To err was forbidden: the changing culture of error exploration in forensic pattern evidence

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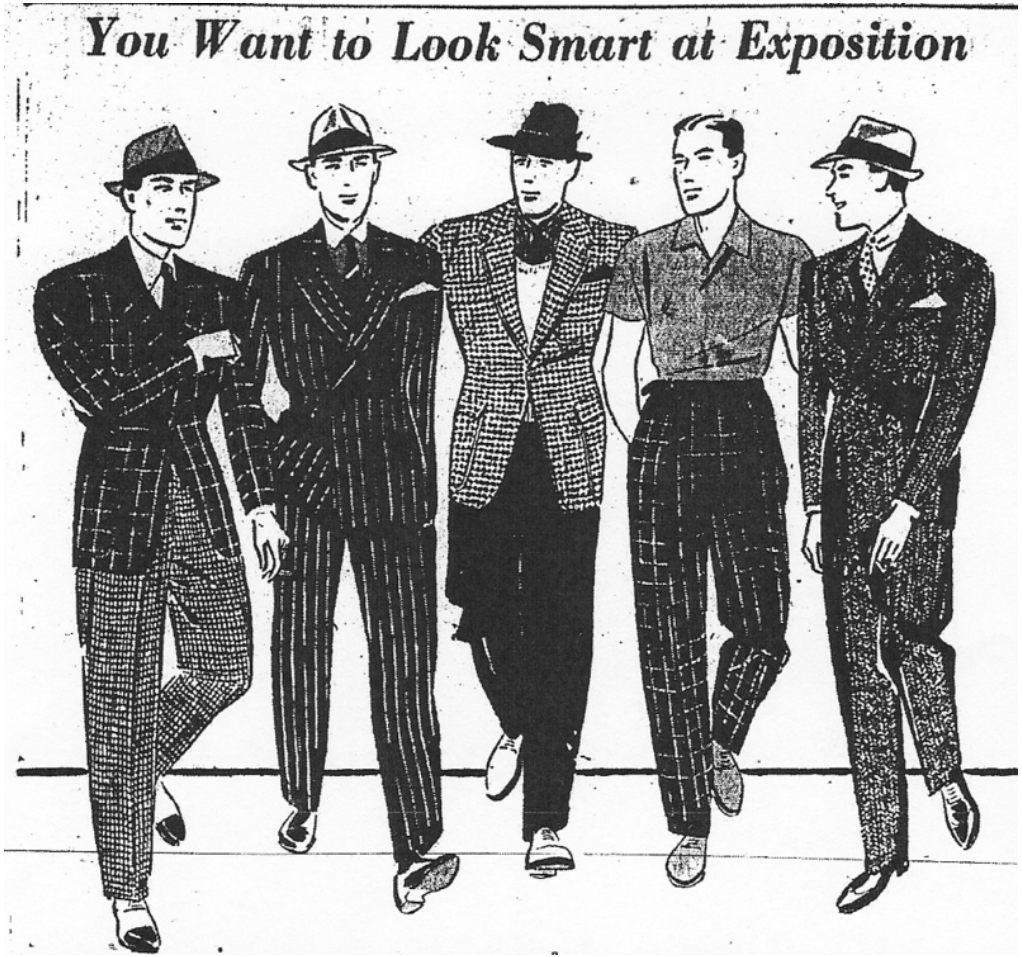
Faculty of Law
University of New South Wales

VICTORIA POLICE

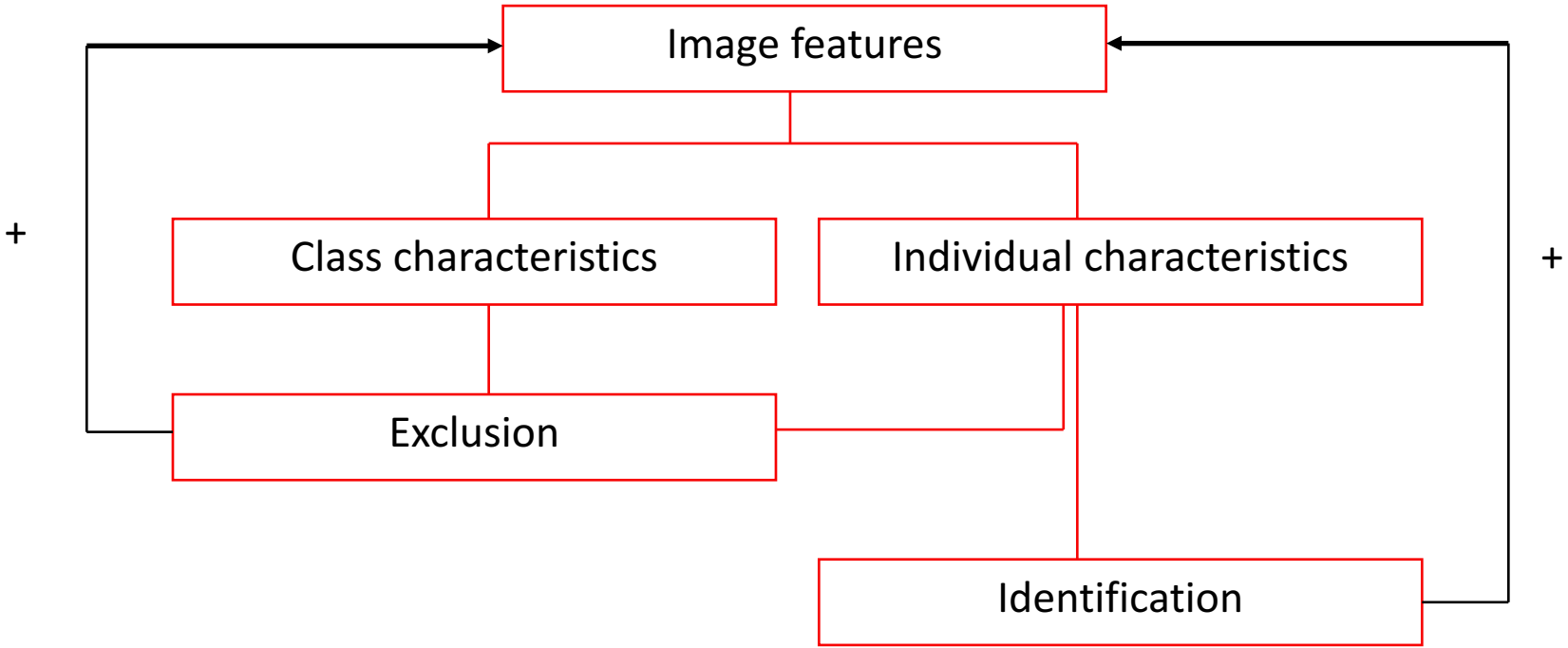
UNSW AUSTRALIA

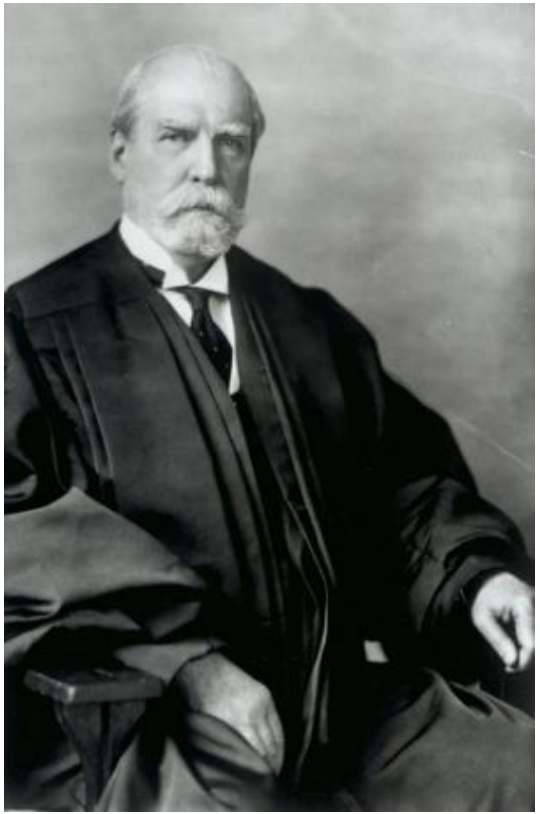
You Want to Look Smart at Exposition




LONDON

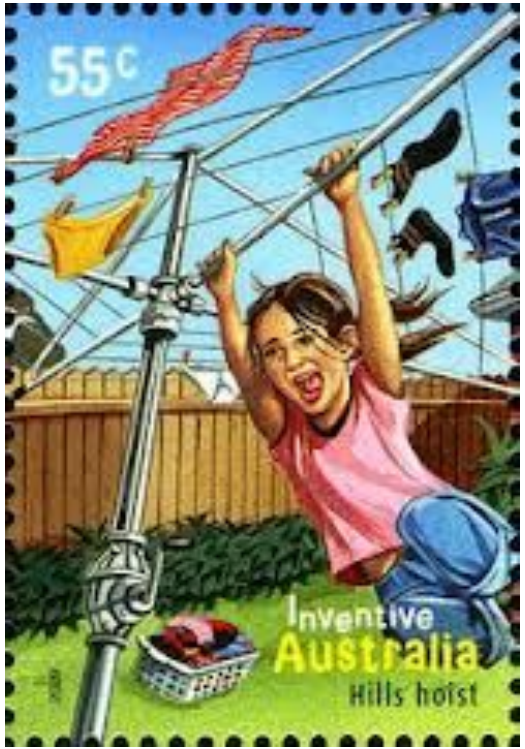
The pattern evidence experiential positive feedback model

