

Pages: 1- 166
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COMMONWEALTH OF MASSACHUSETTS

NORFOLK, ss.

SUPERIOR COURT DEPARTMENT
OF THE TRIAL COURT

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COMMONWEALTH OF MASSACHUSETTS *

v.

* Docket No. NOCR2010-404

JOHN ROONEY *

* * * * *

TESTIMONY OF DR. ITIEL DROR
BEFORE THE HONORABLE BRASSARD, J.

APPEARANCES:

For the Commonwealth:

By: MICHELLE ARMOUR, ADA, ESQUIRE

By: JENNIFER BLAIR, ADA, ESQUIRE

For the Defendant:

By: JOHN SWOMLEY, ESQUIRE

By: MATTHEW COLE, ESQUIRE

April 25, 2016
Norfolk Superior Court
650 High Street
Dedham, Massachusetts 02026

Dawna Chapin
Official Court Reporter

INDEX

<u>WITNESS</u>	<u>DIRECT</u>	<u>CROSS</u>	<u>REDIRECT</u>	<u>RECROSS</u>
DR. ITIEL DROR (By Mr. Swomley)	4		121	
(By Ms. Armour)		41		147, 164

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
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PROCEEDING

_____THE COURT: Ladies and gentlemen, we're going to take the next witness out of order.

The prosecution is still presenting its case but to accommodate a witness's schedule, the defense is going to call the next witness.

Mr. Swomley, please.

MR. SWOMLEY: Thank you very much.

The defense calls Dr. Itiel Dror.

THE CLERK: Please raise your right hand.

Do you solemnly swear that the testimony you shall give to the Court and the jury in the matter now in hearing shall be the truth, the whole truth and nothing but the truth, so help you God?

THE WITNESS: I do.

THE CLERK: Actually, you raised your left hand. Sorry.

THE WITNESS: That's my fault.

Do you solemnly swear that the testimony you shall give to the Court and the jury in the matter now pending shall be the truth, the whole truth and nothing but the truth,

Day 28-4

1 so help you God?

2 THE WITNESS: I do.

3 THE CLERK: Thank you.

4 THE COURT: Good morning, sir. Have a
5 seat there, please.

6 That is not a microphone in front of
7 you, although it appears to be. So we need
8 to have you keep your voice elevated, sir.

9 THE WITNESS: Thank you.

10 THE COURT: Counsel, please.

11 DR. ITIEL DROR, SWORN

12 DIRECT EXAMINATION BY MR. SWOMLEY:

13 Q Good morning, Dr. Dror.

14 A Can I stand up if that's okay?

15 THE COURT: You're welcome to remain
16 seated, sir. Or you can stand, whatever you
17 prefer.

18 THE WITNESS: Thank you.

19 BY MR. SWOMLEY

20 Q Would you please state your full name for
21 the record and spell your last name.

22 A Dr. Itiel Dror. D-R-O-R.

23 Q Dr. Dror, what is your primary occupation?

24 A I'm a cognitive neuroscientist. So I study
25 the brain and how the brain perceives and

1 interprets information, how people make
2 judgments and decision-making.

3 Q Could you describe your educational
4 background and expertise to this jury,
5 please.

6 A The highlight of my education, I got a
7 Doctoral, a Ph.D at Harvard in 1994 and I
8 study, I worked at the university with
9 scientists and academics and do a lot of
10 work in the applied in the real world, where
11 real people make decisions and things
12 happen.

13 Q Have you conducted any research studies
14 regarding cognitive bias?

15 A Yes, my main area of research is experts and
16 a variety of domains when they make
17 mistakes, when their bias in their decision-
18 making. What I like to say, when smart
19 people do stupid things. So, highly
20 educated, motivated, competent people when
21 their biased and make erroneous mistakes.

22 Q And have you conducted any research studies
23 regarding cognitive bias?

24 A Yes, I've been doing a lot of research on
25 that in a variety of expert domains. I've

Day 28-6

1 been looking at medical errors when surgeons
2 and doctors make mistakes. I've been
3 working for, over twenty years, with the US
4 Air Force on pilot decision-making where
5 pilots actually shoot their friends by
6 accident and misinterpret and make wrong
7 decisions. And in the forensic domain in a
8 variety of expert domains.

9 Q Now in the forensic domain, what have you
10 done in terms of research in that regard?

11 A Well I've done quite a lot of study in the
12 forensic domain. I just mentioned a few, I
13 can elaborate more.

14 Very briefly, fingerprint examiner wrote
15 me an email many years ago because he read
16 my papers on Air Force pilots and said, we
17 do very similar kind of work. We look at
18 patterns and we have to match different
19 images. I'm interested to talk to you. So,
20 he came and talked and I said to him, you
21 know pilots only see part of an image and --
22 so, he said, we do. And we have to compare
23 these images. So do we. And then I said to
24 him, pilots, if they expect to see an enemy
25 plane somewhere, that may affect their

Day 28-7

1 interpretation and he said, no, we
2 fingerprint, our objective, we only focus on
3 the evidence. We're not effected by
4 knowledge. I said, you can you repeat that,
5 because that contradicts everything we know
6 about how the brain and the mind works. And
7 he explained it. And I said let's collected
8 research. Let's collected data. And what
9 we did in our first case research, we went
10 back to real criminal cases where
11 fingerprint experts testified in court and
12 made an identification, a hundred percent.
13 They cannot be mistake. There's no
14 objective. And we took those cases and gave
15 it back to the same fingerprint examiners
16 without their knowledge and we fabricated a
17 criminal case and gave them a different
18 context and eighty percent of them said it's
19 not a match. So the same fingerprints they
20 said a hundred percent was a match. And
21 this fingerprint expert wanted to resign his
22 job because that's how they were educated
23 and believed. So after the first case of
24 research, going back to 2006. Since then
25 there's been dozens of researches have been

Day 28-8

1 drawing DNA experts and fingerprint experts
2 and a variety of forensic domain examining
3 the cognitive factors, what influences the
4 perception, the interpretation, judgment and
5 decision-making when they make forensic
6 decision-making.

7 Q How many papers have you published in this
8 area, sir?

9 A Over a hundred papers. I've published not
10 only in the forensic domain but in the
11 medical domain, with the US Air Force, a
12 variety of scientific papers of the human
13 mind, how the brain and cognitive system,
14 how we see, how we understand, how we reach
15 decisions.

16 Q And do you have any other professional
17 accomplishments besides the publications and
18 papers of your research projects?

19 A I have -- I sit on the Editorial Board of
20 the Journal of Science and Justice. I sit
21 on the Editorial Board of the Journal of
22 Applied Memory and Cognition. I received a
23 association for psychological annual highest
24 award for work in proving decision-making in
25 forensic science. The National Institute of

Day 28-9

1 Standards and Technology appointed me as a
2 chair of the Human Factor, the Forensic
3 Science Committee. The US National
4 Commission of Forensic Science appointed me
5 on subcommittee on Human Factor. And I can
6 continue if you want me to.

7 Q Have you conducted any training or seminars
8 with law enforcement agencies?

9 A I've been working closely with the forensic
10 community on giving them ways in developing
11 methods to minimize bias to improve their
12 decision-making and I will limit myself to
13 the U.S. I can expand to other countries.
14 But I've trained NYPD, LAPD, FBI, Boston
15 Police Department, Kansas Police Department
16 and there's a long list of crime labs and
17 forensic laboratories that invite me to
18 train them on understanding the cognitive
19 factors in forensic decision-making and what
20 to do to make their work more objective to
21 focus on evidence and not on the context and
22 the bias.

23 Q And you mentioned the context and the bias.
24 Can you describe, please, just briefly for
25 the jury, what you mean by the words

Day 28-10

1 contextual bias and cognitive bias? And if
2 they are different then let me know it.

3 A So, I prepared a very brief presentation on
4 cognitive bias. Two months ago I trained
5 Boston Police Department Crime Lab, it's
6 sixteen hours. Long and relatively boring.
7 So I'm going to make it short and sweet as
8 possible.

9 Cognitive bias is a complex phenomena.
10 We're not talking bias that we might see.
11 We're talking how the brain processes
12 information. Cognitive architecture. And
13 because humans are so intelligent and
14 because the brain is quite small it can't
15 process everything, we take shortcuts. We
16 use anything we know.

17 I have a paper called Dissection is Far
18 From Perfection, where I explain that the
19 human mind is not a camera. We are very
20 active. We know. We think. We expect all
21 of this enable us to do things that we do.

22 So, I'll give you a few examples. You
23 can try to count how many times you see the
24 letter F in this paragraph. Take your time.
25 And I'm going to ask you but I'm willing to

Day 28-11

1 bet that most of you do not see that there
2 are six F's. There's not three. I know
3 you're looking at three or four. There are
4 six. There are six F's, not just three.
5 I'll point them out to you. You all see
6 one, two, three, four, five and six. Again,
7 one, two, three, four, five, six. You're
8 not blind. Don't worry that you don't see
9 very well, but the reason people don't see
10 six is because you're intelligent. It's a
11 sign of intelligence because when you read,
12 as you're experts you know by experience
13 that "of" "a" "the" is not important and
14 it's not that you don't want to do it or
15 you're not motivated or you can't count to
16 six, it's how the brain processes the
17 information. How we think, based on our
18 experience, expectation. That active nature
19 of the brain and one example of that.

20 Another example is let's take a look at
21 these two images and ask you to rate how
22 similar the two faces. And I'm giving you
23 the tip of the iceberg of research where we
24 give it and there's relative similarity of
25 the faces, you will react differently if we

Day 28-12

1 tell you this is two strangers or it's a
2 mother and her daughter. The fact that you
3 believe that they're genetically related and
4 a mother and a daughter or two strangers
5 doesn't change the faces. Doesn't change
6 the similarity of the eyes and the nose.
7 But when we give people similarity with two
8 images and we randomly pick some of them
9 they're brothers, they're strangers, they're
10 parent and child or not, it changes how they
11 see, the brain sees and make judgment of the
12 similarity not only based on the actual
13 faces, but based on your expectation and if
14 you expect it to look similar because
15 they're genetically related, you believe
16 they actually look similar.

17 The last example I'm going to put on is
18 because many people have a naïve view that
19 they can contort, they have a button they
20 can turn off in their brain in all of this
21 cognitive phenomenon how the brain processes
22 it because we cannot do that. Awareness, if
23 you're affected by context, you really want
24 to block it out, you try to block it out,
25 it's impossible to do.

Day 28-13

1 So here I'm going to prove it to you.
2 I'll show you an image and this image, I
3 assume that you have no idea what it is and
4 I'm going to give you context to what it is,
5 but I want you to look very closely what it
6 is because once I'm going to give context,
7 I'm going to contaminate your mind and bias
8 you and you will never see this image again,
9 because I'm going to ask you later to ignore
10 the context, to come back and see the actual
11 evidence, the actual image the way it is now
12 you're never going to do it. Cherish this
13 moment in time because it's going to go away
14 once you know the context. You can't turn
15 off your awareness. And this is an image of
16 a baseball player basically. Here is the
17 ball in the air. The hat. The eyes. The
18 nose. The hand. The body. Do you see the
19 image of the baseball player? Usually after
20 you see the context for one second you go
21 back and you see the image, you can see the
22 baseball player.

23 But what's important is not that you see
24 the baseball player but after you're exposed
25 to it you cannot go back and not see the

Day 28-14

1 baseball player. Now you see the baseball
2 player and I can't say, ignore the baseball
3 player, go back and see the image the way
4 you did one minute ago. Once you're exposed
5 to context things change in the brain and
6 you can't turn them off, okay, I'll ignore,
7 I know this about the case. I know this
8 context, it's already caused your brain to
9 change and that will effect your perception
10 and judgment.

11 So cognitive bias is what makes us
12 intelligent. It's the cornerstone of
13 intelligence and even more expertise. So
14 you take your experience, your expectation
15 and apply it, you don't only process
16 information coming in. That's what
17 computers do, they're very stupid. We're
18 active and interact this information and
19 cognitive bias is when we interpret the
20 information and reach decision not based on
21 the information but based on our experience,
22 our expectation, what we know and a lot of
23 information that guides our brain what to
24 do.

25 That's in a nutshell.

Day 28-15

1 Q Thank you. Now, has cognitive bias been
2 demonstrated to occur in the forensic
3 science world?

4 A Well in the forensic science there's a lot
5 of research. I started with a piece of
6 research I told you about and followed up in
7 other people. But the real cases it's not
8 theoretical and there have been a number of
9 cases, including a case in the United States
10 that was investigated by the Office of
11 Inspector General and the Office of
12 Inspector General and the FBI concluded that
13 an erroneous forensic fingerprint
14 identification was mistaken and caused by
15 bias, by confirmation bias through the
16 contributor and we're talking about a very
17 big, important lab and not one examiner.
18 First examiner said it's a match, I'm a
19 hundred percent sure. I'm objective. I
20 cannot be wrong. And this was verified
21 because they verified it. It was verified
22 again. And another examiner, examiner after
23 examiner, a hundred percent correct. I
24 cannot be wrong. Independently verified.
25 And they were all proven to be wrong and

Day 28-16

1 after they were all proven to be wrong they
2 didn't acknowledge they were wrong. There
3 was an investigation by the Office of the
4 Inspector General in the United States and
5 that's back in 2004, concluding that
6 confirmation bias contributed to the error.

7 And there have been other mistakes,
8 including in Boston and what we know, but of
9 course we know -- they already know about
10 forensic mistakes, it's very special
11 circumstance in which we know about it. So
12 there's been research and a real case as
13 well where this has happened.

14 Q Now, how has the government in the United
15 States responded and the forensic community
16 as a whole responded to the studies you've
17 been doing?

18 A After initial a little bit defenses
19 response, I do have to say that at large
20 forensic community and the U.S. Government
21 have responded very positively after the
22 wake-up call. So, right now the United
23 States have a National Commission on
24 forensic science, I've been appointed and
25 they have voted on a document about

Day 28-17

1 cognitive bias and about not giving forensic
2 examiners information they do not need. If
3 you're a fingerprint expert know about the
4 fingerprint. If you're a DNA expert, know
5 about the DNA. But don't expose them to
6 irrelevant information with their criminal
7 record, what the detective thinks or the
8 eyewitnesses. That's for the judge, for the
9 jury, for the detective, for the prosecutor,
10 but not for the actual forensic examiner,
11 which in the United States is a very hot
12 topic. For example, in police shooting,
13 whether a young African-American men and
14 there's a bullet wound in the front and in
15 the back. The police officer said he was
16 running at me. Eyewitnesses says he was
17 running away. The forensic pathology
18 doesn't need any of that, he or she needs to
19 look at the body. Did the bullet in the
20 front and in the back, the hole, to
21 determine the entry and exit because there's
22 certain characteristics of an entry bullet
23 hole versus the exit. They're to face the
24 facts and determine on the evidence, not all
25 the stories they hear and they see. They're

Day 28-18

1 not a detective. The same with fingerprint
2 examiner, DNA examiner.

3 So the National Commission of Forensic
4 Science adopted this document. NIST,
5 National Institute of Standards and
6 Technology in the United States has also
7 taken that on board and appointed human
8 factors and committee of forensic science, I
9 chair that committee.

10 Then, all over the United States there's
11 a lot of training of forensic examiners,
12 including judges are starting to receive
13 training on that and adopting procedures.

14 The FBI, for example, changed its
15 procedure to minimize cognitive bias and now
16 Boston P.D., after I give them training,
17 they're changing their procedures.

18 So there's been overall a good response,
19 but there's always resistance with some
20 people, that's, you know, standing in the
21 way. There's still a long way to go, but I
22 do have to say for the forensic community
23 they have transformed themselves in a
24 relative short amount of time, and the same
25 with other experts domain, medical doctors,

Day 28-19

1 military, they don't like to change. They
2 have a very strong culture. So the forensic
3 community has, overall, in the United
4 States, moved forward greatly on this issue.

5 Q Now, in terms of the time frame when they
6 know about this or when your research came
7 to be known, would you agree that in terms
8 of the publication of your research, that
9 your research has come out prior to 2010, a
10 good deal of it?

11 A Yes.

12 Q And that prior to 2010, the notion of not
13 introducing extraneous information was known
14 by law enforcement; is that right?

15 A Absolutely. The review of the Office of
16 Inspector General of the United States
17 publishing an inquiry, why fingerprint was
18 misidentified by one of the best, if not the
19 best, fingerprint laboratory in the country,
20 not by one examiner, by a number of
21 examiners who said they were a hundred
22 percent sure and verified. That was
23 published, I believe, in 2004, saying an
24 error has happened, and it's bias,
25 confirmation bias because of irrelevant

Day 28-20

1 contextual information that biased the
2 examiners.

3 THE COURT: The answer to the question,
4 sir, was that the information, the knowledge
5 was available prior to 2010?

6 THE WITNESS: Yes, absolutely. The
7 research and the result of that --

8 THE COURT: That's fine, sir. We'll
9 have another question.

10 BY MR. SWOMLEY

11 Q Now, beyond the research, were there
12 concrete steps offered or advanced to help
13 the forensic science community minimize
14 bias?

15 A Yes. For example, again there's been many
16 activity. The Department of Justice and the
17 National Institute of Standards and
18 Technology have studies and Experts Working
19 Group on latent print examination that
20 worked for three years, and looked into the
21 issue and published a whole report. They
22 have a recommendation, I pulled it out their
23 recommendation --

24 MS. ARMOUR: Your Honor, I would object
25 at this time as being non-responsive.

Day 28-21

1 THE COURT: Well, let's try to do the
2 usual questions and answers, Mr. Swomley,
3 please.

4 MR. SWOMLEY: Certainly.

5 BY MR. SWOMLEY

6 Q Dr. Dror, can you explain the methods that
7 were advanced pre-2010, that you have
8 knowledge of that helps reduce cognitive
9 bias in forensic decision-making?

10 A The procedures to minimize bias in forensic
11 science are the same procedures used in any
12 scientific endeavor 101 that you learn about
13 science, which is focus on the facts and the
14 evidence and be blind to irrelevant
15 information. And that's done in forensics,
16 it should be done in forensic science, was
17 put forward to be done in forensic science
18 as in any other scientific inquiry you look
19 at the actual evidence, not what you hope
20 and not what you expect. And I can
21 elaborate more.

