

1 MR. KASPER: The first witness is William  
2 Kronenberger, who is one of the state's --

3 THE COURT: Is he here?

4 MR. KASPER: Yes.

5 THE COURT: Is there a motion to exclude witnesses or  
6 is there not a motion to exclude witnesses?

7 MR. SMITH: There is no motion from us. They are all  
8 experts, your Honor.

9 THE COURT: So nobody is asking me to do that, okay.  
10 So we will start with Dr. Kronenberger.

11 The first thing I have to do is get water. Come on up  
12 here.

13 (Brief interruption.)

14 THE COURT: Go ahead.

15 WILLIAM G. KRONENBERGER, DEFENDANTS' WITNESS, DULY SWORN

16 DIRECT EXAMINATION

17 BY MS. LIU:

18 Q Good morning, Dr. Kronenberger. Could you state your name  
19 for the full record?

20 Could you state your full name for the record, please?

21 A My name is William George Kronenberger.  
22 K-r-o-n-e-n-b-e-r-g-e-r.

23 THE COURT: Keep your voice up. Even though there is  
24 a microphone, pretend there's not one.

25 BY MS. LIU:

1 Q Could you give us a brief history of your educational  
2 background?

3 A Yes. I have a bachelor's degree in psychology from Xavier  
4 University. I have a master's degree in clinical psychology  
5 from Duke University where I was a James B. Duke Fellow.

6 I have a PhD in clinical psychology from Duke  
7 University as well.

8 Q Do you have any training in any specialty area of  
9 psychology?

10 A Yes. I am trained in pediatric psychology, which is the  
11 study of children's essentially biology and illness and how  
12 that interfaces with behavior in children.

13 Q Do you have any particular training in any other areas of  
14 psychology?

15 A Well, I did complete an internship as a part of my  
16 training, which is -- it is not didactic schooling per se, but  
17 you go and you do a practical on-site training. As part of  
18 that internship, I did rotations in pediatric psychology and in  
19 neuropsychology.

20 As part of my training in pediatric psychology in  
21 graduate school at Duke University, I also did rotations in  
22 child clinical psychology and neuropsychology in hospital  
23 settings and in pediatric psychology hospital settings.

24 Q Dr. Kronenberger, where do you presently work?

25 A I am --

1 MS. LIU: These are all documents that either have  
2 been attached to his declaration, including the declaration, or  
3 part of the pleadings.

4 THE COURT: Okay. Is there any objection to the use  
5 of any of those? Fine.

6 MS. LIU: May I approach the witness, your Honor?

7 THE COURT: That's fine. No need to ask. Just go  
8 ahead and do it.

9 BY MS. LIU:

10 Q Dr. Kronenberger, I'm handing you what's been marked as  
11 Defendants' Exhibit Number 1. Would you take a look at the  
12 document and let me know if you've seen this before?

13 A Yes. This is my declaration.

14 Q Could you identify for the record what it is?

15 A This is my declaration, and there's attachments in the  
16 back, and I can't say whether they were -- I assume they were  
17 part of my declaration before

18 THE COURT: They were.

19 BY THE WITNESS:

20 A And should I check to see if all of the key articles are  
21 here or -- I mean, it looks like it's the key articles that are  
22 here.

23 BY MS. LIU:

24 Q Now, you mentioned that there's some articles attached or  
25 presentations. Can you just identify for the record what those

1 into the emotional area because there had also been writing and  
2 research about aggression in emotional areas -- I should say  
3 areas of the brain that were associated with emotional  
4 functioning.

5 Phase three is experimental study where -- I can talk  
6 about that.

7 Q Now, you were involved in the design of -- let's talk about  
8 phase one. Let's start with phase one.

9 A Okay.

10 Q You were involved in the design of the study?

11 A Yes.

12 Q How did your team select subjects?

13 A We advertised widely. We wanted to get a broad set of  
14 subjects. We received numerous phone calls, probably in the  
15 low one hundreds. We do a screening process, and the screening  
16 process is to make sure that they meet criteria that we set for  
17 study entry.

18 So, probably most relevant was we wanted to look at  
19 two clinical groups in phase one. One was again this DBD group  
20 which I've talked about before, disruptive behavior disorder.  
21 So, these are kids with either oppositional defiant disorder or  
22 conduct disorder, which I described earlier. But we also  
23 required that they have what was called aggressive features,  
24 and this was one of, I forget, seven or nine criteria that are  
25 specified in conduct disorder that we identified as being

1 reflecting aggression. So, we had that group. They had to  
2 have the DBD diagnosis and the aggressive feature.

