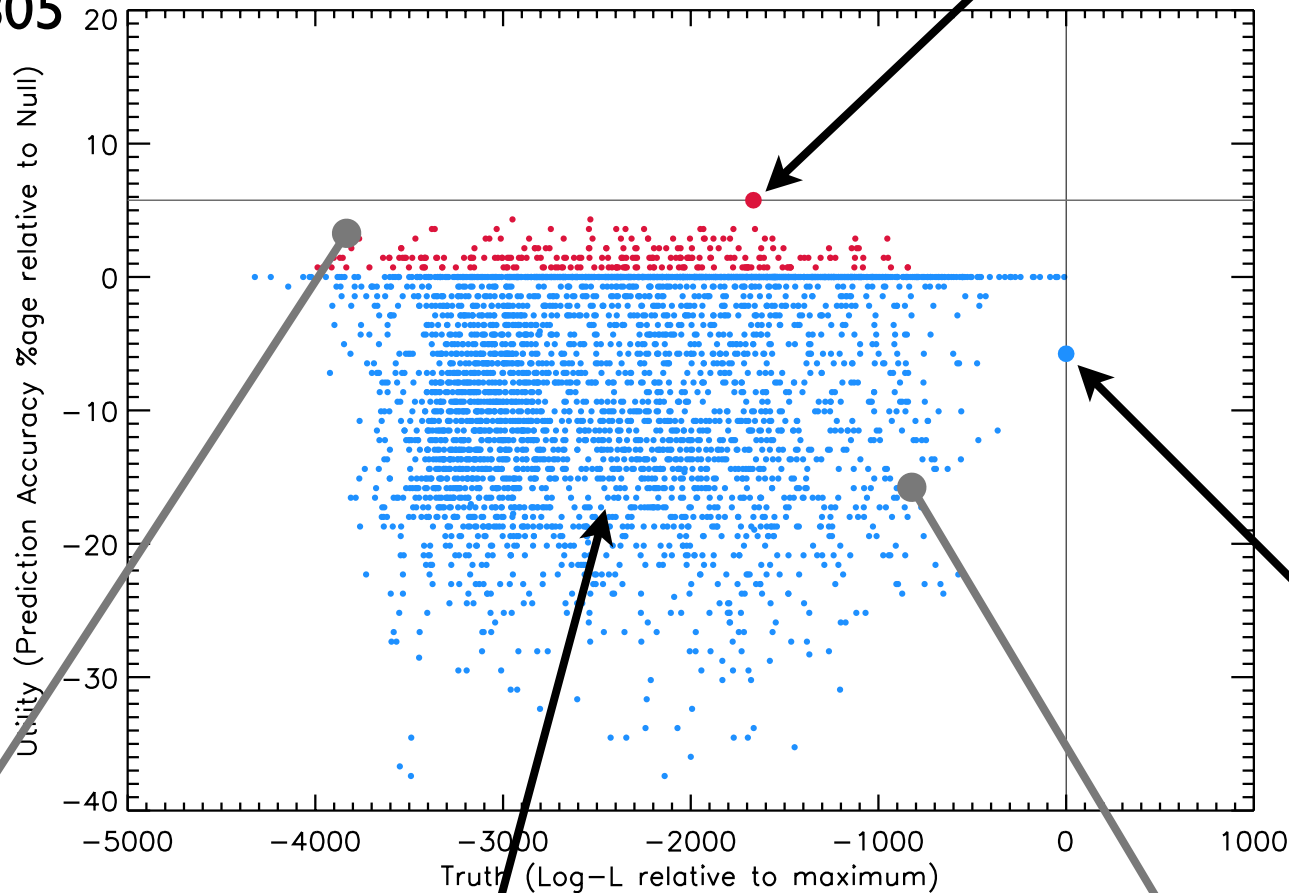


# Fictitious Hindsight

Knowability of trial outcomes in 1806, given complete knowledge of 1805

“most useful” model : chosen by angel

1806



“most likely” model

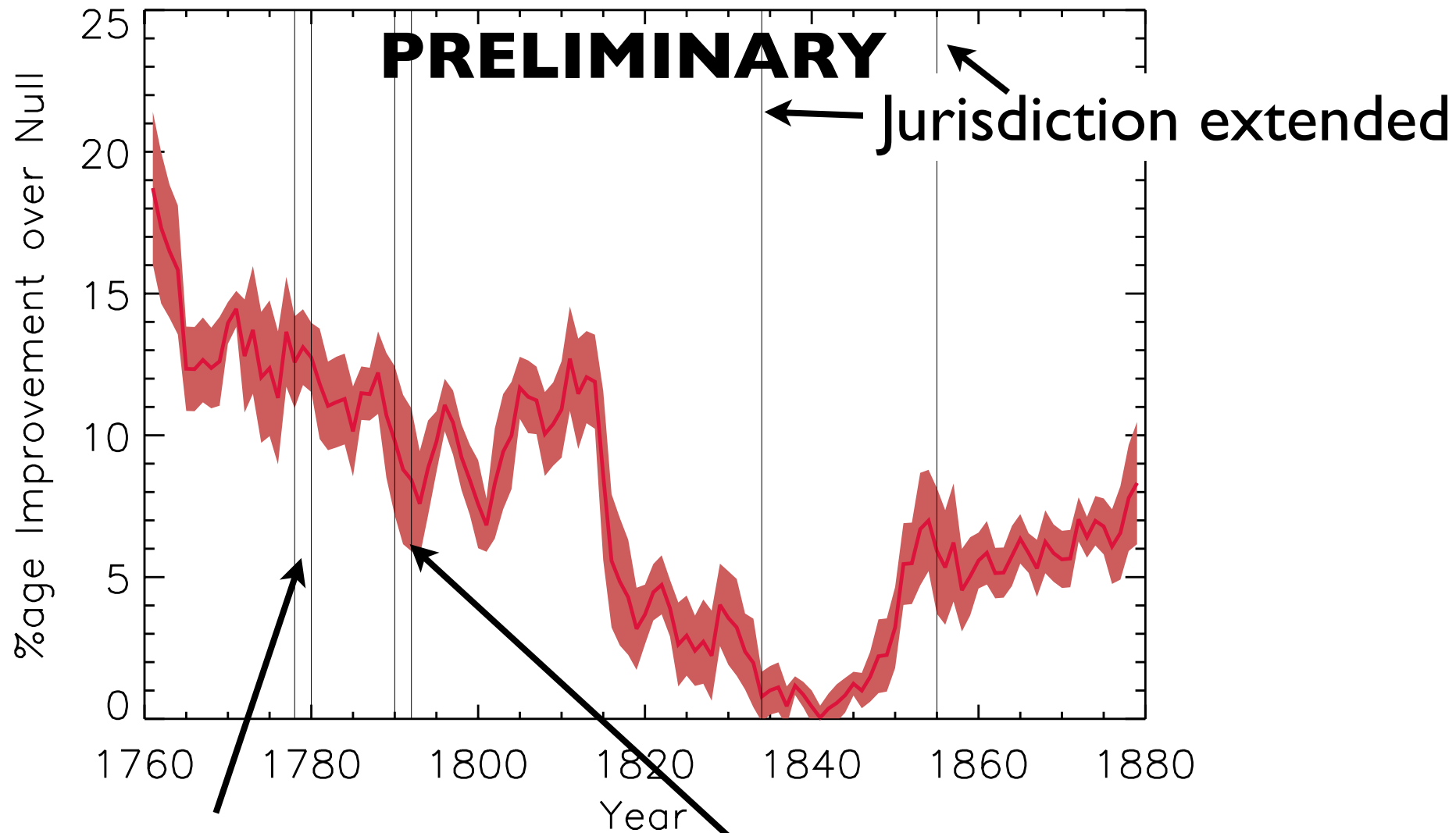
“false but useful”