22 But this has been very basic and been
23 put forward to forensic examiners need to
24 look at the evidence that they need to do.
25 It's quite simple, commonsense, rather than

Day 28-22

1 an elaborate scientific procedure. You have
2 evidence. You have to draw conclusion. You
3 forward the expert to the actual evidence
4 and they look at the evidence and should not
5 be influenced and not think that it's
6 irrelevant what they need. What is relevant
7 to do the job, they need to get, but they
8 don't need additional information that is
9 not relevant. And that is what was put
10 before that to forensic scientists and it's
11 the basis of any scientific requiring any
12 scientific domain.

13 Q So, do you differentiate between say crime
14 scene investigator and an analyst that then
15 takes the information from that
16 investigator?

17 A Absolutely. Imagine, for example, a doctor.
18 You go to your doctor and you tell that
19 doctor all your symptoms and the doctor
20 sends you to the laboratory to do blood
21 counts and whatever. The person doing the
22 blood counts doesn't know why the doctor has
23 asked. They're only counting the blood.
24 The doctor is like the police investigator
25 who pulls all the evidence. The forensic

Day 28-23

1 scientists in the lab, looking at the
2 fingerprint, looking at the DNA, should not
3 be involved in the case.

4 So there's some jurisdiction, there's a
5 lot of information available to the forensic
6 scientist that is totally irrelevant to what
7 they're going to do and affect their
8 perception and judgment and bias of them.

9 One of the problems is that in some
10 cases the same person going to the crime
11 scene and collecting the evidence does the
12 work back in the laboratory. And that's a
13 big no-no. What you do in big laboratories
14 you can separate, but in small laboratories
15 where you can't, you separate. So I would
16 go to the crime scene A, collect the
17 evidence, but then when I get to the lab, I
18 do not analyze it because in the crime scene
19 I'm exposed to a lot of things that are
20 irrelevant, victims, what the police officer
21 is doing, and a lot of other evidence. I'm
22 just a fingerprint examiner or blood spatter
23 analyst or firearm. So I take the actual
24 evidence I collected and I would give it to
25 another examiner in the lab who was not at

Day 28-24

1 that crime scene. And he or she would give
2 me what they collected from their crime
3 scene. So the evidence I'm looking the
4 crime at, I don't know if it's a murder, a
5 terrorist, somebody who stole a bicycle, I
6 don't know if there are other witnesses, I
7 haven't seen a body. I'm just looking at
8 the fingerprint and make my decision based
9 on the fingerprint or the blood spatter.
10 That's why we advise that the person
11 collecting evidence in the crime scene is
12 not a person who is analyzing the evidence
13 in the laboratory.

14 Q Now you mentioned, I think, a lot of things
15 in that answer and I want to break it down a
16 little bit. You mentioned that it's easy to
17 do in a large laboratory, right, when there
18 are plenty of staff to put a wall up between
19 the field examiners, the crime scene
20 investigators and the analysts, right. But
21 you also describe that it works in a small
22 center; right?

23 A Yes.

24 Q It can work in a tiny lab as well?

25 A Correct, and even in a big laboratory,

Day 28-25

1 there's sometimes historical reasons. So I
2 gave training to San Francisco Police
3 Department and usually when I give the
4 training, I spend a few days in the lab and
5 I spend a few days with the crime scene
6 investigator going to murder scene and
7 collecting evidence. In San Francisco
8 Police Department for historical reason, the
9 crime scene investigator also do the
10 fingerprint, the DNA, the firearm goes to
11 the crime lab. So I told them to switch.
12 It's very easy to do. So when you're
13 looking at the fingerprint, it's not the
14 fingerprint you collected from the crime
15 scene that you've been and been exposed. So
16 if it's a small lab, stoical lab, with
17 variety of reasons why these things happen.

18 Q And sir, are there studies that actually
19 have been conducted to demonstrate that this
20 realistic and possible, can be done easily?

21 A It has been done and is happening and there
22 isn't any logistical problem in doing it.
23 Even if there is logistical problems, it
24 needs to be done even if it's difficult.
25 You know you need to be sterilized, you need

Day 28-26

1 to wash your hands and to sterilize it, I
2 said it's too difficulty, you know. Why are
3 you saying we're dirty? No. It has to be
4 done. Here we're talking about
5 contamination of the mind, not contamination
6 of the actual, physical evidence, so it
7 needs to be done and it happening and
8 forensic laboratories around the U.S. are
9 doing it and improving their decision-making
10 in forensic domains.

11 Q Now, sir, is there a phenomenon in the
12 cognitive bias world that is called
13 snowballing, where things kind of build off
14 of each other? And if you can describe what
15 that concept is, please.

16 A It's called bias snowball effect.

17 Q Thank you.

18 A So, unfortunately when everything comes to
19 court in the vast majority of cases, it's
20 presented in --

21 MS. ARMOUR: Your Honor, I'd object to
22 what's happening in the --

23 THE COURT: It's sustained. You can
24 describe the concept of snowballing, sir,
25 but let me have you avoid what occurs, in

Day 28-27

1 what you believe to be the vast majority of
2 cases.

3 THE WITNESS: Not a problem.

4 BY MR. SWOMLEY

5 A Evidence to determine make decisions,
6 evidence is received from the fingerprint
7 examiner, from the detective, a suspect may
8 confess to the crime, the DNA examiner,
9 eyewitnesses. When we weigh this evidence
10 together, we weigh it independent evidence.
11 The problems that bias snowball effect is
12 that this evidence is not always necessarily
13 independent. It could be, for example, that
14 the bite mark examiner knew about the DNA
15 examination, when the bite mark examine, say
16 the bite marks match, he or she in fact
17 takes into account and was influenced by the
18 DNA evidence. But then the DNA evidence is
19 presented, so it's counted twice and
20 influences one another.

21 So what happens where different lines of
22 inquire that should be independent and often
23 presented or could be presented and
24 independent are not. They talk to one
25 another. They know what each other is doing

Day 28-28

1 and their biasing one another. So I'm
2 looking at a body and I'm influenced knowing
3 what eyewitnesses said. So I'm biased. And
4 then I reach a biased decision and then I
5 tell another expert or another expert knows
6 about my conclusion and that bias is again
7 and it gets to this big snowball of bias
8 where everyone hears a lot of what's going
9 on, tells everyone, rather than the way it
10 should be and often presented each one, do
11 your work and then people are suppose to be
12 the detective, the prosecutor, the judge,
13 the jury, they put it all together, it
14 influences and the evidence is biased
15 because they know about other evidence, and
16 then reach conclusion and tell other and the
17 bias just gets bigger and bigger because
18 people do not work independently, each one
19 doing what they're experts are doing,
20 fingerprint, DNA, and each line of evidence.

21 Q Dr. Dror, looking specifically at
22 fingerprint analysis. Do you consider ACE-V
23 to be a scientific method?

24 A ACE-V not only is not a scientific method,
25 it's not even a method. It's a general

Day 28-29

1 approach. It lacks specificity.
2 Specificity saying what you're doing. Ill
3 analyze, compare evaluator, it doesn't tell
4 you how to analyze. To evaluate it doesn't
5 tell you how to --

6 MS. ARMOUR: Your Honor, objection as to
7 his expertise in this area.

8 THE COURT: The objection is overruled
9 for the moment. The witness may express his
10 opinion about ACE-V.

11 BY MR. SWOMLEY

12 A And I've spent many weeks in over twenty-six
13 forensic laboratories in the United States
14 working with fingerprint and forensic
15 examiners. Looked at all the text, looked
16 at all the manuals. There isn't a place
17 that any one of them can articulate the
18 criteria. Imagine cooking ACE-V. Go to the
19 super market. Buy grocery. Mix them up and
20 cook them. You know you do that one person
21 gets a hamburger, one person would get a
22 pizza. The recipe says you have to buy
23 this ingredient, put two ounces of flour,
24 cook it for forty-five minutes, it's
25 specificity what needs to be done. And this

Day 28-30

1 is a recipe, we're talking about a
2 scientific methodology has to say how to do
3 it. But it's not only what I think, the
4 data I have collected in the research, if
5 you have a scientific methodology, the basis
6 of science is that you reach the same
7 conclusion, it doesn't matter if you do it
8 or I do it or somebody else. So if you take
9 the same pair of fingerprints and give them
10 to the same examiner, not a different
11 examiner, we would hope that different
12 examiners would reach the same conclusion.
13 But do the same examiner, the same pair of
14 fingerprints would they reach the same
15 conclusion? I've done that. I've found
16 that it eight percent of the cases they
17 reach different conclusion. Not different
18 examiner, the same examiner.

19 Q I'm sorry, what was the percentage there?

20 A Eight.

21 Q Eight. Thank you.

22 A The FBI did a follow-up on this study. The
23 same study, give a whole bunch of examiners,
24 I believe seventy-two examiners, each one
25 twenty-five pairs of fingerprints and then

Day 28-31

1 sent the same pair of fingerprints a few
2 weeks later, and ten percent of them didn't
3 reach the same conclusion they reached last
4 time, not a different examiner, because it's
5 not scientific methodology. The basics of
6 the scientific method it tells you exactly
7 what to do and if you do the same thing
8 every time you will reach the same
9 conclusion. That's the basics of science.
10 If not science wouldn't exist.

11 So, ACE-V is not a scientific method.
12 It's not a method because it doesn't
13 elaborate and tells you, you evaluate and
14 compare it and decide, do they come from the
15 same source. How do you evaluate? What is
16 your criteria? That is not specified in any
17 book, any text book and no fingerprint
18 examiner, I can testify -- all examiners
19 I've talked to --

20 MS. ARMOUR: Objection, your Honor.

21 THE COURT: Sustained.

22 We'll have a question, please.

23 BY MR. SWOMLEY

24 Q To your --

25 A And just to continue, that's --

Day 28-32

1 THE COURT: Just one moment, Doctor.

2 We're going to have a question from counsel,
3 please.

4 BY MR. SWOMLEY

5 Q To your knowledge, Dr. Dror, is it forensic
6 science community as a whole consider it to
7 be a scientific method?

8 A No, the forensic scientist community
9 themselves don't consider it to be. And
10 Expert Working Group of fingerprint
11 examiners appointed by the Department of
12 Justice in the National Institute of
13 Standards and Technology bring in the top
14 fingerprint experts, other professional
15 organizations, the IAI, International
16 Association of Identification, America
17 Academy of Forensic Science, ASCLAD, the
18 Director of Forensic Laboratory, all of them
19 came together and worked for over three
20 years on cognitive issue and fingerprint and
21 ACE-V and if I may cite from the report --

22 MS. ARMOUR: Objection, your Honor, as
23 to a cite from a report.

24 THE COURT: I'm going to sustain the
25 objection. I think we have your testimony

1 on it, sir.

2 We'll have another question, Mr.

3 Swomley.

4 BY MR. SWOMLEY

5 Q Sir, you were part of that body that issued
6 that report; correct?

7 A Yes.

8 Q What were the findings that -- just forget
9 whatever everyone else thought afterwards,
10 what did you in considering the evidence
11 consider to be the case in terms of whether
12 that rises to the level of being scientific
13 or not?

14 A The finding was that ACE-V is not a
15 scientific method because it doesn't specify
16 what needs to be done. It's a general
17 process, but doesn't tell you the steps that
18 are required from a scientific method what
19 to do. It's a general approach and I've
20 talked about that evaluation in that, that's
21 the E. The analysis, the first step is
22 analysis of the fingerprint before you do
23 the comparison. So, data that I've
24 collected and others, if you give a
25 fingerprint to an examiner and you give it

Day 28-34

1 to another examiner, they see different
2 things. And if you give the same
3 fingerprint to the same examiner two days
4 later, not comparing are they coming from
5 the same source, which is not clear how they
6 do, they see different things. They're
7 inconsistency of what they see because A, in
8 the analysis, it doesn't tell you how to
9 analyze it. It doesn't give you the
10 criteria what counted the minutia and what
11 is not. It's in the eye of the beholder.
12 It's a very subjective process.

13 Q If you would, sticking to the fingerprint
14 analysis for a moment. Can you explain what
15 the term "marking minutia" means?

16 A Marking minutia is when you have
17 fingerprint, either from the crime scene, a
18 latent fingerprint or of a suspect, and you
19 look at the ridge and you look at
20 characteristics and you mark minutia when
21 you reach an end or when a ridge splits or
22 there's any interesting data that can be
23 used as characteristics to determine if the
24 same source or for two prints.

25 Q In terms of your understanding of how the

Day 28-35

1 analysis should proceed if you have to use
2 ACE-V. Sir, is there an importance in
3 understanding whether you look at the latent
4 print first or the exemplar first?

5 A It is critical in scientific method to work
6 from the data to the theory. From the
7 evidence to the suspect, not to work from
8 the suspect to the evidence. So you have to
9 start with the actual evidence, characterize
10 the evidence in isolation without seeing the
11 suspect and mark the minutia so you're not
12 affected by the suspect and after you've
13 done it, whether it's a DNA profile or a
14 fingerprint from the crime scene, then you
15 expose to the suspect, then you characterize
16 the minutia and the suspect and see if they
17 match or don't match. This way you're not
18 working from the suspect finding it in the
19 evidence, you work from the evidence to the
20 suspect and the FBI does that. If not, it's
21 like the Roman doing archery, bow and arrow.
22 You shoot a bow and arrow, you hit the tree
23 and then you draw the target, always bulls
24 eye. You have to do it the opposite, you
25 cannot draw the target after you shoot and

Day 28-36

1 this is how the mind works. That's a bias
2 where -- like the faces I showed you earlier
3 where you already assume they're similar
4 because you know it's a mother and a
5 daughter, the brain picks up on the
6 similarities. To avoid that, we force
7 people, it's called lineal sequential
8 unmasking to start with the evidence. Don't
9 look at the suspect. Look at the evidence.
10 See what you see in the evidence. Mark it.
11 Then see the suspect and then see if they
12 match. If they match, great. If they don't
13 match, fine, but don't see the suspect and
14 then go look for it in the evidence and
15 interpret the evidence, which is ambiguous
16 and subjective to feed the suspect.

17 Q Hypothetically speaking, if you were to
18 understand that there are experts that
19 testify that the error rate of ACE-V is zero
20 --

21 MS. ARMOUR: Objection, your Honor, to
22 the question.

23 BY MR. SWOMLEY

24 Q - what is your understanding of that, of the
25 basis of that testimony?

Day 28-37

1 MS. ARMOUR: Objection to that question,
2 your Honor.

3 THE COURT: I'm going to sustain the
4 objection to that, counsel. I'm not sure
5 you meant to ask that question, Mr. Swomley.
6 What's the basis for that testimony are you
7 saying?

8 MR. SWOMLEY: Yes.

9 THE COURT: I'm going to sustain the
10 objection to that.

11 BY MR. SWOMLEY

12 Q Are you familiar with the manner in which
13 ACE-V is presented as a method for arriving
14 at certainty?

15 A Every scientific method has limitations and
16 weaknesses. And it happens, I hope it
17 doesn't happen anymore, but it used to
18 happen and it's recommended not to say
19 anymore, that when you make an assertion on
20 the ACE-V methodology, first it would have
21 data to back up, and claim zero error rate
22 is not correct to do basically. People who
23 claim, if anybody claim there is zero error
24 rate in ACE-V, in the method, don't -- first
25 of all, to claim an error -- the method has

Day 28-38

1 zero error rate you have to have a method.
2 Here there's no method. There's no
3 scientific method. It's an analyst,
4 comparing, evaluate, so it's a bit of a joke
5 to talk about error rate first --

6 MS. ARMOUR: Objection, your Honor, as
7 to it's a joke.

8 THE COURT: I'm overruling the
9 objection. But try to just answer the
10 question, if you would, sir, please.

11 BY MR. SWOMLEY

12 A So, saying ACE-V is zero error rate is not
13 scientific. So, with no data at all, and
14 incorrect.

15 Q Doctor, in your opinion, should crime scene
16 investigators be involved in analytic work
17 at all?

18 A If they have to and there's no choice and
19 you cannot isolate, you cannot always
20 isolate them from the context. So in a
21 shooting scene, something they have to
22 decide whether gun was fired, the trajectory
23 of the bullet, you have to do it in the
24 crime scene. You can't take it to the lab.
25 But when you're talking about DNA,

Day 28-39

1 fingerprint, shoe marks where somebody can
2 collect it at the crime scene and another
3 examiner can look at it at the lab quietly,
4 scientifically, objectively, definitely you
5 want to isolate that.

6 Q Can someone, forensic expert, simply decide
7 not to be bias and therefore eliminate
8 cognitive bias?

9 A From my experience, forensic examiners are
10 hard-working, dedicated, motivated,
11 competent people. But it's similar to the
12 baseball example that I gave you. They
13 believe they're not effected. They believe
14 they're objective. But they just don't have
15 the proper understanding used to, now we
16 just need to read the literature and listen
17 to National Institute of Standards and
18 Technology, the FBI, the National Commission
19 and to read the paper. But they are not
20 able and will not able to change how the
21 brain processes information. Something,
22 when we know something it effects how we
23 expect things to happen and how we interpret
24 to happen. It's very hard not to do it.
25 You have to take actual steps. It's not

Day 28-40

1 enough just to say I'm going to try to block
2 it out. When you know information it really
3 influences you.

4 Q Doctor, is cognitive bias limited to
5 fingerprints in the forensic community or is
6 it something that is everywhere?

7 A It is a different degrees to different
8 disciplines depending how objective they
9 are. There are some forensic domains that
10 are extremely objective, like toxicology.
11 So, I can tell the examiner, you know, I was
12 taking drugs this morning but they take my
13 saliva and they put it in the machine and
14 the machine says whether there's drugs in my
15 saliva or not. But when that human examiner
16 is the main instrument of analysis, the
17 human examiner that looks at the evidence
18 and they make a judgment without clear
19 criteria, do they match or not, like in
20 fingerprint, like in firearms, like in blood
21 spatter, then those influences are very,
22 very strong. So it depends on the
23 discipline and the level of subjectivity.
24 The more objective they are, the more they
25 have a scientific method and instrumentation

Day 28-41

1 and quantification, it doesn't matter what
2 they know. But when it's a lot in their
3 head, the interpretation of the evidence and
4 the decision-making, that's when they're
5 influenced and that's a problematic issue.
6 So it's varies from discipline to discipline
7 in forensic science.