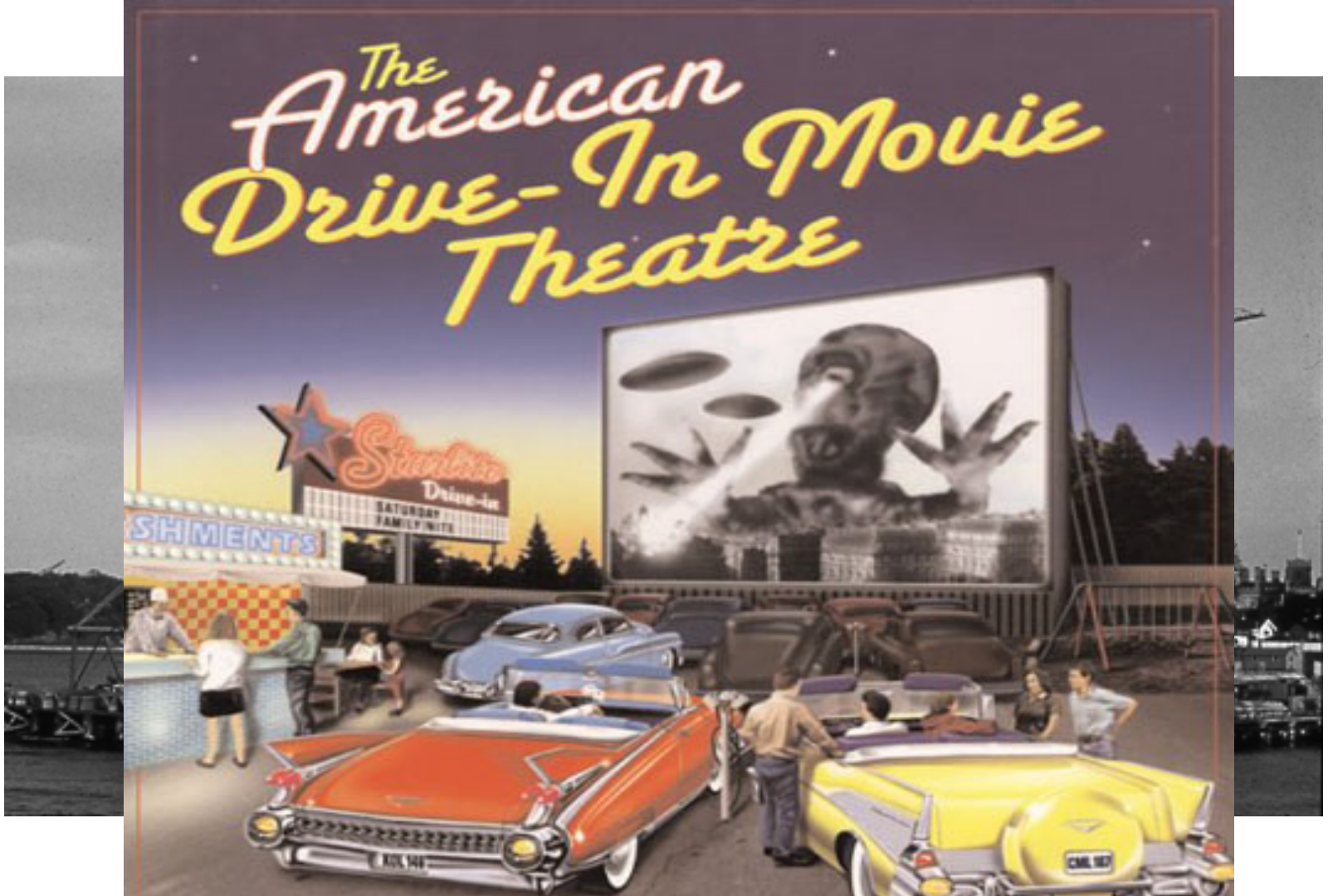


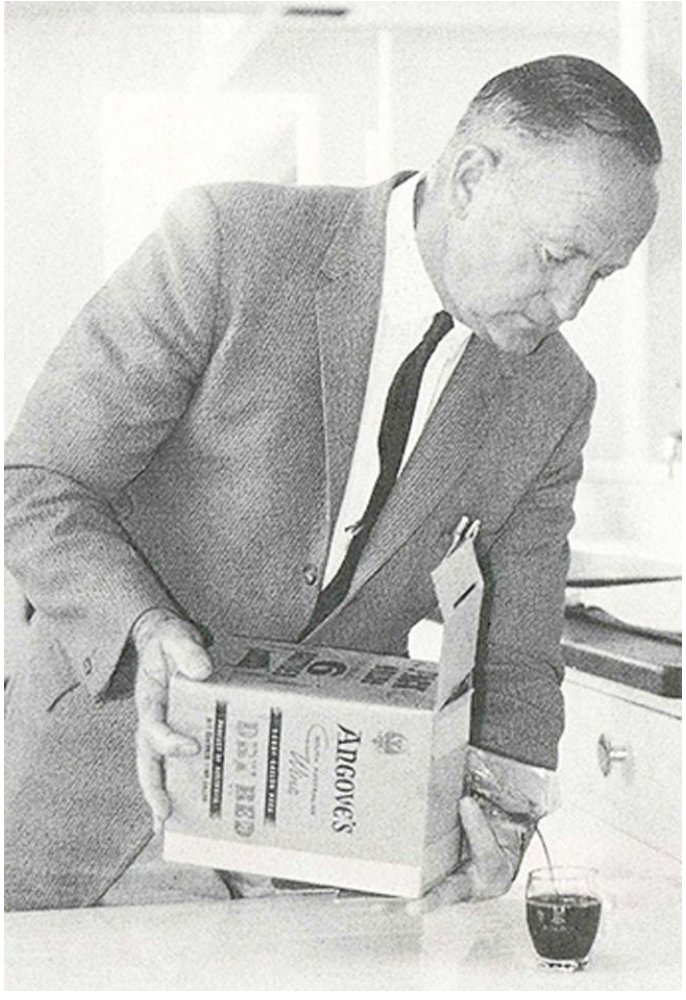


Courtesy, Colt's Fire Arms Mfg. Co.

Official revolver of the New York Department of Police. As the cylinder (A) revolves, fresh cartridges are brought in firing position.

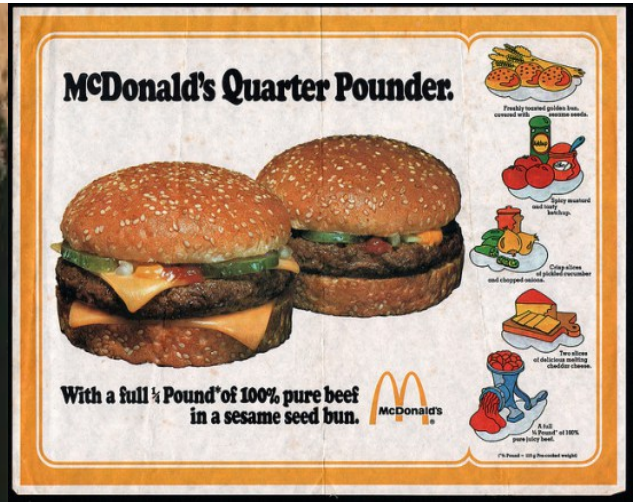

55c
Inventive
Australia
Hills hoist


The American Drive-In Movie Theatre
Drive-in
SATURDAY
SHMENTS

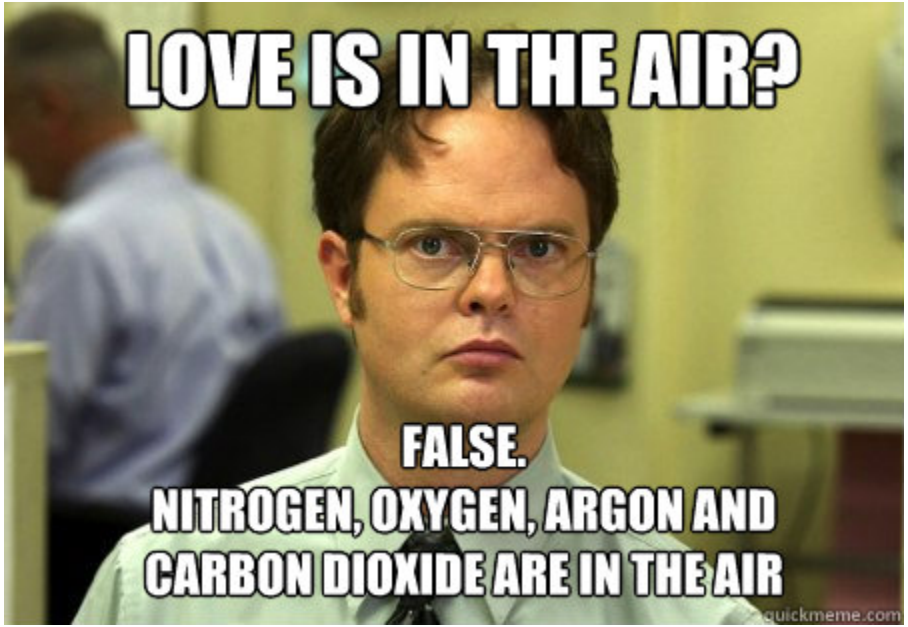

ANGOVE'S
DRY RED

70’s


The Very Best Of
Dolly Parton

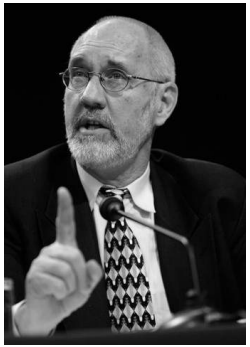

McDonald's Quarter Pounder.
With a full ¼ Pound* of 100% pure beef
in a sesame seed bun.
McDonald's

Critics


LOVE IS IN THE AIR?
FALSE.
NITROGEN, OXYGEN, ARGON AND
CARBON DIOXIDE ARE IN THE AIR
quickmeme.com

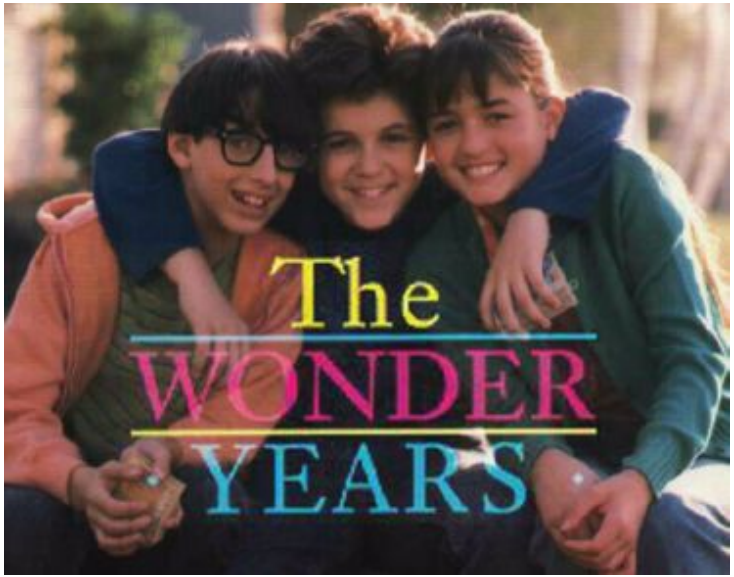
Exorcism of Ignorance as a proxy for rational knowledge: The lessons of handwriting identification “expertise”. Risinger, D.M., Denbeaux, M.P. & Saks, M.J., University of Pennsylvania Law Review, 137, 1989.

Science and nonscience in the courts; Daubert meets handwriting identification expertise. Risinger, D.M. & Saks, M.J., Iowa Law Review, 82, 1996.



The coming paradigm shift in forensic identification science. Saks M. & Koehler, J., Science, 309, 2005.

- Validation testing
- Method development
- Reporting procedure
- Error rate estimates
- Proficiency testing
- Context and bias


The
WONDER
YEARS


Y OUR BUSINESS AND
YOU WILL BE FIRE
BOMBED IF U
DONT STOP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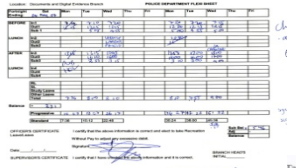
BRYAN FOUND




fraud /fro:d/
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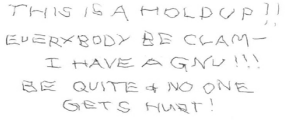
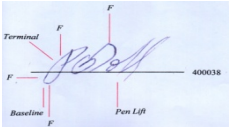
or thing inten

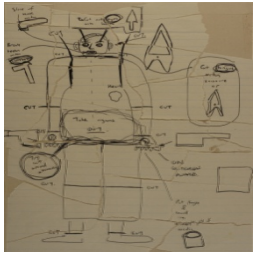

THIS IS A HOLDUP!!
EVERYBODY BE CLAM-
I HAVE A GNU!!!
BE QUITE & NO ONE
GETS HURT!


F
Terminal
F
400038
F
Baseline
Pen Lift

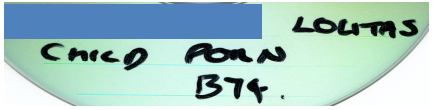

I'VE BEEN WATCHIN YOU
FOR A LONG TIM MY PRETTY
ONE. WE TO BE
TOGETHER. 'LL BE TING.


Penfolds
Grange
BIN 95
VINTAGE 1990
BOTTLED 1991
Bottled by PENFOLDS WINES PTY. LTD.
750ML WINE MADE IN AUSTRALIA 13.5% ALC/VOL


Gewehr Nr.:
Seitengewehr Nr.:
Ausgegeben:
Richtig empfangen:

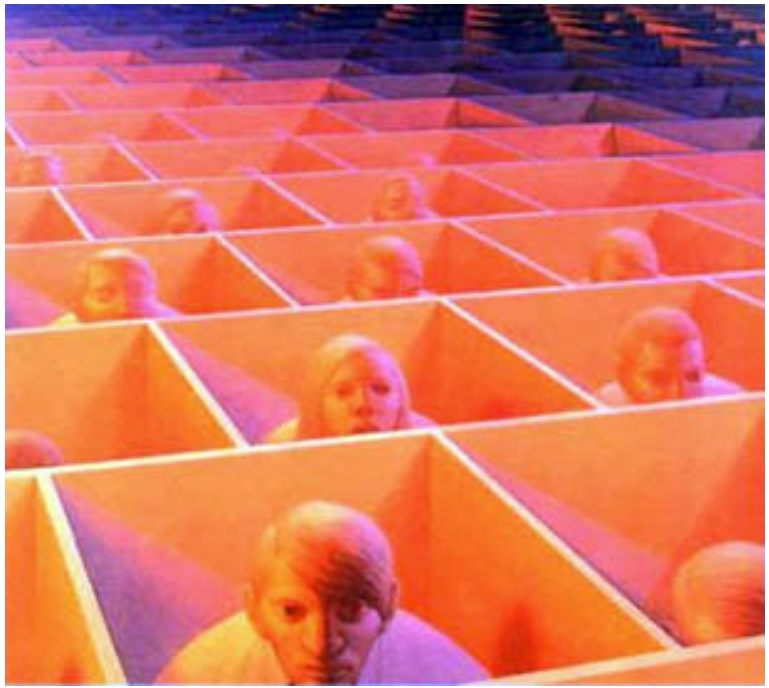



PROSTITUTE
bashed and MURDERED
'used as
punching bag'
CHECK
THE
FACE
MOLE
ITS
YORS
HA!
HA!
YA
LOOK
SFUNK
DONT
YA


LOLITAS
CHILD PORN
BTY.