1805

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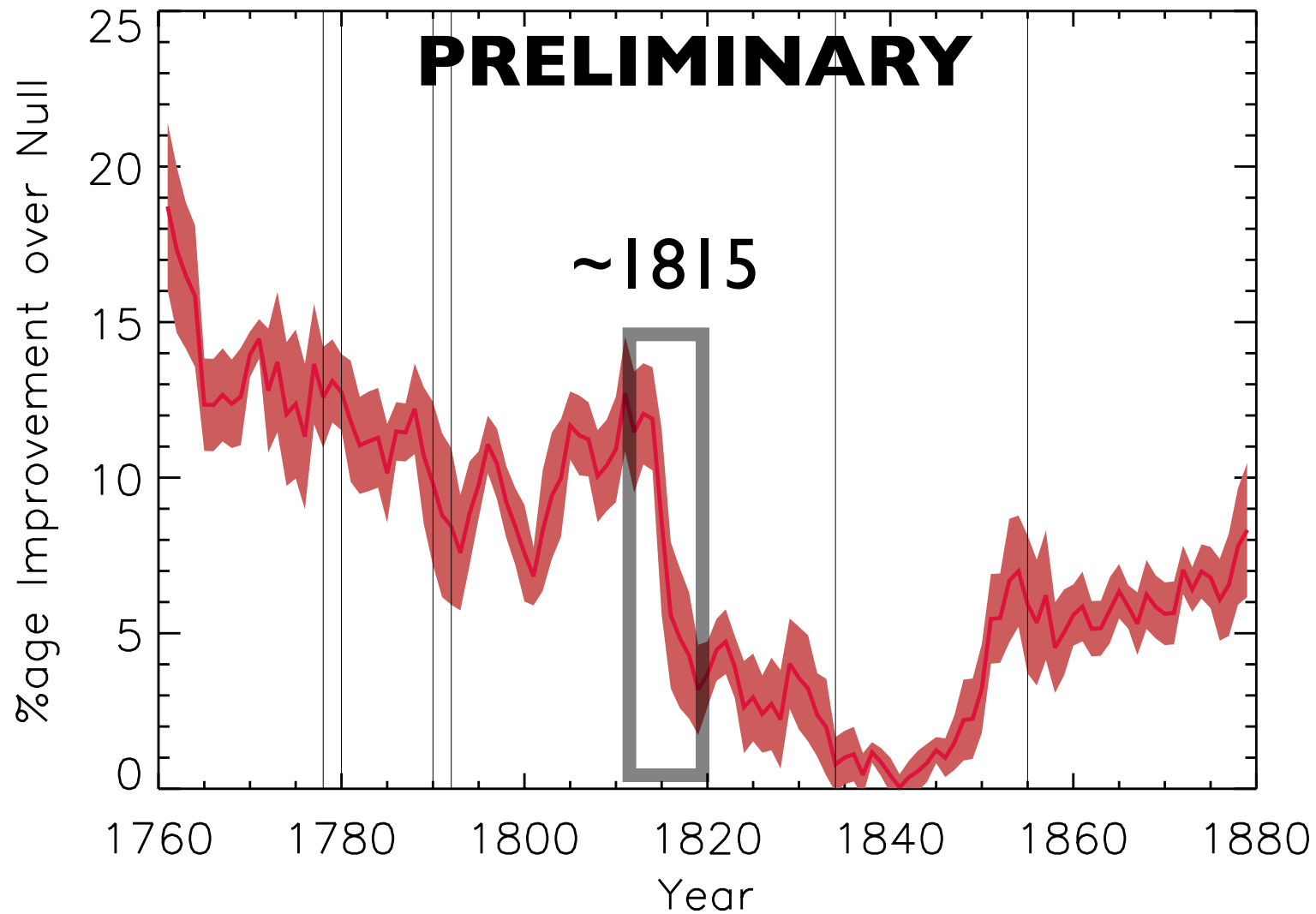
# Predictability of Trial Outcome



John Wilkes mandates  
“true, fair & perfect”