3 The other group was the control group, and that group  
4 had to have no diagnosis using the Diagnostic and Statistical  
5 Manual that's used in psychiatry. It's called the DSM-IV. So,  
6 they had to have no diagnosis and no visit to a mental health  
7 professional in the past three years. So, those were our two  
8 groups.

9 When people called in, we screened them for one or the  
10 other, and, as a result, some got screened out, and there's  
11 other reasons. They don't need screening. Sometimes when they  
12 find out the time demands of the study, they say no. We ended  
13 up with 71 participants that actually showed up for a visit.  
14 It was a two-visit protocol. We ended up with 71 that showed  
15 up for visit one.

16 Q How do you screen for this DBD group in your subject  
17 selection?

18 A Well, there's a two-stage process. When we say screening,  
19 what we mean is they call in on the phone, and we hate to have  
20 them drive all the way down to find out that they can't  
21 participate in the study. So, there's a very brief screen that  
22 takes place on the phone. We don't really use that in our  
23 research. That's more for the convenience of the subject.

24 Then when they come down, we establish the diagnosis  
25 of -- we look at three diagnoses very carefully, ADHD, conduct

1 disorder, and oppositional defiant disorder, and we use a  
2 measure called the Kiddie SADS, which is -- it's called a  
3 semistructured diagnostic interview. It's K-i-d-d-i-e S-A-D-S.  
4 Actually, K-SADS is another abbreviation for it, which may be  
5 easier.

6 The Kiddie SADS essentially takes the diagnostic  
7 criteria in the diagnostic manual and operationalizes them so  
8 that the individual who's making the diagnosis, they will make  
9 a highly reliable diagnosis. And Kiddie SADS is considered a  
10 gold standard of diagnosis. For example, Kiddie SADS is used  
11 in studies when you're looking at disorders and in medication  
12 and you're submitting them to the FDA. So, it's considered a  
13 high standard.

14 For all other diagnostic criteria besides ADHD,  
15 conduct disorder, and oppositional defiant disorder, we used a  
16 questionnaire that essentially has many other criteria from  
17 many other disorders, and then when the parents finish  
18 completing that questionnaire saying whether they were present  
19 or absent, if there were patterns where they said things were  
20 present or absent, then we sat down and conducted more of an  
21 unstructured clinical interview with them in order to establish  
22 whether their report on the questionnaire seemed to fit. So,  
23 that was for the other diagnosis.

24 Q Now, during the selection process for your subjects, do you  
25 control or match for any particular variables?

1 A Yes. Well, in phase one and -- well, actually, I believe  
2 in all of our studies thus far we have matched for age plus or  
3 minus two years, IQ plus or minus a half standard of deviation,  
4 which works out to about seven or eight IQ points, and gender,  
5 and we match our DBD and control groups on that so that there  
6 is not a systematic difference between the DBD and control  
7 group.

8 So, as a result, only though 71 might show up at our  
9 door at visit one, the amount we use in analysis might be lower  
10 because we can't be confident -- of course, you can't know  
11 ahead of time that everybody's going to have a match.

12 Q Do you have to make any assumptions about the subjects that  
13 you're selecting?

14 A Assumptions.

15 Q About the control group or the DBD group related to your  
16 research.

17 THE COURT: He's wondering what you're looking for.  
18 So, be more specific.

19 BY MS. LIU:

20 Q Do you need to make any assumptions about why you would use  
21 the DBD group for this research?

22 A Well, the reason that we sampled it, yeah. We're doing  
23 high versus low media violence exposure, so the questions were  
24 why use the DBD group. The reason we're doing the DBD group is  
25 if you remember our logic of progressing from media violence

1 exposure, aggressive behavior, and brain functioning, we wanted  
2 a group that had that aggressive disruptive behavior so we  
3 could look at them in the context of the brain functioning  
4 studies, as well. There's not a lot of literature out there on  
5 fMRI and aggressive adolescents, and so we felt like it was  
6 important to include that sample in our research. You know, we  
7 also wanted to look at -- we also wanted to see whether  
8 aggressive history made any difference in terms of our  
9 findings.