The Questioned Document Culture

- 5 year on the job training
- Mentored casework
- Context information
- Identification paradigm



Early culture

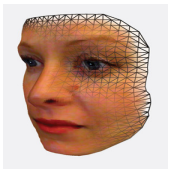
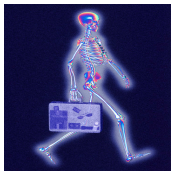
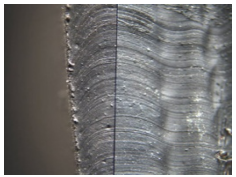
- Courts for acceptance
- Case outcomes as validation
- Error forbidden

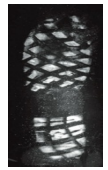
Forbidden error

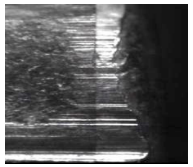
- 100 years of acceptance as expert evidence internationally
- Defining textbooks
- Hierarchy based on experience
- Professional societies
- Existed within government multidisciplinary laboratories
- Documented approaches, peer review
- Acceptance

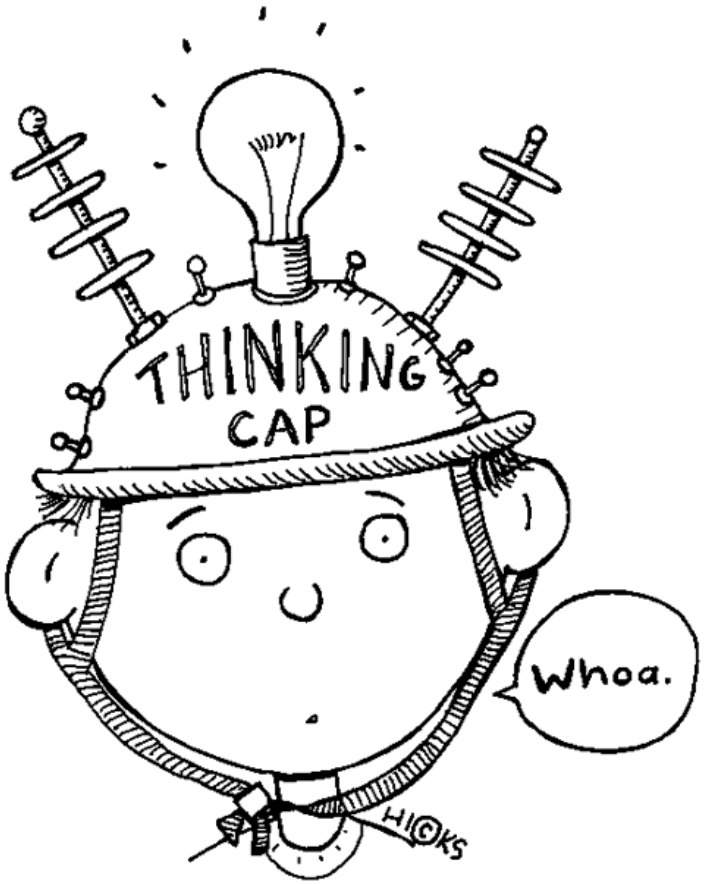
Pattern evidence









- Validity & reliability
- Underpinning theory
- Reporting practices
- Error rate estimates
- Proficiency testing

I highly recommend graduate school as a way to avoid the real world for 2 to 5 additional years.

yourecards
someecards.com

- Neuroscience of handwriting movements and application to forensic examination of handwriting
- Software tools for handwriting measurement
- Complexity theory to replace class/individual characteristics belief
- Signature complexity statistical modelling
- Method development
- Expertise testing and characterisation

Perception, cognition and blind testing

- State the beliefs of the practitioners
- Test the beliefs of practitioners where the ground truth is known
- Define the character of the evidence in terms for it potential to be misleading

- “The level of correctness of the assertions made by examiners from day to day casework is not likely to prove to be a credible source for the (validation) data needed” (Huber & Headrick, 1999)

- “A process such as handwriting identification presents a number of potential subtasks dealing with variables such as writing instruments, forgery of various sorts, age, health and so forth. No single test can map the abilities of any one practitioner, or any group of practitioners” (United States v Hines, 1999)

- “A great many tests… would be necessary to know what, if anything, (examiners) can do accurately, and under what conditions”(United States v Hines, 1999)

- “A complete testing regime would have tests which covered the entire spectrum of conditions and difficulties” (United States v Hines, 1999).

‘…science can examine the dependability of the results of such a process (handwriting identification) even when the process is not a science’.

Risinger & Sacs (1996)
Science and Non-science in Courts
Iowa Law Review

The 90’s years

- The Special Advisory Group (Document Examination)
- All individual Government document examiners who were prepared to offer the soft bit of their professional tummies to enormous independent scrutiny for the good of the Justice system

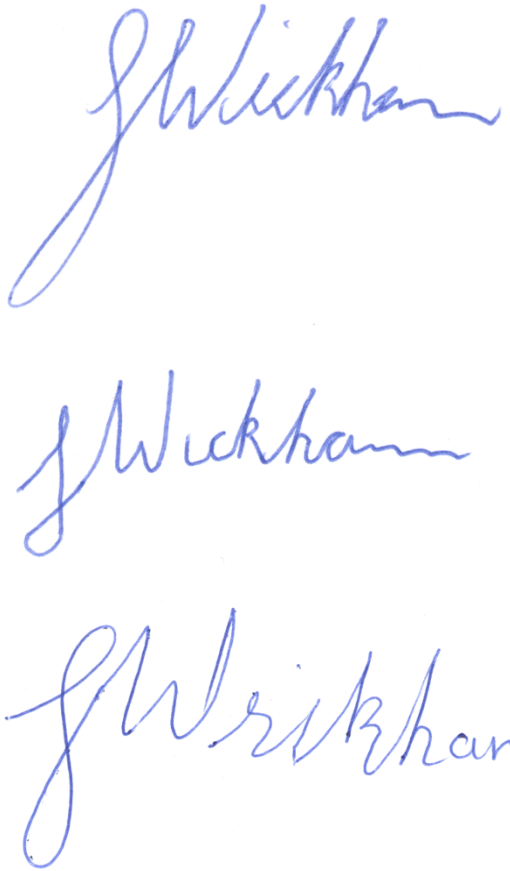
A little background

Although not stated, practitioners must be considering competing propositions

- Normal writing by the specimen writer
- Normal writing not by the specimen writer
- Simulation of the specimen writing not by the specimen writer (forgery)
- Disguised writing not by the specimen writer
- Disguised writing by the specimen writer

Signature propositions

- Genuine by the specimen writer
- Simulated by someone other than the specimen writer
- Disguised writing by the specimen writer

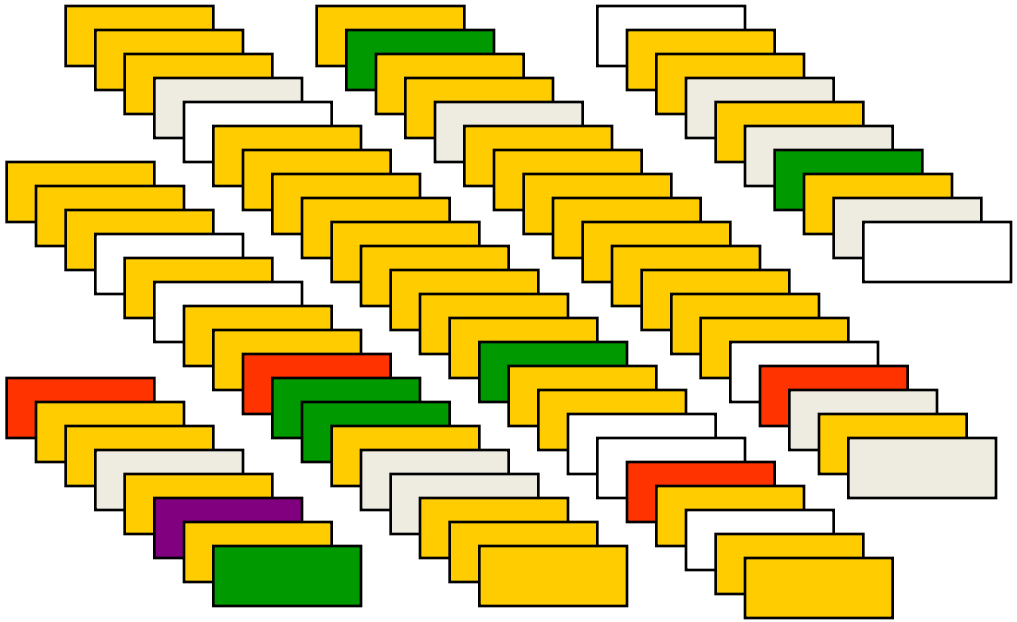


Case emulation trial structure

Population of exemplar handwritten images

Opinions regarding authorship & process of production

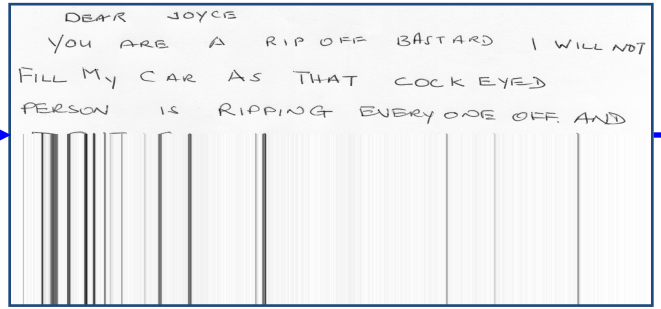
Population of random single questioned handwritten images containing all possibilities



Questioned

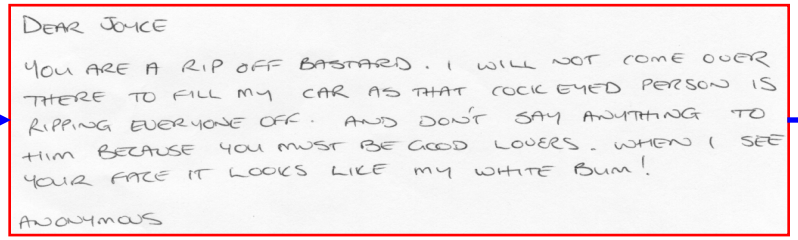
Opinion type and strength for each questioned writing type

Specimen handwriting



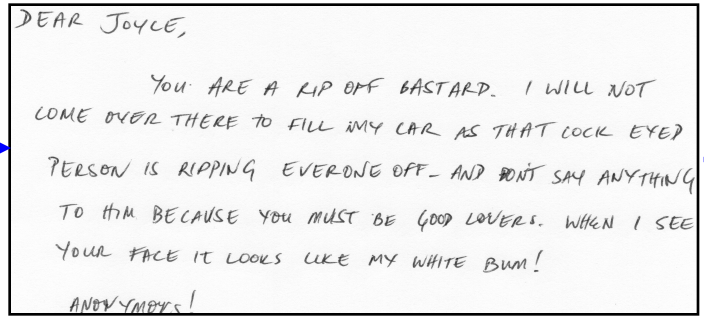
Opinion

Specimen handwriting



Opinion

Specimen handwriting



Opinion

Limitations

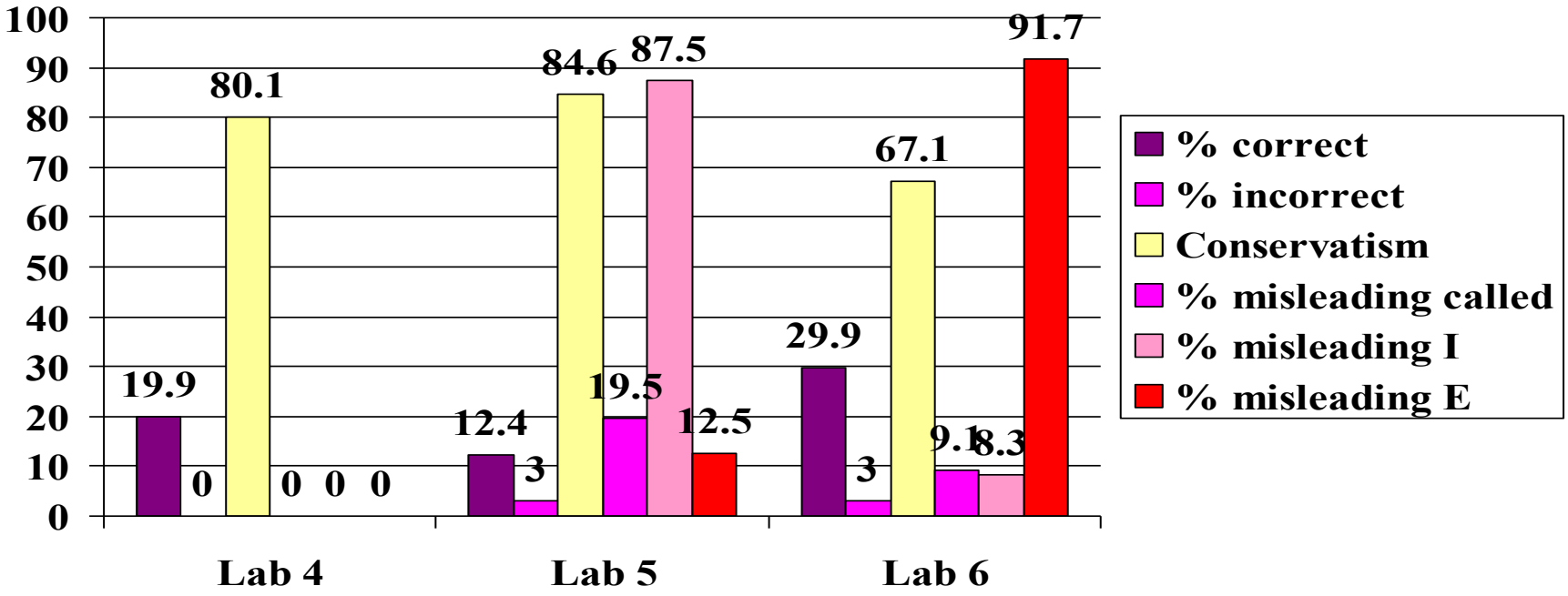
- Non original
- Traditional K to Q structure
- Line up
- Declared
- Fatigue
- Cognitive confusion
- External validity issues

What was expected?