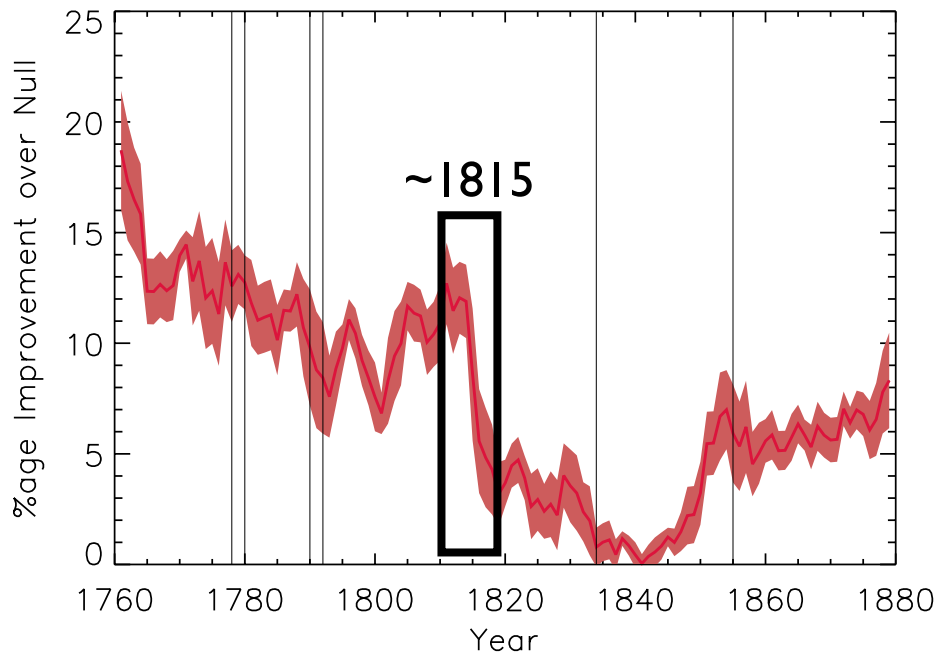
1790-1792  
Censorship

# Predictability of Trial Outcome



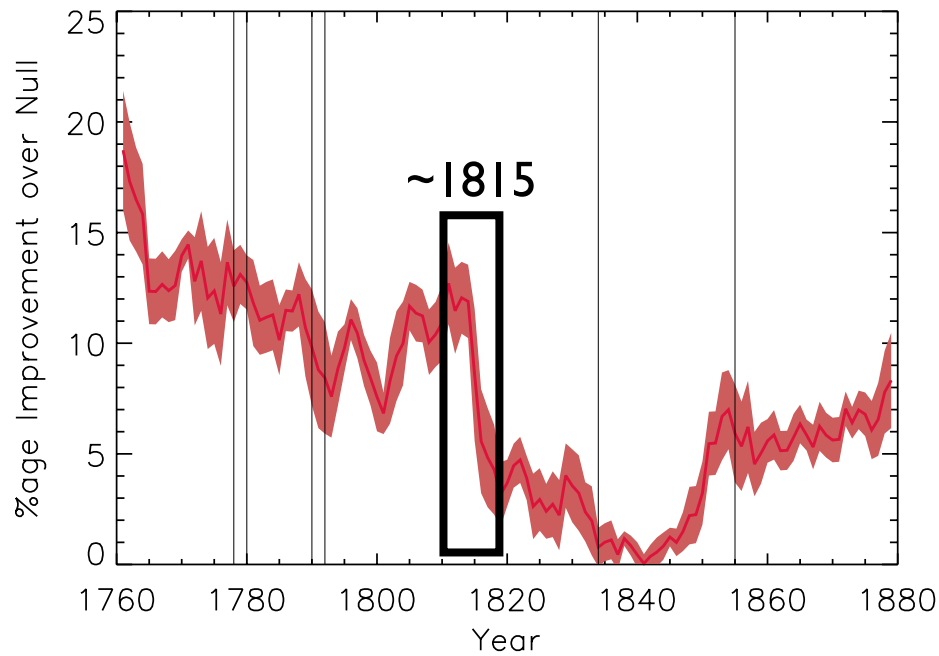


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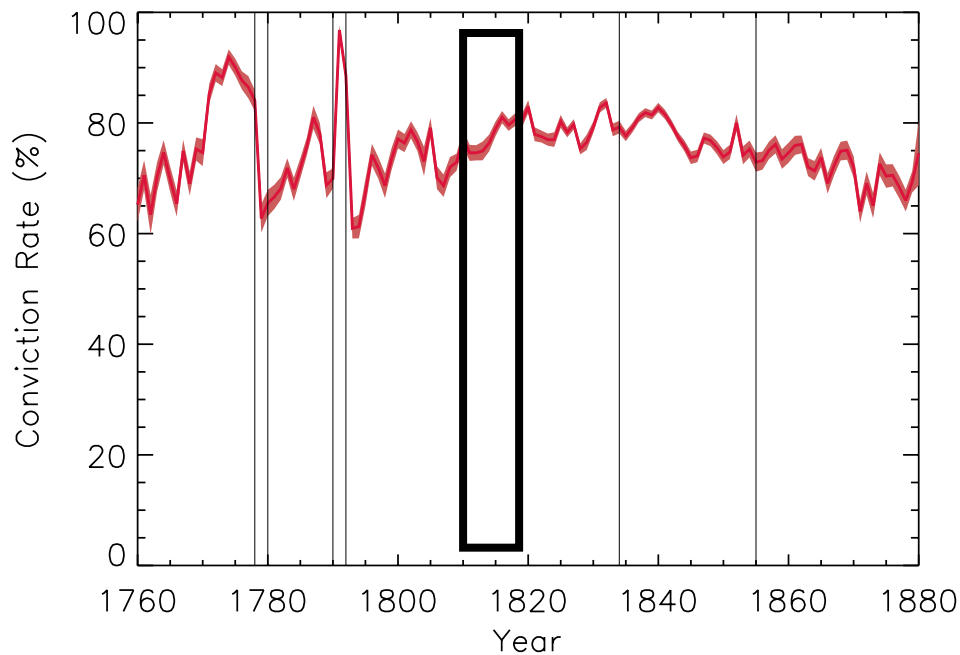


Why the sudden decline?