8 Q Thank you.

9 MR. SWOMLEY: One moment.

10 THE WITNESS: Can I get more water?

11 THE COURT: Yes, certainly, we'll be
12 glad to get that for you.

13 MR. SWOMLEY: Nothing further.

14 THE COURT: Counsel, please.

15 MS. ARMOUR: Thank you, your Honor.

16 CROSS-EXAMINATION BY MS. ARMOUR:

17 Q So, Doctor, the concept of cognitive bias is
18 certainly not a new one; correct?

19 A Can you slow down a bit, I didn't follow
20 you.

21 Q The concept of cognitive bias is certainly
22 not a new concept; right?

23 A In forensic science or generally in science?

24 Q Generally in science?

25 A In science it's well accepted, in forensic

1 science it's a totally new concept. Ten
2 years ago, fifteen years ago they never
3 heard of it.

4 Q Let's go back to science, even elementary
5 school kids are given examples of cognitive
6 bias, everyone has seen the rich little girl
7 example.

8 A That's not cognitive bias, but it's well
9 know. Cognitive bias is well known, it
10 certainly is.

11 Q So when you look at somebody and given some
12 information may look at something and look
13 at it in one way and another person getting
14 different information they look at it in
15 another way?

16 A That's not necessarily cognitive bias.

17 Q So what is it then, Dr. Dror, what is
18 cognitive bias?

19 A Cognitive bias is when you misinterpret
20 information because you're making the
21 judgment not on the information itself but
22 based on your bias, what you hope to see,
23 what you expect to see, and all the
24 irrelevant contextual information. The fact
25 that humans go and interpret images and

Day 28-43

1 faces and images is not bias. Bias is when
2 you misinterpret them because it's not the
3 information itself that's driving the
4 process, but your expectation by irrelevant
5 information, not the actual data.

6 Q So your demonstration with the baseball
7 player really isn't a demonstration of
8 cognitive bias; is it?

9 A It's a demonstration of baseball player,
10 whereas you cannot turn off the context and
11 it is bias because I could give you a
12 different context and you may not see the
13 baseball player, you will see it as
14 something else. The point of the baseball
15 player is that, I'm going to block it out.
16 You showed me the baseball player but I can
17 block it out, what I know and see, the
18 evidence the way I did before is impossible.
19 Once you know the context, then your brain
20 locks in. You can't ignore it and say I'm
21 going to look at the evidence and I forgot
22 what the detective tell me, I'm not going to
23 pay attention that I know that the person
24 had a criminal record. All this information
25 is going to influence you.

1 Q You've been training police departments on
2 this concept of cognitive bias in forensics;
3 correct?

4 A Yes.

5 Q And on February 22nd and February 23rd of
6 2016, you did this long training at the
7 Boston Police Department; correct?

8 A Can you repeat the dates?

9 Q February 22nd and 23rd of 2016, a couple of
10 months ago?

11 A I don't remember the exact dates, but yes,
12 two months ago I was here. I gave two days
13 at Boston Police Department and worked with
14 the Massachusetts General Hospital on bias
15 in the hospitals. I'm not sure about the
16 dates, but about two months ago, yes.

17 Q Okay. So you worked in the hospital as
18 well. But you happen to leave out of your
19 resume that on February 24th of 2016, you
20 gave a talk on cognitive bias at Suffolk
21 University?

22 A My resume is forty-four pages long. I'm
23 more than happy to go over it. It's forty-
24 four pages, I've given probably two thousand
25 presentations. I can go and give it to you.

1 Q Okay, Doctor --

2 A No, I remember I did it. Yes, I gave a talk
3 there. Oh, you have my resume. Forty-four
4 pages, yes.

5 Q That presentation that you did at Suffolk
6 Law was for public defenders; isn't that
7 correct?

8 A I believe it was free for anyone to attend
9 but it was -- I was asked by the person from
10 the Innocence Squad if I'd be able to give a
11 talk and they invited, I believe, public
12 defenders, innocence project and a whole
13 bunch of people. I'm not sure who they
14 invited. I know that it was free to attend.

15 Q It was free to attend for defense attorneys?

16 A I didn't organize it. I wouldn't know.

17 Q But you did this seminar for the defense
18 attorneys for free; isn't that true?

19 A Did I get paid for the presentation?

20 Q Did you get paid for the presentation?

21 A No, I did not.

22 Q You did not. But you got paid by Boston
23 Police Department?

24 A I sure did.

25 Q And you got paid by the Europe Police

1 Department when you trained them?

2 A Six times. Yes.

3 Q And you got paid by the California L.A.P.D.
4 when you did a presentation for them?

5 A Yes.

6 Q And you did this free training for defense
7 attorneys. But during that training you
8 talked about the importance of hiring
9 cognitive bias experts; correct?

10 A Can you repeat the question?

11 Q When you talked to the defense attorneys,
12 you talked about the importance of hiring
13 cognitive bias experts?

14 A I talked about the importance of rising
15 cognitive bias in examination of forensic
16 examiners, correct.

17 Q Correct. And so part of that is when you
18 gave that talk, you got hired by Mr. Swomley
19 to speak today; correct?

20 A Yes.

21 Q And you're getting paid for your
22 presentation today?

23 A Yes, I am.

24 Q And how much are you getting paid to speak
25 today?

Day 28-47

1 A I'm getting paid less than three hundred
2 dollars an hour, I believe two hundred and
3 ninety dollars an hour.

4 Q Two hundred and ninety dollars an hour. Now
5 how many hours have you put into this
6 presentation?

7 A I estimated all the work in going together
8 it will add up to ten thousand dollars.

9 Q So you'll get ten thousand dollars for your
10 presence today. So that free presentation
11 you did at Suffolk University was quite
12 lucrative for you; wasn't it?

13 A No.

14 Q You don't think getting ten thousand is
15 being lucrative?

16 A Can I explain to you?

17 Q Do you think, answer my question, do you
18 think getting paid ten thousand dollars is
19 lucrative to you?

20 A If you take off that travel expenses from
21 London, not much is left, but it's
22 lucrative, yes.

23 Q It cost ten thousand dollars to travel from
24 London --

25 A On a business class ticket I travel to the

1 U.S. about fifteen times a year, cross
2 Atlantic to U.S. alone. So I go business
3 class and spend quite a lot of money. But
4 it is lucrative, I'm not arguing with you on
5 that.

6 Q So these talks that you give and these
7 trainings that you do on cognitive bias have
8 made you a great deal of money; isn't that
9 correct?

10 A Incorrect.

11 Q It's incorrect?

12 A Yes, my annual income last year and the year
13 before is sixty thousand dollars. I'm a
14 U.S. tax payer, so I can give you my tax
15 return. Because the money that is getting
16 paid goes into doing the research. So my
17 annual salary through the University, Boston
18 P.D. paid me much more than ten thousand
19 dollars. In fact, I'm losing money by
20 coming here because the police workshop that
21 they give pay more than ten thousands, if
22 you want I can mention the amounts of money.
23 So, I avoid of paying for the defense. It's
24 the first time ever I've appear in court in
25 the United States. I've received dozens of

Day 28-49

1 invitations and I can explain why I appeared
2 if the court is interested.

3 Q But it's interesting --

4 A So it's not --

5 Q -- you --

6 THE COURT: Counsel and sir, please give
7 each other a chance to finish.

8 So we'll have a question, Ms. Armour.

9 BY MS. ARMOUR

10 A So to finish my answer, sixty --

11 MR. SWOMLEY: He didn't finish answering
12 the question. He was talking --

13 THE COURT: Mr. Swomley, I have your
14 objection.

15 BY MS. ARMOUR

16 A To finish my answer --

17 THE COURT: Please. Ladies and
18 gentlemen, let's stay calm. You may answer
19 the question. You may complete your answer
20 to the question, sir.

21 BY MS. ARMOUR

22 A If you think that sixty thousand dollars a
23 year in income with all my training, all my
24 testimony, if you think it's lucrative, then
25 it's very lucrative. I get sixty thousand

1 dollars a year income.

2 Q But this is additional income to you --

3 A No, this is part of the sixty thousand
4 income --

5 THE COURT: Sir, just let counsel finish
6 her question if you would, please.

7 THE WITNESS: I apologize.

8 BY MS. ARMOUR

9 Q But Dr. Dror, by giving this presentation at
10 Suffolk Law, you've managed to generate
11 additional income; isn't that correct?

12 A It's not income for me. This money goes to
13 paying for research and study. The income
14 that I pay myself is sixty thousand dollars,
15 anything above sixty thousand dollars goes
16 into research.

17 Q So you're just doing this not to make any
18 sort of money in trainings?

19 A I'm doing this to improve forensic science
20 because I believe a forensic scientist,
21 unless the court, this is why I agreed to
22 appear to the court for the first time.
23 I've been having dozens of invitations to
24 come to court. It's because, as long as the
25 courts allow forensic scientist to come and

Day 28-51

1 say their objective. They're not bias.
2 They'll continue some of them, not to take
3 the necessary measures. So that's why I've
4 decided to come to court today.

5 Q But Dr. Dror, you would admit that you have
6 a cognitive bias; isn't that correct?

7 A Definitely I have a cognitive bias. And
8 that's why I take measures to minimize it
9 when I do my research. I don't analyze my
10 data because when I analyze the data and
11 statistics I will pick unintentionally the
12 statistical method that will give me the
13 statics I want. So I hire statisticians.
14 I'll do the --

15 Q If I could interrupt. My question was,
16 cognitive bias --

17 MR. SWOMLEY: Your Honor, could the
18 witness finish --

19 THE COURT: Just a moment, Mr. Swomley.
20 Just an objection.

21 MS. ARMOUR: Your Honor, Dr. Dror,
22 refuses --

23 THE COURT: Ms. Armour --

24 MS. ARMOUR: -- to answer the question.

25 THE COURT: -- Ms. Armour, just a

1 moment. I believe the witness completed his
2 answer.

3 You may ask another question.

4 And counsel, I give you an opportunity
5 to redirect further.

6 BY MS. ARMOUR

7 Q Dr. Dror, you would admit that cognitive
8 bias effects you as well; yes or no?

9 A Absolutely.

10 Q Absolutely. And in a 2015 article on
11 cognitive bias of expert witness --

12 A Will you slow down so I can understand and
13 hear the question. I'm sorry.

14 Q In 2015, your article on cognitive bias of
15 expert witnesses, you indicated that
16 forensic experts to receive training in
17 cognitive bias to help fulfill the formal
18 duty of experts?

19 A Yes.

20 Q And you indicated that in part of receiving
21 formal training is to have yourself do these
22 trainings or somebody that's similarly
23 situated to you in the field of cognitive
24 bias?

25 A Given the demand to do a lot of training in

Day 28-53

1 not only the U.S., we're putting it on the
2 web. And I'm going to provide free to
3 forensic examiners at no charge because I
4 cannot travel to the U.S. fifteen times a
5 year and Australia. So we're putting it on
6 the web and it's going to be available to
7 forensic examiners free of charge. It's not
8 about making money, it's about making good
9 forensics and contributing to administering
10 justice.

11 Q But even putting that out there, Dr. Dror,
12 you're promoting yourself within this field
13 of cognitive bias. That the police should
14 need to listen to you; isn't that correct?

15 A To promote myself, I much prefer to work in
16 the medical domain and the area that's most
17 lucrative financially and otherwise is
18 branding and advertising. When you buy this
19 paper. To buy products. I've been getting
20 lots of requests from the advertising and
21 branding industry how to -- to buy the
22 product. How to package it in a way that
23 it's not the quality of the product. So I
24 would say from the U.S. Air Force, medical
25 domain, banking, advertising, the forensic

1 domain is probably the least lucrative
2 domain, and in fact the most unpleasant area
3 to work with because of the adversarial
4 nature of the system. That doesn't exist
5 when I go to the U.S. Air Force, they're
6 very happy to get me because they know
7 they're shooting their own friends.

8 In the hospitals they know they make
9 mistakes. Legal justice adversarial system
10 makes it extremely -- now, but in other
11 cases too, where a lot of adversarial and
12 unpleasantness during your work in the
13 forensic science domain.

14 So it's the least lucrative one that I'm
15 working in.

16 Q It's the least lucrative, but cognitive bias
17 itself has made you quite a successful
18 person; correct? You've train people in the
19 medical field, doctors in large hospitals?

20 A My research --

21 Q Correct?

22 A -- on the human mind has made me, if you
23 want to call me famous, then I'm flattered
24 and yes, it made me famous. Thank you.

25 Q So the field of cognitive bias has made you

Day 28-55

1 famous in the medical field, in the Air
2 Force and also in these forensic sciences;
3 isn't that correct?

4 A If you consider me famous, then, yes.

5 Q Okay. All right. So, Dr. Dror, I will ask
6 you, when you're working in the medical
7 field, it's very important to help eliminate
8 cognitive bias in those fields?

9 A In the medical domain, yes.

10 Q Because you don't want doctors who might be
11 subjected to cognitive bias making opinions
12 or decisions on somebody's healthcare if
13 cognitive bias is somehow effecting them
14 adversely?

15 A Among many other things, yes.

16 Q And one of the things that you talk about is
17 how your experts completely separate from
18 like the people that are doing the field
19 work so they are not exposed to and then,
20 when you consider like extraneous
21 information, like background information on
22 a criminal case. So are you saying that the
23 medical experts where you're training
24 medical doctors that they shouldn't take
25 medical histories of patients?

Day 28-56

1 A That's a very interesting point and I'll
2 answer it. First of all, the question is
3 what is relevant or not. My medical history
4 is very relevant to the doctor. The family
5 medical history is very, very relevant. The
6 fingerprint examiner, it's not relevant to
7 them that eyewitness has identified the
8 suspect. So, the question is what is
9 relevant or not. So medical background is
10 extremely relevant to the medical decision
11 of the doctor. The fact that I'm black or
12 I'm Jewish is relevant because a certain
13 distribution of diseases, like tay-sachs, is
14 relevant.

15 Here we're talking about DNA examiner,
16 it's totally irrelevant that the detective
17 thinks his guilty or not because they're
18 looking at the DNA. That's point number
19 one.

20 Point number two, even in the medical
21 domain we're starting to recommend that they
22 take your medical history after they talk to
23 you because in the hospital when you get to
24 see the real doctor, they've already taken
25 your medical history and they come with an

Day 28-57

1 opinion. That's why many people who have
2 diabetes don't like to come to the hospital
3 because whatever they complain, they're
4 attributed to diabetes. So you have to be
5 careful also in the medical domain. The
6 fact that everyone in my family died from
7 breast cancer means I'm more likely to have
8 breast cancer but it doesn't mean it
9 necessarily. So they too have to be
10 careful. But it is relevant and in the
11 forensic domain I'm only taking out
12 information that is totally irrelevant and
13 has nothing to do when you look at four,
14 five minutia on the fingerprint and decide
15 if a fingerprint matches or not, what do you
16 need to know if the person confessed to the
17 crime or has a criminal record. You're
18 fingerprint examiner. You make your
19 decision on the fingerprint and nothing
20 else. So you need the information in the
21 medical domain.

22 Sometimes it gets tricky, what's
23 relevant or not in the forensic domain also.
24 But sometimes it's clearly what did the
25 fingerprint examiner need to know this

Day 28-58

1 information. What did the DNA examiner need
2 to know about that information. They need,
3 what they need for their expertise.

4 In the medical domain, the background of
5 the family and new medical history is very
6 relevant and important to medical decision-
7 making.

8 Q Dr. Dror, so taking that, don't you think
9 it's important for a fingerprint examiner to
10 know what item the fingerprint has been
11 obtained from?

12 A Absolutely. They need to know what item, if
13 it's glass or metal, if it was lifted using
14 powder or using chemical and taking picture.
15 They need to know the item had certain
16 pressure.

17 So, for example, if it's off a table
18 that they picked themselves up, it will effect
19 the distribution of distortion of the
20 fingerprint to the object. I would
21 definitely have it, it's relevant. The
22 lifting technique I would have also is
23 relevant, yes.

24 Q And it matters what surface the particular
25 fingerprint, sometime like an item that had

Day 28-59

1 been dropped on a scene, they might have a
2 fingerprint inside of it, might be a more
3 probative item then say perhaps a sliding
4 glass door where tons of people may have
5 touched that sliding glass door?

6 A They need to know the surface for knowing
7 the fingerprint, how it may have been
8 deposited on the surface. Where there would
9 be good fingerprints, the crime scene
10 investigator needs a lot of information to
11 know where to lift the fingerprints. If
12 not, they spend a long time at the crime
13 scene. They don't have a lot of time. They
14 need to know what probably happened.

15 But once they lift the fingerprint, they
16 give that information to another examiner
17 and then need to say the surface that it was
18 picked up and the technique that it was
19 picked up.

20 Q Now, you have never run a state police crime
21 laboratory; correct, Dr. Dror?

22 A Absolutely.

23 Q And you certainly don't know the resources
24 that are involved in having this separate
25 unit in a State Police Crime Laboratory?

Day 28-60

1 A I've talked to dozens of crime directors in
2 the United States and --

3 Q But you don't know first-hand, you've never
4 run a laboratory?

5 A I've never run a laboratory myself.

6 Q And you that a certain size in Massachusetts
7 is a relatively small state; isn't that
8 correct?

9 THE COURT: I think you have to sharpen
10 that question, Ms. Armour.

11 BY MS. ARMOUR

12 Q You don't know the relative size between
13 say, for example, in comparison to like New
14 York State?

15 A I'm familiar with the Massachusetts State
16 Laboratory. I've been there. I would say
17 that there are two parts. One, they're a
18 medium size and B, if they're given enough
19 resources to do the science properly, that's
20 okay. Sometimes I cannot do a project
21 correctly so I say, I can't give you a
22 conclusion because I don't have the
23 resources to do the science properly. If
24 there's no resources, then I expect the
25 examiner to say there are not resources to

1 do it properly. I was contaminated. I
2 didn't do it properly. I didn't use the
3 right equipment and take what they say with
4 a grain of salt because I don't have the
5 resources to do it properly. That's a
6 legitimate answer for people to say.

7 Q Dr. Dror, so we should not be doing
8 fingerprint examinations in Massachusetts
9 because we have a backlog regarding
10 fingerprints?

11 A No, not at all. I think there's definitely
12 enough resources to do it and not only
13 there's enough resources that the connects
14 of cognitive bias you can do higher quality
15 work without needing more resources, using
16 the same resources you have and even less
17 resource and you can do higher quality work
18 when you take a cognitive bias issue. If
19 you want I can elaborate, but --

20 Q Dr. Dror, we have the data available and
21 we've given the data to defense counsel and
22 we've given it, so it's available for an
23 independent review, doesn't that help to
24 eliminate the problem that, in fact, that
25 we're transparent, when we give those

Day 28-62

1 results over so somebody else can take a
2 look at them?