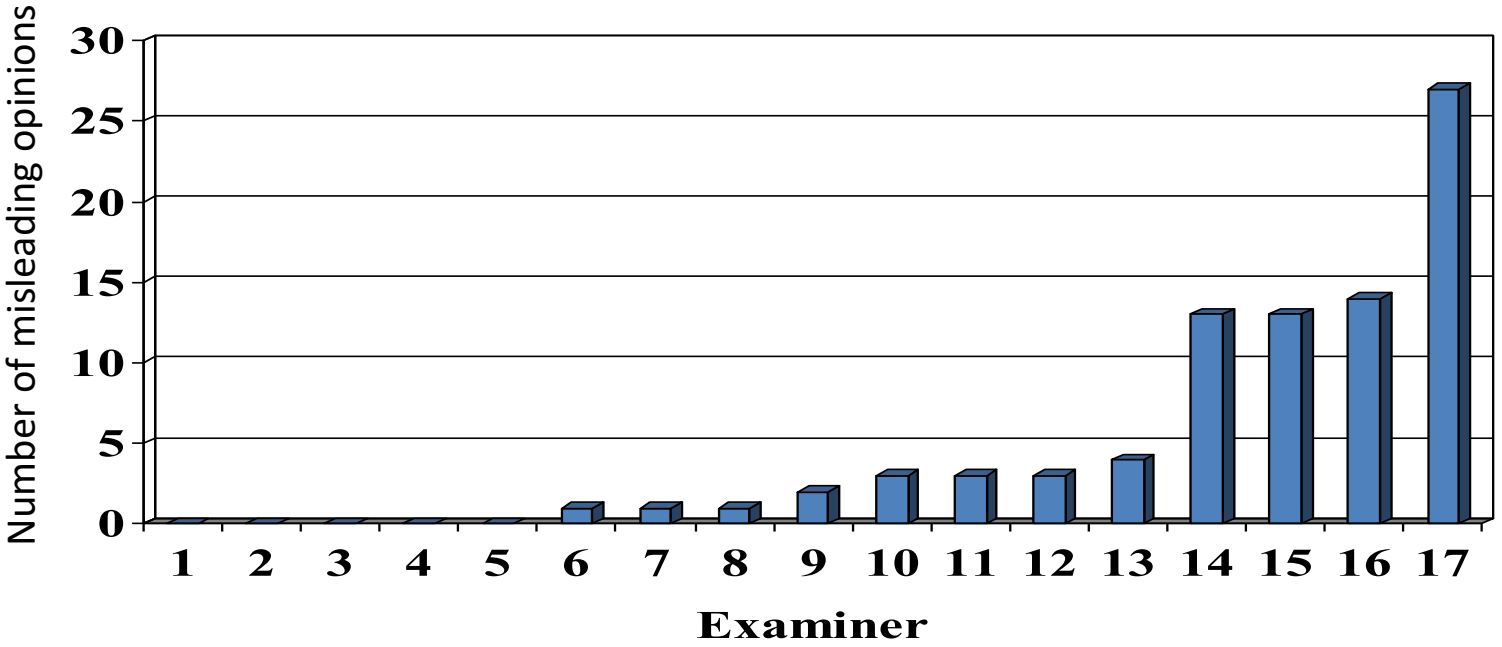
- Low error distributed amongst the authorship opinions

- Similar profiles of responses from qualified FDEs

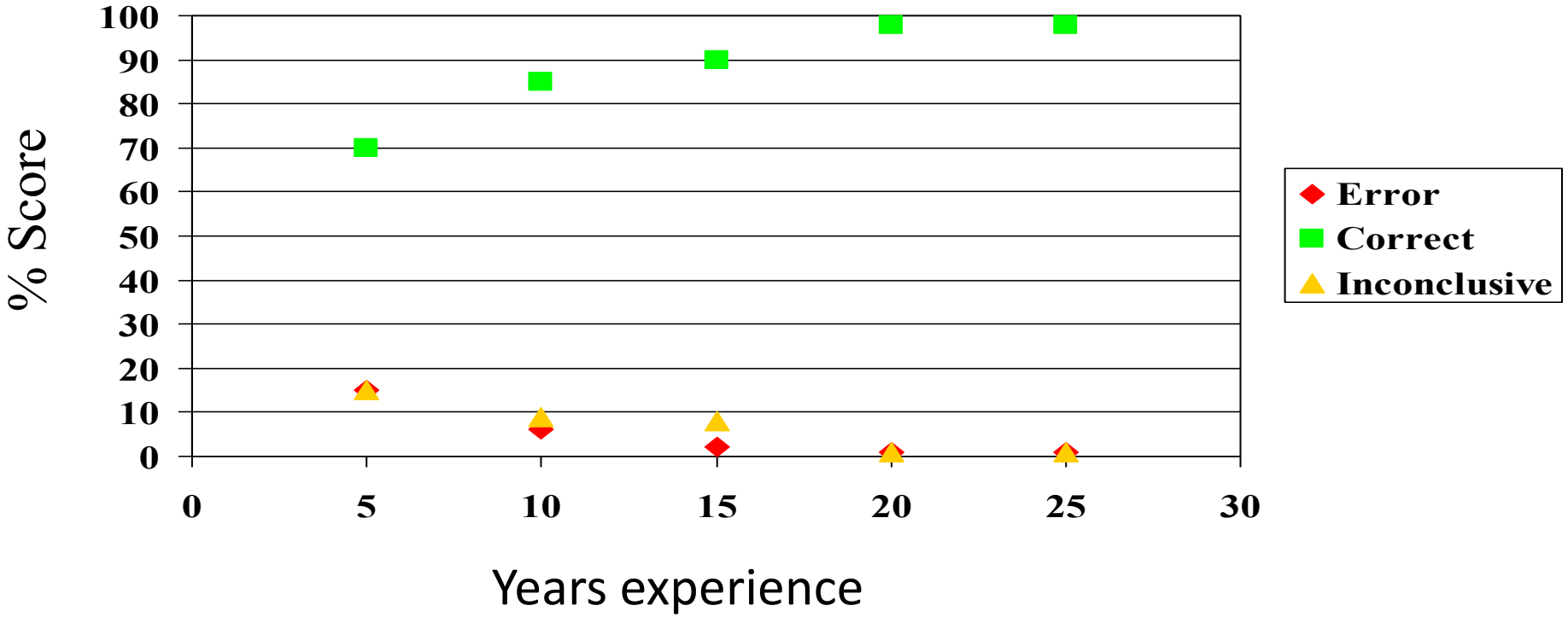
What appeared



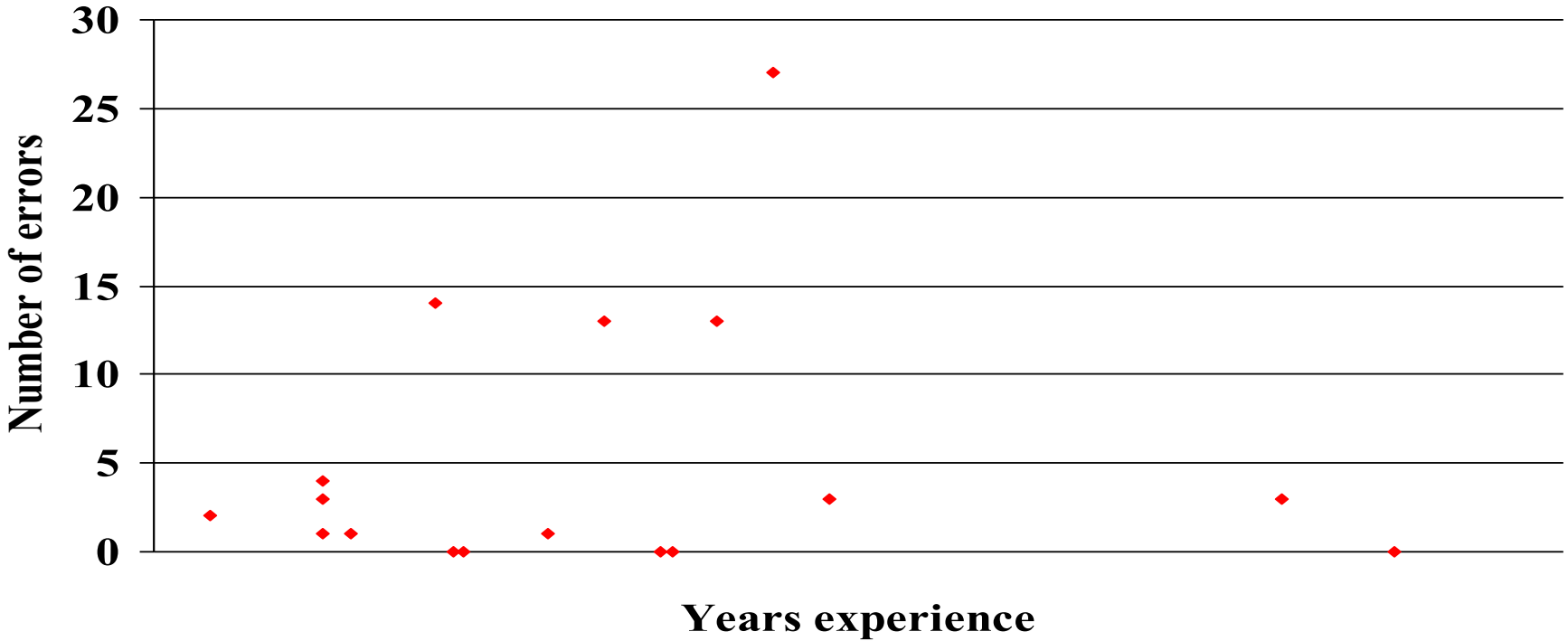
Inter-examiner differences



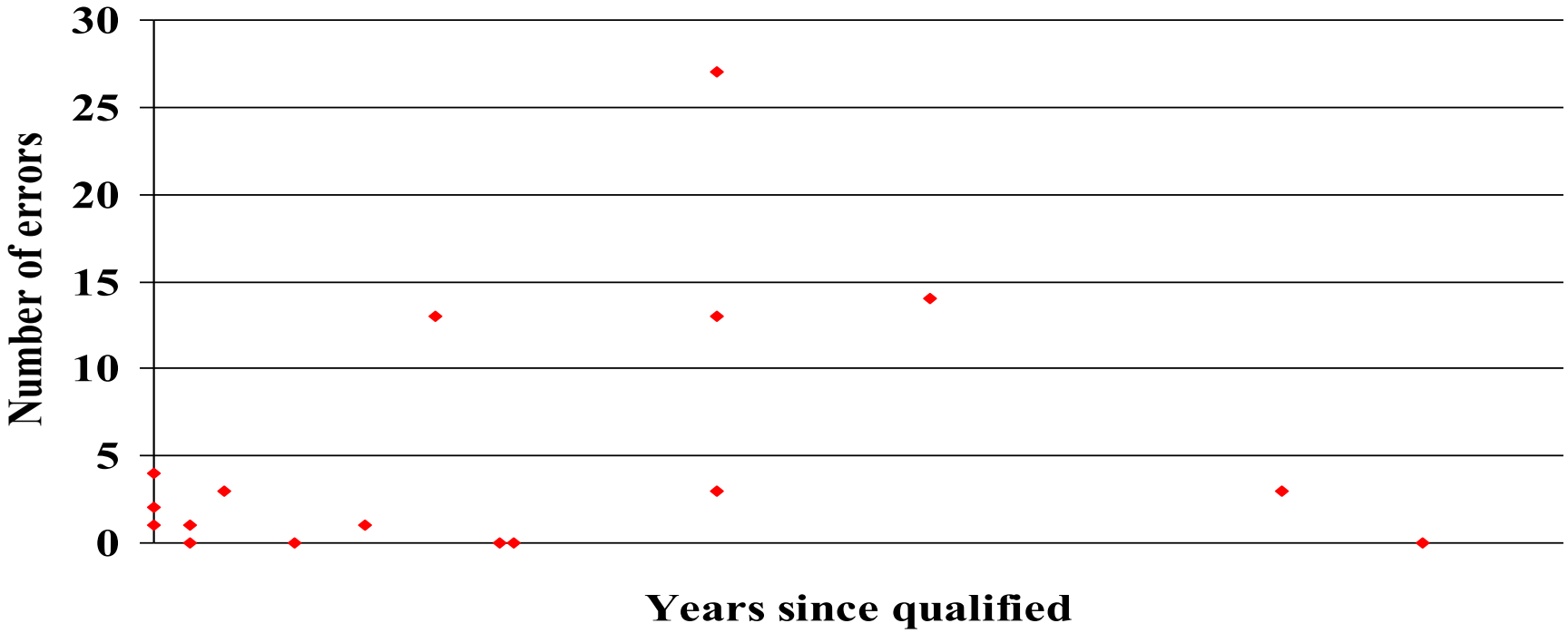
Experience data



Results for examiners



Results for examiners




Ramping up

2000 – 2008 Blind trials

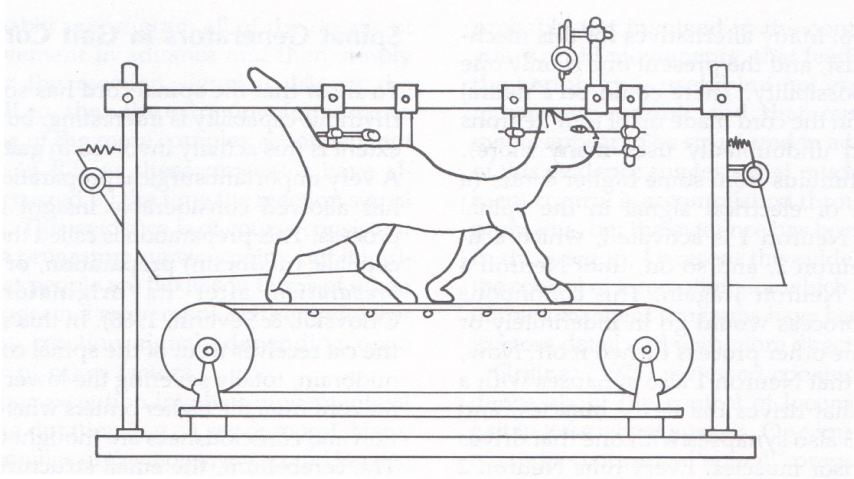
- 45850 OU 2000 -2008 signatures
- 32050 OU 2001-2005 handwritten text