# Predictability of Trial Outcome

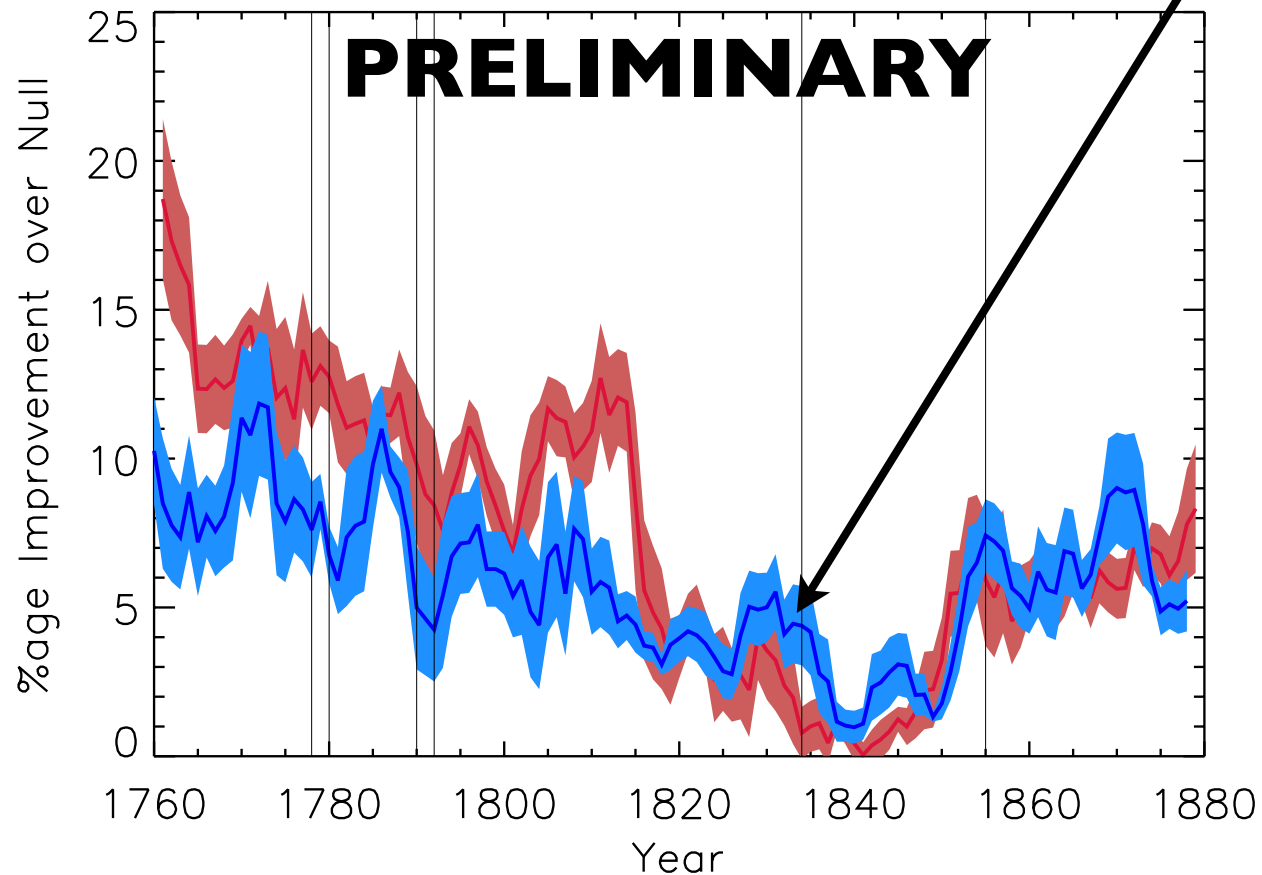


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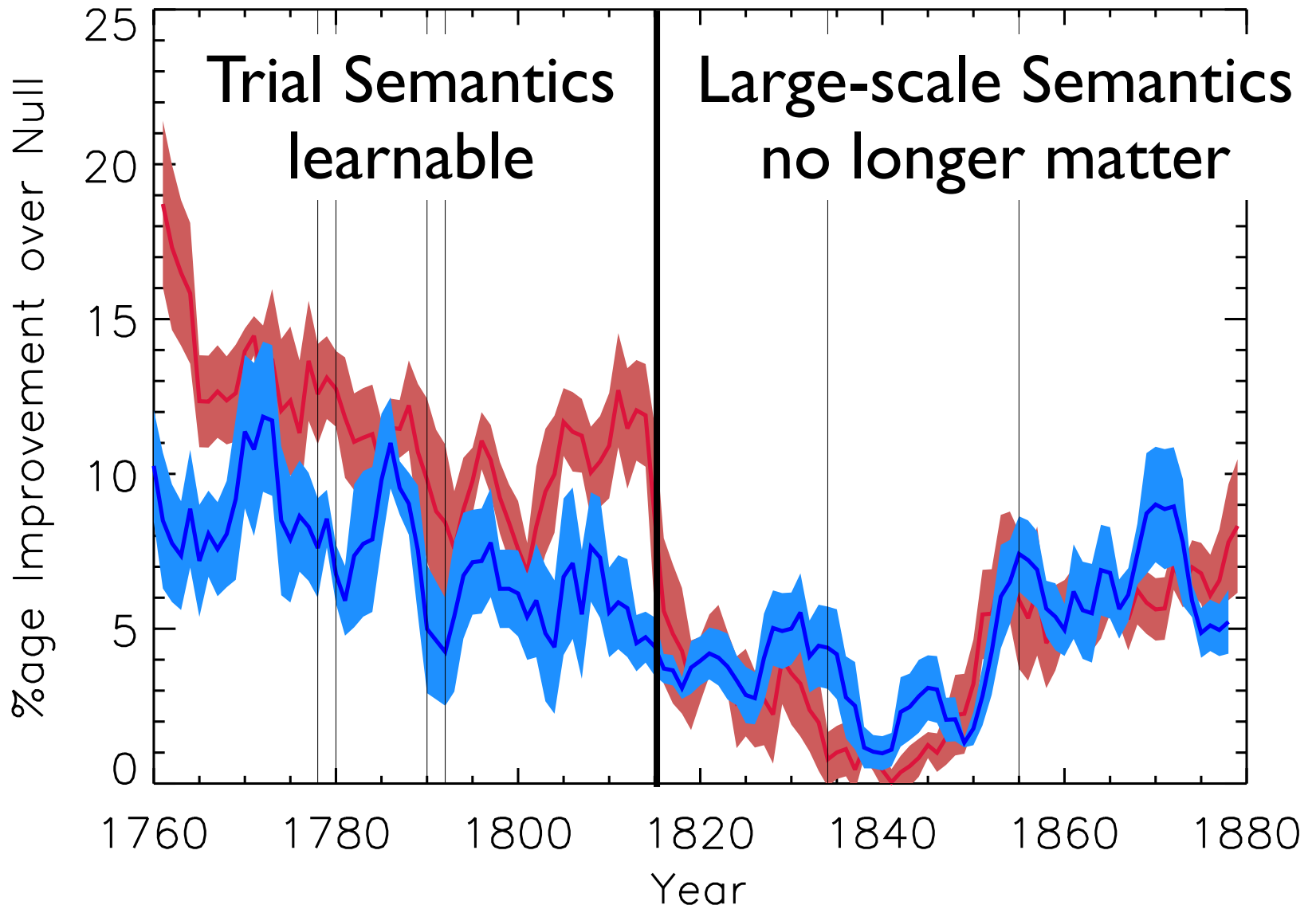


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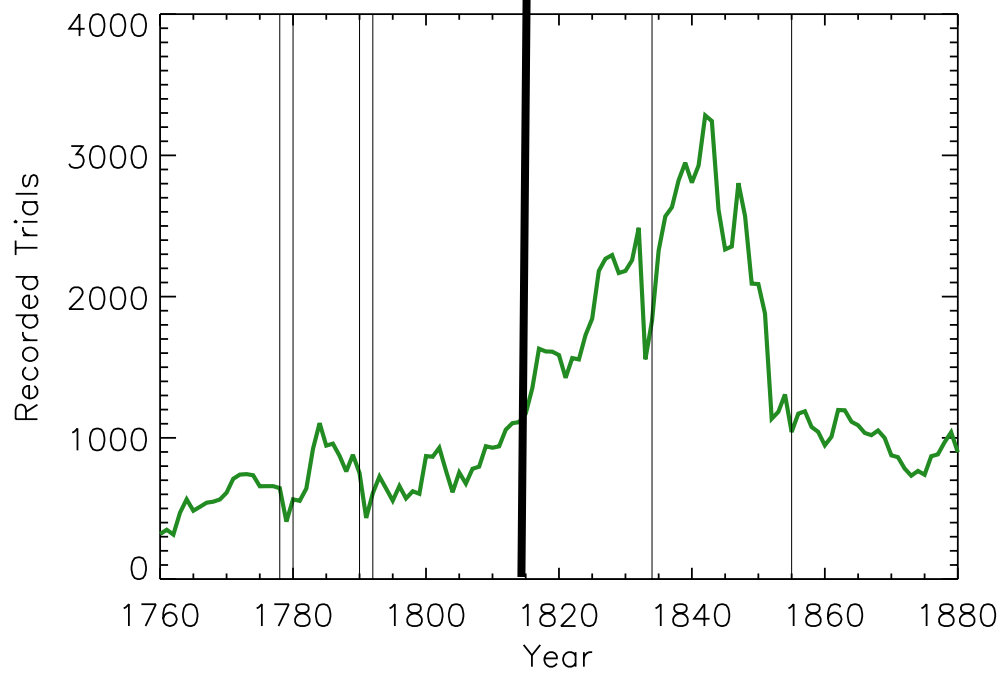
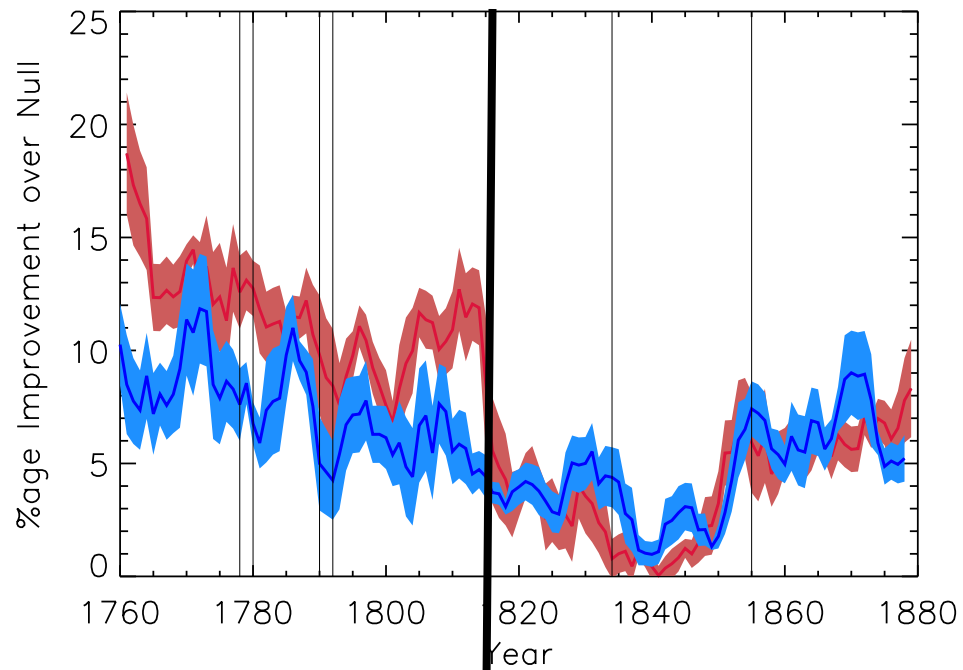
Prediction of outcome given knowledge of offense category alone