3 A Can you repeat your questions because I
4 didn't follow you.

5 Q Part of, one of the things that's been
6 recommended in all these Working Groups on
7 Human Factors in relation to latent ridge
8 analysis is for the laboratories to be
9 transparent; isn't that correct?

10 A Yes.

11 Q And to be able to provide their data to the
12 person that, say is charged with an offense,
13 so that they can do an independent review of
14 that data?

15 A I guess so, yes.

16 Q So it's important, so that when the material
17 is available to do their own examinations,
18 that's how they can really determine if an
19 error was made?

20 A That is very, very resource intensive
21 because you want to replicate and do all the
22 work again. In my 2003 paper it called
23 Practical Solutions to Cognitive Bias --

24 Q Dr. Dror, you're not answering --

25 A I'm answering your question, you're not

1 letting me finish.

2 Q But you're moving on to something else. I'm
3 asking you the question --

4 MR. SWOMLEY: Your Honor, could the
5 witness be allowed to answer the question
6 without being badgered.

7 THE COURT: I thought the witness had.
8 The question is whether an independent
9 review helps to determine errors or mitigate
10 cognitive response, sir?

11 THE WITNESS: And the answer is yes, but
12 it's resource intensive.

13 BY MS. ARMOUR

14 Q Just as it's resource intensive for the
15 Commonwealth to have separate individuals,
16 other than crime scene responders, do their
17 interpretation of the fingerprint results?

18 A Incorrect. You're wrong. Because as I
19 specified, in practical solutions -- I'm not
20 saying -- what I'm saying is with two
21 examiners, I go to crime scene A and I
22 analyze the fingerprint. The other examiner
23 goes to crime scene B and examines the
24 fingerprint. It's the same resources if I
25 go to crime scene A and I give it to the

Day 28-64

1 other examiner to analyze the fingerprint
2 and the other examiner who went to crime
3 scene B, give me. So you just cross the
4 people who collect the evidence to the
5 people who analyze it in the lab. You don't
6 need more staff. You don't need anything
7 else except I look at the fingerprint you
8 collected at the crime scene when you talked
9 to the detective and the witnesses and the
10 victim and I don't know anything about it,
11 you just give you the fingerprint instead of
12 you looking at them and the fingerprint I
13 collected in my crime scene when I was
14 involved in all the evidence, I let you
15 look. It doesn't require more time or more
16 resources. And I did this of cognitive bias
17 a practical solution, there's a paper called
18 Practical Solutions in Forensic Science, so
19 they don't require more resources to do.
20 They just got to take them on board and not
21 believe, I'm objective, I'm infallible, and
22 have zero rate and I never make mistake,
23 when there's research and cases where there
24 are mistakes.

25 Q Dr. Dror, in this particular case you have

Day 28-65

1 not compared the fingerprints in this case?

2 A I couldn't compare fingerprints, I'm not a
3 fingerprint examiner. I wouldn't know how
4 to compare them.

5 Q So you're not qualified as a fingerprint
6 examiner?

7 A No, I'm not.

8 Q You're not a certified fingerprint examiner
9 with IAI?

10 A Correct.

11 Q And you were talking about the ACE-V
12 methodology and you indicated that it's not
13 a scientific method, but it's the prevailing
14 method that's being used in fingerprint
15 examinations?

16 A It's approach, the general approach that
17 they use, correct.

18 Q Right. And they've been using this approach
19 for at least thirty years; correct?

20 A They've used this approach, if I'm not
21 mistaken, less time than -- they believe
22 it's in a good approach, less time that
23 people believe the world was flat, yes. So,
24 they believe that -- they've used it for a
25 few years, but the fact that they used it --

Day 28-66

1 believe that it's an approach doesn't mean
2 it's scientific and they today say it's not.
3 So the NIST Expert Group of the IAI that you
4 mentioned, the presentation and ask that and
5 all of the fingerprint examiners set a group
6 of expert who said that it's not a
7 scientific approach and I can call the
8 conclusions.

9 Q Dr. Dror, if I could approach you with the
10 NIST, Latent Print Examination and Human
11 Factors: Improving the Practice through a
12 System Approach. It was a Report in the
13 Expert Working Group on Human Factors in the
14 Latent Print Analyze; wasn't it?

15 A Yes, I can read.

16 Q Okay. And you were in this group with
17 Kenneth Martin; isn't that correct?

18 A Correct.

19 Q Do you know who Kenneth Martin is?

20 A Where he is?

21 Q Who he is?

22 A Yeah, I know him very well. We're friends.
23 I talk to him, I know him --

24 THE COURT: I'm sorry, sir, I couldn't
25 hear what you were saying.

Day 28-67

1 BY MS. ARMOUR

2 A I know who Ken Martin is, yes.

3 THE COURT: All right.

4 BY MS. ARMOUR

5 Q And he worked with you on the Human Factors
6 Group?

7 A Correct.

8 Q And he is known as an expert nationally and
9 even internationally on fingerprint
10 examinations?

11 A Yes.

12 Q And he is the one that actually verified the
13 print in this case; were you aware of that?

14 A I heard that he was involved in the case. I
15 wasn't sure if he verified it or not.

16 Q He verified the print in this case. And
17 part --

18 THE COURT: The last is not a question,
19 ladies and gentlemen. We'll await evidence.

20 BY MS. ARMOUR

21 Q Okay. All right. And this is the report of
22 that Working Group that you were on with
23 Kenneth Martin?

24 A Yes.

25 Q And during this group they talk about

Day 28-68

1 improving the practice and systems approach
2 but they still talk about how the approach
3 will be done by the ACE-V methodology; isn't
4 that correct?

5 A I'll tell you what they said. Can I say
6 what they said? They say ACE-V --

7 Q I'm sorry, Dr. Dror, can you answer my
8 question.

9 THE COURT: Just if you answer counsel's
10 questions for the moment, Doctor.

11 BY MS. ARMOUR

12 A They talk about ACE-V that it's not
13 scientific method.

14 Q But they're talking about how to use ACE-V
15 methodology so it can be reliable; isn't
16 that correct?

17 A They're considering how to improve it so it
18 has more specificity and turns into a
19 scientific approach because it's not. The
20 conclusion of the committee, of Ken Martin
21 and the experts is that ACE-V is not a
22 scientific method in its current form and
23 the discussion was to say if and how it may
24 be turned. What they say, I'd like to quote
25 what they say --

Day 28-69

1 Q Dr. Dror, is Kenneth Martin's saying that
2 ACE-V methodology is not reliable?

3 A I'll tell you what the committee said. I'm
4 reading from the document that you just
5 showed me that Ken Martin said on Page 9.

6 Q Dr. Dror, I'm not asking you to read from a
7 document. I'm asking you whether Kenneth
8 Martin has indicated that ACE-V methodology
9 is not a reliable --

10 A I don't think I'm allowed to reveal what
11 people said in the Expert Group, which was a
12 government group. When people spoke there
13 was an agreement that the individual
14 opinions in the group will not be revealed.
15 So, I hope I'm not instructed to reveal what
16 certain people said in closed discussions of
17 Expert Groups.

18 THE COURT: Well, I don't think we --
19 you've been asked about a closed discussion,
20 sir, but we'll take it a question at a time.

21 Ms. Armour, please.

22 BY MS. ARMOUR

23 Q ACE-V methodology is the methodology that
24 people are employing right now to determine
25 if there's any errors in fingerprints; isn't

1 that correct?

2 A It's not a methodology but it's approach
3 that they're using. And that's a problem.

4 Q And it's the approach that's generally
5 accepted in the forensic community?

6 A It's an approach used and accepted as being
7 non-scientific.

8 Q You keep saying "non-scientific" but you're
9 indicating though, it is the approach, this
10 ACE-V methodology that people utilize in
11 order to determine if, in their opinion,
12 there is a match between a latent
13 fingerprint and a known fingerprint?

14 A Yes.

15 Q And you're talking about these Working
16 Groups, they've all been put together since
17 2004, since that error was found in order to
18 improve ACE-V methodology?

19 A Correct.

20 Q And all of these groups and Kenneth Martin
21 himself have been working with you on these
22 groups to address the issue of cognitive
23 bias?

24 A Yes.

25 Q And you're aware, he's the one that's

Day 28-71

1 putting the protocols in place, or was at
2 the time of this testing, in regard to how
3 the lab conducts their ACE-V methodology in
4 Massachusetts?

5 A If you say so, I'm not sure if he was or
6 not.

7 Q And also, Dr. Dror, you're not qualified as
8 a DNA expert either?

9 A Correct.

10 Q You didn't work in an accredited laboratory?

11 A I'm not a forensic scientist, no.

12 Q You're not a forensic scientist. As a
13 matter of fact, your bachelor's is in
14 philosophy?

15 A I have a bachelor in philosophy, yes.

16 Q And it's your Ph.D that's in psychology;
17 correct?

18 A Ph.D in psychology and a Master's in
19 psychology. I have a Master's and a Ph.D in
20 psychology from Harvard.

21 Q Psychology. So you're not a medical doctor
22 in any way?

23 A No.

24 Q Ph.D not an M.D.

25 Q Ph.D. And you're not a scientist?

1 A I'm definitely a scientist.

2 Q In psychology; correct?

3 A In brain and cognitive sciences.

4 Q Brain and cognitive sciences. But not in
5 DNA or genetics?

6 A I believe I've answered it, but I'm happy to
7 say again, I'm not a forensic scientist.

8 Q And you don't even have any training in
9 crime scene services response?

10 A I do have some training but I don't consider
11 myself a forensic scientist. If you want me
12 to elaborate, I will. I did get some
13 training in forensic science but I'm not a
14 forensic scientist. I'm not pretending to
15 be or talk in the forensic scientist. I
16 don't fly planes and I work with a pilot
17 decision-making and I don't know how to fly
18 plane and I'm not certified, but I work on
19 pilot decision-making with the U.S. Air
20 Force. My expertise is in how people
21 perceive information, make judgment and
22 interpretation, understanding the human
23 brain and the human mind.

24 Q Well, one thing you will agree with me, Dr.
25 Dror, is the best way to determine if

1 cognitive bias effected the fingerprint
2 examination in this case is to have somebody
3 take a look to see if there was an error in
4 the fingerprint examination?

5 A The best way, if you're able to get a
6 fingerprint and give it to a fingerprint
7 examiner who knows nothing about the case,
8 doesn't know that this is identification, so
9 it's not a normal verification where they
10 verify only items, and we can talk about
11 verification, and give it to a new examiner,
12 knows nothing about the case, they make a
13 judgment, that would be most objective way
14 to decide if there were bias involved or
15 not. Correct.

16 Q Dr. Dror, that's the only true way of
17 determining if cognitive bias effected the
18 fingerprint examination in this case?

19 A That would be a way to do it. Not that it's
20 the only true way.

21 Q And the only true way to determine if
22 cognitive bias effected the DNA testing in
23 this case would be to have somebody take a
24 look at the DNA results and determine if
25 there was any error in the DNA

1 interpretation?

2 A Someone who doesn't know anything about the
3 case. You give them, from scratch, give
4 them the DNA material and they do the work
5 without the context, not knowing anything
6 about the case and not knowing that somebody
7 has looked at this before and what
8 conclusion they've reached, they do it
9 blindly. Then yes, that would be excellent.

10 Q And have you heard something called a second
11 reader that's used by Massachusetts State
12 Police Crime Laboratory?

13 A About the verification process.

14 Q No, about the blind -- second reader?

15 A No.

16 MR. SWOMLEY: Is there a blind second
17 reader? No testimony about that at all.

18 THE COURT: The objection is overruled.

19 Let's have the question again, please,
20 Ms. Armour.

21 BY MS. ARMOUR

22 Q Dr. Dror, if you learn that there was a
23 second reader, a person who knew nothing
24 about the case that looked at the DNA
25 results, the electropherograms and came up

Day 28-75

1 with their own profile without having any
2 knowledge of the case, is that that sort of
3 independent review that you're talking
4 about?

5 A If that person only receives
6 identifications, then that's not good and I
7 can explain why. If they receive from time
8 to time matches, from time to time no
9 matches, then that's very good, yes.

10 Q They're not actually receiving that Dr.
11 Dror, I'm talking about they're not doing
12 the comparison of the known, they are just
13 looking at the genetic data on a question
14 sample and determining what that profile may
15 be.

16 A If they do it context free, that's very
17 good, yes.

18 Q That's very good. And if our initial DNA
19 examiner did not have the known, a separate
20 DNA unit did the processing of the known and
21 developed their DNA profiles before they
22 even obtained the sample from the known,
23 that would be a very good process as well?

24 A Yes.

25 Q And that would help eliminate cognitive bias

1 from coming into their findings?

2 A A certain kind of cognitive bias,
3 definitely. What they're doing, they're
4 developing the sample from the crime scene
5 and the sample of the suspect independently,
6 before they compare, that's very good
7 practice to minimize cognitive bias.

8 Q And that's a very good practice. And in
9 fact, even in your research when there have
10 been comparisons regarding single source
11 profiles, not mixture interpretation, you
12 would say that's extremely a reliable
13 science because they're basing it on the
14 data itself.

15 A Single source are extremely reliable and
16 extremely objective. The cognitive bias
17 comes in when they subjectivity, mixture
18 DNA, low copy, single source, very
19 objective, very robust, yes.

20 Q So, single source is extremely reliable,
21 that's what you're indicating?

22 A Yes.

23 Q Now going back to mixture interpretation.
24 So, where an analyst has very low level
25 results, is that more subject to cognitive

Day 28-77

1 bias?

2 A Yes, when there is low copy DNA, when
3 there's mixture an examiner has to do
4 interpretation. So it's not objective.
5 They have to interpret things and they have
6 subjectivity, then cognitive bias can creep
7 in. It doesn't have to. If they don't have
8 any irrelevant information, then they make
9 good, subjective information. The fact that
10 forensic examiner makes subjective decision
11 is not a bad thing. I'm not criticizing
12 subjectivity. Subjective decision-making is
13 fine. Forensic examiners can make very good
14 subjective decision. We just want to make
15 sure that doing subjectivity, that's when
16 they may be influenced by irrelevant
17 information. When it's very objective, even
18 if they know irrelevant information, it's
19 not usually going to influence them. When
20 it's subjective, we want to protect them
21 from the context.

22 Q So it's very important if there are low
23 threshold results or not sufficient data to
24 do a mixture interpretation, the analyst
25 shouldn't be recording those results;

1 correct?

2 THE COURT: Well, counsel, I'm going to
3 sustain an objection to that question.

4 BY MS. ARMOUR

5 Q Dr. Dror, I just want to go to your study.
6 The Meta-Analytically Quantifying the
7 Reliability and Bias Ability in Forensic
8 Experts. Is that your study regarding
9 fingerprint examinations and cognitive bias?

10 A That's not a study, it's a meta-analytically
11 analysis. It's based on two other studies
12 independent and they were collapsed together
13 to one statistical analysis in that specific
14 study.

15 Q So you used two studies in that particular
16 report?

17 A Taking two previous published studies, put
18 the data together and did more statistical
19 analysis.

20 Q And in those two studies you used a very
21 small sample size; isn't that correct?

22 A Correct.

23 Q As a matter of fact there were only six
24 fingerprint examiners that were utilized in
25 one of the studies?

1 A Correct.

2 Q And they were only five examiners used in
3 the other studies?

4 A Correct.

5 Q You would agree that that is not an ideal
6 pool to generate that?

7 A And I disagree. The number of participants
8 depends on the effect size. Sometimes you
9 need huge amounts of participants, sometimes
10 you need less. In another study we had
11 fifty-five thousand forensic decisions, we
12 needed fifty-five thousand to find the
13 buyers. The stronger the phenomena the less
14 participants you need. And there are
15 statistical scientific method to determine
16 how many participants you need called power
17 analysis. So those are subjective to
18 statistical analysis to determine how many
19 participants you need. Sometimes you need
20 more participants, sometimes you need less
21 participants.

22 Q But you had two examiners that were not
23 really as good a fingerprint examiners as
24 maybe the majority of fingerprint examiner,
25 those two out of six could skew your study,

Day 28-80

1 even applying your analysis?

2 A Depending on your random sampling and your
3 analysis. When you do the analysis you look
4 for outliers and there are statistical
5 scientific procedures. I didn't invent
6 them. Where you examine participants. How
7 they're randomly selected and whether the
8 outliers and whether they skew the data,
9 whether the entire data depends on one data
10 point or not.

11 But it's -- generally it's better to
12 have more participants, and better, but it
13 depends on the design. For example, and I
14 don't want to elaborate, but happy. When
15 you're comparing two people, you need many,
16 many participants because you may have
17 gotten one person randomly that's especially
18 good or bad. In those two studies we
19 compared people to themselves. They were
20 their own control group. So when you
21 compare group A to B, you need bigger
22 numbers. When you compare it person to
23 themselves then there needs to be less
24 number because they're controlled to
25 themselves. In those two studies it was the

1 same subject experimental design that
2 required less participants because they
3 compared people to themselves under different
4 conditions.

5 Q So where did you obtain these participants
6 for this study?

7 A From a participant pools of expert
8 fingerprint examiners that do case work and
9 appear in court.

10 Q So, can you tell me, so where were those,
11 those particularly, those fingerprint
12 examiners from what parts?

13 A One, I don't remember. Two, we called for
14 anonymity. And we have participants pulled
15 from the U.S., from Canada, Australia, the
16 UK and we use in different studies,
17 different participants and we don't find
18 differences between those countries, between
19 the methodologies.

20 Q So the fingerprint examiners that you used
21 in the study has to sign up to be a willing
22 participant in a particular study?

23 A It depends on which studies.

24 Q How about that one study that Meta-
25 Analytically Quantifying Reliability and

1 Bias Ability of Forensic Experts?

2 A I don't believe, so one of the issues in
3 studies, for example, the FBI study when
4 they find low error rate, people know
5 they're participating in a study --

6 Q Dr. Dror, I'm asking about your study.

7 A In this study the people, it's very
8 important that they do case work, they don't
9 know we're studying them. When you know
10 they're being observed, they behave very
11 differently. So I'm not sure if this study,
12 either they didn't agree to participate,
13 their laboratory director agreed their
14 quality assurance, so this will fabricate it
15 fine, used and they didn't sign any form,
16 consent form. That's one option.

17 The other option, we have a pool of
18 participants where we ask fingerprint
19 examiner: Are you willing to take part in
20 the study the next five years without your
21 notice, we will have fake cases that you
22 will do case work? And they sign for it and
23 we have a data base for those and we use
24 them.