10 Q Now, how do you measure media violence exposure in this  
11 experiment?

12 A We have a measure called the MEM, the media exposure  
13 member, M-E-M, and the MEM -- it's a complex measure, but it  
14 boils down to essentially six scores that you get at the end  
15 point. I should say as long as you all understand that we're  
16 simplifying here. But there's six scores. There's a measure  
17 of television violence exposure reported by the adolescent in  
18 the past week, and we do that by literally taking the  
19 adolescent through their past week and asking them exactly  
20 which television shows they watched, asking them what they saw  
21 on the television shows in terms of different kinds of violence  
22 and injury and things like that.

23 We do a similar thing with video games over the past  
24 week from the report of the adolescents. You have television  
25 past week adolescent report, video game past week adolescent



1 report. Then we ask the adolescents to make an estimate of the  
2 past year. So, in general how many hours of television do you  
3 watch during the week in the past year. Then we go through the  
4 same kind of steps with like the levels of injury or violence  
5 on television in the past year. So, then you get an adolescent  
6 estimate past year report. You do the same thing with video  
7 games. You get an adolescent past year video game.

8 And then we go to the parents, and we ask them for the  
9 past year how much violence their adolescent has been exposed  
10 to in television, in video game from the parents' perspective.  
11 So, you get six measures. Television past week adolescent,  
12 video game past week adolescent, television past year  
13 adolescent, video game past year adolescent, television past  
14 year parents, video game past year parents. So, you have these  
15 six indexes. Oh, I should say the reason we don't do past week  
16 parent is the past week thing, remember, is like a daily diary,  
17 and parents simply don't have that level of knowledge about  
18 what their adolescent is doing every minute.

19 Then what we did is we looked at do these -- assuming  
20 that there is this thing called media violence exposure, there  
21 should be some correlation between some of these, and we used a  
22 technique called factor analysis and looked at how well these  
23 six things hung together, and what we found was that five of  
24 them hung together fairly well, well enough for us to add them  
25 together. A sixth one, parent report of adolescent television

1 violence exposure during the past year did not hang together  
2 with the first five sufficiently well for us to include it on  
3 the media violence measure.

4 I know it's a long explanation, but since it's kind of  
5 our measure of media violence, it's kind of important to know.  
6 So, it's those six things, but not the sixth, not the parent  
7 television violence exposure. So, we add together the five to  
8 get a media violence exposure index.

9 And then in our fMRI studies what we do is we go one  
10 step further and we divide the adolescents into high and low  
11 media violence exposure by essentially just cutting right down  
12 the middle. Anybody above is high. Anybody below is low.  
13 Mostly that's for convenience of the fMRI results.

14 In the neurocognitive study, which is the Kronenberger  
15 one, the statistics that I run, I can just use the media  
16 violence exposure index as a continuum, just exactly as we add  
17 it together and calculate it.

18 Q So, you mentioned you use the MEM, the violence index for  
19 fMRI when you're doing scanning, and you also use it in the  
20 neurocognitive testing?

21 A Right. We used it as our measure of media violence  
22 exposure. We don't do it in the fMRI, but yeah. I mean, we  
23 don't do it in the scanner. You know what I'm saying.

24 Q What are the tasks that you use in the fMRI scanning?

25 A In phase one, which again phase one you can think of more

1 as our phase where we tended to look at frontal lobe  
2 functioning and anterior cingulate functioning. In phase one  
3 we used what's called a counting Stroop in the scanner, and I  
4 described the Stroop color-word before where the interference  
5 is between the words you read and the color of ink that the  
6 word is printed in. Well, in the scanner we opted to use  
7 what's called a counting Stroop, which has been used by other  
8 people, too, but -- or versions of it have been used by other  
9 people.

10 THE COURT: Say again. A counting --

11 THE WITNESS: Counting Stroop.

12 BY THE WITNESS:

13 A So, you still try to get the interference, but --

14 THE COURT: Stroop.

15 THE WITNESS: Stroop. It's not a great -- Stroop  
16 basically means you kind of -- it's easier to do one thing, but  
17 you got to hold back and do the other. So, it's easier to read  
18 the word, but you got to hold back and do the color.

19 THE COURT: Okay.

20 BY THE WITNESS:

21 A The counting Stroop what happens is you might see -- the  
22 stimulus might be one, one, one, the numeral one three times,  
23 and you have to push a button corresponding to three. And then  
24 it might be two. So, the numeral two, but it's only one time.  
25 You have to push a button corresponding to one.