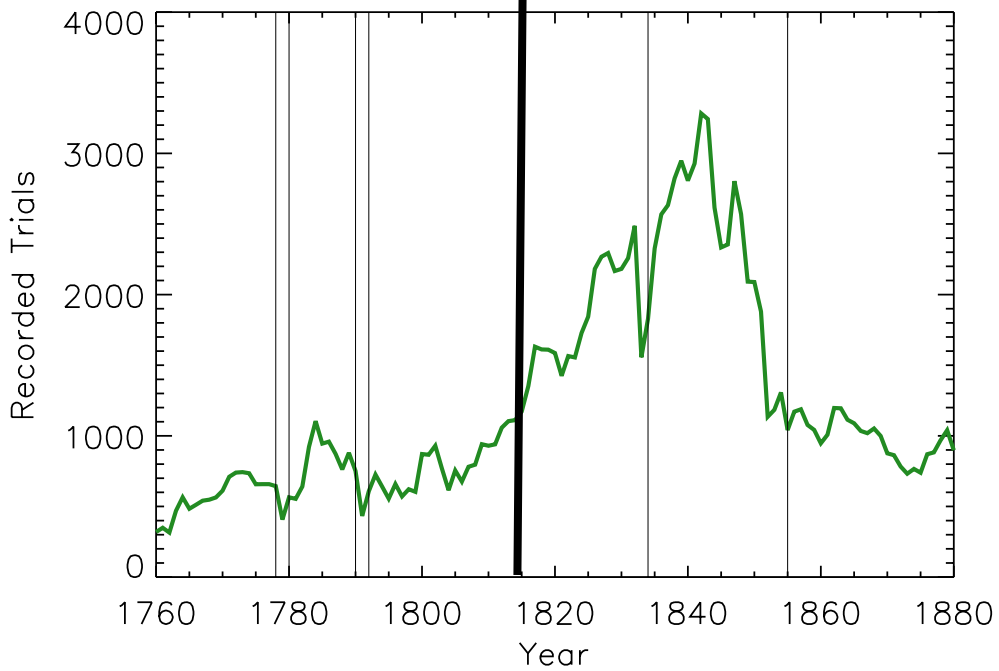
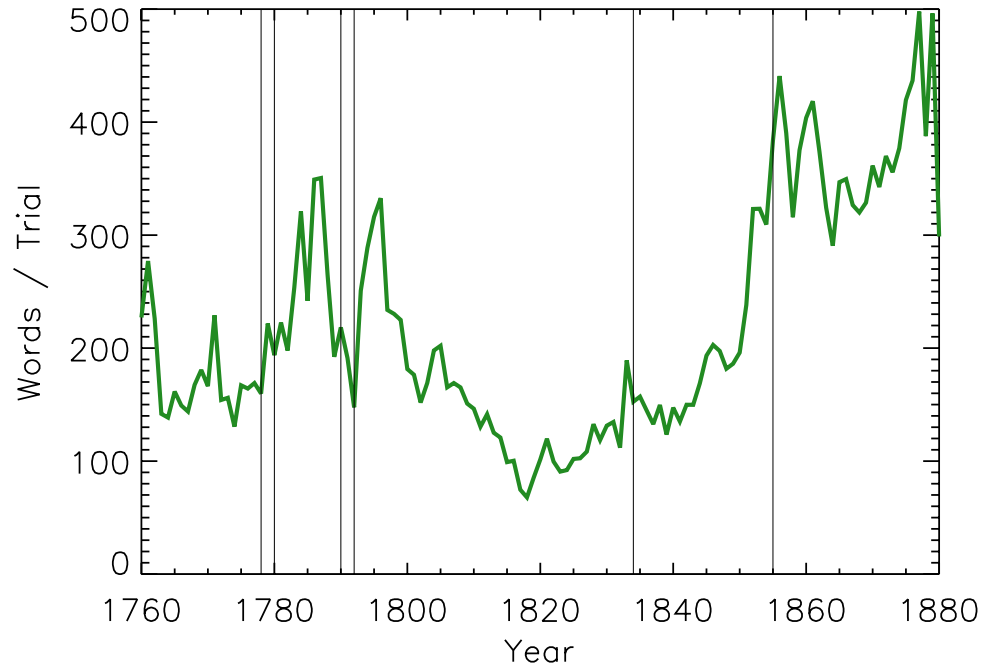
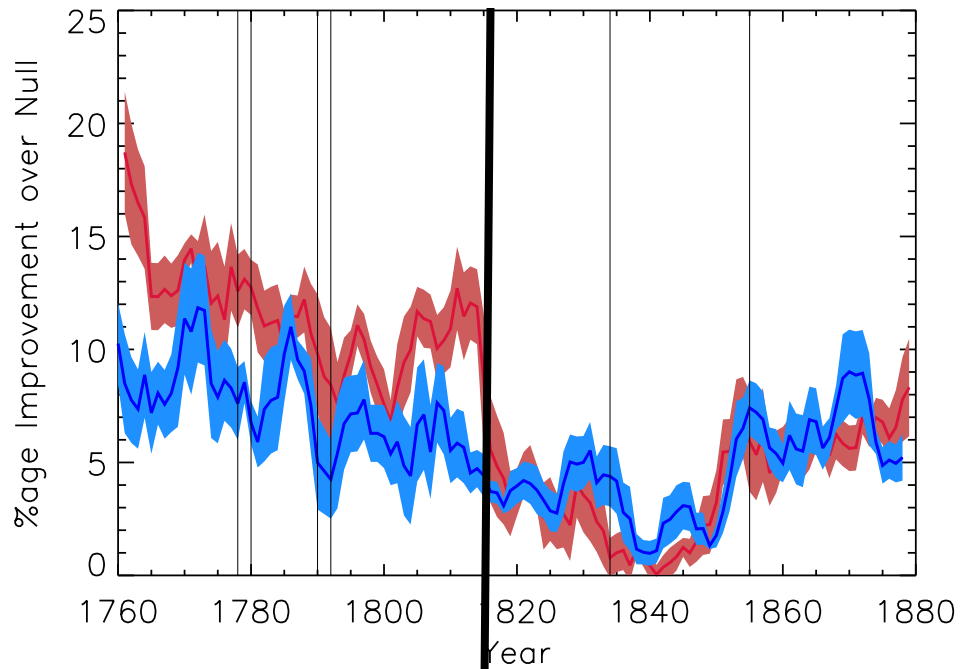
# Two Eras