25 But at the time of them doing the actual

Day 28-83

1 decision-making, those studies, they didn't
2 know they were doing a study, an experiment.
3 They thought they were actually doing case
4 work. That is critical and that's why the
5 evidence, data collected is very strong.
6 They were all covert studies in laboratories
7 without the knowledge of examiners doing the
8 study.

9 THE COURT: Counsel, we'll pick it up
10 after lunch.

11 Would you step down, sir, please. Watch
12 your step there on the left.

13 Ladies and gentlemen, we'll pick up at
14 two o'clock. I know you're all being and
15 will be very careful with all of my
16 instructions.

17 Thanks very much.

18 (LUNCH RECESS)

19 THE COURT: Ms. Armour, you may
20 continue your examine, please.

21 BY MS. ARMOUR

22 Q Dr. Dror, before the lunch recess we were
23 talking about a study you did, the one that
24 you had the six experts and then ones with
25 the five experts in the study. So, in that

Day 28-84

1 particular study you found it difficult to
2 find participants to conduct the research?

3 A It was hard to find participants,
4 laboratories that will participant.
5 Correct.

6 Q So when you ended up doing it, you combined
7 the results of these two, like small studies
8 and did this meta-analytical analysis to the
9 data; is that correct?

10 A Yes.

11 Q And in a way, you did this sort of - - this
12 step in order to increase the weight of your
13 results?

14 A No, not necessarily. Meta-Analytical Study
15 are done all the time in many scientific
16 domain. There are many different studies,
17 each one is a bit different design. Each
18 one find things that will be differently and
19 you have to put all the studies together and
20 review, and put all the data together to see
21 what they all mean together, the
22 interpretation to give more data points,
23 more statistical power and to put it all
24 together to have an overview of studies.

25 Q But you still, in total that would only have

Day 28-85

1 a eleven actual fingerprint examiners in the
2 study itself?

3 A In that study, correct.

4 Q And you would agree that based on years or
5 levels of experience, different fingerprint
6 examiners could be more accurate than other
7 examiners?

8 A Different examiners will have different
9 levels of accuracy based on experience and
10 many other factors, yes.

11 Q And the factors would include training?

12 A Yes.

13 Q Whether they are aware of the concept of
14 cognitive bias?

15 A No, not at all. Awareness matters not at
16 all. When it comes to cognitive bias,
17 awareness is not important. There has to be
18 certain procedures to minimize. Awareness
19 of bias doesn't minimize the bias.

20 Q However, in numerous articles and reports,
21 you indicate that examiners should be aware
22 of a potential cognitive bias?

23 A Absolutely, because procedurals are not very
24 good if people don't believe they don't
25 follow them. In the medical domain seventy

Day 28-86

1 percent of the nurses don't follow the
2 checklist. So, they have to be aware so
3 they will follow the procedures. If we have
4 procedures and examiners don't understand
5 the device, they believe they're going to
6 use some context they will not follow the
7 procedures. So, awareness is only to enable
8 them, as I say in many of my papers, to
9 follow the procedures. So it has to be
10 procedures with education on this topic
11 together.

12 Q So it's important that they be aware, the
13 examiner be aware of cognitive bias and then
14 follow the protocols and the procedures that
15 is put in place with the understanding of
16 cognitive bias?

17 A I couldn't say it better myself.

18 Q So, all these people when you say, none of
19 these participants were from the Crime Scene
20 Section Services in Massachusetts?

21 A I don't remember and I don't say where the
22 participants from. They have anonymity
23 because it's criminal cases they
24 participate. And in addition to that, they,
25 themselves don't know they participated. So

Day 28-87

1 I don't remember and we don't avail the
2 participants that we used in the studies.

3 Q Do you recall if Massachusetts signed on to
4 participate in any of your studies?

5 A They appear in the data base, but they
6 didn't necessarily used. We have people in
7 the data base and sometimes we don't them.
8 So I do have people from Massachusetts
9 signed in the data base, yes.

10 Q Kenneth Martin is a certified fingerprint
11 examiner, wasn't in your data base?

12 A Ken Martin himself?

13 Q Ken Martin himself.

14 A I don't recall off the top-of-my-head and we
15 don't reveal the names of people who
16 participate on the data base.

17 Q In fact, your only kind of requirement for
18 being a participate in the study was to have
19 five years of experience or more; isn't that
20 true?

21 A No, that time was one of the requirements,
22 we wanted to make sure the most important
23 requirement that those fingerprint examiners
24 are examiners who do case work and appear in
25 court and make decisions on real criminal

Day 28-88

1 cases. In some jurisdictions in the United
2 States you don't even need five years of
3 experience. So we raised the bar beyond
4 that. But from our point of view, someone
5 can come to court and testify in a case even
6 if they have zero experience if the police
7 or the crime lab says they're good enough,
8 they should be good enough to do the
9 decision. But we had that, and in addition
10 we required five years of experience in
11 addition to that.

12 Q So you didn't have a requirement that they
13 have ten or more years experience or thirty
14 or more years of experience?

15 A Correct.

16 Q And certain laboratories have stricter
17 protocols and guidelines than other
18 laboratories?

19 A Correct.

20 Q In Massachusetts Kenneth Martin was a
21 Detective Lieutenant in the Crime Scene
22 Services Section in Massachusetts, this is
23 certainly a person that was well aware of
24 the issues involving cognitive bias?

25 A In what year are you asking me?

Day 28-89

1 Q Well in - - let's say 2009, 2010?

2 A I don't want to say what was in Ken Martin's
3 mind, but I would think that he was aware of
4 it, yes. But I cannot testify to his state-
5 of-mind in what he was knowing or not.

6 Q Well he was a contributor, wasn't he, to the
7 National Academy of Science Report on
8 Forensics?

9 A Yes, and I've spoken to him many times and
10 he's a friend and a colleague that I respect
11 and he's a good expert.

12 Q He's a good expert?

13 A Yes.

14 Q Because he understands these issues; isn't
15 that correct?

16 A He's not a cognitive scientist. He
17 understands forensic science and he
18 understands the cognitive issues to some
19 level, but not to the cognitive scientists,
20 of course.

21 Q Correct. Like he's not a psychologist, he
22 doesn't have a Ph.D psychology?

23 A Just like I'm not a forensic scientist, he's
24 not a cognitive scientist. But we
25 understand each others domain to a good

Day 28-90

1 level.

2 Q And it's important for both of you to sort
3 of understand one another's domain so that
4 proper procedures and protocols could go
5 into place in laboratories to ensure the
6 integrity of results?

7 A Correct.

8 Q And he was on the Human Factors Committee of
9 OSAC with you?

10 A He was on the expert Working Group of the
11 National Institute of Standards and
12 Technology in Department of Justice. OSAC
13 is a different group that I think he's on.
14 I'm not sure if he's on it. I was a chair
15 of the Human Factors Committee on that.

16 Q But you left in 2015; correct?

17 A Yes, correct.

18 Q Did you have a disagreement with the OSAC?

19 A No, not at all. We're on very good terms
20 and if you read my paper that came last
21 week, I applaud their work and they're doing
22 great work in introducing standards to this
23 domain.

24 Q Okay. So you approve of the work of OSAC
25 doing when you left OSAC?

Day 28-91

1 A Yes. Yes.

2 Q And you would agree certified examiners,
3 those are examiners that are certified by
4 the IAI are less likely to be impacted by
5 cognitive bias or to remain fairer?

6 A Not at all. When we look at erroneous
7 mistakes, including laboratories in the U.S.
8 it will shut down because of problems. You
9 find there's no correlations that a lab
10 that's accredited and have problems, labs
11 that are accredited and are doing great.
12 Labs that are not accredited and doing great
13 job. The same thing with examiners that are
14 certified, we find some of them make
15 mistakes and some of them don't, including
16 the FBI blackbox study where they found
17 mistakes. They couldn't show that it was
18 the experts who were not certified. The
19 experts that were certified who made
20 mistakes and experts who were not certified.
21 So certification and accreditation has not
22 yet implemented and less errors of
23 individuals all lapse where we find huge
24 problems and they close down the entire lab.
25 Q But you would agree that certification

Day 28-92

1 process is quite an intensive process for
2 examiners?

3 A Yes.

4 Q They get blind studies they have to complete
5 fingerprint examinations on tough
6 fingerprints; is that correct?

7 A And that certification, we can have long
8 discussions. We've done it in many
9 committee. First of all the problem with
10 certification, they know they're being
11 tested. So, when I do driving test I drive
12 very well. I can't say in court how I
13 actually drive on the freeway because I know
14 I'm not watched. The certification is
15 always done. They know they're being
16 tested. It does not necessarily reflect how
17 they actually do case work. Like in my
18 studies are the only studies who actually
19 tested examiners who believed they're doing
20 case work. So during the test it is quite
21 difficult and this issue of how you define
22 error in mistakes, which is problematic.
23 But there are tests and it's good that there
24 are tests.

25 Q Yes. So you support certification on

Day 28-93

1 fingerprint examiners?

2 A Yes.

3 Q And in fact, some of those working groups
4 that you're on there's a real push to have
5 examiners certified?

6 A Yes.

7 Q And it's true that certified examiners
8 haven't been found to commit error like
9 we're seeing in some of these cases,
10 especially after 2009?

11 A I don't think that's correct. I think that
12 in the FBI study they examined performance
13 of examiners. They tested a big sample
14 size, I believe a hundred sixty-nine
15 examiners, and depending how you define
16 error, examiners made mistakes and they
17 looked and the examiners who made mistakes
18 had examiners who were certified and
19 examiners who were not certified and
20 mistakes were made by both examiners. They
21 couldn't show that more mistakes were made
22 by examiners who were not certified.
23 Certified examiners made mistakes also.

24 Q But not in mistakes of identification where
25 they are falsely identifying someone?

Day 28-94

1 A Enforcing the false identification mistakes,
2 I think they had seven or twelve, I think
3 seven erroneous or six - - six erroneous - -
4 I think, I can pull out the study if you
5 want. Six erroneous identification made by
6 five examiners. And it was not the case
7 that all five of them were not certified. I
8 think two were. But I'm not positive. I can
9 pull the study if you want off my laptop to
10 look at the numbers.

11 Q That's okay. That's a very small amount in
12 that particular study?

13 A They had other errors, other - -

14 Q I'm sorry - -

15 A What was the question about - -

16 Q That's a very small percentage?

17 A Of errors?

18 Q By certified examiners?

19 A No, I think it's like forty percent of
20 examiners who made false ID were certified.
21 I can pull the numbers, I think there were
22 six examiners who made erroneous - -

23 Q What's that study, Dr. Dror?

24 A It's the FBI Blackbox Study published, I
25 think two or three years ago. I can pull it

Day 28-95

1 out and give you the numbers. But FBI did a
2 very big study called the Blackbox Study
3 where they tested a hundred and sixty-nine
4 examiners. Each one received a hundred
5 pairs of print and they found false mistakes
6 of different kinds of mistakes, and the
7 mistakes you're talking about, first
8 identification, I believe there were six
9 false identification made by six examiners
10 and - -

11 Q You mean five?

12 A Or five, six. I'll pull out the paper, I'm
13 more than happy to pull out the paper.

14 Q That's fine.

15 A It's not --

16 Q And you - -

17 A - -

18 COURT REPORTER: Your Honor, I cannot
19 take both going at the same time.

20 THE COURT: We just can't have you both
21 speak at the same time, counsel and Mr.
22 Witness.

23 THE WITNESS: I'm offering to take out
24 the paper and give you the number. It's not
25 my paper, my research. I don't remember the

Day 28-96

1 exact numbers.

2 BY MS. ARMOUR

3 Q You'll get a chance to have further
4 questions as follow up.

5 The reasons the 2009 NAS report, the
6 Forensic Scientist of Fingerprint Examiners
7 had begun to take significant steps to
8 address cognitive and contextual bias in
9 their decision-making?

10 A Is that the question? I'm not sure what you
11 --

12 Q Would you agree that since the 2009 NAS
13 reports, the Forensic Scientist of
14 Fingerprint Examiners had begun to take
15 significant steps to address cognitive and
16 contextual bias in decision-making?

17 A Absolutely.

18 Q Protocols have been changed, accreditations
19 standards have been changed?

20 A The field has conformed itself and good for
21 them. They still have work to do but
22 they've made a big effort and I applaud them
23 for that, yes.

24 Q And you would agree that blinding steps or
25 blind reviews are not needed in every case?

Day 28-97

1 A Correct.

2 Q It's only when a case is - - or again, your
3 so-called bias danger zone in your report?

4 A That's my view.

5 Q And it's important that the forensic
6 examiner learns very little about the case?

7 A The forensic examiner needs to know
8 everything, all about the case that is
9 relevant.

10 Q Okay.

11 A And nothing that's not relevant.

12 Q So in a case where a fingerprint examiner
13 knew very little about the suspect. There
14 was no confession. They didn't have their
15 criminal record. There was no
16 identification made. That examiner is less
17 likely to be impacted by cognitive bias?

18 A The less irrelevant contextual information
19 they have the better it is. And if there's
20 very, very little, then there's very little
21 bias.

22 Q And the NIST has indicated that forensic
23 science service providers may rely on task
24 relevant information when performing their
25 analysis?

Day 28-98

1 A Yes.

2 Q Including talking to the police regarding
3 what piece of evidence to evaluate?

4 A Not the actual forensic examiner doing the
5 comparison. They need to talk to the
6 police. They get all the information, but
7 then the actual person doing the comparison
8 should not know or should have no contact
9 with the police at all. He or she needs to
10 be a expert in fingerprint and look at the
11 fingerprint. There needs to be
12 communication, we call it the case manager.
13 So, somebody needs to know the information.
14 Somebody collects all the evidence from the
15 crime scene but the actual expert conducting
16 the comparison of the fingerprints needs to
17 make their decision based on the
18 fingerprints and they shouldn't know
19 anything that is not relevant to the
20 fingerprint. The information you needed is
21 needed by someone but not the actual person
22 making the decision do the fingerprints
23 match or not.

24 Q So task irrelevant information would include
25 criminal history's, telling the examiner a

Day 28-99

1 suspect confessed, telling an examiner a
2 suspect was implicated by other forensic
3 evidence or saying that another examiner had
4 looked at the prints and said that the
5 suspect was the source of the print, that
6 would all be task irrelevant information?

7 A Those are the examples of that, yes.

8 Q Once again, if that task irrelevant
9 information wasn't provided to the
10 fingerprint examiner in this case, it would
11 minimize the chances for cognitive bias?

12 A It would eliminate them on this information
13 if they didn't know, it couldn't have effect
14 them.

15 Q So even if that fingerprint examiner had
16 gone to the scene but the scene did provides
17 in and of itself, information that
18 implicated the suspect, that information of
19 just going to the scene alone wouldn't
20 necessarily, sort of, create that type of
21 cognitive bias that would allow for
22 fingerprint examiner to be so influenced by
23 it that they might just focus on that
24 suspect alone?

25 A Going to the crime scene exposes them to a

Day 28-100

1 lot of information. What information they
2 were exposed to and how it effected one
3 would have to look at the specific case. I
4 don't know about the specific case. Best
5 practice is they don't go to the crime
6 scene. If they go to the crime scene,
7 depending on what they see, what they don't
8 see, the feelings they get, the atmosphere,
9 what type of crime, you know, the emotions
10 around. There's a lot of information, the
11 human brain picks up a lot of stuff. What
12 was picked up at the crime scene, I don't
13 know.

14 Q When there's no witnesses or live witnesses
15 at the crime scene, the fingerprint examiner
16 is less exposed to statements of witnesses;
17 isn't that true?

18 A If there's no - - that's right. And if
19 there's no victim, there's no victim. If
20 there's no blood spatter, there's no
21 spatter. Depending what was there, but when
22 you go into the room you learn a lot in a
23 crime scene. What was there, I don't know
24 but there is information there and I don't
25 know what it was and what that examiners

Day 28-101

1 should have picked. The best way they
2 shouldn't be there, they should do the
3 fingerprint examination. What they saw in
4 the crime scene and what they picked up I
5 cannot assess.

6 Q But if I give you an example of a crime
7 scene where there's no information in the
8 crime scene itself that implicates the
9 perpetrator, it would be less likely that
10 that fingerprint examiner would be
11 influenced by cognitive bias.

12 A It would be influenced by other type of
13 information at the crime scene. I was
14 joining a crime scene unit and they went
15 into a house for a burglary and there was a
16 little girl crying - -

17 Q I'm sorry, I'm going to stop you with that
18 specific example because that wasn't the
19 question I asked.

20 MR. SWOMLEY: Your Honor, could the
21 witness be permitted to answer the question
22 and if she doesn't like the answer she asks
23 you not - -

24 THE COURT: Counsel, - -

25 MR. SWOMLEY: - - tells the witness not

Day 28-102

1 to answer.

2 THE COURT: - - without speaking
3 objections. So, let's start the question
4 over again, please, Ms. Armour.

5 BY MS. ARMOUR

6 Q So given my example of a crime scene that
7 doesn't have identifying information of the
8 perpetrator, the fingerprint examiner would
9 be less influenced by cognitive bias?

10 A He or she would be influenced by context
11 from the crime scene, not about the identity
12 of the suspect but other things in the crime
13 scene will cause them bias. It will be less
14 bias if you had that and the person in the
15 crime scene.

16 Q I understand that Dr. Dror, but in this
17 circumstance, where the fingerprint examiner
18 went to the scene but there's nothing at the
19 scene that points to the defendant directly,
20 no papers, no particular witnesses that are
21 standing there, they're not inside the crime
22 scene with any police officers, under those
23 circumstances would the chance of cognitive
24 bias be diminished?

25 MR. SWOMLEY: Your Honor, I'm

1 objecting.

2 THE COURT: I have your objection,
3 counsel. I'm going to overrule it.

4 I think the question, Dr., is just, are
5 there some circumstance where there would be
6 less likelihood of cognitive bias?

7 THE WITNESS: It would be different
8 kinds of cognitive bias. If there's nothing
9 about the suspect that context would not
10 effect the examiner but there are other
11 contextual influence in the crime scene that
12 affect the forensic examiner. There's a
13 lot of different information. So there will
14 be less susceptible but still susceptible to
15 cognitive bias from other information at the
16 crime scene.

17 BY MS. ARMOUR

18 Q So when that fingerprint examiner who did go
19 to the crime scene is doing an examination,
20 they shouldn't look at a police reports or
21 criminal history sheets when they're doing
22 their examination?