1           The easier task, obviously, when you see a numeral is  
2           just to name the numeral, but in the counting Stroop, in the  
3           key part of the task, what happens is you have to push the  
4           button that's for the harder thing to do, which is say the  
5           number of numerals that you see.

6           THE COURT: How many times you've seen it, in other  
7           words.

8           THE WITNESS: Well, it's how many numerals are there.  
9           So, if it's two, two, two, the answer is three, not two.

10          THE COURT: Got it.

11          BY THE WITNESS:

12          A    And what you'll find is some subjects will hit two because,  
13          you know, that's kind of like "Two. Oh, sorry," you know.  
14          "That was a mistake." Because again the easier response is the  
15          numeral identification. So, we use the counting Stroop.

16                As an aside, the reason we use the counting Stroop in  
17          the scanner is people are pretty good at identifying one, two,  
18          and three with certain fingers, but red, green, and blue don't  
19          go with fingers quite as easily. It's not that you can't do it  
20          in the scanner, but it's not as intuitive, and our concern was  
21          that we would get other patterns of brain activation that might  
22          interfere with our results a bit. You can still do it, but,  
23          anyway, we like the counting Stroop better.

24                So, that was one of our measures that we used, and  
25          that was what was used in the Matthews study. What we used in

1 the Wang study, which was a presentation -- and I should say  
2 I'm calling them different studies, but you're talking about  
3 the same project.

4 BY MS. LIU:

5 Q We're still on phase one.

6 A Phase one.

7 In the Wang study it was a little bit different. We  
8 used a comparison of two video game -- simulated video game  
9 play, basically. We couldn't have the subjects play the video  
10 game in the scanner because of the technology. You can't have  
11 metal, you know, in a real powerful magnetic field. It  
12 interferes with the magnet, and it can be dangerous. And so,  
13 they've made some joysticks that you can get in there, but we  
14 weren't comfortable and actually at the time we ran this data  
15 may not have even had them yet. So, we tried to find the best  
16 way we could to simulate video game play.

17 The other thing that we wanted to make sure happened  
18 was that everybody did the same video game while they were in  
19 the scanner. Of course, the only way to do that is to have  
20 some videotape that you run. So, when I call it video game  
21 play, I should clarify. I hate to make mistakes or be inexact.  
22 I really don't mean video game play. I mean simulated video  
23 game play. It wasn't just video game watching because what we  
24 told them was you're going to see a video in the scanner, and  
25 it's either going to be a James Bond video game, which is a

1 first person shooter game where you go through these kind of  
2 hallways and you shoot people, and or it's going to be a car  
3 racing game, which is kind of a competitive racing game. And  
4 we told them we want you to watch it, but we also want you to  
5 simulate play. We want you to push a button if you want to  
6 shoot. We want you to push a right or left button if you want  
7 to turn. Again, I freely acknowledge that, you know, it's  
8 simulation and not actual play. On the other hand, the fact  
9 that we had them doing something we felt was more accurate than  
10 just having them watch the video game play. So, that was the  
11 Wang study.

12 And what we did was we subtracted out the activation  
13 during the James Bond game from the activation during the car  
14 racing game because otherwise you end up with -- you know, you  
15 don't know if it's video games in general or whatever. You try  
16 to match them as closely as you can.

17 I should say in the Stroop task you do the same thing.  
18 So, even though you have the one, one, one or two, two, you  
19 have a subtraction task where -- because they also have to  
20 watch or push buttons, you have a subtraction task, and for  
21 that it's just X, X or X, X, X. So, there are no numerals, but  
22 they're just responding to the number.

23 THE COURT: Pause for a second.

24 THE WITNESS: I'm sorry.

25 THE COURT: When you say in the scanner, what does

1 this equipment look like? Physically what's it like?

2 THE WITNESS: It looks just like an MRI. So, it's a  
3 tube.

4 THE COURT: It's a tube.

5 THE WITNESS: They lay down on a -- kind of a moving  
6 table. Different fMRIs are done different ways. In our fMRI,  
7 they have like a prism where we can show things on a computer  
8 screen and -- a mirror, you know, and they can see it on the  
9 mirror, and then we watch the computer screen so we can, you  
10 know, make sure that the task is actually going on. And then  
11 there's like this -- their hand is down, and it's on like a pad  
12 where they can push buttons.