# One Explanation

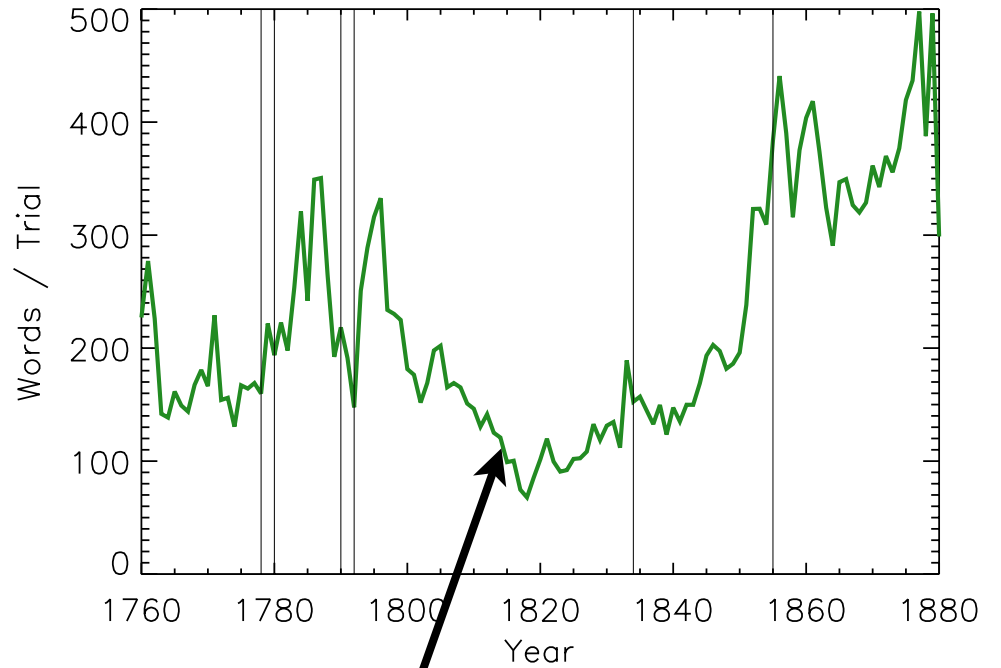
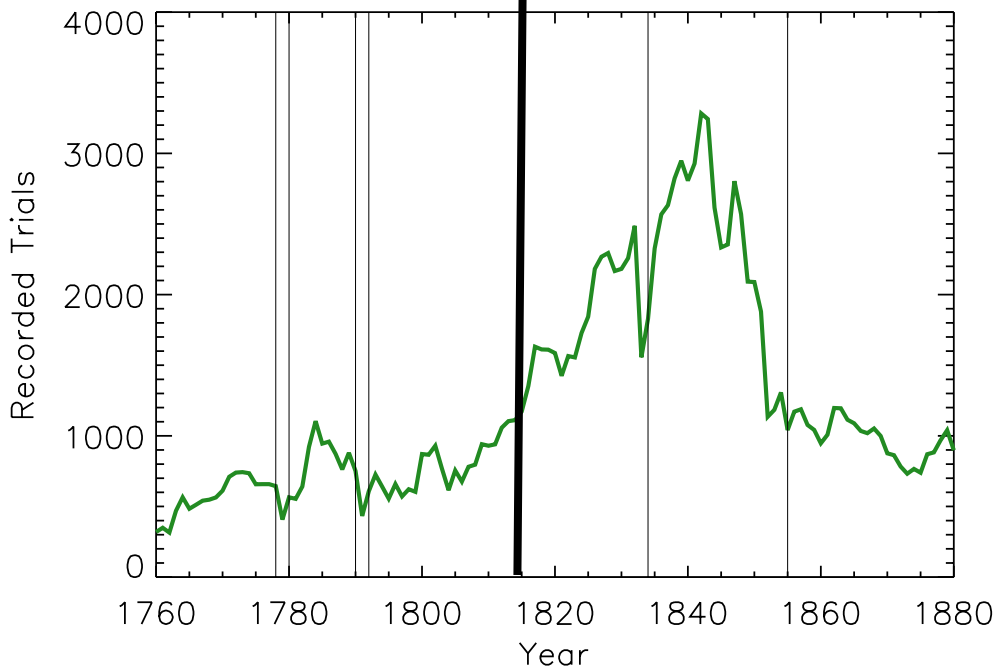
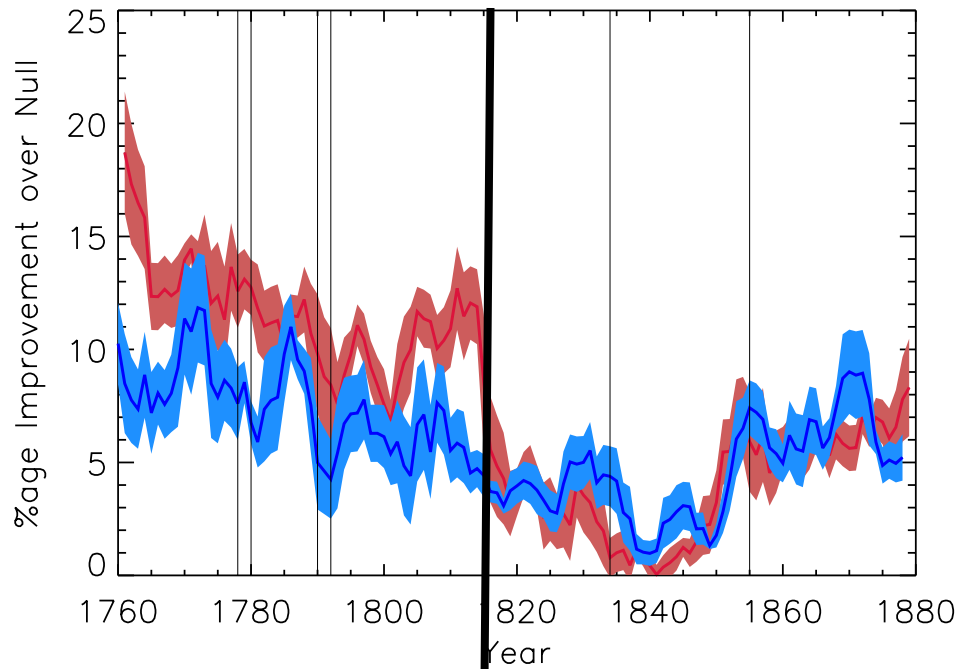