23 A The crime scene investigator coming to the
24 crime scene should read everything, talk to
25 all the police officers, do everything to

1 collect the evidence well. But then, after
2 they collected the fingerprints, they need
3 to give it to another examiner that knows
4 nothing. Here's two fingerprints, look at
5 them. Do they match? Just look at the
6 fingerprints. Count the minutia and say if
7 they match knowing nothing. That is the
8 proper procedure to do it. That is
9 recommended by the National Commission on
10 Forensic Science that you cited a minute
11 ago.

12 Q Dr. Dror, but in the circumstance where the
13 laboratory, the forensic examiner and we're
14 going back to 2010, is looking at a
15 fingerprint but doesn't have any of this
16 task irrelevant information, the chances of
17 cognitive bias would be diminished?

18 A Yes.

19 Q Are you aware that the State Police Crime
20 Laboratory following 2009, set up a two step
21 review mechanism?

22 A I don't remember dates.

23 Q Do you remember a conversation with Kenneth
24 Martin about his idea to have a two step
25 review?

Day 28-105

1 A Ken Martin asked me for advice on cognitive
2 bias and I gave him advice, but I give
3 advice to many laboratories and Ken emailed
4 me, called me, asked me about advice about
5 certain procedure that would dis-eliminate
6 cognitive bias and I said to him, I don't
7 remember exactly what I said, it's a great
8 idea but it will not eliminate cognitive
9 bias, here is what you need to do.

10 Q But it is a great idea to have two reviewers
11 on a fingerprint examiners?

12 A The way he presented it to me in theory it
13 was a great idea, practicably to not
14 minimize cognitive bias. And that's what I
15 wrote to him and I can pull out the email if
16 - - I was not going to raise it but if you
17 did I'm happy to pull it. He contacted me,
18 Ken Martin because he was worried about
19 cognitive bias. He contacted me in England
20 because he knew I would be able to answer
21 and to have an idea that on paper sounded
22 well. They were really trying to deal with
23 it, but it was ineffective. It was like
24 putting gas in neutral. Like nailing jelly
25 to the tree. It wasn't going to work and I

Day 28-106

1 said, it sounds great. You're making an
2 effort but it's not effective because A, B
3 and C and here's how you need to do it.

4 Q But it's effective for reducing the amount
5 of error, putting cognitive bias aside,
6 having two independent reviewers is helpful
7 to help eliminate error in fingerprint
8 examination?

9 A Not the way they were doing it. And I can
10 explain if you want me - -

11 Q Well, I hear - -

12 A - - the answer is no.

13 Q We talked a little bit before about the way
14 that you would like to see fingerprint
15 examinations sort of take place is to have
16 the fingerprint examiner look at the unknown
17 fingerprint first, do all of their work and
18 markings on the unknown before they obtain
19 the suspects standards?

20 A Correct.

21 Q Similar to DNA analysis. They're generating
22 a chart before they pulling the suspect's
23 standard?

24 A Yes.

25 Q So that will be helpful in eliminating

Day 28-107

1 cognitive bias in the review?

2 A In minimizing cognitive bias. Yes. That
3 aspect. But you were asking about
4 verification not about the sequence of ACE-
5 V.

6 Q But that is a helpful process to look at the
7 unknown first and then compare a suspect
8 rather than vice-verse where you might be
9 influenced by the suspects?

10 A Working from the evidence to the suspect not
11 the other way around. Correct.

12 Q You would agree there are some fingerprint
13 examinations that are clearer when the data
14 is more clear than other fingerprint
15 examinations?

16 A Correct.

17 Q For example, if there were multiple
18 fingerprints on top of one another that
19 would be more difficult examination?

20 A Correct.

21 Q But where there's a great portion of a
22 fingerprint that's not covered by other
23 fingerprints, there's more information
24 available within that print to do an
25 examination?

1 A The quality and quantity of information the
2 latent print varies. Sometimes they have
3 more, sometimes they have less.

4 Q And you stated that when the data is clear
5 and decisions are simple and the power of
6 contextual bias is diminished?

7 A Correct. As I said earlier, when there's
8 more subjectivity, more interpretation than
9 you'll lessen the danger. If the decision
10 is more difficult, then it effects you more.

11 Q I'm just going to show you what is SSS for
12 identification.

13 MS. ARMOUR: Ms. Crawford can you just
14 put up the fingerprint identification chart.

15 BY MS. ARMOUR

16 Q So Dr. Dror, so there's something of an
17 examinations where these initial
18 characteristic are very easy to see, a
19 whorl, a loop, an arch. So when there isn't
20 that sort of fingerprints that are
21 completely on top of one another sometimes
22 that pattern is easy to see?

23 A The overall pattern, the level one you're
24 talking about is not used for
25 identification. They never identify based

Day 28-109

1 on arch, loop or whorl. They go to level
2 two of the minutia and sometimes to level
3 three. So this level of the top three is
4 not ever used to identify a suspect.

5 Q No, you certainly wouldn't say just because
6 somebody has a whorl pattern that then the
7 whorl pattern in the unknown that that's the
8 person is identified as the fingerprint?

9 A Exactly.

10 Q But it's one of the characteristics that
11 they start with. You can eliminate, if that
12 pattern wasn't there in the fingerprint you
13 would eliminate that?

14 A You could eliminate based on it but not
15 identify. Correct.

16 Q And then we go to kind of this second level.
17 So the central pockets, plain whorls, right
18 loops, left loops, these are other patterns
19 that are generally relatively easy to see
20 within a fingerprint?

21 A We see the nice fingerprint of a suspect.
22 At the crime scene latent prints, some are
23 higher quality and some are lower.
24 Sometimes they're only small segment of the
25 fingerprint, so they vary drastically.

Day 28-110

1 Q And then these characteristics, so, say that
2 the bifurcation, ending ridge, short ridge,
3 you know a dot, and then one of these kind
4 of loops that are in there. Are you
5 indicating that a person, a fingerprint
6 examiner can't actually see these patterns
7 within the fingerprint because of bias?

8 A I'm saying first of all, without bias, if
9 you give it to a fingerprint examiner, the
10 same fingerprint twice, one time they say
11 there's a ridge ending, and one time they
12 will not. If you ask him to count the
13 minutia, that inconsistent not between the
14 same examiner in nice, high quality, high
15 quantity print to show them because of ACE-V
16 doesn't specify what it means exactly, how
17 to decide. So if you give the same
18 examiner the same print and ask them, is
19 there a ridge ending here? One time they'll
20 say, yes. One time they'll say, no without
21 bias. Piece of data.

22 Second piece of data we will add the
23 bias and we motivate, we tell them it's a
24 murder scene, they see more characteristics
25 versus we give them the same print and say

Day 28-111

1 somebody stole a bicycle, suddenly there's
2 more ridge ending and characteristics
3 because they're motivated knowing the nature
4 of the crime. That's why we wanted to give
5 him fingerprint and say first count the
6 minutia because it's the ability in that
7 because ACE-V doesn't specify. It's not a
8 scientific method that tells you. And
9 every examiner and not only I have done this
10 study, you're given the same print twice,
11 they count different number of minutia.

12 Q But that's because sometimes like somebody
13 could see fifty little characteristics
14 within a fingerprint, somebody might see
15 twenty of those fifty characteristics, it
16 doesn't necessarily mean they're seeing
17 different things?

18 A It's not two different people. It's the
19 same examiner, you ask them, mark all the
20 important characteristics on the fingerprint
21 and they say, I see twenty. There's only
22 twenty on this fingerprint and mark it. You
23 give the same examiner the same print the
24 next day and ask him, mark all the
25 characteristics and says they're twenty-five

1 now.

2 Q But let's flip back. You don't just give
3 the print to the examiner. You lie to the
4 examiner, don't you, in these studies and
5 you tell them things that aren't true, like
6 there was a confession in this case or the
7 person had an alibi, so you plant those
8 ideas in the people that you're studying;
9 isn't that correct?

10 A In the study that they mentioned, incorrect.
11 The first study we don't give any context.
12 We just ask them, count all the minutia on
13 the fingerprint, we're looking at section of
14 minutia, perception of minutia with no
15 context and we give it to them again, even
16 without the bias, they don't come up with
17 the same number. When we lie to them, yes,
18 we give them contextual information to see
19 if influence them, this variability
20 increases even more. You get it even
21 without context. They don't see the same
22 every time.

23 Q But it was not that they're not necessarily
24 seeing the same characters, they might be
25 seeing more characteristics, do you

Day 28-113

1 understand what I'm saying, Dr. Dror? Like
2 they might be - - like the first time around
3 they might count out twenty-five
4 characteristics on a print and maybe they
5 take a look at it again and they're seeing
6 more detail in it that they didn't pick the
7 first time, so now they're picking up
8 thirty, it doesn't necessarily mean that
9 those details are really there?

10 A That would be very nice if they see more
11 things the second time. Sometimes it's the
12 opposite. The first time they see forty
13 characteristics, you give them that same
14 print the next day they see only twenty-five
15 in the same print they don't see. They say,
16 there aren't anymore characteristics because
17 it isn't an objective criteria to determine
18 the characteristics.

19 Q But that's because and you would agree that
20 all of the reports that indicated that just
21 counting up the number of characteristics,
22 isn't an effective way to make an
23 identification?

24 A They do not only count the number of
25 characteristics, but it plays a major role

1 identifying the characteristics in the
2 spacial relations between them, the data,
3 and the data changes. In science we have
4 the data before we even draw conclusions,
5 they don't agree on the data of a
6 fingerprint when you give them the
7 fingerprint every time they say the data is
8 different because ACE-V doesn't say when you
9 do that analysis and mark the minutia, what
10 is a criteria to determine that? It's just
11 in the eye of the beholder.

12 Q Dr. Dror, these fingerprint examiner are
13 trained on ACE-V methodology, they're
14 trained on these different levels of
15 characteristics, they're trained on what to
16 look for in what locations to look for these
17 characteristics and to kind of go over the
18 print to find what locations they're finding
19 these characteristics on and they're trained
20 to look at the print in its entirety before
21 they make any conclusions - -

22 A Yes.

23 Q - - correct?

24 A And all this training and years of
25 experience, including twenty and thirty

1 years of experience, the examiner is trained
2 and they look at it and then they look at
3 the same thing the next day and they report
4 different data, different minutia of what's
5 in the fingerprint.

6 Q Dr. Dror, I disagree with that.

7 A Look at the data, not only published by me,
8 this is data that's been done and other
9 researchers and I'll call you. I'll give
10 you fingerprints, give it to any examiner
11 and every lab that they've trained in the
12 world, including the United States, they
13 don't believe me, I say here, I put out
14 fingerprints to give to the examiners and
15 they do and no one has ever been able to
16 show that they see the same. This is
17 consistent data replicated not by six
18 examiners but hundreds of examiners
19 including studies conducted not by me, by
20 fingerprint examiners, Glenn Langenburg from
21 Minnesota, has his Ph.D. He's a fingerprint
22 examiner, certified from the IAI entirely on
23 that of the inconsistency that fingerprint
24 examiners have between one another and
25 themselves in marking the minutia.

1 Q Dr. Dror, you don't - -

2 A It's the most - -

3 Q - - you have said - -

4 A - - basic phenomena.

5 Q - - yourself that fingerprints are a very
6 reliable piece of forensic evidence?

7 A Absolutely.

8 Q Absolutely. So despite all of these studies
9 and all this research on cognitive bias, you
10 would agree that fingerprints are very
11 reliable and something that we can trust in
12 making identifications?

13 A It's very reliable. But it is not perfect.
14 It's not objective. And it's not error
15 free. Estimating the errors, the errors are
16 low, and I say from the beginning I would
17 trust forensic examination more than
18 eyewitnesses. Forensic science in
19 fingerprint is a very good forensic domain,
20 but it's not perfect and mistakes do happen
21 and it's not objective. I'm not saying it's
22 unreliable. It's very good method and
23 should be used but we need to make sure it's
24 as objective and reliable as it is by
25 removing that irrelevant contextually

Day 28-117

1 information.

2 Q Okay. So this very reliable science, the
3 only way that you could determine if
4 cognitive bias created an error in a
5 fingerprint examination would be to have
6 that fingerprint independently evaluated to
7 determine if there was any error?

8 A Independently and blindly.

9 Q Independently and blindly. And these
10 fingerprints were available for anyone to do
11 an independent review?

12 A I don't know about this fingerprints, I'm
13 not familiar with them.

14 Q Okay. And you said before that resources
15 might prevent against these independent
16 reviews; isn't that right?

17 A No, you suggested in every case to do an
18 independent review. I said that is not
19 needed in every case. Only problematic
20 cases where there's a lot of context. And
21 I'm more than happy and I've done it in the
22 past, when I get fingerprints, I give it
23 independent examiners, they look at it and
24 say something, it's an ID sometimes it's
25 not. The fact that a fingerprint examiner

Day 28-118

1 is bias by context, doesn't mean they made a
2 mistake. Bias means they don't see things
3 objectively, but the decision can still be
4 correct. I'm not saying that bias - - for
5 example, a police officer may be biased
6 against black people and shoots a young
7 person and he did have a gun, yes, but he
8 shot him because he was biased. So the
9 forensic decision-making, the fact that they
10 know context and is bias him doesn't mean
11 they made a mistake, it means they're more
12 likely to make a mistake because they were
13 influenced by a lot of other stuff. If it's
14 an ID or not, the only way to know is, as I
15 say, take the fingerprint, give it to
16 somebody totally independent that knows
17 nothing to make a judgment. That judgment
18 is very good.

19 Q So you're not saying that there was a
20 mistake in this particular case?

21 A I don't know anything about this case. I
22 haven't seen a single print. I know very
23 little about this case.

24 Q So you're not saying that former Detective
25 Lieutenant Kenneth Martin who you know, that

Day 28-119

1 you're friends with made a mistake in his
2 examination of this?

3 A Absolutely I'm not saying that.

4 Q And instead of paying you ten thousand
5 dollars to testify about cognitive bias,
6 those funds could have gone to an
7 independent fingerprint examiner?

8 THE COURT: Counsel, I'll have you ask
9 another question.

10 BY MR. ATWOOD

11 Q And you certainly agree that DNA, especially
12 DNA, single source examinations are
13 extremely reliable?

14 A Yes.

15 Q And less likely to be impacted by cognitive
16 bias?

17 A Yes, the more objective the decision, the
18 less impact the context have.

19 Q Because they're looking a raw data and doing
20 a comparison with the raw data itself?

21 A Yes.

22 Q So the integrity of those results can be
23 assured despite the concept of cognitive
24 bias?

25 A I'm not a DNA expert. What I can say that

Day 28-120

1 they're much stronger when they're not
2 influenced by cognitive bias. Yes.

3 Q So when this strong DNA science comports
4 with the fingerprint examination confirming
5 what was found in fingerprints, that would
6 suggest that the fingerprint examination in
7 this case was reliable?

8 A If it was done independently and they didn't
9 know about one another, what they were
10 talking about bias snowball effect - - if
11 the DNA examiner just looked at the DNA and
12 the fingerprint examiner just looked at the
13 fingerprint and made their decision based on
14 the fingerprint, didn't know anything and
15 they were done independently and the
16 converging lines of evidence, great stuff.
17 If they talked to one another and they knew
18 the influence and biased one another. So I
19 don't know about this case. That's - - I
20 don't know.

21 Q So if the fingerprint was done long before
22 the DNA evidence in this case, it would
23 suggest - -

24 THE COURT: Counsel, I'm going to have
25 you - -

1 MR. SWOMLEY: Objection.

2 THE COURT: - - move on.

3 THE WITNESS: Can I have some more
4 water?

5 THE COURT: Yes, you can.

6 THE WITNESS: Thank you.

7 MS. ARMOUR: Nothing further.

8 THE COURT: Mr. Swomley, please.

9 MR. SWOMLEY: Thank you, your Honor.

10 REDIRECT EXAMINATION BY MR. SWOMLEY:

11 Q Let's talk about your bias, Doctor. I took
12 you to lunch this afternoon; didn't I?

13 A You offered to.

14 Q You wouldn't let me buy you anything; would
15 you? Not even a cup of coffee?

16 A That is because I didn't want to be tired.
17 If I was hungry, I would have let you pay
18 for it, but I didn't today because I didn't
19 want to be tired.

20 Q And how many times have you testified in a
21 court in the United States, sir?

22 A This is the first time. But given how
23 pleasant it is I may do it more often. I'm
24 thinking of doing it again.

25 Q How often have you been asked?

Day 28-122

1 A Dozens of times. I've been asked many times
2 to come to the U.S. and to other countries
3 to appear in court. I almost always in the
4 U.S. up until now, every time, said, no I
5 work with the forensic community. I try to
6 bring change from the forensic community
7 from within.

8 Q And this time I found you at a talk you
9 gave; right? At Suffolk University Law
10 School; right?

11 A Yes.

12 Q And you hadn't met me before; had you?

13 A No.

14 Q And why did you say yes to me?

15 A I've received, by the way, a number of
16 offers, post that talk to come in and appear
17 in court in a number of cases and you're the
18 only one I said yes to. It's a balance in
19 the decision to do that because I don't want
20 to alienate, in a way I'm losing money being
21 here because I'm alienating because I gave a
22 workshop at the Boston P.D. and the
23 Massachusetts State Police have been talking
24 to me the last few months about coming and
25 training them and they were going to pay

Day 28-123

1 more than ten thousand dollars. Now I don't
2 think they're going to invite me at all.
3 So I'm in a deficient in my retirement fund.
4 But I decided to come because I think that
5 to move the forensic science community and
6 they've moved a long way, and most of them
7 will agree with what is said, but a few
8 still say we're objective, we have zero
9 error rate, ACE-V is totally scientific and
10 to move them along they need the courts to
11 say to them, this is unacceptable. You
12 cannot go around with no data contradicting
13 what is known. So this is, from my point of
14 view, an encouragement to the forensic
15 community to some forensic examiners the
16 same thing I published an article with a
17 Supreme Court Judge of Michigan, and the
18 judges - - to train the judges so the judges
19 would be educated.

20 And with all due respect, I don't see
21 myself appearing here for the defense or the
22 prosecution. I'm here for the court and for
23 improving forensic science and administering
24 justice here and in other countries to do
25 the science as good as possible. That's my

1 motivation.