13 THE COURT: So, in other words, the person is prone,  
14 as they would be in a normal MRI test.

15 THE WITNESS: Absolutely.

16 THE COURT: And what they're seeing, they're seeing it  
17 on a mirror that's reflecting a computer screen, and they've  
18 got some sort of a keypad at their hand that they're using to  
19 push as you described.

20 THE WITNESS: That's exactly what happens. And while  
21 the -- I mean, it is an MRI. There's like computer programming  
22 and physics, and this is why I work with a team.

23 THE COURT: I just wondered if it was a different type  
24 of device altogether. Okay. Go ahead.

25 BY MS. LIU:

1 Q So, in your MRI study, what are you looking for when you're  
2 scanning the brain?

3 A So, we wanted to look at two things in phase one. As a  
4 first part of our studies, looked at differences between the  
5 control group and the disruptive behavior disorder group to see  
6 if we were getting differences in brain activation between a  
7 group that was known not to have aggressive behavior and a  
8 group that was known to have persistent aggressive behavior,  
9 and we looked in candidate brain regions that we had identified  
10 based on our earlier understanding, and in phase one those  
11 candidate brain regions were the dorsolateral prefrontal cortex  
12 and the anterior cingulate cortex. If it's too inconvenient,  
13 I'll spell them out every time, but DLPFC is dorsolateral  
14 prefrontal cortex, and ACC is anterior cingulate cortex.

15 So, we compared control and DBD groups on their  
16 activation in those regions. And I should say if I say  
17 functioning, what I mean is activation. This is essentially  
18 based on that blood oxygen level thing that I talked about  
19 before.

20 So, you have these two groups. You're comparing them  
21 on their functioning. You have these candidate regions that  
22 have been shown in other studies of aggression and brain  
23 functioning to be potentially important areas associated with  
24 differences between groups.

25



1           Then the second level of differences is high versus  
2 low media violence exposure. So first we look at control  
3 versus DBD to help us understand the brain regions. Then we  
4 look at high versus low media violence exposure.

5 Q   Why are you choosing the dorsolateral prefrontal cortex and  
6 the anterior cingulate cortex?

7 A   There are two regions -- two reasons.

8           One reason is that individuals who have summarized the  
9 literature on brain functioning and aggressive and violent  
10 behavior have said the prefrontal cortex, including the  
11 anterior cingulate cortex, is an important region of the brain  
12 in this type of behavior. It tends to be associated --  
13 actually lower activation or deficits or injuries to that  
14 region tend to be associated with aggressive or violent  
15 behavior.

16           They also identify some regions that they think are  
17 more related to emotional functioning or anger. Now, that  
18 wasn't the purpose of phase one, but I can talk about that when  
19 we get to phase two.

20           So the prefrontal cortex is a large area. The  
21 anterior cingulate cortex, you know, is an area. And then you  
22 design, you know, tasks that you think your subjects can do and  
23 that you think are good tasks for them to do in the scanner and  
24 that relate to the real world.

25           So we chose the Stroop because it had been widely

1 used, it related to real world behavior, you know, and we knew  
2 from prior study that the Stroop tended to result in  
3 activations of the anterior cingulate cortex and a subregion of  
4 the prefrontal cortex called the DLPFC. Now, there are other  
5 regions of the prefrontal cortex, but we did not expect -- this  
6 is based --

7           Actually I do mean we, the team, did not expect based  
8 on our experience that we would see activation broadly outside  
9 of the dorsolateral prefrontal cortex and the anterior  
10 cingulate cortex. So those were our regions of interest within  
11 the broader prefrontal cortex.

12 Q   If we just look at what the results from the published  
13 finding under the Matthews 2005 article were, can you tell me  
14 what were the findings?

15 A   Yes. In Matthews 2005, and, again, that was the study that  
16 used the counting Stroop, when we did the first comparison of  
17 controls compared to DBDs, we found activation of the anterior  
18 cingulate cortex, the ACC, and activation of the left  
19 dorsolateral prefrontal cortex in the control group.

20           In the dorsolateral prefrontal cortex, the key areas  
21 there are the middle frontal gyrus and the inferior frontal  
22 gyrus. These are two key areas of the dorsolateral prefrontal  
23 cortex. So you have the dorsolateral prefrontal cortex and  
24 then subareas, the middle frontal gyrus, inferior frontal  
25 gyrus. That was in the controls.