77900 blind opinions by practicing FDEs

The things about investigations of error that I reflect on

Studying FDE behavior

Similar problems as with normal laboratory animals……



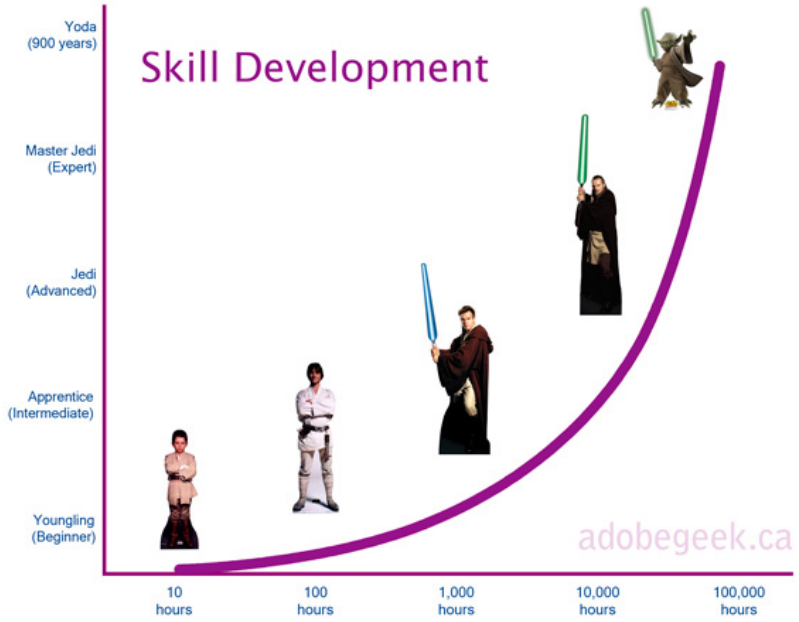
68% comply either because they think it is a good idea or they are told to

22% are annoyed about it and don't want to participate but are controlled by the 68%

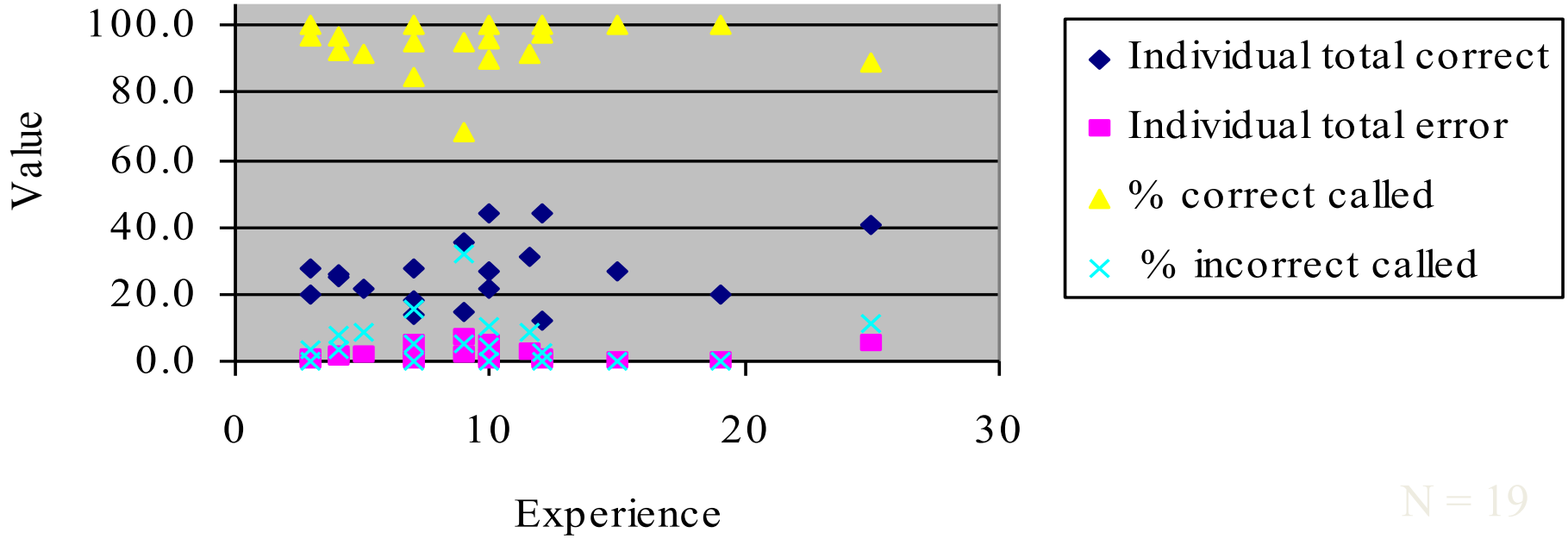
5% are angry and just won't participate in spite of whether they consider the experiment a good idea or not

5% attack the experimenters

Expectations around experience



The relationship between experience and specialists' behavior



The character of expertise

The data

Kam, M., Wetstein, J., & Conn, R. (1994). Proficiency of professional document examiners in writer identification. Journal of Forensic Sciences, 39, 5-14

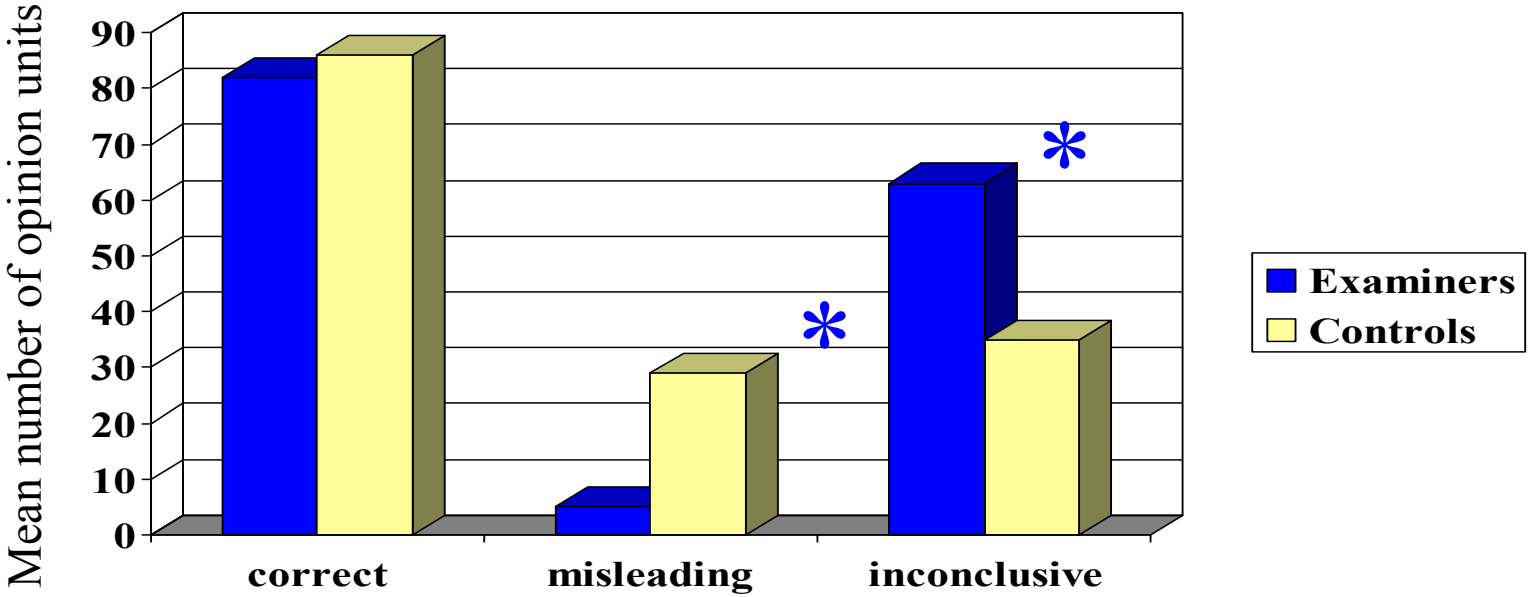
Kam, M., Fielding, G., & Conn, R. (1997). Writer identification by professional document examiners. *Journal of Forensic Sciences*, 42, 778-786

Found, B., Sita, J., & Rogers, D. (1999). The development of a program for characterising forensic handwriting examiners' expertise: Signature examination pilot study. Journal of Forensic Document Examination, 12, 69-80

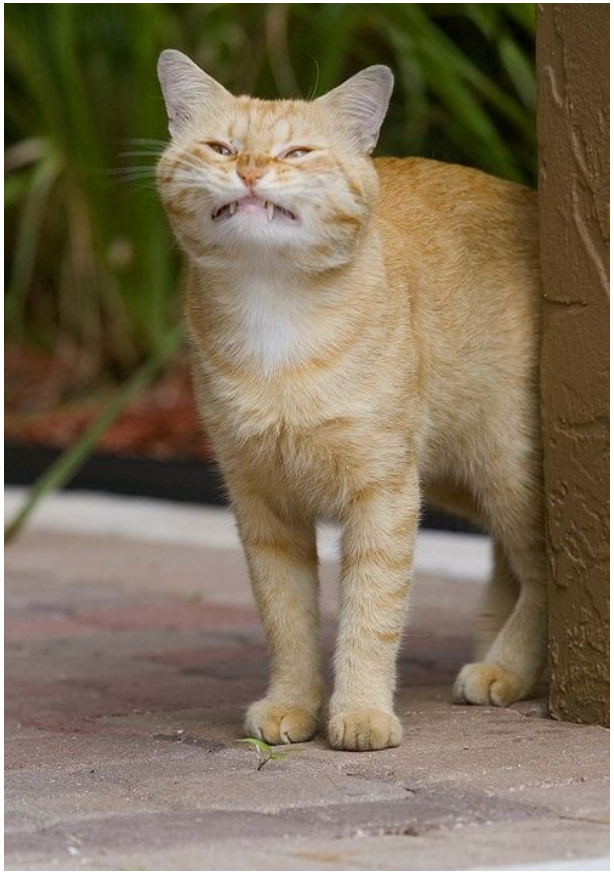
Kam M, Gummadidala K, Fielding G, Conn R (2001). Signature authentication by forensic document examiners. J Forensic Sci 2001;46:884-8

Sita, J., Found, B., & Rogers, D., (2002). Forensic handwriting examiners' expertise for signature comparison, *Journal of Forensic Sciences* Sept. 2002, Vol.47, No.5