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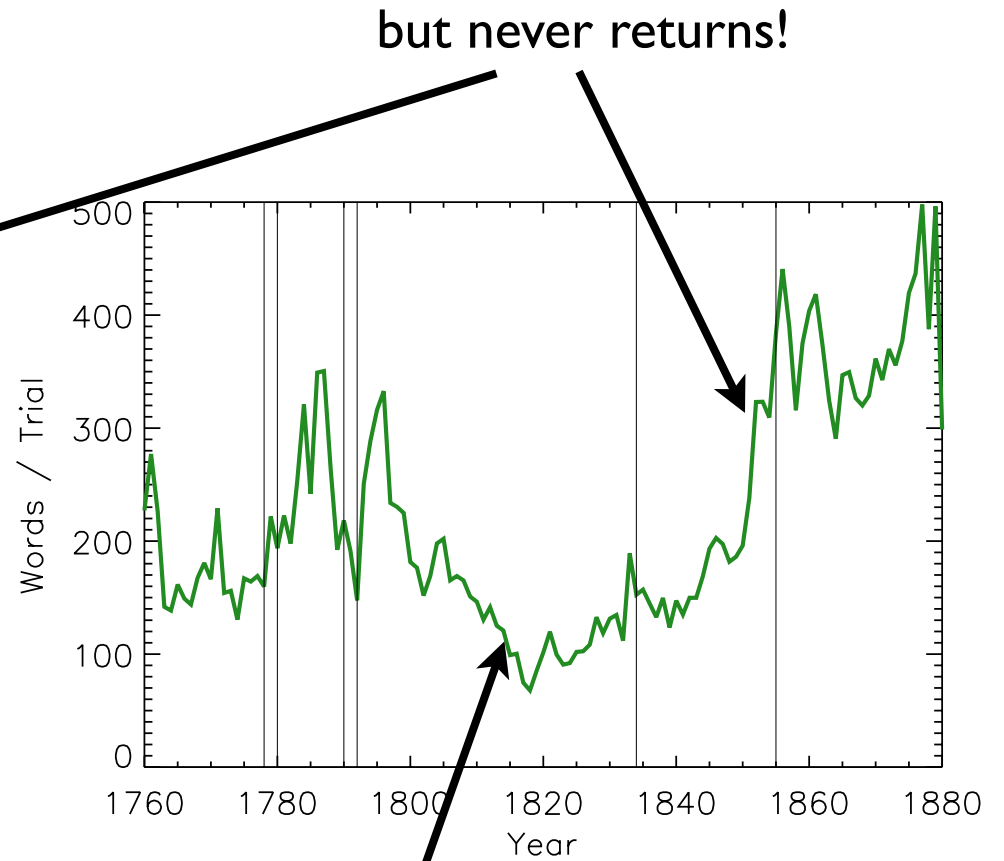
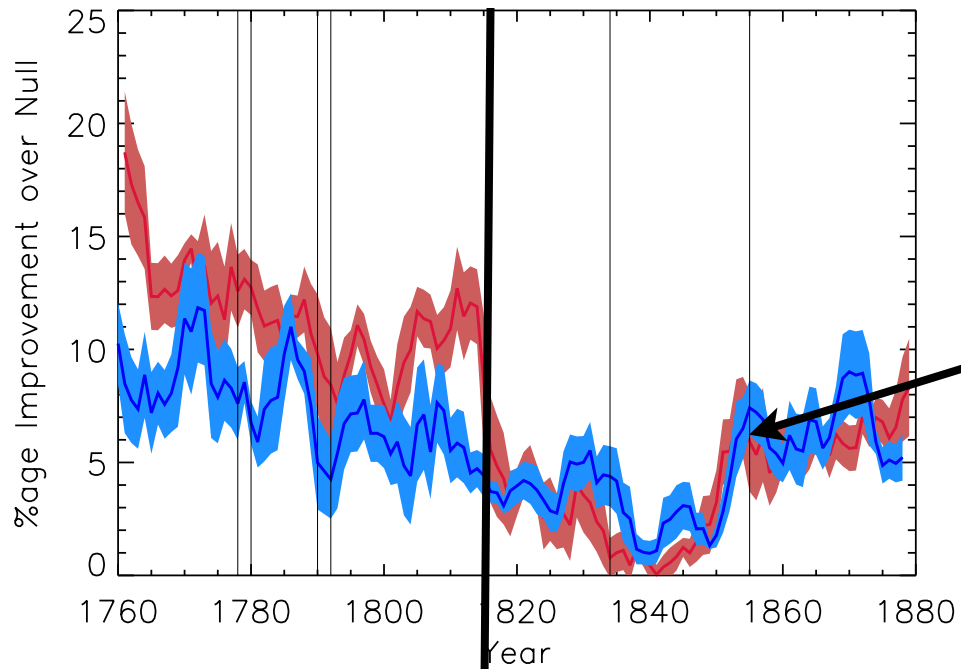


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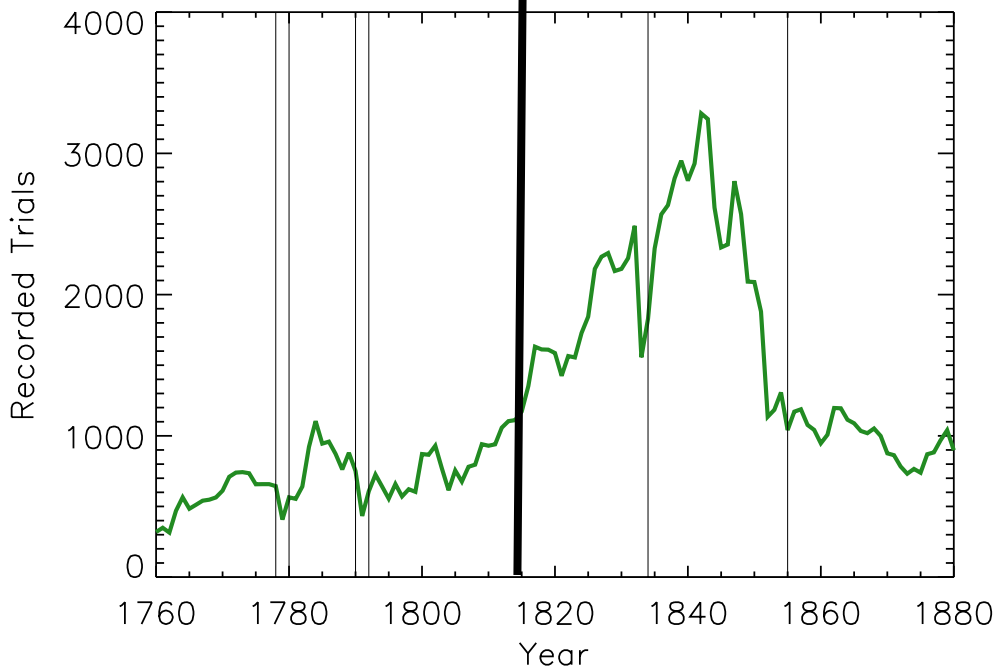
predictability leaves the system  
near minimum words/trial

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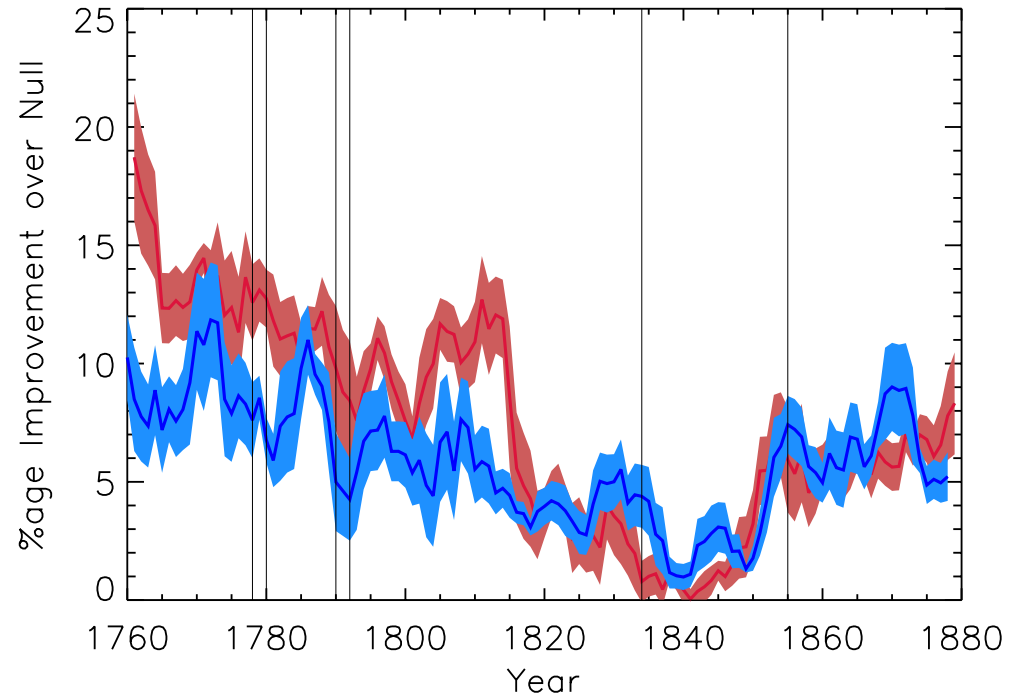


but never returns!