1 In the DBD group, we did not find the anterior  
2 cingulate activation. We found activation on both sides of the  
3 brain bilaterally of the middle frontal gyrus. So this is a  
4 part of the dorsolateral prefrontal cortex.

5 Now, based on prior research and our expectations, our  
6 interpretation of that was that the control sample showed  
7 increased activation in the anterior cingulate cortex and in  
8 certain important regions of the dorsolateral prefrontal  
9 cortex; namely, the inferior frontal gyrus that was different  
10 from the DBD group.

11 So then we looked at high versus low media violence  
12 exposure. In that article really our focus was on -- we  
13 decided to focus on control, the control sample with high  
14 versus low media violence exposure. There are a few reasons  
15 for that.

16 Actually we also did look at all high versus all low  
17 media violence exposure, but if you look at all high and all  
18 low media violence exposure, while it is an important  
19 comparison, in your low media violence exposure group, you are  
20 going to have some kids that have DBDs and are aggressive. So  
21 you have -- you just have to be aware that you have got kind of  
22 a mix of people there.

23 If you use your control sample, you know that you have  
24 an all nonDBD group. Then you can compare high and low media  
25 violence exposure within the control group. When we did that,

1 we found that the low media violence exposure control group  
2 showed activation in the anterior cingulate cortex, ACC, and  
3 the left inferior frontal gyrus, that part of the dorsolateral  
4 prefrontal cortex.

5 That matched up to a large extent the increased act-  
6 -- or the activation of the anterior cingulate cortex and the  
7 activation of the left inferior frontal gyrus matched up with  
8 what we had seen in controls and we didn't see that in DBDs.

9 When we then turned our attention and looked at the  
10 controls with high media violence exposure, we found that they  
11 showed activation in the left middle frontal gyrus. Again,  
12 that is a part of the dorsolateral prefrontal cortex, but it's  
13 the part also that we saw activation in the DBD sample.

14 So in terms of -- you know, you start a study, you  
15 have your expectations, your candidate areas, you're looking.  
16 You might get exactly what you expect and you might have some  
17 deviations.

18 And so to kind of characterize it, where do we get  
19 exactly what we expected? Anterior cingulate cortex, we found  
20 low media violence exposure and controls associated with  
21 anterior cingulate cortex activation. That was consistent with  
22 that line of reasoning that I talked about.

23 We also found for a key region of the dorsolateral  
24 prefrontal cortex; namely, the inferior frontal gyrus -- we  
25 found low media violence exposure and controls associated with

1 your studies with your IU research team.

2 A Correct.

3 Q Can you describe what the hypothesis that you set out to  
4 test in that phase was?

5 A Yes. I alluded to these -- our literature view and  
6 background knowledge had -- we had looked at media violence  
7 exposure and aggressive behavior and then aggressive behavior  
8 and brain functioning and looking at the parts of brain  
9 functioning that were associated with aggressive behavior. The  
10 parts of brain functioning that were associated with aggressive  
11 behavior, one group had been the prefrontal cortex that we had  
12 looked at in phase one.

13 The other group of structures were brain structures  
14 that had been hypothesized and it had been suggested that they  
15 were associated with emotional functioning and in particular  
16 what we call threat arousal stimuli. And these parts of the  
17 brain have been grouped under the name limbic system,  
18 l-i-m-b-i-c, system.

19 And the particular area that has been talked about  
20 quite a bit is the amygdala, a-m-y-g-d-a-l-a.

21 And the amygdala has been talked about as sort of a  
22 threat processing or as important in threat processing. And  
23 there is research that shows amygdala activation in situations  
24 that involve threat or when stimuli are presented that involve  
25 fear or distress or negative emotion. So we wanted to look at

1 those regions of the brain.

2 In order to do that, we developed a paradigm called  
3 emotional Stroop. So here we have Stroop again, but this one  
4 is different. In emotional Stroop, we have the colors, okay,  
5 and unlike counting Stroop where we had an easy way to do  
6 numbers, we had to go to colors at this point.

7 In emotional Stroop we had colors, and there were  
8 words that were printed in different colors. And in the  
9 activation part, or the part that we were looking at, the words  
10 were things that involved aggression or harm, things like hit,  
11 kill, murder, rape, so words that would connote that.