Comparison FDE to lay people



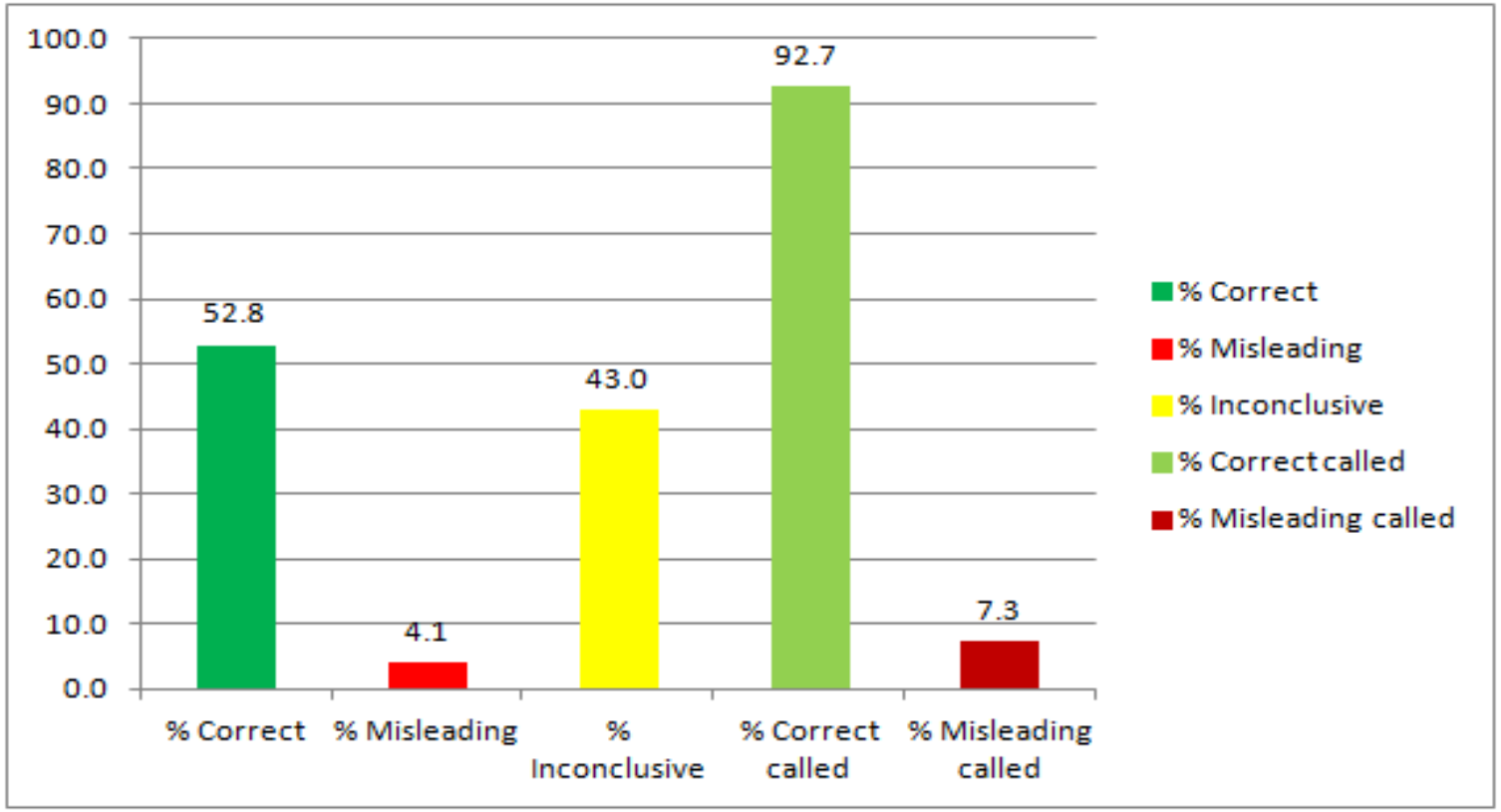
All studies to date have shown that the ‘expertise’ is real and demonstrable



Did we find a global error rate?

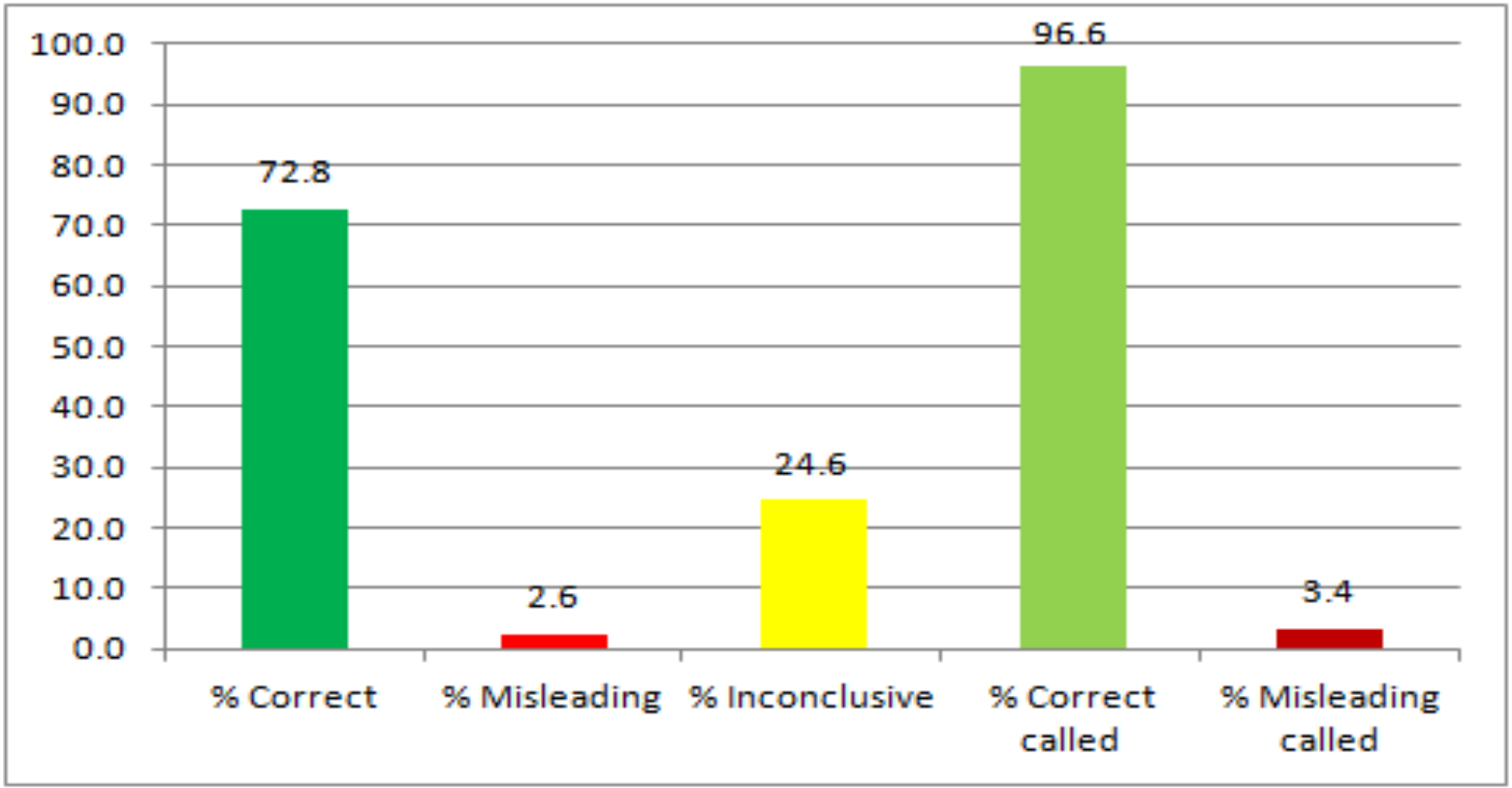
The easy answer: Signatures

(45850 OU 2000 -2008)



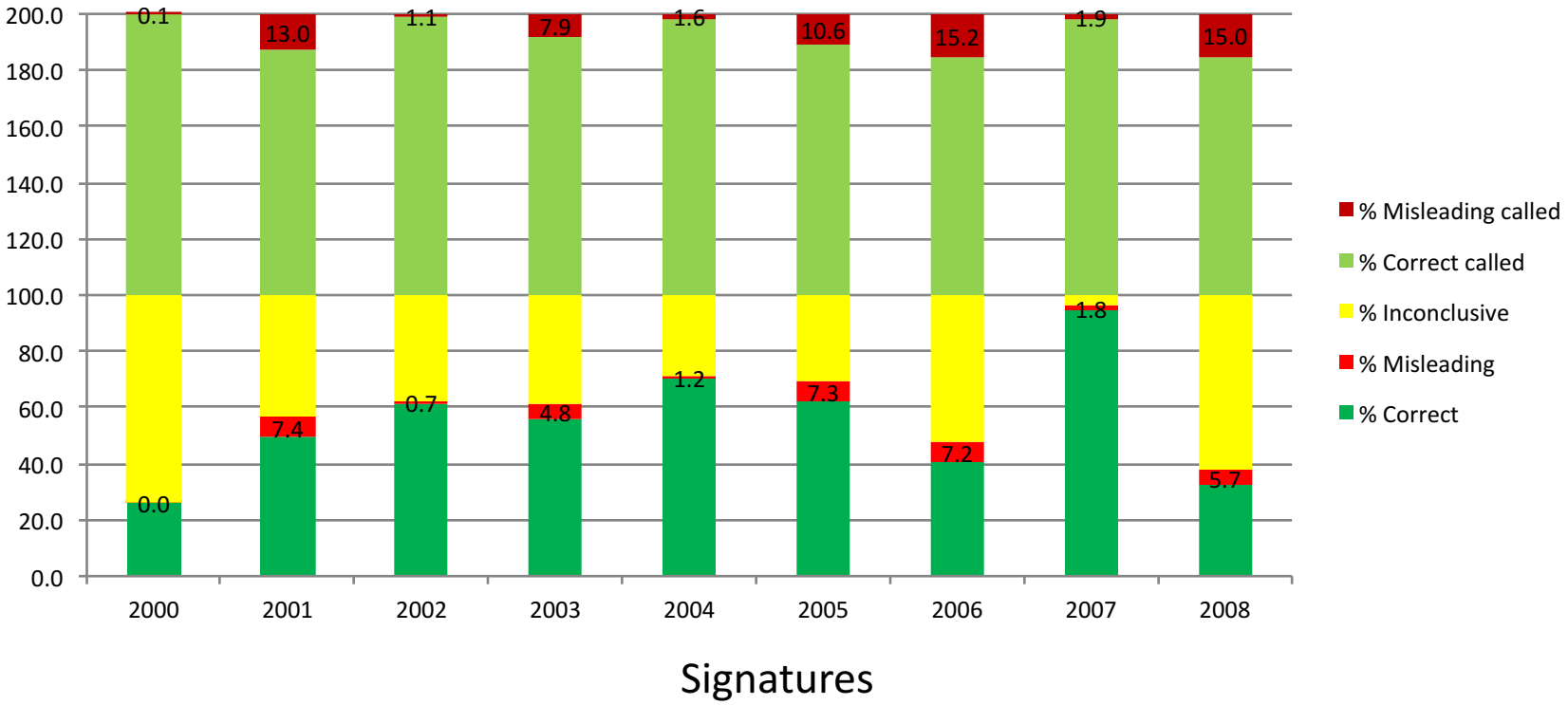
The easy answer: Handwritten text

(32050 OU 2001-2005)

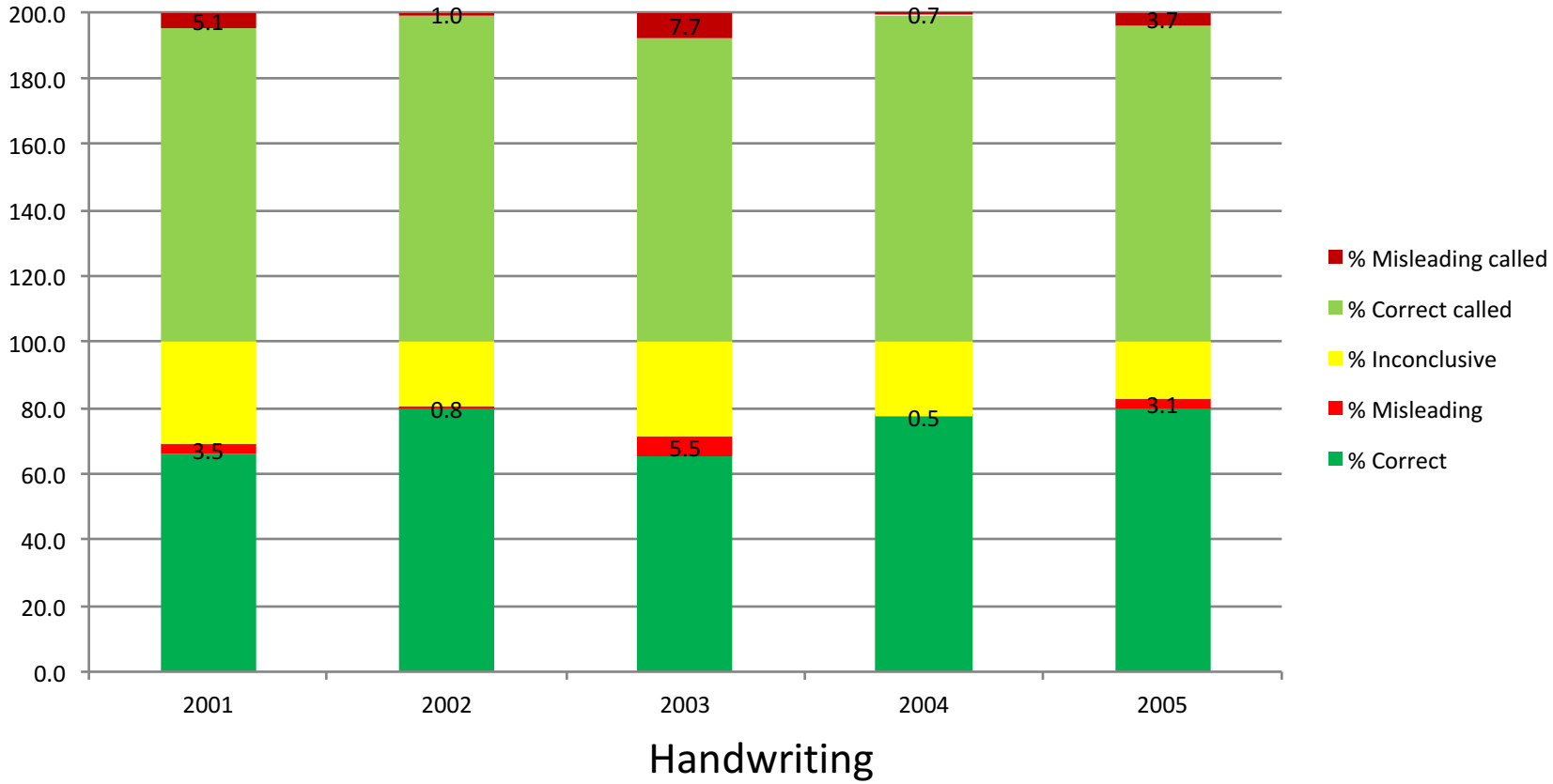



THE
HISTORY
OF
MAN
WHAT THE HELL
IS HAPPENING...
THE
END
www.poorlydrawnlines.com