2 Q Have you ever given talks to prosecutors?

3 A Oh, yes. Why don't I give a free talk to
4 the - - they piggyback because they heard
5 I'm here anyhow so I said I'm happy to do.
6 I trained on the west coast a few years ago
7 in Santa Clara Crime Lab and the prosecution
8 said, can you come talk to the prosecutor
9 and I talked to the prosecutor. I trained
10 the prosecutor in New York and Manhattan a
11 few months ago. So once I'm somewhere and
12 they pay my plane ticket, I'm happy to give
13 other talk and to meet and to go to labs and
14 in fact, when I was here I was going to
15 visit Kennedy at home, but he was away so I
16 didn't visit him in Cape Cod and he was
17 going to my workshop. So, it just piggy
18 back. And I've trained prosecution and I'll
19 be here in June and happy to give a free
20 talk to the prosecutor if they're
21 interested, as long as I'm here. But
22 someone initially has to pay my plane ticket
23 to come here from London.

24 Q So, you've testified, I believe, a little
25 bit about what you as your own cognitive

Day 28-125

1 biases and I wanted to give you the
2 opportunity to explain how you do protect
3 against it and what that means?

4 A Everyone has biases and we protect it, a
5 person alive, I don't want to give advice in
6 person, they're alive, but if you are loved,
7 you ask someone who is not in love and I
8 pity the live person because we know love is
9 blind. This kind of thing effects experts
10 also and science 101 is to protect
11 ourselves. So when I do the studies, all
12 the studies, it's a great excuse not to do a
13 lot of work, I don't analyze the data
14 because when you analyze data statically,
15 you decide either meta analytic, what
16 procedures do you use? How to treat data.
17 All of this stuff, I'm objective and I want
18 to be but I'm looking for bias, so I'm
19 consciously pick a statically procedure that
20 will find bias. So I hire statistician.
21 They know nothing about the case. I say,
22 here's Group A, here's Group B. Statically
23 analyze are they different or not? So I
24 don't do the statical analysis.

25 We protect ourselves in the medical

1 domain when we have a drug, we have
2 placebos, because people taking a drug,
3 believing they're taking a drug, doesn't
4 effect whether they can heal them and make
5 them pure, so we use all of these scientific
6 methodologies to protect people and
7 scientist from the belief and the knowledge
8 effecting what we do.

9 And I'm definitely biased because I'm a
10 human being and I have a brain and I
11 acknowledge it and I take scientific steps
12 to minimize the bias. And even with all the
13 steps, bias is never totally eliminated, but
14 you can really, really minimize it by not
15 doing the task so you don't do it. That's
16 when they say in forensic examiner and any
17 other scientist needs to do.

18 Q Dr. Dror, you described Ken Martin as a
19 friend and a colleague; right?

20 A Yes.

21 Q Do you regard him as being someone who is
22 immune to bias?

23 A No one is immune to bias. When I started my
24 lectures I would go to forensic examiners
25 and they thought they would say in the

Day 28-127

1 conference, I said, who is objective? All
2 of them. Who has never made a mistake?
3 Zero error rate? Everyone. Who may have
4 made a mistake? They would all say we've
5 never made a mistake. We could have never
6 made a mistake, that was ten years ago. I
7 would go down and shake their hand, I have
8 always wanted to meet God. What do you
9 mean? You never mistake, it's zero error
10 rate. Now you don't get that anymore but
11 here and there a few examiners will still
12 say, zero error rate. This is infallible.
13 And this we need to push out.

14 I assume that Ken Martin would not say
15 that, but I don't want to speak for Ken
16 Martin. He's a well respected good examiner
17 and I have all respect for him.

18 Q You were asked on direct examination about
19 your correspondence with him. Would you
20 please share what that correspondence was
21 and when he asked of it?

22 MS. ARMOUR: Your Honor, I would object
23 to hearsay.

24 THE COURT: You meant on cross-
25 examination, Mr. Swomley?

1 MR. SWOMLEY: I'm sorry, on cross-
2 examination, yes.

3 THE COURT: And the question is, when
4 did he have correspondence?

5 MR. SWOMLEY: When did you have
6 correspondence is one of the questions, yes.

7 THE COURT: Let's start that way.

8 MS. ARMOUR: That's fine.

9 THE COURT: You may answer when, sir.

10 BY MR. SWOMLEY

11 A The correspondence specifically that you're
12 referring to that I was asked in cross-
13 examination was I believe in June of 2015.

14 Q And what was - - what were you - - what was
15 the advice that was sought from you?

16 A The question was, - -

17 MS. ARMOUR: Objection, your Honor.

18 THE COURT: I'm going to sustain the
19 objection.

20 MR. SWOMLEY: May we be seen at side
21 bar, your Honor?

22 THE COURT: Sure.

23 SIDE BAR CONFERENCE

24 MR. SWOMLEY: I didn't bring this up,
25 your Honor, Ms. Armour brought it up and it

Day 28-129

1 goes square to the heart of what information
2 that Kenneth Martin - -

3 THE COURT: What do you expect the
4 answer to be?

5 MR. SWOMLEY: He has his correspondence
6 live. He has it - -

7 THE COURT: I didn't hear you, I'm
8 sorry.

9 MR. SWOMLEY: He has it in his computer.

10 THE COURT: My question is, what do you
11 expect the answer to be?

12 MR. SWOMLEY: My understanding is that
13 he sought information about whether or not
14 fingerprint examiners that do verification
15 should be blind. And it's my understanding
16 that he sought that information - -

17 THE COURT: He what?

18 MR. SWOMLEY: He sought that information
19 in order to be able to be informed about
20 this case because it happened in June.

21 THE COURT: I'm not going to have that
22 back and forth about this case. Do you have
23 any objection about the blind part?

24 MS. ARMOUR: Yes, your Honor. Your
25 Honor, this is an out-of-court conversation

Day 28-130

1 between these two parties. It's classically
2 hearsay in that regard.

3 If he wants to talk about what he thinks
4 about certain policies or ideas, it's
5 different. But actually talking about the
6 communication is classic hearsay.

7 THE COURT: Okay. You may ask a
8 leading question because the witness has a
9 tendency to wander and be discursive.
10 Whether his conversation with Mr. Martin
11 related to blind, the importance of blind
12 examiners and then that will be it. We'll
13 leave that conversation.

14 MR. SWOMLEY: Your Honor, the
15 Commonwealth sought to burnish her own
16 experts credentials by associating him with
17 my client - - my witness. I would submit
18 that I am entitled to have that - -

19 THE COURT: How are you going to
20 unburnish it?

21 MR. SWOMLEY: The relationship between
22 them, somewhat explored. So it's - -

23 THE COURT: I think that's enough
24 counsel. You'll reburnish by pointing out
25 that Mr. Martin sought the witness's advice.

1 MR. SWOMLEY: Thank you.

2 END SIDE BAR CONFERENCE

3 BY MR. SWOMLEY

4 Q Did Mr. Ken Martin seek information from you
5 or seek your advice about blind
6 verifications?

7 A Yes and my - -

8 THE COURT: That's fine.

9 THE WITNESS: I don't want to
10 elaborate unless I have to -

11 THE COURT: You - -

12 THE WITNESS: - - to say what we
13 talked, Ken and I.

14 THE COURT: I prefer that you did not
15 elaborate.

16 THE WITNESS: And I prefer not to
17 elaborate.

18 THE COURT: Okay.

19 BY MR. SWOMLEY

20 Q He sought your advice; is that correct?

21 A Correct.

22 Q And what is your understanding of the value
23 of blind presentation in the fingerprint
24 context?

25 A In verification?

1 Q Yes.

2 A In verification they have - -

3 Q I'm sorry to interrupt you. Verification,
4 we're talking about ACE-V, the V for
5 verification.

6 A Yes. Yes. So, one examiner makes an
7 identification and another one verifies and
8 in the Office of the Inspector General in
9 the big erroneous, fingerprints happened,
10 they did that and they verified an erroneous
11 identification and the reports started to
12 criticize, that it's like a rubber stamp.
13 Why? Because if all the time verified only
14 ID's and given the fingerprint is very
15 accurate, generally speaking, it's very
16 reliable, as I said before, then almost all
17 the cases, when they make an ID are correct
18 and they verify them and they get into a
19 cognitive bias.

20 Now, the idea that you really try and
21 you train them, try to prove that it's not
22 an ID when you verify, it does not work.
23 It's an airport security. When you go to
24 the airport you put your suitcase, when you
25 check in and they train people to look for

Day 28-133

1 the bomb. And I'm involved in that. I
2 trained them and you, one minute are going
3 to text or not pay attention the bomb will
4 go and the plane will die, blow up and you
5 kill kids. And they really try to look, and
6 no bomb, no bomb, no bomb. They do it one
7 day. Second day, no bomb. They do it for
8 twenty, how many bombs do they find? Zero.
9 So the brain, even though they try to look
10 at it, doesn't engage. So what is done?
11 Unclassified information, you can look on
12 the web, T.I.P., treat, image, projection.
13 The computer generates a bomb in the
14 computer screen from time to time to make
15 the examiner who is doing the scanning, to
16 pay attention to know that from time to time
17 there will be a bomb on the screen. So, if
18 the verifier don't encounter examples when
19 they're suppose to verify and they don't.
20 And they verify thousands and from the data
21 I have in many, many laboratories in the
22 U.S., thousands of ID's they may not verify
23 one or two, sometimes zero. Then trying to
24 show that it's not an ID it's not effective
25 because they have a habit, because it's like

1 a rubber stamp. They really trying the
2 first day, the second day, but they're smart
3 people, the brain learns not to pay
4 attention, like I showed you, I don't know
5 how many F's you counted, but probably most
6 of you didn't count six F's. And we pay
7 people money. We pay them in England a
8 pound, a dollar fifty to count every F and
9 it's legal to do it. The students are very
10 motivated and they can't count six F's
11 because the brain has a habit "of" and "a"
12 and that is not important and it skips, even
13 though they're very motivated. The same
14 with airport security and the same if, and
15 again, I don't about this case, if in this
16 case, if in this case of identification was
17 only of ID, the verifier knew, I'm getting a
18 pair of prints that were identified and I'm
19 verifying ID and the only verify ID, then
20 it's a problem. If they get verification of
21 ID, and one ID they don't know what the
22 first person has done, then it's not a
23 problem.

24 Q Now, would you agree that the working groups
25 and even the Office of Inspector General

1 when it came to verifying, suggests that
2 there be what you mentioned as placebos or
3 decoy fingerprints included in the package
4 where they're trying to make a real
5 identification?

6 A I can't recall which committee recommended
7 it or not but it's out there definitely as
8 the best practice suggestion. I can't
9 recall off the top of my head which
10 committee, which Expert Group adopted which
11 recommendation.

12 Q And I'm not certain you do know the answer
13 to this question, but has the Mass State
14 Police, to your knowledge, made any of the
15 changes that you and others had recommended
16 that the FBI made?

17 A I don't - - I can't testify as to whether
18 they did or did not.

19 Q Now, you were asked about small sample sizes
20 in your study. Is that a problem in the
21 manner in which you constructed your
22 studies?

23 A No. I said we conducted them with
24 statisticians who said how many participants
25 you have to run to have statistical power

1 and he said and that determined the number
2 of participants. And it's all done by
3 scientific measures. It's not I decided how
4 many there are going to be. It's all done
5 by scientific methodology. And as I said,
6 the scientific methodology is specified. It
7 doesn't say pick a good number of
8 participants, it's specified exactly what
9 you need to do. We followed that and
10 published the two studies in scientific peer
11 review, forensics journals. Some of my
12 studies I publish in brain and cognitive
13 journals but specifically to the forensic
14 community. But it's always good to collect
15 more data and have more participants. But
16 this study have been replicated and
17 collected more data by myself and other
18 researches.

19 I don't think there's any question in
20 the community today where the cognitive bias
21 exists. The question is when does it exist,
22 how powerful and does it effect the
23 decision-making and that it depends on the
24 specific case. And I can - - and I can tell
25 you on this case, was a cognitive bias, was

1 enable me to predict greater likelihood
2 whether they will make a mistake or not or
3 they're higher expert or not.

4 Q And I believe you did answer this already
5 but in terms of the certified examiners that
6 perform verifications. If the verifications
7 is just of something that they already know
8 is a match, is that problematic?

9 A As I've explained, yes. If they know it's
10 an ID and they know that in the vast
11 majority of cases, yes, they verify there's
12 no bomb in the suitcase. They get a brain
13 just takes it for granted because it's very
14 effective, as I've tried to explain earlier
15 today. So if they only verify ID and they
16 don't get decoys from time to time look like
17 non ID's to keep the brain engaged, then
18 that's a problem.

19 Q You were asked by Ms. Armour in whether or
20 not you and Ken Martin served on the same
21 Expert Working Group that was tasked with
22 improving or helping eliminate the human
23 influence in fingerprint identification. Do
24 you remember that line of questioning?

25 A Yes.

1 Q Sir, you were asked whether or not you had
2 reached some conclusions and I wanted to
3 give you an opportunity to testify to what
4 the conclusions were that that Working Group
5 reached?

6 A So, one conclusion has to do with some - -
7 the so-called scientific methodology, ACE-V,
8 and the committee - - and I'm talking about
9 what's published and agreed, state on Page
10 9, ACE-V designates a logical - -

11 MS. ARMOUR: Your Honor, objection once
12 again.

13 THE COURT: Let me hear the question
14 again, Mr. Swomley and I'll ask the witness
15 to try to answer that question.

16 BY MR. SWOMLEY

17 Q You were asked on cross-examination by Ms.
18 Armour about whether you and Mr. Martin
19 served on the Expert Working Group, working
20 on improving ACE-V and insulating against
21 human factor biases. Do you recall being
22 asked that line of questioning?

23 A Yes, I do.

24 Q And you were asked whether or not there were
25 results from that but you were not asked to

Day 28-140

1 give them. I am now asking you to give the
2 results from that Working Group of the ways
3 of improving ACE-V.

4 A So, the results are - -

5 MS. ARMOUR: Your Honor, objection.

6 THE COURT: If you need to read it sir,
7 you can. If you can just testify to it.

8 THE WITNESS: I prefer to read it to be
9 accurate what the committee decided and
10 agreed after a long discussion. They have
11 it written down.

12 THE COURT: All right, sir. Ladies and
13 gentlemen, this is an out-of-court statement
14 by a group, but the witness is familiar with
15 the groups recommendations.

16 BY MR. SWOMLEY

17 A So as per ACE-V they say on Page 9, "ACE-V
18 designates a logical sequence of complex
19 processes of judgment. But ACE-V itself
20 does not provide substantive guidance about
21 standards to be applied within the sequence.
22 Therefore, even the two examiners might both
23 assert, correctly, that they have used ACE-
24 V, they may be employing different cognitive
25 processes. This difference create

1 opportunity for human factors to come into
2 play.”

3 Then on Page 123, “ACE-V maps the steps
4 of a process but it does not provide
5 specific functional guidance, how to carry
6 out the process. Nor do they detail what
7 substantive contents or steps should be.
8 And the result the legal and scientific
9 literature contains assertion merely
10 following that steps of ACE-V does not imply
11 that one is proceeding in a scientific
12 manner.”

13 That’s about the ACE-V.

14 And about cognitive bias whether it’s an
15 issue or not.

16 MS. ARMOUR: Objection, your Honor.

17 THE COURT: I’m going to sustain the
18 objection at this point.

19 BY MR. SWOMLEY

20 Q Does ACE-V permit cognitive bias to intrude
21 in its processes?

22 A Depending on how you interpret it. If you
23 apply it by lineal sequential unmasking,
24 where you analyze, document and move as I
25 said, cognitive bias is minimal.

1 If you apply it like some people, when
2 you go back and forth, you know, as your
3 momma said, if you don't succeed, try and
4 try again, they don't find they go back to
5 the evidence and look again and do a
6 circular, then it introduces cognitive bias.
7 The problem that it doesn't specify that
8 ACE-V what to do. It's a general approach,
9 analyze, compare, evaluate but it doesn't
10 tell you how to do it. So, this approach
11 doesn't constitute the scientific method.
12 It could be and the community is working to
13 add specificity to make it. So it depends
14 how it was applied or not, and I don't know
15 in this case. Using it doesn't mean they
16 were bias. Using it doesn't mean they were
17 not bias because it doesn't tell you what
18 they did, except of the general sequence.

19 Q You were asked a bit about FBI study
20 determining, depending on how - - and you
21 said something about how you - - depending
22 upon how you define errors allows you to
23 understand whether that was - - something
24 about the study. I wanted to give you an
25 opportunity to describe how you would define

Day 28-143

1 errors and I think we were talking about the
2 FBI's blackbox study. So if you need to
3 contextualize, please.

4 THE COURT: Well, you may answer the
5 question of how you define errors, sir.

6 BY MR. SWOMLEY

7 A An error is very simply defined by making
8 the incorrect decision based on the
9 information available. If you only define
10 error as some, doing the forensic community
11 when you make an identification but not say
12 inconclusive, to have out of jail card, you
13 never make a mistake by saying inconclusive,
14 inconclusive. So in studies we try to
15 establish error rate and try to show they
16 have low error rate, in ten people, we're
17 trying to establish error rate. If you say
18 I didn't, it's incorrect, we've counted an
19 error. But if you say, I don't know, we
20 don't count it as an error. That makes them
21 not behave as they would in a real criminal
22 cases and then the error rates that we get
23 on the false positive is very, very low.

24 Q So, can I understand that what you do
25 differently than what the FBI does when it

1 studies itself is you only use examiners
2 that don't know they're being evaluated and
3 you use them when they think they are
4 actually doing a real fingerprint ID?

5 A In some of my studies, not in all of the
6 studies. In some studies it's irrelevant if
7 they know or not, like marking the minutia.
8 It depends on the study.

9 Q But you would agree that in no circumstance
10 does it make sense to tell the subjects of
11 your testing that they're being tested?

12 A No, I disagree. Sometimes it's useful. So,
13 if they can't perform when they know they're
14 being tested. If I cannot drive properly in
15 a driving test, I definitely can't drive
16 properly on the road. So studies like this
17 are important to know they can do it,
18 because if they can't do it when they know
19 they're being tested, they're definitely not
20 going to do it properly in real case. So
21 they have a value and I think it's good to
22 know that they have real expertise and they
23 can make good decision. How does that
24 transfer to real cases and are there
25 isolators from context because the FBI

Day 28-145

1 didn't give them context. If it's done
2 properly, then great. If it's not done
3 properly, then that can be a problem. So
4 the potential is very good depending what
5 has been done. And I don't know in this
6 case what context, if context they were
7 exposed to.