12 In the --

13 Now, remember, you always subtract out a control  
14 condition from the -- so they are still doing color naming, but  
15 the control condition was verbs that were not aggressive: run,  
16 jump, things like that. So in one part of the test they would  
17 have these aggressive words, and in the other part of the test,  
18 they would have these nonaggressive verbs. Their task was to  
19 say what color of ink the word was printed in.

20 And our expectation was that because those aggressive  
21 words would involve aggression, threat, that we would see  
22 activation in the limbic system and, again, in particular the  
23 amygdala.

24 Now, I should say this is phase two. So this is a new  
25 sample. Everything that I have been talking about up until now

1 was phase one. In phase two we recruited a whole new sample of  
2 adolescents. Essentially the DBD control, the recruitment  
3 procedure, et cetera, for all intents and purposes was the  
4 same, but we are doing emotional tasks. When we did the  
5 emotional Stroop in the scanner, what we found --

6 And, again, remember you start with comparing control  
7 and DBD. We found that the control group showed activation of  
8 the anterior cingulate cortex, and I believe also the  
9 dorsolateral prefrontal cortex. The DBD group showed increased  
10 activation of the amygdala.

11 Actually I have been talking about so many studies, if  
12 you don't mind, I am going to refer to this just to keep me on  
13 point, if that is all right.

14 Do I need to say the Matthews study?

15 Q Just for the record, you know, which?

16 A I am looking in my declaration at the back here where --

17 Q Are you referring --

18 A I am sorry, Kalnin.

19 Q The Kalnin 2005 paper?

20 A Yes.

21 Q It's attached to your declaration.

22 A And this is a paper presentation out of phase two, right.

23 So the first comparison, again, controls and DBDs.  
24 The DBDs show more activation in the amygdala which, again, is  
25 one of those limbic, l-i-m-b-i-c, system structures, and the

1 parahippocampal, p-a-r-a-h-i-p-p-o-c-a-m-p-a-l, gyrus, which is  
2 another structure that I believe is part of the limbic system.  
3 My interest was more in the amygdala.

4           Individuals with high media violence exposure when  
5 they did those tasks also showed activation of the  
6 parahippocampal gyrus and the amygdala, and individuals with  
7 low media violence exposure did not. They showed dorsolateral  
8 prefrontal cortex activation.

9 Q Now, even though --

10 A I do have to say, as I look at this, I don't see Kalnin  
11 reporting the ACC and DLPFC activation in the control group on  
12 this presentation. So I may be going from recollections of our  
13 discussions or I may be in error. I believe he has submitted  
14 his own declaration that people can refer to to see what he  
15 says.

16 Q Does this emotional Stroop task, in particular phase two  
17 test, are these results consistent with any of the phase one  
18 findings even though it is a different paradigm?

19 A In terms of the fact that the individuals with high media  
20 violence exposure showed a pattern of brain functioning -- a  
21 pattern of brain activation, I should say, in amygdala and  
22 parahippocampal gyrus regions that was similar, the high media  
23 violence exposure and the DBD groups showed similarities there.

24           Remember, that was a pattern of similarities that we  
25 had also seen in our phase one studies. I think it is



1 important to remember that this is sort of the -- one of the  
2 kind of down-the-line results that you look at. It is not like  
3 we just kind of took brains and said, wherever they are  
4 similar, that's what we are going to say.

5 Remember, this is built on a mountain of other  
6 research and theory that had us looking in certain candidate  
7 brain regions that were associated with certain things. And  
8 people were saying, you know, when you do this certain task,  
9 you get activation of this certain brain region, not just some,  
10 well, we are going to look generally within the brain and  
11 wherever they both show activation. So there is a progression  
12 from the literature to a theory to then actually looking at the  
13 brain functioning.

14 Q Now, you indicate that there has been support or literature  
15 for the fact that there is certain activation in an area when  
16 you look at that brain area and associate with a task. Is that  
17 exclusive of all other areas that could be activated?

18 A No. When I say "certain," what I mean is a long time ago,  
19 there was this discussion about whether, you know, different  
20 brain areas can have certain functions or whether the whole  
21 brain was involved in everything.

22 And what I am saying is that there is a certain task  
23 that you do in the scanner, and then you look at a certain  
24 brain area for activation, and you choose that brain area based  
25 on a theory. And then you have this theory, and then you look