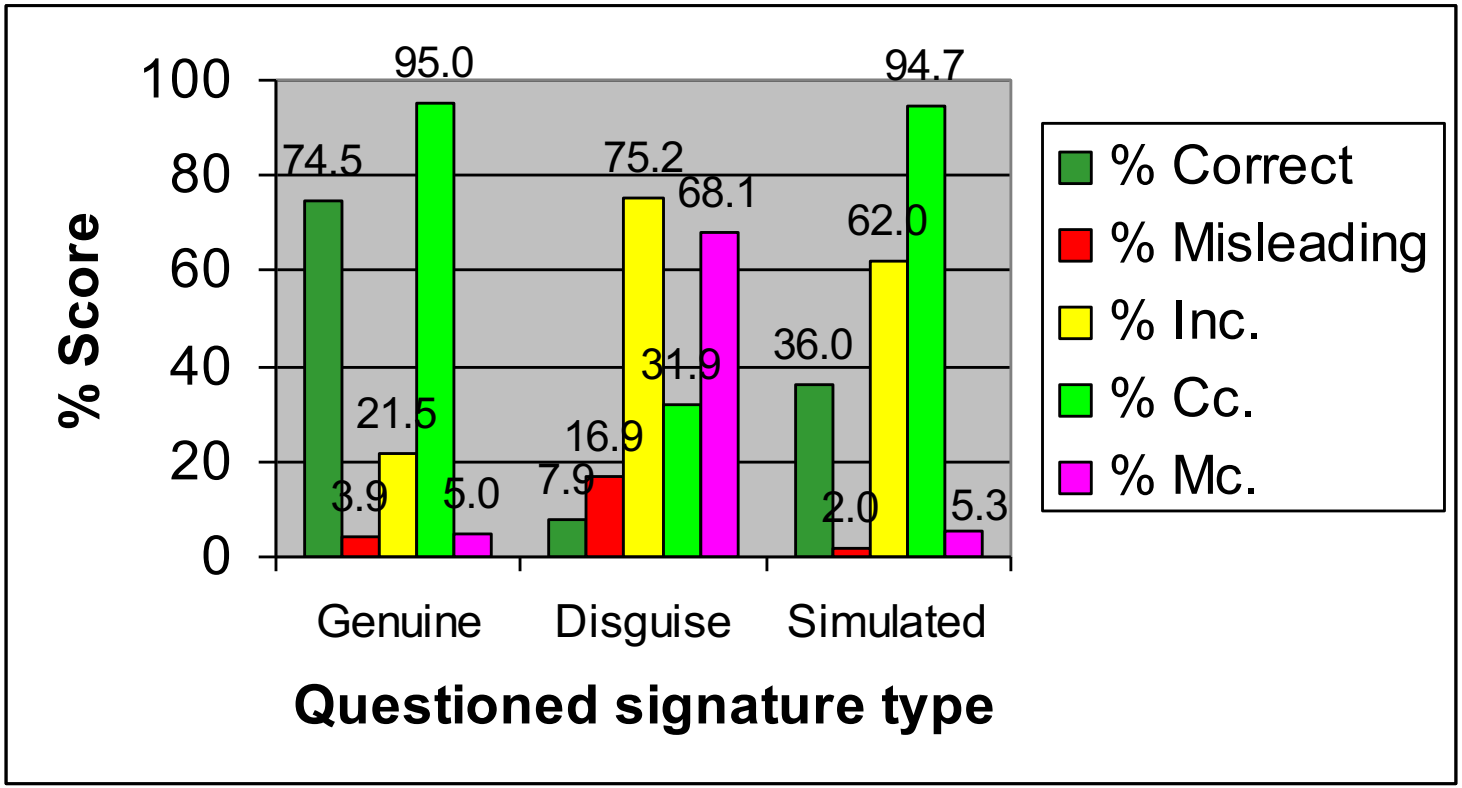
The more sophisticated answer

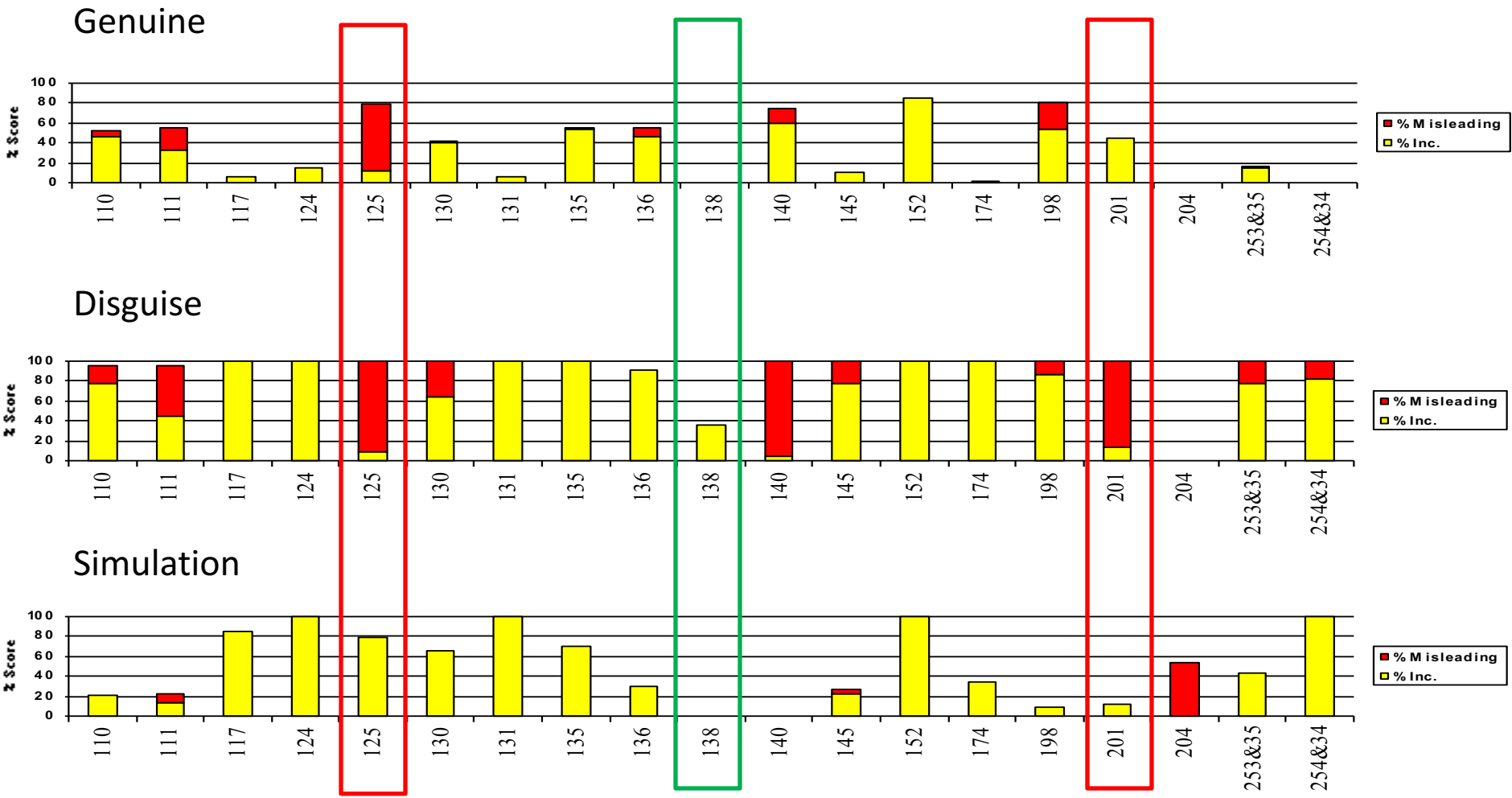


The more sophisticated answer



The much more sensible more sophisticated answer




Genuine
% Score
100
80
60
40
20
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110
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117
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152
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198
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204
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254&34
% Misleading
% Inc.
Disguise
% Score
100
80
60
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20
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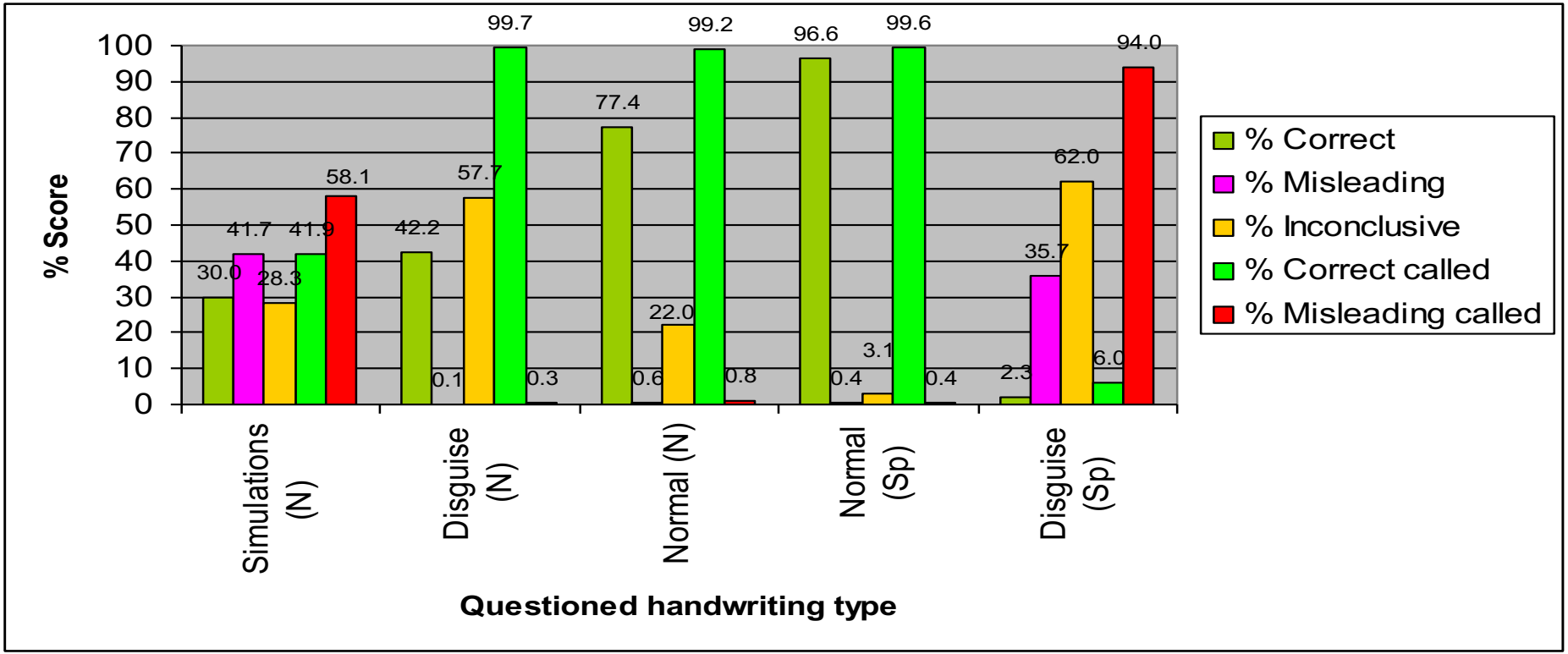
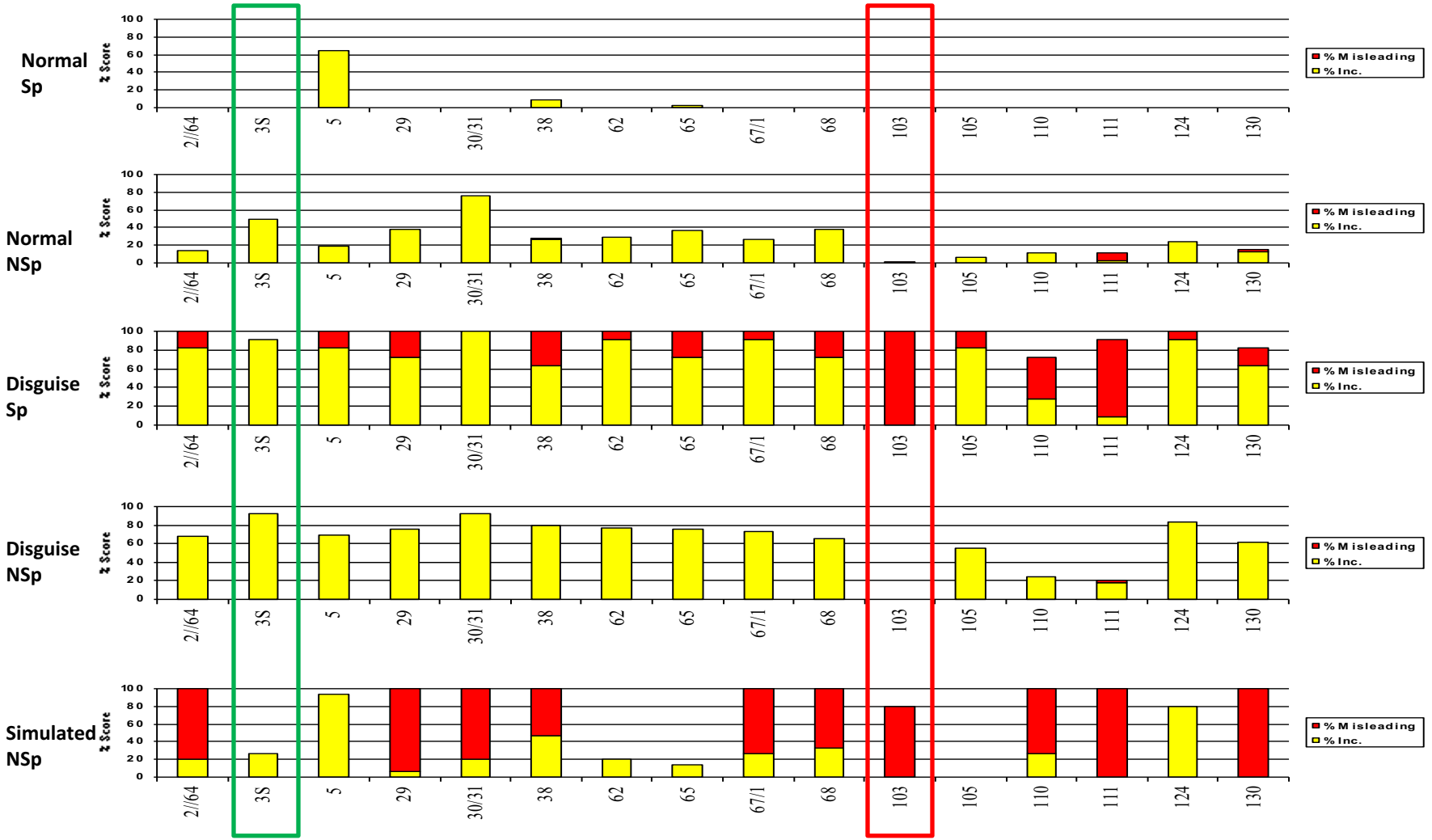
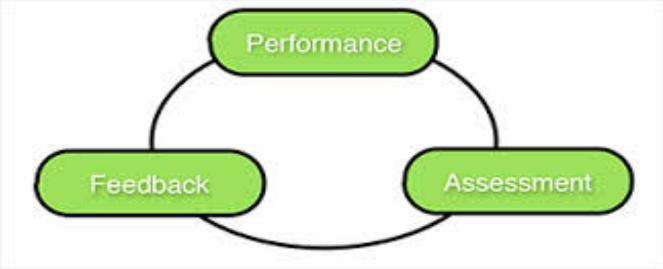
% Misleading
% Inc.

The much more sensible more sophisticated answer

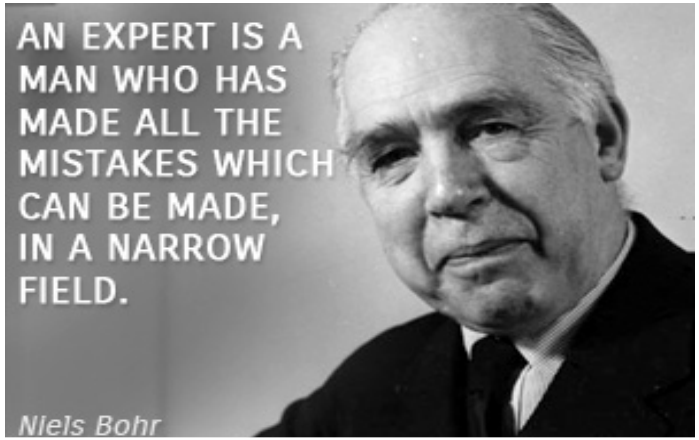



Normal Sp
Normal NSp
Disguise Sp
Disguise NSp
Simulated NSp
% Score
100
80
60
40
20
0
2//64
3S
5
29
30/31
38
62
65
67/1
68
103
105
110
111
124
130
% Misleading
% Inc.

How do blind trials help?

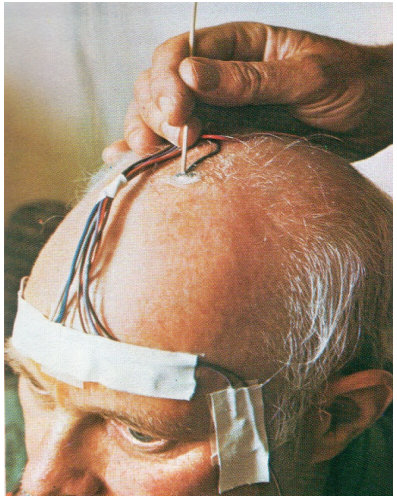


- Revision & corrective action package for each trial
- Group and individual analysis
- Problem samples


AN EXPERT IS A MAN WHO HAS MADE ALL THE MISTAKES WHICH CAN BE MADE, IN A NARROW FIELD.
Niels Bohr