8 Q You testified, I believe, that the FBI
9 doesn't always do and you would agree
10 doesn't always need to do, blind reviews;
11 right?

12 A I think the FBI now started but I'm not sure
13 if they do blind verification of all the
14 decision.

15 Q Blind verification.

16 A I think they have started to do but they - -
17 I'm not sure about that. I'm confident, but
18 I'm a hundred percent sure they adopted the
19 lineal ACE-V, that they analyze the
20 fingerprint first. And analyze some
21 interpret because it's not a scientific
22 method, they analyze it, they look at it and
23 decide is there sufficient information for
24 comparison? That's what an analysis is.
25 Analyses is decide if there's sufficient and

Day 28-146

1 if there is you have to mark it. As I
2 explained earlier, you have to mark the
3 minutia before you exposed to the suspect.
4 And that is what the FBI have adopted to do.

5 Q And if blind reviews are needed, you would
6 be, in circumstances, where, for example,
7 there would be only one print that is being
8 used to inculcate someone?

9 A That is a discretion of the lab. Not
10 necessarily. Depends, as was mentioned
11 earlier when I was cross-examined in the
12 bias danger zone. One has to evaluate. Is
13 it a danger zone. If the evaluation, the
14 print, is clear, there's no context or
15 minimal context, then the chances of bias
16 are minimal. In the line we say, don't
17 bother necessarily doing blind. However, if
18 the quality is not very good and there's a
19 lot of information then you need to go to
20 the measures to isolate and give it to
21 another examiner. So one has to assess how
22 dangerous cognitive bias was in this case.
23 We see the fingerprints and the cross
24 domains what they do or what they didn't do
25 when they were making the comparisons. And

Day 28-147

1 I can't testify to that because I don't
2 know. It's a function of how much
3 information and how difficult. If the
4 decision was real easy, I wouldn't worry
5 about it so much. If the decision is
6 difficult, then you will get into a problem.

7 MR. SWOMLEY: Thank you. No further
8 questions.

9 THE COURT: Ms. Armour, anything
10 further?

11 RE-CROSS-EXAMINATION BY MS. ARMOUR:

12 Q Dr. Dror, when you were talking about
13 individual error rates, and you were saying
14 how you addressed a room of fingerprint
15 examiners who indicated that they did not
16 believe they had made any errors; is that
17 correct?

18 A I'm not sure I'm following you.

19 Q On redirect examination you had indicated
20 that you had spoken to a group of
21 fingerprint examiners who had indicated that
22 they believe they had not made any errors;
23 isn't that correct?

24 A Correct.

25 Q And isn't it because fingerprint examiners

1 whose work has been taken a look at and
2 independently evaluated may not have been
3 found to have any errors?

4 A No, I believe the main reason for that, the
5 difference in all the expert domain I work
6 in, the medical domain, when they amputate
7 somebody's leg incorrectly, they know about
8 it. When the Air Force pilot shoots a
9 friend, they know about it. In the forensic
10 domain they make a decision, it's verified,
11 because it's a criminal case we never
12 actually know if they've made a mistake or
13 not. We know that they all agree on the
14 decision but that doesn't mean it was a
15 correct decision. We don't have what we
16 call the ground tools. That's what we're
17 trying to develop data bases where we really
18 know who left the fingerprint. So, all
19 those examiners know, they made the
20 decision, another examiner says they were
21 correct. Maybe both of them were correct.
22 Maybe both of them wrong. Nobody can know
23 because we never know who left it at the
24 crime scene, that's your job, a very
25 difficult job.

1 Q But Dr. Dror, don't you agree in many cases
2 fingerprint examiners work have independent
3 reviews by whether it's defense experts or
4 independent laboratories, they are subject
5 to independent reviews?

6 A Not scientific reviews. If I forecast
7 tomorrow it's going to rain and other people
8 forecast or where they look at all my
9 calculations and they say, yes, correct,
10 yes, correct, but we never look outside the
11 next day, we don't know if it rained or it
12 was sunny. That's what they do. They can
13 say they followed the procedures, but they
14 never know if the decision was actually
15 correct because they never get feedback.
16 They never actually know. In other expert
17 domain they make a decision and you can know
18 if they were correct or not, you know. If
19 you do a mistake in diagnoses and the
20 patient dies and they mis-diagnose, they
21 know about it. Here, we know that an
22 examiner made an ID. We know that other
23 examiner said, oh, they did a good job. But
24 maybe both of them are wrong. We never know
25 who actually left the print, we only know

Day 28-150

1 they followed the methodology. The only way
2 to know it is a data base, which I've
3 developed where I - -

4 Q Dr. Dror, I'm just going to stop you right
5 there.

6 A Sorry.

7 Q Dr. Dror, you're making a huge assumption
8 here that every time a fingerprint examiner
9 gives their fingerprint to a verifier that
10 they're always verifying those fingerprints
11 and saying that there's a match?

12 A I, based on the data I have in forensic
13 crime laboratories all over the world,
14 including the United States, when they make
15 an ID the vast majority are verified,
16 absolutely. Maybe a - -

17 Q But that doesn't mean that their verifier
18 couldn't find a - -

19 MR. SWOMLEY: Objection. Can the
20 witness be allowed to - -

21 BY MS. ARMOUR

22 Q - - an error?

23 A In the literature - -

24 THE COURT: Overruled.

25 MR. SWOMLEY: - - answer the question.

1 THE COURT: Overruled.

2 BY MS. ARMOUR

3 Q That doesn't mean that there had been no
4 verifiers who ever saw an error in that
5 fingerprint then didn't move on?

6 A That verifier, in theory, could find an
7 error and in fact, because of what I've
8 talked like airport security, they verify
9 the vast majority of cases. It varies, I
10 don't know the Massachusetts Police, you can
11 ask, probably ninety-five, ninety-eight,
12 ninety-nine, maybe a hundred percent they
13 verify every year.

14 Q But you're really only seeing the
15 verifications of cases that become charged
16 and that cases that move on in other step.
17 You're not seeing the data on cases where
18 the verifier doesn't agree and they go back
19 and those cases aren't prosecuted?

20 A I do see those cases. They go to labs and
21 they share the data with me and I've seen in
22 many labs and what happens, if it's not
23 verified, and I'm happy to respond and tell
24 you what happens if you want to ask about
25 it.

Day 28-152

1 Q So, these fingerprint examiners that are
2 indicated that they've never been known to
3 have an error, if a verifier found an error,
4 they wouldn't be able to say that, would
5 they Dr. Dror?

6 A If an error was found, yes, but the fact
7 that it wasn't found doesn't mean they
8 didn't make an error.

9 Q That's understandable. But, if a
10 fingerprint examiner who had a print that
11 went to a technical review and a technical
12 reviewer disagreed, that would be an error?

13 A Most of the time what happens --

14 Q Dr. Dror I'm just asking --

15 A I'm answering your question.

16 Q Yes or no, would that be an error if a
17 technical reviewer --

18 MR. SWOMLEY: Objection.

19 BY MS. ARMOUR

20 Q -- found an error, wouldn't that be --

21 THE COURT: Overruled.

22 BY MS. ARMOUR

23 Q -- an error?

24 A Most of the time what happened in this case,
25 they don't call it an error, they say, look

1 it's probably an ID, but we are more
2 conservative, let's call inconclusive.
3 Rarely do they call it an error. What they
4 do is they say, let's agree that's it's
5 inconclusive, we couldn't agree on it and
6 I'm not saying you were wrong, but it's a
7 very, very difficult and I'm a bit more
8 conservative, so let's call it inconclusive
9 --

10 Q That's not --

11 A -- that's what they do in most of the cases.

12 Q Dr. Dror, so where a fingerprint examiner is
13 being somewhat conservative in saying
14 something is inconclusive, you're
15 considering that to be an error?

16 A If there is a match from a crime scene and
17 it's clearly a match and they're saying
18 conclusive, they're not making the right
19 decision it is an error, correct.

20 Q So that's simply an error. So you're not
21 only counting like times where you believe
22 there's been a false identification, but
23 where a fingerprint examiner is, you know,
24 coming up with an inconclusive, that's also
25 being counted in your error statistics?

1 A If they don't make the correct decision,
2 yes.

3 Q And that's even with complicated prints like
4 overlay prints?

5 A If it's inconclusive, the correct decision
6 is inconclusive. If the correct decision is
7 a match, it's a match. If they make the
8 wrong decision it's an error regardless of
9 how difficult it is. The question is, what
10 is the correct decision given the data
11 available.

12 Q So, this sort of increases your error rates
13 because you're including inconclusives in
14 your errors?

15 A Yes. And even more by false exclusion.
16 They also make false exclusions, sometimes
17 they say it's not a match when it was
18 inconclusive or a match. I'm including
19 every time the scientist looked at the data
20 and the evidence and doesn't draw the
21 correct decision.

22 Q So your error rate isn't just for
23 identifications that were mistakes, it's
24 actual, it's comprised, error rates are
25 comprise of a bunch of inconclusives or

Day 28-155

1 places where fingerprint examiners are not
2 making matches?

3 A It includes where they make a wrong decision
4 and not only when they make wrong ID's,
5 correct.

6 Q So it's not like these numbers are inflated
7 for wrong ID's, so your numbers are not
8 related to wrong ID's, it's including all
9 this information?

10 A It's broken down, but yes, I include all of
11 them and the wrong ID's the smaller the
12 wrong inconclusive, in case you --

13 Q It's smaller?

14 A Yes.

15 Q So that's a very small percentage of your
16 error rate?

17 A It is much smaller, yes. Mistake of wrong
18 ID are smaller than mistaken wrong
19 inconclusive.

20 Q So that's why you can say that fingerprint
21 examinations are very reliable?

22 A Yes.

23 Q And you're not saying that you're testifying
24 in this case because you believe our
25 laboratory is not addressing the issues of

Day 28-156

1 cognitive bias within our laboratory?

2 A Correct. And I don't know the details, but
3 if I had to guess, they're probably advanced
4 in this area. I don't know the specific
5 case because Ken is there. I believe
6 they're probably thinking about it. What
7 they're doing it or not, I don't know.

8 Q Because Kenneth Martin, who is no longer at
9 the laboratory, but at the time he was at
10 the laboratory was at the time of this case,
11 he was involved in the Working Groups in
12 developing protocols for the lab?

13 A Yes. I hold the lab in high regard.

14 Q And they even came, some of our people from
15 our laboratory even came to hear you talk
16 when you were in Boston; isn't that right?

17 A I even came to the lab and gave a talk. And
18 I didn't charge them any money.

19 Q You didn't charge --

20 A I gave them a free talk, I think four years
21 ago or five years, I don't remember.

22 MS. ARMOUR: Nothing further.

23 THE COURT: All right. Ladies and
24 gentlemen of the jury, does any member of
25 the jury have a question for the witness?

Day 28-157

1 All right, counsel, let me see you
2 please at side bar.

3 SIDE BAR CONFERENCE

4 THE COURT: Counsel, from Juror Number
5 3, "Hearing an interview of a suspect, would
6 there be a bias if the interview was not
7 recorded and we're left to reference the
8 investigators notes?"

9 Did we have such a situation here,
10 folks?

11 MR. SWOMLEY: I think we did, yes.

12 MS. ARMOUR: Not regarding any
13 defendant's interview. The station was
14 recorded and Alex interview was recorded, so
15 I don't know what they're referring to.

16 MR. SWOMLEY: Alex's wife interview was
17 not recorded. And there were a number of
18 interviews that were not recorded in this
19 case.

20 THE COURT: Well, I'm not going to ask
21 that question. The witness has not spoken
22 about interview.

23 MR. SWOMLEY: Your Honor, he's spoken
24 about cognitive bias, your Honor --

25 THE COURT: Well, I'm on to that, Mr.

1 Swomley.

2 MR. SWOMLEY: -- and he's quite well
3 versed about it, regardless of whether it's
4 enumerated. That's a forensic interview,
5 your Honor, so it is forensic scientist. So
6 I would ask that you ask it.

7 THE COURT: From Juror Number 8.

8 "Can you please summerize the findings
9 of research studies to date about the error
10 rate in fingerprint identification when
11 examiners are not isolated from information
12 that is irrelevant to their experiment -- to
13 their examination?"

14 "And, how would your cautions about
15 cognitive bias apply to the construction of
16 photo arrays of potential suspects in
17 showing those arrays to an eyewitness for
18 identification purposes?"

19 I'm also reluctant to ask that question.
20 We have not had an ID from anyone based on
21 photo array and that's a whole other lengthy
22 chapter of bias. The questions were
23 relating to fingerprints and DNA evidence in
24 this case.

25 Let me just be sure I've got all of

1 these.

2 END SIDE BAR CONFERENCE

3 THE COURT: Do I have all the questions,
4 ladies and gentlemen? One more coming.

5 SIDE BAR CONFERENCE

6 MR. SWOMLEY: It is, however, something
7 that was the subject of cross-examination of
8 the witnesses that did put together the
9 photo arrays, your Honor, in terms of where
10 --

11 THE COURT: But to what end? There was
12 no ID.

13 MR. SWOMLEY: I get that. And he's an
14 expert on the subject and --

15 THE COURT: Well, yes, I'm certain that
16 he is.

17 From Juror Number 12, "Do you have a
18 guess for an error rate for an ID from a
19 single print using ACE-V, whatever that
20 acronym is?" I'm not going to ask him about
21 an error rate from a single print.

22 I'll return that to you Margaret.

23 From Juror Number 14, "Does or did the
24 number of marks of minutia at all influence
25 the rate of error between some reviewers in

Day 28-160

1 your study, ie: more marks or less marks
2 result in a higher or lower number of
3 errors?" I'll ask that question.

4 I'm going to ask him to testify briefly
5 about cognitive bias and photo arrays but
6 with an emphasize on brief.

7 Likewise with respect to not recording
8 interviews of suspect's.

9 And what suspects interview was never
10 recorded?

11 MR. SWOMLEY: Tommy Joyce was not
12 recorded. Wayne Callender.

13 THE COURT: I'm not clear that he was a
14 suspect.

15 MR. SWOMLEY: John Rooney was not
16 recorded for a huge hunk of the interview
17 that took place in his house.

18 MS. ARMOUR: They haven't even gotten
19 that information yet.

20 THE COURT: I'm sorry?

21 MS. ARMOUR: They haven't even gotten
22 that information yet. That witness hasn't
23 even testified.

24 THE COURT: Okay. I'm going to go from
25 there, folks.

1 END SIDE BAR CONFERENCE

2 (Questions from jurors marked as
3 Exhibit RRRRR for Identification)

4 THE COURT: Sir, I have some questions
5 for you from our jury and I'll ask of them
6 of you and you may respond to the jurors
7 questions to the jury, please.

8 THE WITNESS: How many questions are
9 there?

10 THE COURT: I haven't counted them up,
11 but we won't keep you too long.

12 THE WITNESS: Okay.

13 THE COURT: First, can you please
14 summerize the findings of research studies
15 to date about the error rate in fingerprint
16 identification when examiners are not
17 isolated from information that is irrelevant
18 to their examination?

19 THE WITNESS: First of all, excellent
20 question. Very good question. And every
21 answer will be an estimate and I cannot put
22 a number on that. It's estimate and in some
23 cases it would depend on the case, I would
24 say zero point zero, zero, zero, zero, zero,
25 zero, one, I would never say zero. In other

Day 28-162

1 cases, it can be much more. That's for you
2 to consider given the strength and the
3 evidence and the context. How difficult the
4 decision was and what context was available.
5 So it's very hard.

6 I can say that every decision is more
7 difficult to make. It's more borderline and
8 there's more context, then we getting into
9 bigger trouble. Every decision is clearer
10 if there's less information, you're on more
11 solid ground. If the variance is big and I
12 can't even estimate it. So it's a great
13 question and --

14 THE COURT: Okay.

15 THE WITNESS: -- maybe in the future.

16 THE COURT: Thank you, sir.

17 Would you just describe what the acronym
18 ACE-V stands for, please.

19 THE WITNESS: A, analysis, C is
20 comparison, E is evaluation and the V is
21 verification.

22 THE COURT: And just briefly, Doctor,
23 would your cautions about cognitive bias
24 apply to how a photo array of a potential
25 suspect is constructed and shown to a

1 witness for identification?

2 THE WITNESS: Absolutely. Huge area of
3 research. A lot of data. How it's presented
4 sequentially or parallel, a lot of critical
5 issues are around that. Absolutely.

6 THE COURT: And similarly, sir, is there
7 a potential for bias if instead of recording
8 an interview of a suspect, there is only
9 reference to notes of an investigator?

10 THE WITNESS: Yes.

11 THE COURT: I'm sorry?

12 THE WITNESS: Yes.

13 THE COURT: Okay. Thank you, sir.

14 And do you have an opinion, sir, whether
15 the number of marks of minutia influence the
16 rate of error among reviewers in your study,
17 that is to say, would more or fewer marks
18 result in a higher or lower number of errors?
19 And I'm happy to repeat that.

20 THE WITNESS: I heard you.

21 THE COURT: You have it? Okay.

22 THE WITNESS: Again, a very complicated
23 question and I prefer not to answer because I
24 need to think about and to talk for a long
25 time. It's very complicated because

Day 28-164

1 sometimes once they decided in their mind
2 it's a match, they look for more and more
3 minutia. So they inflate it. But sometimes
4 they can't find it, it's a smaller number, so
5 the bottom line, no correlation. I would not
6 draw any conclusion by the number of minutia
7 if high or low to the fact that it may be
8 more susceptible to error. But it's in there
9 and one day we'll understand, but right now
10 to you I would say, I would not take that as
11 a sign for error or no error, or bias or no
12 bias.

13 THE COURT: Sir, thank you.

14 Let me just give counsel one further
15 opportunity.

16 Mr. Swomley?

17 MR. SWOMLEY: No questions. Thank you.

18 THE COURT: And Ms. Armour.

19 MS. ARMOUR: Just briefly.

20 FURTHER RECROSS-EXAMINATION BY MS. ARMOUR:

21 Q So, where an eyewitness has not made an
22 identification in a particular photographic
23 array, does that sort of demonstrate that was
24 a less bias photographic array?

25 THE COURT: I think that calls for

Day 28-165

1 speculation, Ms. Armour. I think I will
2 sustain my own objection to that question.

3 Doctor, thank you for your testimony,
4 sir. Please watch your step on your left-
5 hand side.

6 THE WITNESS: Thank you.

7 WITNESS STEPS DOWN

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Day 28-166

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