predictability leaves the system  
near minimum words/trial



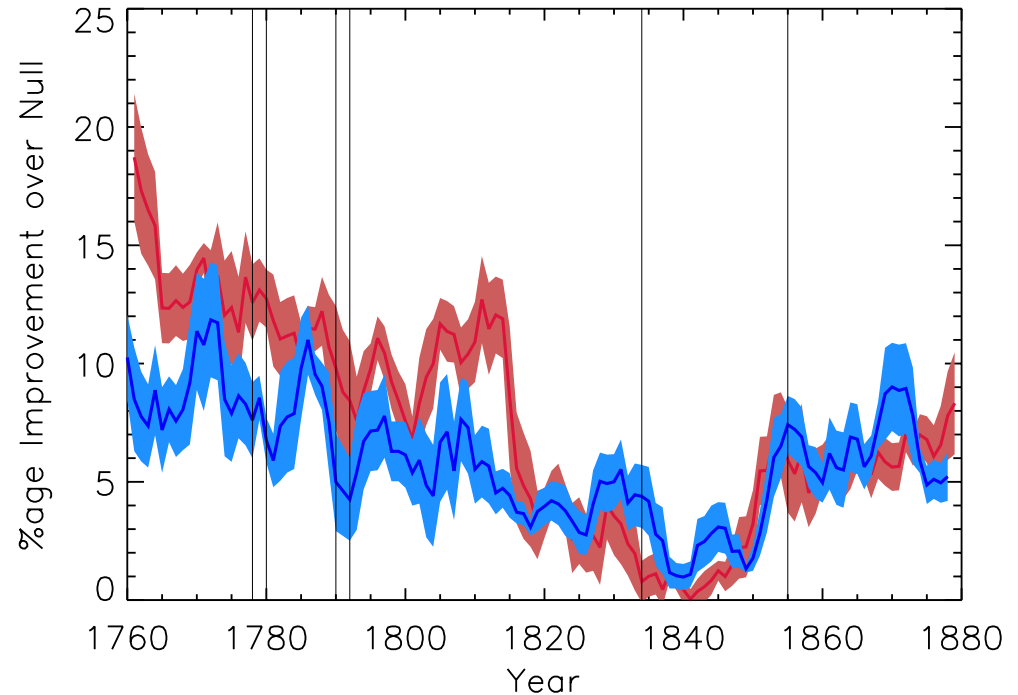
# The Pre-History of Information Processing



## **PRELIMINARY**

- Overburdened system ceases information flow
  - Channel does not reactivate

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*(Property produced and sworn to.)*

The prisoners pleaded distress.

HOLLIS—GUILTY. Aged 14.

PIKE—GUILTY. Aged 15.

Transported for Life.

*First Middlesex Jury, before Mr. Common Sergeant.*



844. JAMES HOLLIS and THEODORE PIKE were indicted for stealing, on the 15th of June, one handkerchief, value 4s., the goods of James Bernard Bernard, from his person.—MR. HONE conducted the prosecution.

JAMES BERNARD BERNARD. I am a barrister, and reside in Gray's Inn. On the 15th of June, about nine o'clock in the morning, I was in Castle-street, Bloomsbury—I heard a voice call out "They have picked your pocket." I felt and missed my handkerchief—and at the same time, turning round, I saw two persons running away. I pursued them towards Plumtree-street, into Museum-street, Broad-street, St. Giles's—and there they divided. I secured Hollis, and never lost sight of him. Pike was brought back, and my handkerchief produced.

WILLIAM HATTON. I am eleven years old, and belong to Shelton school; I live in Little Russell-street. On the 15th of June, I was coming out of a dairy in Castle-street with some milk, and saw Hollis draw the handkerchief from Mr. Bernard's pocket and give it to Pike, who followed close behind him. I am certain they are the boys. I immediately called to Mr. Bernard, they both ran away. I went home, and saw them at the office the same day.

JOHN CAREY. I am a shoemaker, and live in Plumtree-street. I was passing from Museum-street to Drury-lane, and saw Pike running with a handkerchief in his hand. I joined in the pursuit—and when he ran across, he threw it into a shop-door. I picked it up, and gave it to the prosecutor—he was stopped directly.

(Property produced and sworn to.)

The prisoners pleaded distress.

HOLLIS—GUILTY. Aged 14.

PIKE—GUILTY. Aged 15.

Transported for Life.

First Middlesex Jury, before Mr. Common Sergeant.

## FiveThirtyEight Forecast

Updated 10:10 AM ET on Nov. 6

President Nov. 6 Forecast	President Now-cast	Senate Nov. 6 Forecast
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Barack Obama

Mitt Romney

313.0

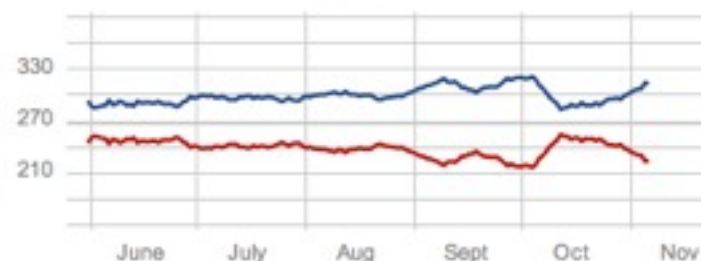
+14.0 since Oct. 30

Electoral  
vote

225.0

-14.0 since Oct. 30

270 to win



90.9%

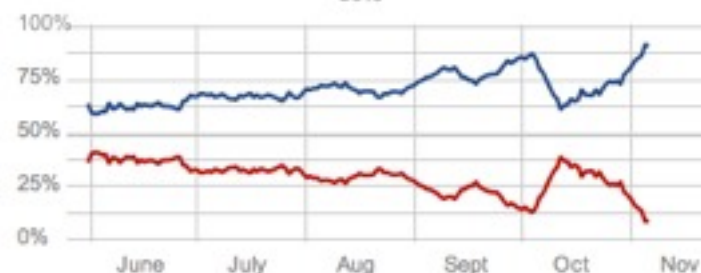
+13.5 since Oct. 30

Chance of  
Winning

9.1%

-13.5 since Oct. 30

50%





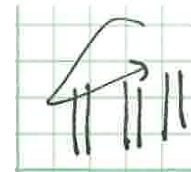
# Thank you



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Foundation



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