"I thought I felt a paradigm shift, but it was just my undershorts riding up."

Validity & reliability of a human skill



Pattern evidence practitioners should be treated as ‘instruments’

All efforts should be made to calibrate and monitor these instruments, using appropriate testing sets prior to and during their use in forensic investigations

- Unlike before, through the application of the ‘principles processes of science’, we provided practitioners with the opportunity to make mistakes, and provided real opportunity for skill development

- Skill profile across the international community is still largely unknown

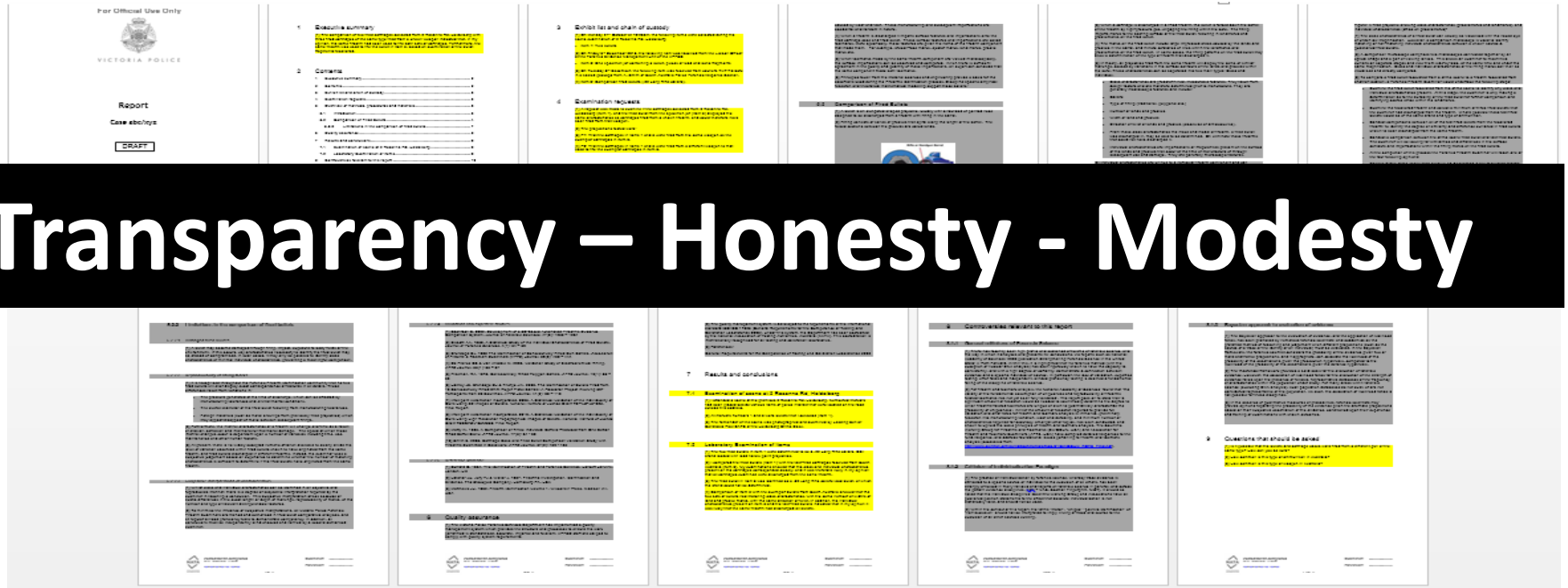
Jay Kardane
Measuring criminalistic uncertainty

‘Look at the largest source of error first. These are likely to be human processes’

Is there a global error (misleading) rate?

Error mitigation

In the interim



Reinoud Stoel

Mara Merlino

Linton Mohammed

Christophe Champod

Itiel Dror

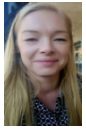
Mike Caligiuri

Derek Hammond

Kristy Martire

Richard Kemp

Tahnee Dewhurst



Kaye Ballantyne

Sargur Srihari

Franco Taroni

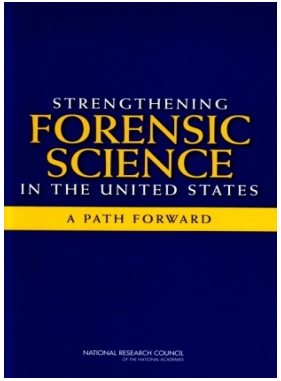
Charles Berger

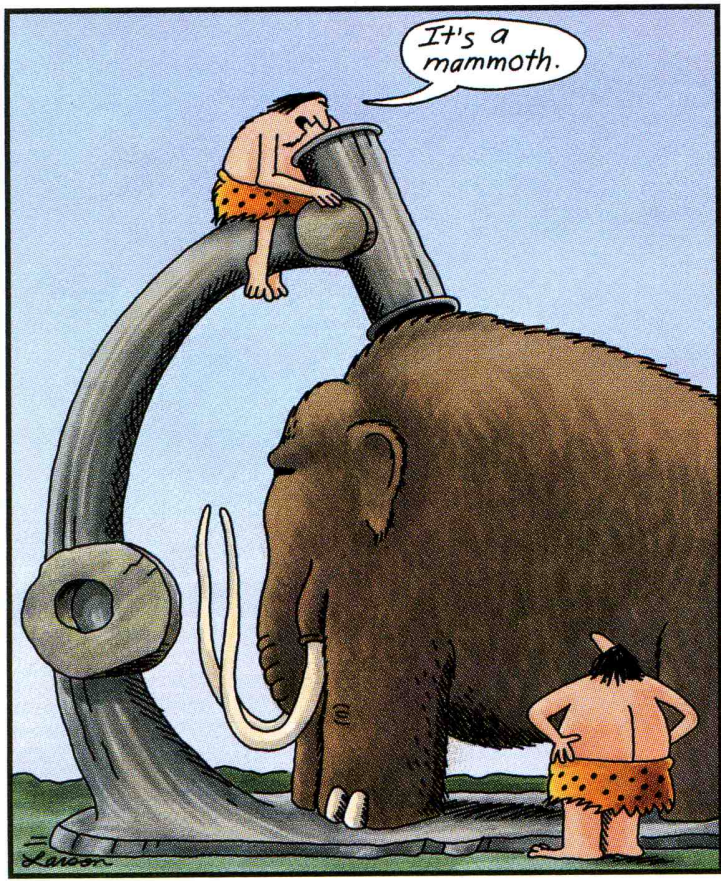
Adrian Dyer

Carolyne Bird


NIST
National Institute of
Standards and Technology


FLIGHT RECORDER DO NOT OPEN


STRENGTHENING
FORENSIC
SCIENCE
IN THE UNITED STATES
A PATH FORWARD
NATIONAL RESEARCH COUNCIL



Early microscope

Q